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# PRACTICAL Fishkeeping

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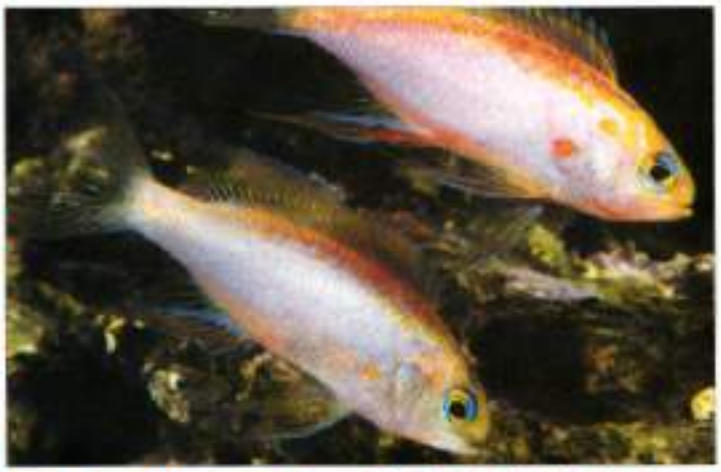

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■ PRACTICAL FISHKEEPING,
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*Top: Longfin Anthias - see page 70.*
*Left: Cuckoo Catfish - see page 8.*
*Below: Red Shiners - see page 114.*

● *Cover shows a Dwarf Gourami. Pic by Max Gibbs, The Goldfish Bowl, Oxford.*

## MARINES



## REVIEWS



## NEWS & OPINION



## PONDS



## COMPETITION



**At 41,604 (THIRD SUCCESSIVE RECORD ABC) Britain's best-selling fishkeeping magazine**

PRACTICAL FISHKEEPING

**How does a nine-year-old get the best advice when setting up a new tank? BERNARD BARTON and his son ROBIN were the test bed. IAN LUCAS went along to guide them through those tricky questions.**

*Right: No-one can tell you what fish to buy - that's a personal choice. But if you chose unwisely Paul would advise you to think again.*

# Right at the start

Robin Barton had been asking his dad, Bernard, about setting up a tropical aquarium, and when they saw *PFK's* beginners' series it gave them the final incentive to begin. When visiting local aquatic shops the Bartons had come across Fintastic, of Darwen Lancs, where they were impressed with proprietor Paul Eyles' forthright manner, and willingness to give his time and knowledge to his customers.

There is more than one possible approach to setting up a tank but Paul's advice was generally similar to ours.

I joined the Bartons on the day they returned to Fintastic to make their purchases.

## Siting the tank

The original site for the tank was on the fireplace, lit by a window. Unfortunately the heat from the electric fire, and the sunlight from the window could lead to problems - with overheating and algal growths.

A more suitable location was in the dining area adjoining the lounge, which might also allow a larger tank.

As the conditions in a large tank are more stable, Robin would find it easier to learn about keeping his fish, and should be able to sort out any problems before they become disasters.

A tank 36" x 12" x 18" high was chosen, holding about 25 gallons - over twice as much water as a 24" x 12" x 12" tank but not much more expensive.

## Equipment choice

Robin liked the idea of a planted tank, for the fish's benefit, the natural look, and the educational aspect.

His undergravel filter, therefore was best powered by an air pump rather than powerheads. When the undergravel is matured the flow through it will be reduced a little and a small internal power filter added, to give a 'belt and braces' filtration system.

Robin's mum, Shirley, likes peace and quiet in the lounge - at least sometimes - so a large

# – FIRST FOR BEGINNERS

Paul Eyles discussing the choice of airpump with Bernard and Robin Barton.

A good dealer stocks a wide range of small, colourful, peaceful fish ideal for the beginner's community tank.

Bernard's original idea was for a 24" tank next to the fire, but our series made him think again.

At the left of the dining alcove is a more suitable location - after a door stop has been fitted to stop the door knocking the tank.

Selecting dogwood and other decor can be as much fun as choosing your fish.

powerful pump with a regulator was chosen. The noise of the pump can be reduced by reducing the output using the regulator, giving a quieter result than a small pump running flat out.

The fluorescent tube was fitted with a reflector to get the maximum possible light to the bottom of the tank which, at 18", is deeper than many, and should look very impressive when planted.

## Decor

We chose two nice pieces of bogwood for decor at this stage, as they would need soaking before use. Plants would be chosen and added later, when the tank was set up, running, and settled down.

After another settling period the first fish would be introduced, a few at a time. Robin is considering various tetras, a pair of Dwarf Gouramis and some Corydoras catfish to begin with. Although fond of Angelfish he realises that they would grow big enough to eat many of the other fish he likes, like Neon Tetras. When the fishkeeping bug really takes hold of the family, I suspect another tank for Angels and a few other larger fish will find its way into the house.

## Odds and ends

After leaving Fintastic, a visit to a local DIY store turned up some floor protectors for the aquarium stand to rest on, protecting the polished wood flooring.

Some mains flex and a plug were also needed to connect the cable tidy to the nearby wall socket, and a hook from which to suspend the air pump. Hanging the pump on strong elastic is an additional way of reducing the noise, as well as locating it above the tank's water level for safety. If the pump is below the water level, a one-way valve in the airline is a wise precaution.

Another detail to be purchased was a small doorstop, as the final location for the tank is behind a door, which could otherwise bump into the stand.

Robin's first job was to well wash half a hundredweight of gravel following Paul's advice to wash small amounts at a time. The tank was washed out too, and placed on a layer of polystyrene on the stand.

In went the filter plate, followed by a thin layer of filter matting. This was to prevent the fine gravel from finding its way through the undergravel plate. Coarser gravel would not need it, but fine gravel is easier for plants to grow their roots through.

The tank was gently filled, but not to the top - there would be a danger of slopping water over the floor when adding the bogwood and plants. The bogwood went into a bucket of water to soak out any discolouration, and to waterlog it so that it sinks.


*Above: Home again, and it's time to assemble all the equipment we bought into a living picture.*

*Right: Silver Sharks and Kissing Gouramis grow too large for the ordinary community tank - as a good dealer will tell you.*

*Below left: This is Robin's tank, and he's keen to understand how everything works.*

## Patience needed

A week later the bogwood was ready for use. The heater had been adjusted to give a temperature of 76°F, and the filter was bubbling away nicely.

It was time to plant the tank. To begin with Robin used Amazon Swords, Water Wisteria, Java Fern and Pygmy Chain Swords, as these are quite hardy plants which should thrive and give him confidence to try some other kinds later on.

Pygmy Chain Swords are low-growing, and were used in the foreground, and Java Fern grows attached to bogwood. To allow it to get established Robin temporarily tied it in place with fishing line.

After another week Robin introduced his first fish - five Neon Tetras.

To finish, I will remind you of something which Paul Eyles regrets he cannot sell in his shop - although we both agree it is indispensable when setting up a tank for fish: **patience.** ■

**■ THE EDITOR SAYS**

**If you're planning to set up a second or third tank, and would like a helping hand when you do, please get in touch. We've looking for more features of this type and in return we'll offer free "expert" advice.**

# The Right Mix

**It's not always easy to get a compatible mixture of fish and plants which are geographically sound. This month sees the start of a new series to help you do just that. We begin with the lagoons of Central America.**

The rivers and streams of Central America have virtually no plant life, as the current is too strong for them to survive. But in more stagnant areas, such as the lagoons, where there's very little water movement, plants grow in abundance. These include both submerged species, like *Myriophyllum* and *Cabomba* as well as surface plants, such as *Salvinia* and the Water Hyacinth, *Eichhornia crassipes*.

The water in these lagoons is generally fairly alkaline, with a hardness of 5-15°dH. In the aquarium, aim for a pH of 7.2-7.6 and a temperature of between 77-79°F. There shouldn't be too much water movement and plants will resent this, so avoid large, powerful filters and powerheads. An air-powered sponge filter or small, internal power filter will be adequate, so long as you stick to a proper maintenance regime and are not tempted to overstock. Don't add an air diffuser, if you intend to grow Cabomba, as they tend to interfere with its growth. All the plants listed below require bright lighting.

The best decor for this type of tank consists of wood and a few rocks. Substrate can be either aquarium sand or, if you prefer, gravel.

Cabomba caroliniana.

## Suitable plants

**Cabomba** ***(Cabomba caroliniana)*** In the aquarium Cabomba can reach 24" in height, although it may double this in the wild. Bright lighting for this species is particularly essential, as without it the plant will become straggly and yellow in colour. Air stones will inhibit its growth.

**Water Hyacinth** ***(Eichhornia crassipes)*** A large growing surface plant which is only suited to bigger tanks, where it grows very rapidly. It provides refuge for fish and fry in its trailing roots. This species needs strong lighting to flourish. The Water Hyacinth is not native only to Central America - it has a worldwide distribution. The condensation tray should be angled so that any drops of water fall away from the leaves.

**Spiked Milfoil** ***(Myriophyllum spicatum)*** This species of *Myriophyllum* is one of the most robust. It will stand very high temperatures and hard, alkaline water. It looks at its best if the stems are kept trimmed, which makes it more compact.

**Hornwort** ***(Ceratophyllum demersum)*** The Hornwort has a worldwide distribution, so it's suitable for most set-ups. The stem has no actual roots. It reproduces readily by runners and soon becomes established.

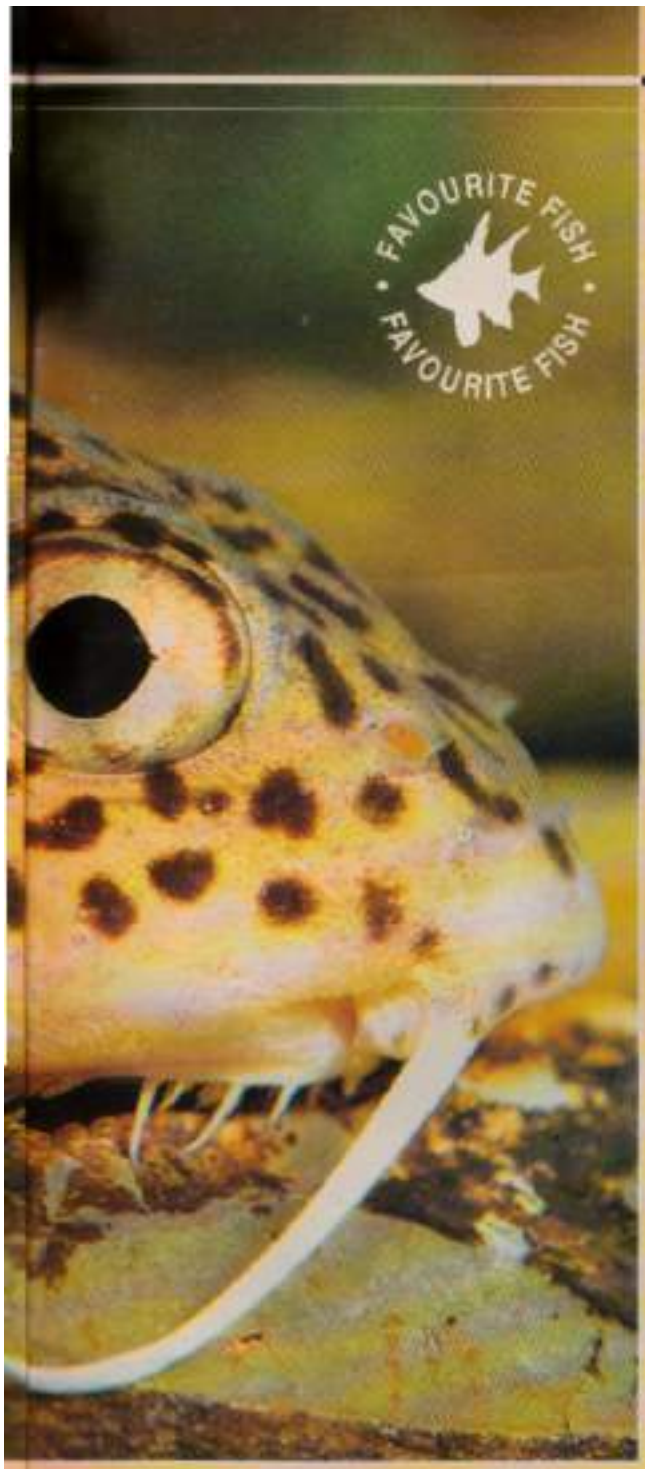
**Butterfly Fern** ***(Salvinia auriculata)*** This surface plant is made up of three leaves. One pair float on the top of the water while a third hangs below to act as a root. *Salvinia* spreads quickly so take care that it doesn't block out the light from the plants below. Tilt the condensation tray at one end to prevent the water droplets from falling on the leaves and spoiling them. ■

Above: Salvinia auriculata. Top: Eichhornia crassipes has a worldwide distribution, but requires a large tank. *All pics by Max Gibbs, The Goldfish Bowl, Oxford.*

## Suitable fish

**Some of the most popular aquarium fish come from Central America. These include Swordtails, Platies and Guppies. You could add also add Rainbow Cichlids (Herotilapia multispinosa) to this set up. These cichlids are quite peaceful, reaching only 4" or so in size and they are fairly easy to breed, spawning on rocks or wood. If you'd like to include a catfish in your set-up, then try Sturisoma aureum, which is one of the many species commonly referred to as "Twig" Catfish. This one grows to just 6½".**

Above: Synodontis multipunctatus fits well into a large Rift Valley set-up. Right: S. multipunctatus leaves its eggs in the care of unsuspecting mouthbrooding cichlids.
Pics: Max Gibbs, The Goldfish Bowl, Oxford.




# The Cuckoo Catfish

**This month we look at a catfish with an unusual spawning technique.**

The Many-Spotted Catfish, *Synodontis multipunctatus* is a firm favourite among catfish enthusiasts. It comes from Lake Tanganyika which makes it ideal for inclusion in African Rift Valley Cichlid set-ups.

The body pattern is golden brown and the fish is marked with chocolate coloured spots which may vary considerably between individuals. The caudal, dorsal and pectoral fins are marked with darker stripes. Small specimens are sometimes confused with *Synodontis petricolor*. Males are smaller than females, reaching only 8" compared to 10" in the ladies.

This catfish exhibits an usual form of "parental care", not dissimilar to that of the cuckoo - which is infamous for laying its eggs in the nests of other birds and leaving them to be hatched and raised by the involuntary "foster-parents". In the case of *Synodontis multipunctatus*, it swims in and out among mouth-brooding cichlids which are in the throes of spawning and releases its eggs at the same time as the cichlid, whose eggs it often devours. When the mouthbrooder picks up her eggs she gathers up the *Synodontis* eggs with them which she incubates inside her mouth along with her own fry until they are released as tiny replicas of their natural parents - possibly after preying on the cichlid fry while they are inside her mouth. This school of thought emerges from the low numbers of cichlid fry which are found in the mouths of cichlids which are incubating the *Synodontis*. It has been suggested that spawning in *Synodontis multipunctatus* may be triggered by the pheromones which are produced during the activity of the cichlids, whereas other *Synodontis* species spawn in the rain and flood seasons.

These catfish have been bred in captivity in tanks containing African Rift Valley cichlids, although there have been one or two reports of them scattering their eggs in the substrate in the usual *Synodontis* fashion when no cichlids were present.

Diet in the wild consists of snails, crustaceans and insect larvae. In the aquarium they will take frozen and freeze-dried foods, such as Tubifex, bloodworm, shrimp and brine shrimp, along with flake and tablet foods. They should be offered a little greenstuff in the form of blanched lettuce or spinach on an occasional basis (ie. once a week).

*Synodontis multipunctatus* is a peaceful species, which can be kept either on its own or as a group of three or more if you have a very large tank. Two specimens tend to be more likely to fight than small groups.

In keeping with other Tanganyikan species, they require clean, well filtered water with alkaline conditions and a temperature of 72-79°F. The pH should be 7.6-8.5 with a hardness of 6-10°dH. Make sure the tank is furnished with plenty of rockwork to provide them with cover. Plants are not necessary and aren't a natural occurrence in Lake Tanganyika, but if you *do* feel you want plant life in your tank, try Java Fern and Anubias. ■

**MANY-SPOTTED CATFISH *Synodontis multipunctatus***

**Family:** Mochokidae
**Environment:** Rift Valley community set-up
**Tank position:** Bottom
**Temperature:** 72-79°F
**Distribution:** Lake Tanganyika
**Size:** Males 8"; females 10".
**Diet:** Flake and tablet foods, freeze dried and frozen bloodworm, gamma shrimp and brine shrimp. Occasional feeds of blanched lettuce or spinach.

# A Pe

**Anyone familiar with Peacock Gobies will know there is very little information available on them. FRANK FREEMAN had to start from scratch.**

Top: Both fish display all finnage when breeding. The male is to the front.
Main picture: The female takes a breather. Note her closed finnage.
Above: The male leads the female into the cave to inspect it as a nesting site.
Right: The happy couple. Both fish in the nest between bouts of "showing".

As these fish are rather shy, the tank needs to be densely planted to provide them with plenty of cover.

# eacock's Tale

I recently set up a tank specifically to try to breed the attractive little Peacock Goby, *Tateurndina ocellicauda*.

None of the dealers I spoke to felt confident enough to sex Peacock Gobies, so I purchased seven fish from three different dealers.

Basing my decisions on body shape and colouration I thought I had four males and three females.

## The set-up

I put them into a 24" x 12" x 12" (10 gallon) tank, kept at a constant 78°F. The tank was filtered using the undergravel method, with an Aquaclear powerhead. A small bag of zeolite was used for three days, every two weeks to keep ammonia in check. Lighting was a 15W Grolux tube, with an Interpet reflector.

The tank was very densely planted, with lots of hiding places for these shy fish. Some pieces of ¾" diameter pipe were half-buried in the gravel for the fish to use as nesting sites.

They were fed on frozen European Bloodworm and frozen *Daphnia*, supplemented with live Bloodworm and Brineshrimp.

## Success - and disappointment

After the fish had settled in for a few days, one that I had thought to be a male showed signs of filling with eggs, and developed a bright yellow patch on her belly.

The largest of the males began to court her. This took the form of fin display - first by him, then by her. After a day or so, they started to inspect the half-buried ¾" plastic pipes I had provided as caves. One of these was chosen as a nest site, and the fish carefully excavated until there was an entrance at each end.

The fish took up residence, and the male immediately started pushing the female against the side of the pipe and wriggling against her as she laid her eggs, which he then fertilised. I could see about 45 eggs in all.

The male then chased the female from the nest, and stood guard. He continued to chase the female away, sometimes forcefully. I can only assume she tried once too often to enter the nest, as the female died during the night. I suggest you keep an eye on breeding pairs and be ready to move the female out if things get rough.

Soon another pair began to lay eggs in another pipe. The male started to bully the female, so I removed her to another tank - better to be safe than sorry.

With hindsight, I would recommend only one breeding pair to a tank, or the other fish are constantly being chased away from one nest or another.

## Hatching

The male parent, having chased away the female, spent most of his time in the nest, swishing about to ensure a constant flow of oxygenated water over the eggs.

The eggs were clear for the first two or three days, after which the developing fish were clearly visible inside.

The eggs began to hatch after about seven days, and the transparent fry were about 2mm long.

I found it best to suspend the tube containing the eggs in a net near the spraybar of the filter. This ensures good circulation over the eggs.

I moved the eggs as soon as the embryo could be seen inside. I found that it was vital to keep them under water when moving them after I had experienced problems with eggs which were accidentally exposed to air which probably dried them out.

Once the fry hatched I moved them into a tank of their own.

## The fry tank

My fry tank holds a gallon of mature water from the parents' tank. It is filtered by an undergravel, powered by an airstone. Temperature is a constant 78°F to match the main tank. A brine shrimp hatcher is suspended in one corner.

*Frank Freeman with his breeding set-up*

## The tank

**Size** - 24" x 12" x 12" (10 gals).
**Temperature** - 78°F.
**Hardness and pH** - straight from the tap.
**Filtration** - undergravel, via an Aquaclear powerhead. Zeolite is used for three days, every two weeks.
**Lighting** - 15W Grolux tube, with Interpet reflector.
**Planting** - dense, with lots of hiding places.
**Nesting sites** - ¾" pipe half-buried in the gravel.

I feed the fry on Liquifry No1 for the first week, and from the second week onwards they have both Liquifry and newly-hatched brine shrimp.

## Two months on

I now have two males and three females, which give me one brood a week. Brood sizes are now around 60-70 eggs.

I have come to an arrangement for local dealers to have the fry when they are big enough. ■

**I would particularly like to thank Steve and Frank at Hertfordshire Fisheries for their help, advice and encouragement.**

**I would be happy to correspond with any readers interested in Peacock Gobies, please send SAE to: Frank Freeman, 146 Bishops Rise, Hatfield, Herts AL10 9QB.**

# Practical Fishkeeping's A to Z OF FISH HEALTH

**This month Jerzy Gawor's A to Z reaches G, and covers a couple of nasty parasites and Gas Bubble Disease.**

*The removal of excess weed can guard against gas bubble disease.*

## G

### Gas bubble disease (gas embolism)

This is not a fish-disease in the true sense of the word. It is not caused by a pathogenic (disease causing) organism - bacteria, parasite, virus or fungus. It is in fact a purely physical problem associated with excessive amounts of gas (usually atmospheric oxygen and nitrogen) dissolved in the water in which the fish finds itself, be that an aquarium, pond or indeed lake. However the situation is potentially lethal to fish, who find themselves in a similar situation to those human divers experiencing the bends!

The symptoms are usually quite acute and can be seen with the unaided eye. Tiny gas-bubbles are present - under the skin, in the fins, behind the eye (causing pop-eye), in the blood capillaries, gills and internally. Affected fish usually swim erratically and die fairly rapidly. Those that do survive often do poorly as brain tissue is often damaged. The eye is often found to contain gas bubbles which damage the cornea. Fish thus affected are invariably blinded.

#### KEY FACTS

**There are three main ways that water can become supersaturated with excessive amounts of atmospheric gases.**

- **Through a leak in a recirculatory system, especially where high power water-pumps are used. Always ensure your pipes and fittings are soundly installed. Never allow a water pump to suck in air if it feeds a long length of pipework to a system of tanks or ponds. There is a real danger of super-saturation of the water. I have personal experience of such a catastrophe. The venturi outlets on pond-pumps/systems and aquarium powerheads are quite safe as indeed are air pumps.**
- **Never fill a warm aquarium or pond with particularly cold water. Cold water can hold a higher percentage of dissolved gases which, when suddenly warmed by the water in the aquarium or pond, will be released and cause supersaturation. Result - gas bubble disease in the fish.**
- **High levels of algae or even 'oxygenating weed' in a pond on a hot, sunny day can cause supersaturation with oxygen produced by the plants during photosynthesis. Removal of excess weed and filtration/aeration is the long term answer to this problem.**

### Gills

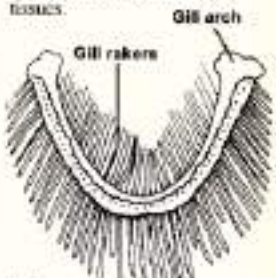
Probably the most delicate organ of the fish's anatomy and yet one that is open directly to water and all the potential pollutants, pathogens and hazards that water can contain.

The gills have two main functions:

- To absorb oxygen and oxygenate the blood system.
- To excrete waste products, including carbon dioxide and ammonia.

The mechanics of gill function are simple yet effective. In ideal conditions where the surrounding water is high in oxygen and low in carbon dioxide the gases move across the gill membrane (oxygen in, carbon dioxide out) to put the gas equilibrium into balance between the inside of the gill and the outside.

In a similar way the fish rids its system of ammonia, the primary waste product from its conversion of food into body tissues.




*Gill - probably the most delicate organ of the fish's body.*

#### KEY FACTS

- **We as fishkeepers should take every precaution to ensure that the fish's gills are not stressed or damaged in any way, either through rough handling or poor water quality.**
- **If gill damage does occur it is often the first site of activity for parasites and bacteria, and remedial action must be swift in order to prevent excess damage.**

## Glochidia

These nasty little 'parasites' are often found nestling in, feeding on, and damaging the gills in your pond (or coldwater aquarium) fish but only if you have introduced Swan Mussels into your system. *Glochidia* are the larvae (young stages) of Swan Mussels, which, when released in their thousands by the adults during breeding, must find a 'host' fish upon which to settle, or they will die.

Unfortunately gill damage to the fish is often the result, allowing secondary infection by all manner of parasites, bacteria and fungi.

*Breeding need Swan Mussels to breed – but Swan Mussels can also make parasitic use of a host. Pic: Kim Taylor, Bruce Coleman Ltd*

### KEY FACTS

- **My advice is to resist the impulse to buy Swan Mussels for your pond (you won't see them anyway), and get rid of any you may already have. Build a separate pond if you really must have Swan Mussels in your garden!**
- **Do not be misled by anyone telling you that Swan Mussels will filter your pond. True, they are filter-feeders, but not in the sense of turning a dirty, unmaintained, pea-soup pond crystal clear.**

## Gyrodactylus

I have probably seen this skin fluke parasite on more fish in my laboratory studies than any other pathogen. Almost invariably where fish (especially pond fish) are showing problem symptoms, *Gyrodactylus* is involved. It is a particularly nasty parasite because it can be so difficult to eradicate once it has multiplied and affected your system.

Typical symptoms of the early stages of a skin fluke infestation are persistent flashing and scratching of the fish against anything that's handy, including the sides of the pond or aquarium, rocks, gravel, plants and ornaments. This is an attempt by the fish to dislodge the offending parasites, but of course where many hundreds of flukes can be involved this is really futile. On the other hand one wonders whether the fish obtains temporary relief from the irritation by having a scratch? Does anyone know?

Secondary symptoms soon appear if treatment is not given. These are:

- Reddening of skin and fins
- Very apparent blood vessels appearing at the skin surface
- Excessive mucus production, giving the fish a greyish, shiny appearance and feel,
- Fins held close to the body
- General listless appearance
- Gulping at the surface as the gills become clogged by mucus

If you have been unable to detect the early symptoms and the disease has progressed (very common with ponds where fish can easily hide or where water clarity is poor) you will have to catch all the affected fish and treat them in a salt bath. This not only clears away the excessive mucus, but also kills many of the parasites associated with a fluke infestation i.e. White-spot, *Trichodina*, *Costia* and *Chilodonella*. The salt itself, even at high dose (5%) in my experience, has little effect on the flukes other than to weaken their hold on the fish. Therefore once the fish have been salt-bathed and returned to the pond (or aquarium) an anti-fluke remedy should be added.

Check on salt tolerance of your fish especially some of the more delicate catfish before treating.

I have found freshwater dips for Marine fish effective at clearing flukes from infected fish. Five minutes treatment in a fresh water bath (N.B. this must be dechlorinated, well aerated and adjusted to within 0.2 pH units of the aquarium water using pH adjuster or sodium bicarbonate and an accurate pH kit/meter) will cause the flukes to release their hold and drop off the fish. Marine fish will actually tolerate up to 15 minutes in freshwater, but such excess is not required. ■

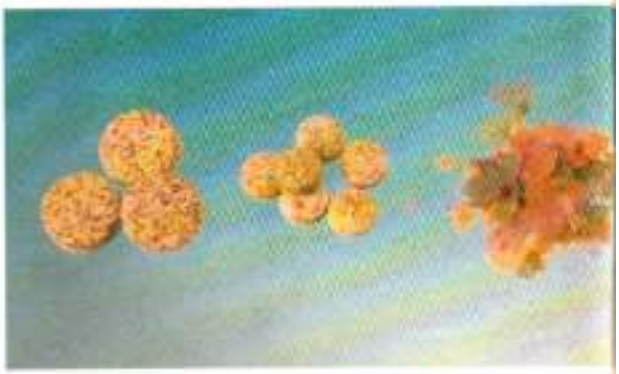
### KEY FACTS

- **Treat with a proprietary medication as soon as symptoms appear i.e. persistent scratching.**
- **Do not wait for secondary symptoms as tissue damage will have already occurred.**
- **If the disease has progressed treat the fish in a 'salt-bath'.**

■ **Jerry Gower is a Chartered Biologist, Member of the Institute of Biology and Member of the Institute of Fisheries Management. He has been involved in the Aquatic industry for over fifteen years and runs his own Aquatic Consultancy Practice - Aquality. If you have any queries, questions or criticisms to put to Jerry please contact him c/o Practical Fishkeeping enclosing an SAE. All correspondence will be answered personally.**

PRACTICAL FISHKEEPING

**In September we showed you how to set up a simple tank as we continued our beginners' series. We have looked at the maintenance required to keep your water quality ideal for your fish. This month IAN LUCAS looks at their other major requirement - food.**



# A fir in

*Daphnia will survive for long periods in your tank.*

*River Shrimp will be taken by most fish over 4" long.*

*Bloodworm may need treating to avoid disease problems.*

When all is said and done flake foods are excellent as a staple diet.

They are made of the kind of ingredients that wild fish eat - insects, shrimps, meat, fish, and algae are among the usual list.

The majority of popular community fish will survive very happily on this diet. But there are exceptions which have specialised needs - while all fish seem to benefit from a bit of variety now and then.

## Exceptions

Flake food floats on the water's surface, which suits most of our fish. Some prefer to feed from the tank bottom, or the mid-water level, however, and if we do not cater for these fish they may find all the food gets eaten before any sinks down to them.

■ Sinking pellets are available in a range of sizes to suit fish like Cichlids. The smaller grades are best for the kind of Cichlids that suit community tanks - Kribensis, Keyholes and so on. If your mid-water fish do not seem to get to the food, try a sinking variety.

■ Catfish including the popular Corydoras species, generally eat food from the substrate. The old idea of catfish surviving on the left-over flakes which sink to the bottom to rot is no longer good enough. Provide a sinking food specially for your catfish. Tablet foods are ideal for them, and again these come in a range of sizes. Also the larger tablets can be broken up for smaller fish.

■ Mollies, Guppies and barbs are among the common community fish which really need a higher proportion of vegetable matter in their diet than average fish.

Many suppliers produce a vegetarian flake variety, or you can use peas, lettuce or spinach. Any of these vegetables should be briefly blanched to soften them - even lettuce which we normally eat raw. Suckermouth catfish, such as Plecs will also appreciate some greens to supplement the algae they find in the tank.

■ Nocturnal or crepuscular (evening-time) fish may miss out on the food if you do not give them their rations just before lights out. Other fish are best not fed at this time, as the food may be left uneaten.

– FIRST FOR BEGINNERS

From left to right: Large tablets; small tablets; 'predator' flake; 'growth flake'; large floating pellets; sinking stick food (vegetarian algae and brine shrimp); small floating pellets; and fry foods.

# st course feeding

■ Shy fish may also miss out in the hustle and bustle of community feeding. In this case, try feeding at one end of the tank and then, while the bolder fish are busy, feed the timid ones at the other end.

## Treats

Many fishkeepers like to give their fish live foods. Others claim it is unnecessary. Most fish can certainly be kept healthy without live foods, but they do seem to enjoy them! Although prepared foods are very good there is a feeling that there may be some advantage to live foods in that their vitamins, minerals and so on have not been affected by any processing. On the other hand, prepared foods offer a balanced diet which would not be available from just two or three kinds of live food.

The best diet for your fish is almost certainly a staple diet of prepared food, supplemented with regular treats of live food, say, once a week.

Frozen foods of the same types that are fed alive are also popular with many fishkeepers and their fish. These are generally irradiated to ensure sterility

Live foods can be purchased from your aquatic dealer, cultured at home, or caught from the wild.

## How much to feed

Remember that any traces of uneaten food will decompose in your tank and foul the water. Your filter can deal with the waste products of the fish, but you should not expect it to also cope with additional and unnecessary pollution. ▶

Lettuce and cucumber will quickly be eaten in most tanks.

## HOW MUCH IS A PINCH?

"Feed a pinch of flake" – but just how much is that? Better to feed small amounts at regular intervals.

*Large earthworms will need chopping before feeding. If you have the stomach for it minced worms make a wonderful fry food!*

The amount of food to give your fish, then is no more than they will eat. After a few minutes dried food becomes soggy and loses its appeal, so the rule becomes: **feed no more than the fish will eat in five minutes.**

Any foods left uneaten must be removed after this time.

Live foods from freshwater will survive in the tank for a while, but the conditions that suit your fish may not suit them, and they will die and decompose, so do not overfeed with live food either. That said, your fish will appreciate a good feed of, say, Daphnia, and enjoy chasing them for quite a long time, so the quantity is a little less critical than with prepared food.

Lettuce for vegetarian fish can be left in the tank for several hours, allowing them to browse, which is what they would do in nature. Remove it before it starts to break up, though.

Many fishkeepers feed their fish just once a day, but this is very different to the ideal situation. In nature small fish are constantly looking for food, and will eat small amounts whenever they find them. This is the situation their digestive system has evolved to cope with, and we should try to approximate this in the aquarium if possible.

With work and other commitments, it is not often possible to feed several times a day, but if you can feed twice or three times a day this will be appreciated by your fish. Each time you feed, remember: **only as much as they will eat in five minutes.**

Children love to feed the fish, but you must make sure they understand the importance of giving the right amount. If younger children want to feed your fish it's usually best to measure out the correct amount for them.

## Holidays

Holidays cause a lot of worry for novice fishkeepers. There is no need to worry, though, as most fish can survive a fortnight without being fed. They will find tiny plants and animals in the tank to help, but immature fish often have to go for periods without food. One or two holidays a year, of a week or fortnight each will not be a problem.

Getting a friend to feed the fish seems like a good idea, but after you have learned the discipline to only feed that tiny amount it may be better not to trust the job to an inexperienced person. A friend who is also a fishkeeper should be ideal, of course.

If you really want your fish fed while you are away, perhaps for a longer time, you could measure out individual portions of food into envelopes, and hide all the other food.

Another solution is to buy an automatic feeder.

Do not be tempted to overfeed the fish on the last day before leaving! ■

## Hunt them or gather them

Collected live foods carry a risk of introducing diseases, and you need to be able to identify the edible insects, crustaceans etc from a pond as well as those which may attack your fish.

If your want to collect your own live food you need to study pond life books in some detail. Do not collect from ponds which contain fish, as the risk of disease will be greatly increased.

Live foods which are not collected from water do not carry the risk of fish diseases, but only collect them from the garden if you use no weedkillers, insecticides and so on. Garden live foods include earthworms, woodlice, and greenfly.

The last are suitable for small fish as they are, but earthworms and woodlice are too big for many tropical fish. They are still good food if you chop them up into suitably sized pieces, or larger fish, such as adult Angelfish will eat woodlice whole.

Flies can be captured in the summer months with a net attached to your car bumper or another area while you drive along or can be 'hatched' from anglers' maggots.

■ **Cultured livefoods include:**
**Brineshrimps,** which are hatched from eggs.
**Whiteworms,** cultured in boxes of compost.
***Daphnia*** and ***Cyclops,*** which will breed in tubs of water.
**Mosquito larvae,** which hatch from eggs laid if you leave small tubs of water in the garden.

■ **Live foods available from your dealer:**
may include ***Daphnia*, bloodworms, brineshrimps, glassworms,** and **Tubifex.** Tubifex has a poor reputation, being linked to unexplained fish diseases and deaths, and should always be sterilised before use, with a proprietary treatment from your dealer.

This is also a wise precaution for collected aquatic live foods.

*Holiday blocks offer a controlled release of food – but are they necessary?*

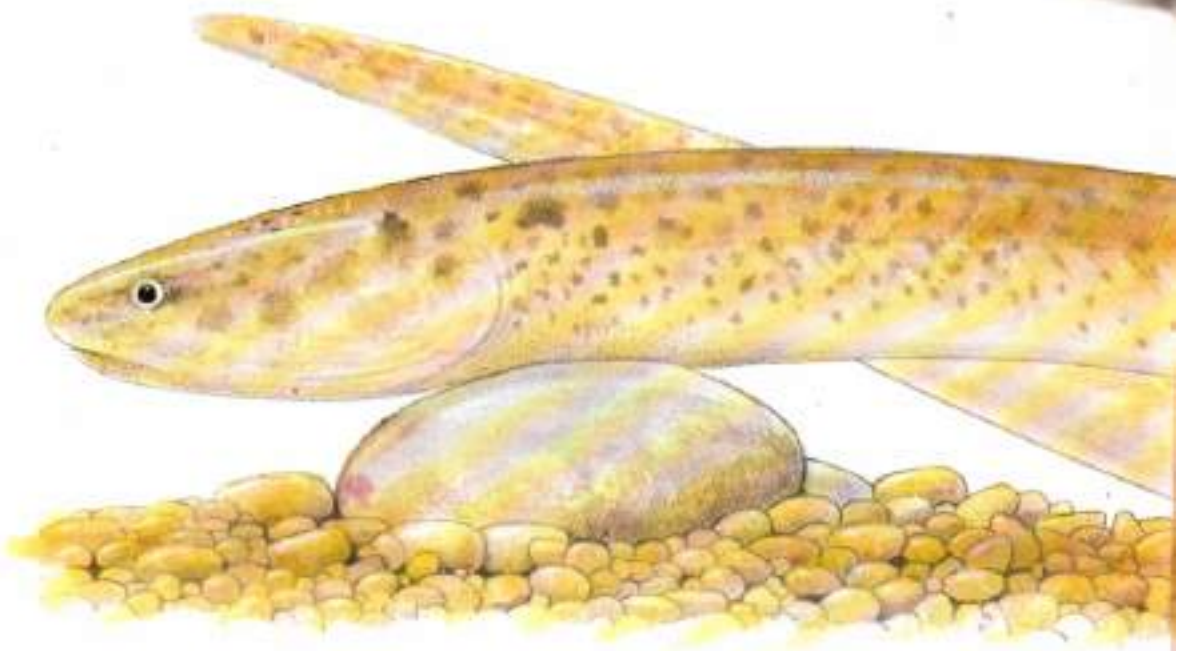
## A feeding regime for a community tank

**(Stock includes tetras, barbs, catfish, and gouramis)**

A suggested weekly feeding regimen for an average community. You can adjust according to when your supplier's livefoods are delivered, and your available time on different days.

| | |
|---|---|
| **Sunday** | Grated frozen beefheart. Cooked peas. |
| **Monday** | Tropical flake. Tablets for bottom-feeders. |
| **Tuesday** | Freeze-dried Tubifex. |
| **Wednesday** | Herbivore flake. Tablets for bottom-feeders. |
| **Thursday** | Live Bloodworms and Daphnia. |
| **Friday** | Tropical flake. Tablets for bottom-feeders. |
| **Saturday** | Live Whiteworms, or chopped Earthworms. |

***N.B.** It does no harm to include a fast day in the feeding regime.*



**Our Oddball expert ANDY PARKES turns his attention to the seemingly indestructible Marbled Swamp Eel.**

# Eels that go walka

I do have another interest apart from fishkeeping and that is herpetology (snakes, lizards, and so on). For practical reasons, it is no more than an interest though - but probably as a direct result of this interest, my fish collection always seems to have an excessive quantity of eels.

## Freshwater Moray?

This particular eel (I think) has much to endear it to those of us that keep some of the more serious "oddballs".

My curiosity was first aroused some ten years ago when I heard of something being called the "Freshwater Moray Eel". Well, we've all heard the stories of divers tackling the marine Moray (and may remember the film "The Deep"), so you can imagine the sort of thing my mind was conjuring up.

The initial research provided nothing, but eventually I discovered the scientific name and came up with a photograph of *Synbranchus marmoratus*, also known as the Marbled Swamp Eel. **I had to have one.**

That may have been my first mistake. To admit to liking it was definitely an even bigger one.

After a long week, I received a phone call at lunchtime to say that the specimen was at the airport about to be collected, and I made arrangements to go up the following day. By nine that same evening I was being begged to go and get them!

Instead of just one 45cm eel, six 30cm eels had been sent, so I duly set off, having re-arranged a tank to put them in. A couple of hours later I collected the box, mysteriously taped down and with a mass of weight on top.

Once home, I tentatively lifted the bag from the box and lowered it into the tank to acclimatise the fish. Having kept many spiny eels, I only undid the bag a little to inject water in slowly, but made my next mistake in not tying the bag up again.

Within five minutes all six eels were loose in the aquarium, apparently unaware of the drastic difference in water conditions.

## Wandering eels

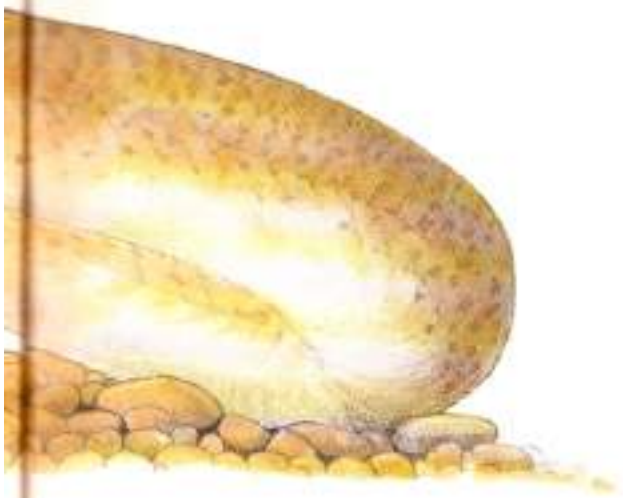
An essential part of all eel tanks is sliding glass covers, so these were duly closed and the eels left to themselves for the night while I hoped that they were strong enough to survive the constant stress that they had endured over the past thirty-six hours.

The following morning, three of the six were eventually discovered at various positions around the living room, the faint glimmer of life making me change my mind about dispatching them to the waste bin. I put them back into the tank, still amazed they'd had the strength to move the glass.

Despite being thrown from water with a temperature of 19°C and a pH of 7 into water of 24°C and a pH of 7.9 the previous evening and then virtually dessicated, they were all feeding later that day.

At this stage the fish were all a dull brown which I put down to the new environment - the photograph I had seen showed a tan coloured upper body smothered with black patches. I later discovered this is the colouring of juvenile specimens and the darker colouring should appear after the fish has reached 20cm - mine duly obliged after about a week. Once coloured up, this is truly an attractively marked eel (although it is **not** a true eel), the dark, glossy tan brown being irregularly mottled from head to tail with black blotches.

The Swamp Eel is happiest when wedged into a small hole



## Out for a walk?

**This particular member of the Synbranchidae family is native to most areas of Central and Southern America, favouring the more tropical regions with temperatures into the high 20s°C.**

**Reaching lengths of 150cm, these eels inhabit all types of water, from shallow, swamp-like ponds to slow-moving rivers and backwaters.**

**Not surprisingly, in these conditions, the Swamp Eel has adapted by being able to breathe atmospheric air during the times of drought when the swamps dry up, aestivating (the summer version of hibernating) until more favourable conditions return, by burrowing into the mud or travelling across land in search of alternative waterways.**

**It will also take air from the surface when kept in an aquarium, which is another good reason to have sliding glass covers. If the water is maintained at 26-28°C and the eel breathes in cooler, free-moving air, this can lead to the loss of your fish in the same way as with Anabantids.**

**For practical, as well as aesthetical reasons, it is unlikely that the aquarium will be filled with mud and sand, so a variety of suitable hiding places should be provided. I tend to prefer piping (pond hosing is ideal and comes in a range of bores), which I then cover in rocks and Curiowood. If you choose to bury the pipe, please ensure that both ends are above the surface of the gravel, or the eel will wreak havoc with your decor.**

**The refuges should not be too large. These eels appear to feel insecure unless they are wedged into an impossibly small hole.**

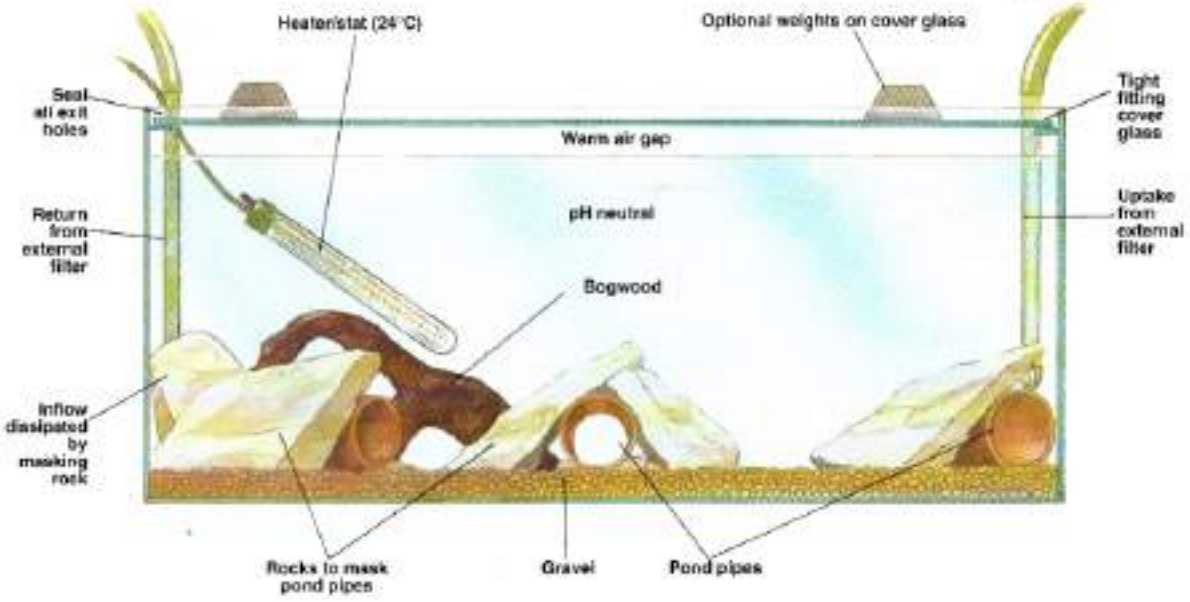
# bout

## Turning cannibal

Feeding presents no problem at all, once the Swamp Eel has settled in, the younger specimens preferring earthworms and larvae of all sorts.

As they grow - at an alarming rate - they take almost anything with a meat content, whether it's dead or alive. They will not hesitate to attack anything small or slow enough either, grasping the victim in their powerful jaws and twisting until the mouthful rips free, not unlike the feeding manner of the crocodile.

They also have no qualms about cannibalism; my first six specimens rapidly decreased to ▶



*S. marmoratus has Asian and African counterparts. Pic. by Mike Sandford.*

three before realisation dawned and they were separated.

Take care if rearranging the decor or bravely (foolishly?) trying to feed by hand. Once the jaws are shut, it's no easy task persuading them to open again.

## Plug those holes

Filtration should be in the form of an external power filter, with the outlet pipes sheltered to prevent too high a water flow. Undergravel filters are also quite satisfactory, but are best used in conjunction with an external filter to eliminate the problems of dead spots when the eels burrow - or when they decide that the uplift pipe would make an ideal home, so ensure the tops are tightly fitted!

The tank should be at least four feet in length, with all the pipework and cable holes securely plugged to stop the eels from attempting to travel. Please be warned: they are capable of getting through that gap which you are in two minds about bothering to block. The temperature should be 24°C, but pH and hardness make no apparent difference. Plants will be excavated, no matter how well-rooted, the only possible exception being the Java fern and only then if it's securely attached to wood or rocks.

## Possible tankmates

Companions have to be robust and sizeable, which narrows down the choice considerably. Smaller eels are not too much of a problem, but as their size increases, the options are few.

I have kept mine with Snakeheads, Arowanas, Bowfins and some of the large Characins and Cichlids. Whatever you choose it will need to be a matter of trial and error, but avoid anything that is slow or spends a lot of time near the bottom - it won't stand a chance.

Overall, this may have given the impression that the Swamp Eel has nothing going for it. In fact I find it a fascinating creature which is colourful and lively, remaining active at all times of the day and night - and is virtually indestructible. ■

## Other species

**Although *S. marmoratus* is the only member of the family from the Americas, there are two others, *S. afer* of Africa and *S. bengalensis* from Southeast Asia and parts of Australia. They are very similar in appearance to our American specimen, although the colouring is usually less intense. Unfortunately they are hardly ever available.**

**Occasionally I have seen the common *Anguillidae* eels offered for sale as the "Freshwater Moray". These true eels never colour up more than the dull grey/green of the juvenile specimens. You can identify between the two by looking at the heads.**

**On top of the head of *S. marmoratus* there are two pale lines running from the tip of the nose back for about two to three head lengths, with small pale dashes at the end. These lines are present at all ages, even before any colouring has begun to show. In addition, the gill openings on either side of the head have fused together to form a single opening across the throat.**

*A Snakehead may be a suitable companion – but don't bet on it!*

# CLUBS TOGETHER

**This month sees the start of a new series, looking at the major national fishkeeping clubs and associations. We kick off with the British Killifish Association.**

The British Killifish Association is a national and international organisation, dedicated to the study and breeding of Killifish and to the publication of relevant information.

Owing to the fact that the members are so widespread, most of the business is carried out by post, and this includes the buying and selling of both fish and eggs.

## Publications

The BKA publishes a monthly journal reporting on new discoveries with articles on the upkeep of Killifish. There's also a monthly egg and fish listing in which members can advertise their sales, wants and swaps.

## Meetings

Once a year, usually in September, the BKA holds its convention and A.G.M. which takes place over a weekend. This includes international speakers, a Killifish show and a banquet with a prizegiving ceremony. On the Sunday all the show fish are auctioned off with the proceeds going to the BKA funds. The venue for this changes every year.

At various intervals and locations around the country, local groups of the BKA hold shows and auctions, with fish, eggs and all associated items on sale.

## Membership fee

The current annual membership fee is £14 for the UK, £16 Europe and £20 R.O.W. Contact: **Adrian Burge, 14 Hubbard Close, Wymondham, Norfolk, NR18 0DU. Tel. 0953 607004.**

## Local groups & contact addresses

**Norfolk:** A. Burge, 14 Hubbard Close, Wymondham, Norfolk, NR18 0DU. Tel. 0953 607004.
**W. London:** L. Eldridge, 64 Molesham Way, East Molesey, Surrey, KT8 9NX. Tel. 081 941 3833.
**Kent:** L. Ensden, 14 Priory Drive, Abbey Wood, London, SE2 0PP. Tel. 081 310 4139.
**Wessex:** P. Watkins, 87 Norfolk Road, Charminster, Bournemouth, Dorset, BH8 8GB. Tel. 0202 557142.
**N. E. Yorkshire:** P. Riley, 1 Mortimer Drive, Stockton on Tees, TS20 1HA. Tel. 0642 556437.
**Manchester:** A. & B. Brown, 173 Parr Lane, Unsworth, Bury, Lancs, BL9 8JN. Tel. 061 766 9836.
**E. Midlands:** S. Jones, 4 Bakers Lane, Sprotton, Northampton, NN6 8JB. Tel. 0604 842372.
**S. E. Midlands:** R. Gladwell, 2 Aynho Walk, Kingsthorpe, Northampton, NN2 8JX. Tel. 0604 842805.
**Fife:** A. Muir, 13 Abbotsford Dr, Glenrothes, Fife, KY6 2LR Tel. 0592 759927.

*Left: The members are so widespread that the BKA conducts most of its business by post. Pic shows Panchax lineatus.*

*Above: Fish and eggs are sold at all the BKA's local shows and auctions. Pic shows Aphyosemion bivittatum.*

*Top: A pair of Yellowtail Panchax.*

**Star ratings**

| | |
|---|---|
| Don't bother | ★ |
| Barely acceptable | ★★ |
| Average/adequate | ★★★ |
| Good | ★★★★ |
| Very good | ★★★★★ |

# WHAT'S I

## Colourful BCA productions

The **British Cichlid Association** has just published two new colour information pamphlets on groups of Cichlids - Mbuna, and South American Dwarf Cichlids. Other groups will be covered when funds allow.

The eight pages are full of the basic essential information to get you started with these groups of fish, and a list of further reading is included.

Price of the pamphlets is £2 each, and they are available from: **BCA (PFK), 7 Delamere Avenue, Sale, Cheshire.** The BCA also produces information sheets on various individual species of Cichlids - details from the same address. **IL**

**Star rating**

| | |
|---|---|
| Readability | ★★★★★ |
| Information | ★★★★★ |
| Price | ★★★ |


# *Are they Deependable?*

**Deependable Products** now offer an easy way to remove and prevent induced voltages - the **Nega-volt.** This device consists of a corrosion-proof, non toxic probe which sits in the tank water, and a two metre cable to connect it to an earth point, in your cable tidy or elsewhere.

Fishkeeping equipment such as lights, powerheads, etc can induce small electrical voltages in the tank water. This is not a fault, but a problem associated with the laws of electricity. For some time it has been suspected that these voltages affect aquarium fish, causing stress and possibly disease. Recent research has linked induced voltages with lateral line disease.

Subjectively, a number of fishkeepers have noticed an improvement in the health and behaviour of their fish.

Marines are most at risk, as salt water conducts electricity more easily, but certain Discus breeders have also reported good results from earthing their water.

I would imagine that fish such as Elephant-Noses and Knife Fish, which navigate and communicate by electrical impulses would also benefit, being especially sensitive to electricity. **IL**

**Star rating**

| | |
|---|---|
| Quality | ★★★ |
| Practicality | ★★★★★ |
| Price | ★★★★ |

■ Deependable Phosphate Remover which was recently reviewed is now packaged with extensive instructions on the packet. Other new Deependable products include marine Buffer to stabilise pH and KH and buffer pH to 8.3; and four liquid additives - marine calcium aimed at corals, marine iodine, strontium with molybdenum for polyps, coral and anemones; and FMF fiber maturation fluid to use in starting off new tanks.

• If your dealer does not yet stock these products they are available from **Deependable Products, 1 Bracken Road, Ingrow, Keighley, West Yorks BD22 7DF - phone 0535 680030.**

## ■ BOOK REVIEWS

*Snakes of the World* by **Chris Mattison. Blandford. £9.95 ISBN 0-7137 2340-8**

You rarely find anyone with a neutral opinion on snakes. Those who love them are those who have bothered to study them and separate fact from prejudice - but, unluckily for the snake, they are in the minority. Chris Mattison has probably done more than any other recent author to champion the snake's cause: as he says in the introduction to this excellent paperback, *'...though I respect the ability of some species to cause a rapid and somewhat unnatural death, outright fear of them is, to me, irrational.'*

If *Snakes of the World* can cure even a few readers of their phobia, replacing terror with admiration, it will have achieved its purpose.

But, realistically, the book is likely to appeal more to the converted, who wish to know more about the sub-order *Serpentes*. It is pitched at a level which is neither simplistic nor dull-dry, reflecting Chris's ability to communicate on the lecture hall as well as on print. Illustrations and line drawings are of the highest quality, many coming from Chris's own photographic portfolio.

This is not a book on snakes in captivity: Chris prefers to bag his reptiles on film and allow them to glide away.

But never forget that snakes are more united against than uniting. The chapter 'Snakes and Men' makes this abundantly clear. 'Man Bites Snake' - that's a headline the Sunday Sport would never carry, because it's absolutely true. **NF**

**Star rating**

| | |
|---|---|
| Readability | ★★★★★ |
| Information | ★★★★★ |
| Price | ★★★★ |

*Garter Snakes (Their Natural History and Care in Captivity)* by **Roger Sweeney (Blandford, ISBN 0-7137 2271-1**

Just as fishkeepers tend to start their hobby with 'easy' livebearers, so the herpetologist invariably begins with an inexpensive animal that he is told will be easy to keep.

Garter snakes could almost have been made for the purpose, being undemanding in their housing and dietary requirements, harmless and relatively simple to breed in captivity - certainly less problematic than any lizard.

Roger Sweeney's book will enable anyone contemplating adding a snake of the genus *Thamnophis* to their collection to avoid all the common pitfalls, his knowledge being of the practical sort gleaned from his position as livestock manager at Surrey-based Birdworld.

I have seen many Garter Snakes on sale which I took to be pattern variations on the species most commonly available, *Thamnophis sirtalis*, were in fact nothing more than motley subspecies.

Add to this another twelve species in their own right and there is certainly scope for a new find among imports. **NF**

**Star rating**

| | |
|---|---|
| Readability | ★★★★ |
| Information | ★★★ |
| Price | ★★★ |

# NEW?

**The latest fishkeeping equipment & books reviewed by KAREN YOUNGS, NICK FLETCHER, IAN LUCAS and Editor STEVE WINDSOR.**

## PRODUCT NEWS

### Two units in one

Reverse osmosis units for freshwater fish are all very well but many fishkeepers who use them are forced to mix the water obtained with raw tapwater before adding it to the tank, simply because they cannot afford the expense of a separate carbon filter. **Purity-on-Tap** have developed a combined carbon and RO unit, featuring the CBR "metals" cartridge to produce very high quality water.

The FT1500 and 3500 systems come with a 15 or 35 gpd rated TFC membrane in either a two or three pod configuration. The FT1500 (the "T" stands for "tropical", by the way) costs £269; the FT3500 is £309. Replacement cartridges are available at £44 and £59.95 respectively.

At the request of fishkeepers, Purity-on-Tap have added a new filter to their popular 'CB' range. It features a meter with an automatic shut off device at 1250 gallons, preventing the hobbyist from accidentally exceeding the life of the cartridge. A dial gives you the running total of the amount of gallons the cartridge has dealt with, so a new one can be ordered in good time. This meter is currently only available for the new CB1250RM and is priced at £149.

● As an introductory offer these units come with a 10% discount to purchasers quoting this PFK page number when placing an order. The offer is open until **November 15.** For more details, contact **Purity-on-Tap, Wickfield Farmhouse, Shefford, Woodlands, Newbury, Berks. RG16 7AL. Tel. 0488 648316**


### RO Systems

**AQRO1** is a new reverse-osmosis system from **Aquatechnics (UK) Ltd**, capable of removing up to 98% of all contaminants from tapwater - up to 35 US gallons per day. The system includes sediment filter, carbon block pre-filter, TFC membrane R.O. unit, storage tank and post-filter. The carbon block is able to remove chlorine from over 22,000 gallons of water before replacement, protecting your fish and the unit's membrane.

For more details contact Neil Chapman on **0702 543979** (Fax 0702 530373). **Aquatechnics (UK) is at 47 Back Lane, Rochford, Essex SS4 1BE.**

### The dividing line

Sometimes fish need to be separated at very little notice and unfortunately not every hobbyist has the space or funds to facilitate a spare tank. For this reason **Neonfair** have come up with the **Fishpen**, a unique system for the immediate division of a tank.

It consists of a dividing mesh, grips and eight magnets. It works along the same lines as an algae magnet where the two magnets attract each other through the aquarium glass. The divider is placed widthways inside the tank and is held firmly in position at either end by using divider grips to which magnets are attached - four magnets on the outside and four inside the tank. It's easily assembled: the only other tools required are a junior hacksaw blade and a pair of scissors. Take care with the magnets by the way, as allowing them to snap together causes them to break. One of the magnets in the Fishpen we had for review was already broken presumably in the post.

Once in place, the dividing mesh allows the water to circulate normally through the aquarium, but is still fine enough to prevent young fry from being sucked into the filter. It can be cut to the size you require - careful though: cutting it just a little too small may still allow that troublesome fish to wriggle through. The "standard" divider size is 18" x 19½", but other sizes can be provided on request.

The Fishpen will be particularly useful to separate young fish from their parents or to help introduce new fish safely. I'm not totally convinced that it would stop a very aggressive fish from finding a way through if it made up its mind to do so.

In addition you'll have problems if you have a Mbuna set-up or similar, as loads of rockwork at the back of the tank will prevent the magnets from gripping to the inside of the glass. And don't place the magnets directly next to your heater, as they may affect its performance. Most of all of course, with magnets inside the tank, it can't be used in marine set-ups. **KY**

● The Fishpen retails at £14.95 inclusive of postage and packing. It's available from **Neonfair Ltd., 6 High Street, Tadworth, Surrey, KT20 5SD. Tel. 0737 813132.**

**Star rating**

| | |
|---|---|
| **Quality** | ★★★ |
| **Practicality** | ★★★ |
| **Price** | ★★★ |

### Lotus rock falls

Lotus have produced a rock effect waterfall in six different styles and in two rock-like colours at prices ranging from £19.95 to £44.95.

Apart from their obvious use on garden pools, they also have potential as an unusual substrate (albeit at two levels) in a large fishtank.

**Star rating**

| | |
|---|---|
| **Quality** | ★★★★ |
| **Practicality** | ★★★★ |
| **Price** | ★★★★ |

## TRADE NEWS

### Where are they now?

■ **The Ornamental Fish Industry UK group have issued the following appeal:**

"Help - Have you been offered small (some as little as one litre in volume) cylindrical jars as aquaria, possibly by a company trading under the name of **'Aquario'**?

If so, **Mr C. Reynolds** of the Licencing Section of Hammersmith and Fulham Trading Standards Office on **081 748 3020** would very much like to hear from you.

He is currently investigating the unusual claims made for this range of products. When a visit was made to the company premises, it was found that they had left, leaving their livestock, very little of which survived.

Mr Reynolds is very keen to find their new location.

OFI (UK) the trade association of course condemns the practice of abandonment of stock, and does not approve of the products sold by 'Aquario', and the claims made for them."

### Aquasoil register

■ Aqua-Soil products Ltd are forming a register of all retailers that sell their products. The register will be used to distribute a new and improved shop display pack for the coming season, and to compile a list of local stockists.

**Names and company addresses should be sent to: Promote '93, Aqua-Soil Ltd, Bovey Tracey, Devon TQ13 9YF.**

# Tropical *Answers*

## ■ The wrong set-up

**I have a 36" x 12" x 12" community tank with Platies, Ghost Catfish, *Corydoras metae* and a pair of *Julidochromis ornatus*. The tank is filtered by an undergravel run by a powerhead. It is well planted. The pH is 7.3 and the temperature is 77°F.**

**I know that the *Julidochromis* are a pair, because they had bred before I bought them, but since adding them to my aquarium three months ago, they haven't bred and one - presumably the male - continually chases the other. What should I do?**
**Geoff Wright, Leics.**

I'm not surprised your *Julidochromis* haven't bred and have fallen out if you are keeping them in a community tank! They are not suited at all to a general tropical community tank. They need to be housed in hard, alkaline water with other Tanganyikan species, with plenty of caves and rockwork. You should remove the cichlids as soon as possible and transfer them to a separate tank which is set-up specifically for African cichlids, or take them back to the place you bought them. In future, it would be wise to find out a little more about your fish before you buy them.

## Should I remove the fry?

**Q** **I have recently set up a four foot tank which I furnished with rocks, caves and bogwood. A month ago I added seven *Lamprologus brichardi* of 1" in size. A couple of weeks later I noticed 15-20 free-swimming fry. Is it unusual for these fish to breed this young?**

**The parents seem to be protecting them although one fish, which doesn't have a mate and is fairly aggressive, has managed to eat one or two. Should we separate the fry from the other fish?**
●Paul Hanley, Beds.

*Neolamprologus brichardi may take a year or more to settle down and breed. Pic. Max Gibbs, The Goldfish Bowl Oxford.*

**A** The behaviour of your *brichardi* is very unusual. I have observed that this species can breed at sizes of little more than 1", but I have only seen this happen where a larger adult in my colony has died and been replaced by a young fish. In such cases spawning often occurs successfully, almost immediately.

What is surprising is that a new colony has settled down to breed so quickly - it normally takes a year or even longer for a newly-formed pair to get down to breeding. I cannot imagine why yours have started so quickly, unless they are older than they look - they may have been kept in conditions where they have not grown on, due to overcrowding, or because they have been left with their parents for too long. I have observed that *brichardi* left with their parents stop growing at about 1½" - in the confines of an aquarium they are likely to be killed if they grow any larger. Normal growth resumes when the fish has a secure position.

Whatever the cause, you should be pleased at such rapid success.

Please do not separate the parents and fry, as if you do, you may put a stop to breeding, as this species is colonial. Once you have a first brood then the stage is set for repetitions. Obviously you will have to remove most of them eventually, at about 1", but by then you should have at least two more broods coming along behind to maintain the colony.

I would be inclined to remove the odd fish, though. Cannibalism has no place in a colonial species and I would be disinclined to breed from a specimen with a behavioural defect of this type. **MB**

*Anostomus anostomus is compatible with small barbs and tetras. Pic. Max Gibbs, The Goldfish Bowl Oxford.*

**Severums. Or can I keep a pair of Firemouths? What do you suggest? A friend of mine also suggested I get a pair of Scats, but I'm told they require special conditions, so would they be a good idea?**
●Roger Salvi, Northants.

**A** Your choice of cichlids would be too large for a community of small fish - even the Flag cichlid, although it is smaller, would not, I feel, make a good choice. Try Kribensis if you feel you must have cichlids in your tank.

The Red Tailed Black Shark is a well-established aquarium favourite and gets on well with any fish, apart from members of its own family. It can be aggressive towards other fish if they stray into its territory, but generally leave most alone.

The Scat, *Scatophagus argus*, is adaptable to all water types, but would be unsuitable for a system such as you suggest, for they prefer hard, neutral, to strongly alkaline water. A further disadvantage is that they will strip the aquarium of all plant growth, for this forms the staple part of their diet.

It is difficult to choose a medium sized fish which is compatible with smaller fish, but why not consider keeping the Striped Anostomus, *Anostomus anostomus*? **PD**

## Big fish with small tankmates

**Q** **I'm intending to set up a community tank. The pH here is 6.8. I'd like to keep small barbs, tetras and some small cichlids. The tank will be well planted. I'm planning to keep a Red Tailed Black Shark. Will this be alright with these fish? Secondly, I love cichlids and I'd like to keep a pair of Flag cichlids and/or**

## Frustrated Oscar

**Q** **Up until recently I had two female Oscars in a tank. They got on very well together, but I have recently lost one. Since then the remaining female, which is 8" in size, has become very aggressive and destructive. She is presently in a four foot tank with two Armoured catfish and a Plec. She chases them all the time, delivering butts and bites freely and she pulls the filters from the tank walls. She has got so bad that I worry about my fingers when I carry out water changes.**

**I would like to add another Oscar, but I'm worried that she will tear it fin from fin. What do you suggest I do?**

**I hope you can help me. I shall soon be doing my water changes in rubber Oscar-proofed gloves!**

•Clare Fenton, Staffs.

**A** I suspect your Oscar is behaving this way because she is bored and lonely without her former tank-mate. But equally she is likely to take considerable exception to the arrival of any stranger and in her current mood you would probably end up with mincemeat (minnowfish?).

I suggest you put her on "hold" by giving her something to play with - other than the Plec. Some friends of mine have given their Oscars a ping-pong ball (the plain white type - avoid the coloured ones as they seem to be painted). Mine gained great pleasure from playing with a piece of plastic pipe. Such a toy should take precedence (as an intruder) over residents such as the Plec and the filters and will be attacked with great gusto.

If and when you find a suitable mate, then a divider will be an absolute must - probably for some months, unless she ripens and appears to be ready to spawn, in which case she may welcome the attentions of a mate - but don't bank on it; any divider-out time should be strictly supervised.

You can obtain heavy duty rubber gloves from some garden centres and most agricultural supply depots. **MB**

## Bogwood with fungus

**Q** **I have a tank which has two pieces of bogwood in it. One of the pieces has a white fungus growing on it. The fish won't eat it. I don't want to throw it away if I can help it. What should I do?**

• T. Pavitt, Essex

**A** I would make an educated guess and say that the "fungus" growing on the bogwood is the result of decaying food. You give no indication of the fish maintained in the tank, its size or the size of the bogwood. If it is large in relation to the aquarium, the accumulation of food and subsequent rotting will lead to the growth of what you call fungi. And just because the fish lives in the water with it, does not mean that it is going to eat it - it would be like you eating mouldy food.

The way to overcome this problem is to keep strict controls on feeding and if necessary reduce the size and amount of bogwood used. Increase general water maintenance by carrying out regular water changes. And when you do these changes, syphon off any deposits of matter on the wood. It would also be advisable to coat the bogwood with a clear, polyurethane varnish. **PD**

## Breeding Discus

**Q** **I have recently dismantled a three foot community tank and I'd like to use it in which to have a go at breeding Discus. I'd just like to keep one pair. Could you please advise me as to whether my tank will be big enough and also on which decor and type of filtration I should use. What are the best conditions for Discus?**

•Sara Gittins, S. Wales

**A** Discus in good condition will spawn quite happily in tanks as small as 15 gallons. The equipment need only be a sponge filter, air pump and heaterstat. The parameters of water should be around 1-6°GH and 1-2°KH. The temperature needs to about 86°F.

When the Discus spawn the eggs will hatch in 60 hours. The parents mouth the little larvae out of their shells to move them to clean site. Not all Discus do this, but those that do make very good parents. After another 72 hours the fry will begin to swim. Problems arise if the fry stray from the parents and don't graze from their sides for food. If no food is taken within 12 hours the fry are doomed. A simple technique is to lower the water level to the height of the parents. This procedure ensures the fry find the source of food from their parents. After another two weeks the fry will be ready for newly hatched brine shrimp and you will need to conduct water changes every day, removing all uneaten food. This will ensure good growth in the brood. **SD**

*A 15 gallon tank is large enough for a pair of Discus*

### Importing your own

**I am going on holiday to Malaysia and I would like to bring back some fish. How do I go about obtaining a licence to do this?**
**I. B. Chaudhur, London**

To import any fish into this country you will require an import licence. Write to: **Ministry of Agriculture, Fisheries and Food, Room 607, Nobel House, Smith's Square, London, SW1P 3JR.** **PD**

### Keep more than one

**I have a 36" x 12" x 18" tank, containing three medium sized cichlids, two small Corydoras and two Plecs. A local shop has received a consignment of small *Pimelodus* pictus and I would like to purchase a pair. Do these catfish grow too large for my tank and could you give me any other information?**
**Andrew Wheeler, Aberdeenshire**

*Pimelodus pictus* is very popular in the hobby. It is found in the rivers of Colombia and Peru. In the aquarium it can be expected to grow to about 13cm. It's fairly peaceful and I don't think it will pose any threat to the fish currently in your aquarium. However, if the opportunity arises, it will eat smaller fish.

The barbels are long and are very tempting to other fish, which may pick at them, damaging the ends. Keep an eye on your cichlids as they may attempt to do this.

*P. pictus* is sensitive to poor water and this often manifests itself in the degeneration of the barbels and the membrane between the fin rays. This is easily cured by a water change, which should be regular.

It will eat flake and tablet foods, frozen bloodworm, live aquatic insects and small pieces of chopped meat and fish. It requires a temperature of 22-28°C with 8-12°dH and a pH of 6.0-7.4.

To see them at their best, keep a small shoal, although in an aquarium of your size, two should be quite happy. Nothing is known of their breeding habits, but females are believed to be more robust than males. **GS**

## No fry

**I have a 24" x 12" x 12" community tank housing Guppies, Tetras, Danios and a Red Tailed Black Shark. My Guppies keep getting pregnant but I have never seen any fry. What can I do?**
**L. Barnes, Wolverhampton**

This is a common problem in the community tank. The fry of livebearers and the eggs of any fish which happen to spawn are quickly devoured by the other fish - often including the parents, which see them as a meal.

There are several ways to prevent this from happening. You could place the female Guppy in a breeding trap or a separate tank and return her to the main tank after she has given birth. But please note that you shouldn't move heavily pregnant livebearers, as it can cause them to miscarry. Another way is to provide the fry with plenty of cover in the form of plants (real or plastic). Remember that it's perfectly natural for the other fish to eat the fry and that unless you take steps to prevent it, the fry will have to take their chances in the same way as they would in the wild.

## Colour me bad

**Please could you give me some information on Disco Fish. I recently saw them at my local garden centre. I don't know the Latin name. Can I keep them in my community tank? What do they eat?**
**L. Clarke, Norfolk**

I have a suspicion the fish you saw at your garden centre are not "Disco Fish" but dyed Glassfish, *Chanda ranga*. I have heard these referred to as Disco Fish occasionally, but they are not nearly as common in the trade as they were. Take a look at a photo of an Indian Glassfish in a reference book and then have a good look at the fish in your local shop. If the Disco Fish are just brightly coloured versions of the Glassfish, then please don't buy them. The dye is injected into the fish and they usually suffer an early death as a result. Glassfish are not suitable for a community tank in any case, as they are nervous fish and fussy feeders. They prefer brackish water.

## Peaceful communities only

**Q** **Please could you give me some information on *Pelteobagrus ornatus*? I have three which are 1" in length at the moment.**
• D. Waterworth, Lancs.

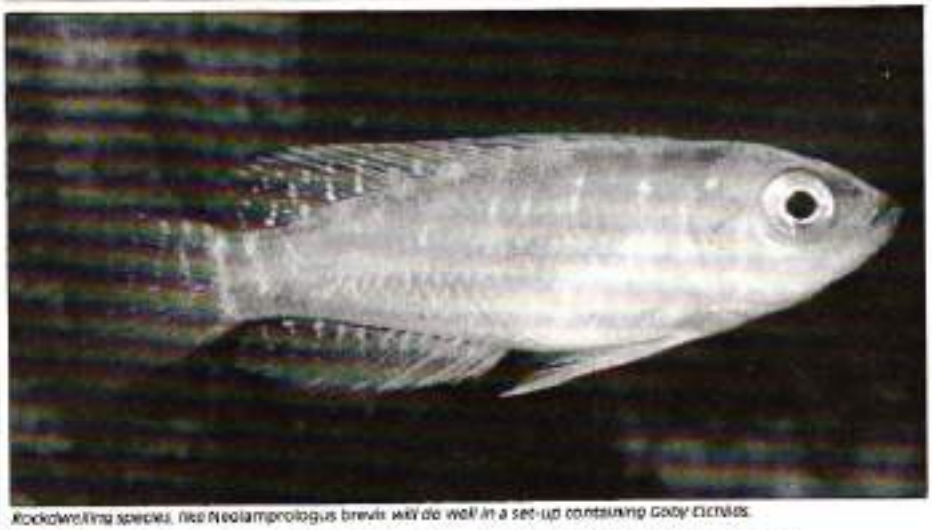
**A** *Pelteobagrus ornatus* comes from Malaya. These attractive little bagrid are active during the day making them a useful addition to the mature, well-established and maintained planted community tank. It should contain only peaceful species.

They are a midwater, shoaling fish and should be kept in a group. If kept with larger fish they may be bullied.

*Pelteobagrus ornatus* reaches a size of 4.5 cm so requires soft, slightly acidic conditions, with a pH of 6.6-7. Take care when doing water changes as they do not like great volumes of freshwater. A gentle water current is beneficial.

Feed them on flake and frozen foods. Live foods such as daphnia are very beneficial.

Males are generally slimmer than females. A clutch of green eggs may become apparent in the body cavity of the more robust mature females. **GS**



Rockdwelling species, like *Neolamprologus brevis*, will do well in a set-up containing Goby Cichlids.

# Plenty of rocks required

**Q** **Please could you give me some information on Goby Cichlids? I have recently bought five, but I don't know the Latin name. They seem to ignore the caves in their tank and they lie on the open gravel at night. Any tips would be appreciated on these fish.**
• Colin Lindsay

**A** Goby Cichlids come from Lake Tanganyika. There are three genera with four described species: *Spathodus marlieri*, *S. erythrodon*, *Eretmodus cyanostictus* and *Tanganicodus irsacae*. All four species live in the surf zone of the lake and have a reduced swim-bladder which enables them to cope with the rapid water movement. They don't require a simulation of surf in captivity, but well-oxygenated water is essential. The water should be hard, alkaline and very clean, with a temperature of about 80°F.

They like to perch on rocks - the higher the better - and you should consider this when setting up their tank.

Breeding Goby Cichlids is not easy - it is one of my ambitions and so far I have been unsuccessful. The main problem is aggression, though once a pair forms this abates. They are one of the most interesting of the Tanganyikans, as they are biparental mouthbrooders.

They need a large tank with lots of rockwork extending up towards the surface. You can keep them with small rockdwellers, such as *Neolamprologus*, *Julidochromis* and *Telmatochromis*. Remember that none of the rockdwellers like being crowded so keep the population at a sensible level. **MB**

## Angels shouldn't fight too hard

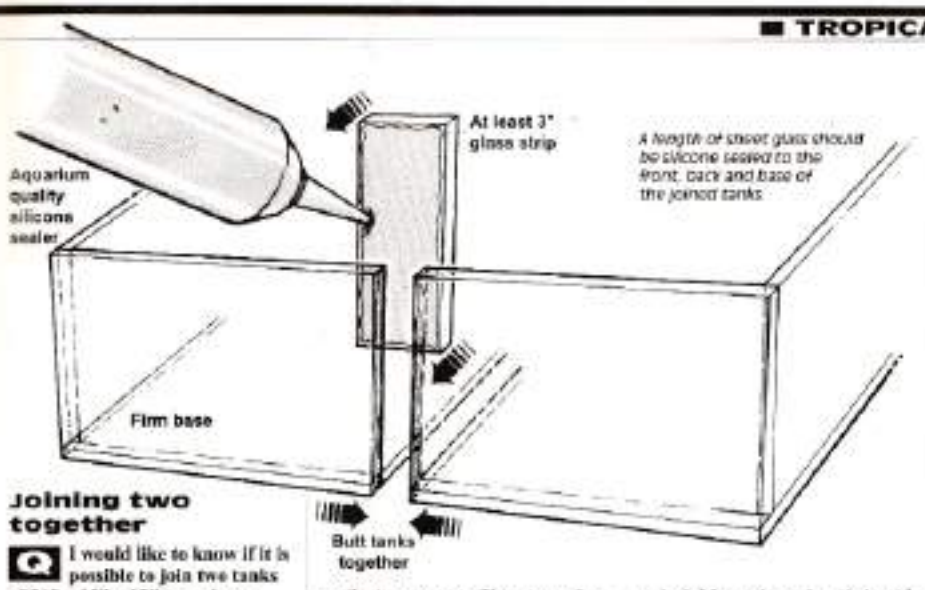
**Q** **Please could you give me some information on Angelfish, regarding plants, lighting and filtration? I have checked with a breeder and my Angel is a female.**

**I would like to put a fully grown male in with her. Will they fight? What diet would you recommend?**
• M. Scott

**A** I would always plant a tank for Angels out with Amazon Swords as these are what they spawn on in their wild state. Lighting should be dim to moderate, bearing in mind that these fish live in shady areas and in coloured water. The water should be of almost zero hardness and a low pH. Of course they will live in hard, alkaline water, but I believe in providing the most natural conditions for the fish. The mode of filtration doesn't matter, but remember that these fish come from slow-moving waters, not a jacuzzi.

It is quite likely that any new Angel will be "greeted" by a resident one, but in a reasonable sized tank with plant cover I doubt there will be any lasting harm done.

Angels can eat voraciously if they like what they are getting. Live, disinfected Daphnia and mosquito larvae are popular. You can also try beef heart, mussel, chicken, liver, prawn and the like. **MB**




## Joining two together

**Q** **I would like to know if it is possible to join two tanks of 36" x 15" x 12" to make a single 72" x 15" x 12" tank.**
• M. A. Hollis

**A** Yes, tanks can be joined, providing the joint is under no flexing pressure. This means they must be mounted on a strong flat base on a good floor - not bouncy floorboards. The old sides can be removed by slicing through the silicone sealer with a razor or scalpel. Mount the tanks side by side on the firm base and stick a length of sheet glass over the inside joints with a smear of silicone sealer. Then seal all the edges with a ribbon of sealer to make them watertight. **DF**

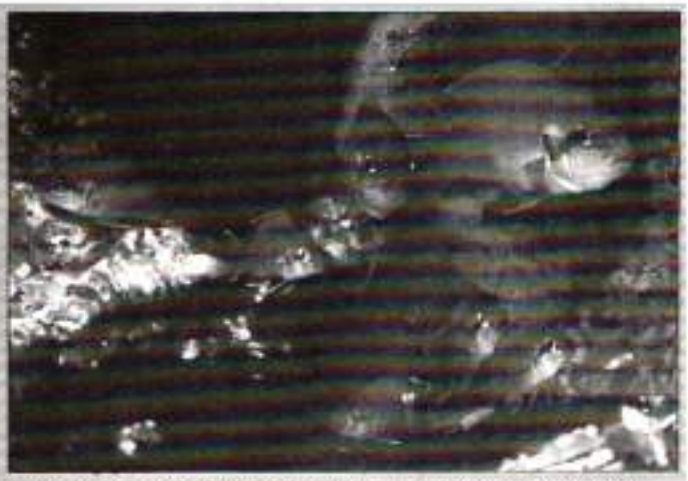
## Sexing Mbuna

**Q** **I recently set up a 48" x 12" x 18" Mbuna community. The pH is 8.5 and nitrate levels are very low. The stock consists of: one pair of *Ps. lombardi*, two *Ps. socolofi* (which I can't sex), one pair of *Labidochromis sweeri*, a pair of *Labidochromis chisimulu* and two *Labidochromis caeruleus* (unsexable). All the fish are sized between 1-3".**

**How do I sex the *Labidochromis caeruleus* and the *Ps. socolofi*? Also, please could you give me some information on the *Labidochromis* species mentioned above?**

**My female *Ps. lombardoi* keeps developing a sort of round white patch on the top of her mouth which turns black after a week only to turn white again. There are no signs of fungus and the fish is otherwise all right.**

**I would like to add some more fish: possibly two *Lamprologus brichardi*. What do you suggest?**
• Paul Simon, S. Yorkshire



Introducing Neolamprologus brichardi to a Mbuna set-up is not a good idea, as they require much larger territories than the overcrowded Mbuna community can provide.

**A** The best way to sex *L. caeruleus* is by the amount of black in the anal fin - males have much more than females and young females have hardly any at all.

In general, *Labidochromis* grow to 3-4" when fully grown. They are among the most peaceful Mbuna and you shouldn't have too much trouble with aggression in them. Sexual maturity is not normally attained until they are three quarters grown.

If you have both sexes of *socolofi* then at 3" the difference in body shape should be becoming apparent. Females are dumpier, ie. deeper in relation to their length. Often the blue is slightly darker too and any facial markings are less pronounced. Once again the amount of black in the anal fin can help - more in males than females.

I think your *lombardoi* is abrading her upper lip on something - possibly through digging too close to a rock, so that her upper lip gets rubbed. Coral gravel can also cause this, as it is sharp.

It would not be a good idea to add a Tanganyikan substrate spawner like *Neolamprologus brichardi* to a tank of Mbuna. The behavioural patterns are so different that they do not mix well. *Brichardi* need a fair sized territory and would not be able to establish this in a Mbuna tank. **MB**

## ■ On the bright side

**Please could you tell me if colour enhancing foods have any side effects?**
**K. Greenwood, Staffs.**

Colour foods contain additives, such as carotene, which brings out the colour pigments in fish. There are no side effects with specially prepared colour foods, except that any white areas on the fish may turn pink if the amount of additive is excessive, but this is more of a problem with Koi than with tropicals. Spirulina is also used as a colour food. This is a type of algae which is high in protein and enhances the fish's colour.

## ■ Fasting catfish

**I am having problems with my two foot Red-Tailed Catfish which has been fasting for two weeks. It looks healthy and comes to the top of the tank, as usual when I walk into the room. I have offered the fish some of his favourite food (trout) but he just "feels" it and then turns round and ignores it. What can I do? Would it have anything to do with the warm weather, as the tank temperature has risen slightly over the last couple of weeks.**
**T. Williams, Somerset**

It is well known that large, predatory fish fast and the Red Tailed catfish is no exception. In the wild they are opportunist feeders and at times of plenty they gorge themselves and then may fast for several weeks.

In the aquarium, they also fast. It is recommended that these catfish are fed just two or three times a week. Under normal conditions they will be quite happy with this feeding regime. But if temperatures rise, as they have done recently, the fish may cease feeding. No harm will come to them and they will recommence feeding as the temperature begins to fall. Don't overfeed them to compensate for the fasting stage. Check the filter is working efficiently, as warmer waters hold less oxygen than cooler waters and anything that will place additional stress on the fish should be avoided. **GS**

## Lights for blue fish

**Many of my Malawis are beautiful blue and purple colours which look great when the aquarium light is combined with natural daylight, but in the evening when there is no natural light, they look a pale blue/white colour - a far cry from their stunning metallic daylight colours.**

**Can you recommend a suitable tube to bring out their best colours? I presently use a Grolux tube. A. Mackersey, Herts.**

Grolux tubes are great for promoting plant growth, but they do give everything a pinkish tinge. If you really want to see the blues, see if you can get a Northlite tube (if they are available) or a Trulite. Even a plain, cheapo warm white tube will give better results.

However, for the best effects of all, turn off the main room light and have a few lamps in corners to read by and so on. These will not affect the tank, which will then assist in the overall illumination of the room, rather than being drowned out by it. **MB**

## Going brown

**Please could you help me with a problem I am having with my 30" x 12" x 15" tank? The substrate is fine gravel with Everts No.1 and plants include 30 Amazon Swords, Red Ludwigia, Vallis and Hairgrass. Lighting is by a 20W Triton and a 20W Gro-lux and these are on for ten hours a day.**

**The tank has been set up for about 5-6 weeks and houses five Tiger Barbs and five Serpae Tetra. All the plants, decor and gravel are covered with brown algae. S. Mildenhall, Wilts.**

Brown algae is generally an indication of quite low lighting levels and increasing the amount of light will overcome this problem.

Of course, by increasing lighting levels you may have an outbreak of green algae, although this can be controlled by adding algae-eating fish, increasing the number of plants, or by using an algicide.

To remove the algae which is already in the aquarium, you may need to remove the offending items and scrub them clean. Also hoover the substrate and remove any loose clumps of algae.

## Dying fry

**Q** **I purchased a breeding pair of Convicts two months ago. They are in a 24" x 15" x 12" tank with a large and small cave and a Swordplant. Filtration is by an internal filter. I change 15% of the water weekly and syphon the substrate once a fortnight.**

**The fish have bred a few times but each time the fry have died. I have added a small amount of methylene blue. I have noticed small mites and flatworms at the front of the tank. Would these have contributed to the death of the fry?**
**•A. Dooley, Surrey**

**A** I am not sure what is killing your fry. The usual causes are starvation or poor water quality. I suspect the latter in your case for two reasons.

Under no circumstances should you add methylene blue to your tank. It is bactericidal and will kill off all the beneficial bacteria in your filter and on the surface of your gravel, probably causing a sudden rise in nitrites which will finish off even the hardiest fry. Methylene blue is used when eggs are hatched artificially and do not have the benefit of parental care to keep them clean. Fish manage perfectly well without methylene blue in the wild.

The presence of small organisms on your glass is an indication that you are overfeeding as these creatures thrive where there is uneaten food. This coupled with your methylene blue filter bacteria wipe-out means that you have a tank which is generally unhealthy and at times extremely unhealthy.

Cut down on the feeding and forget the methylene blue and hopefully you will be successful with your fry next time. I suggest that you have some brine shrimp nauplii or microworm ready for the time when they become free-swimming. **MB**

*Julidochromis spp. detest alterations to their environment.*

## Leave well alone

**Q** **I have a three foot tank housing four *Julidochromis marlieri*, five *Neolamprologus brevis* and a *Neolamprologus leleupi*. Two of the Julies bred about six weeks ago and around ten fry have been saved, the largest being 15mm in length.**

**I have a four foot tank which I was going to set up for Malawis, however, with the above in mind, what would you consider to be the best course of action:**
**1. Move all the Tanganyikans except the parents and fry to the new tank?**
**2. Move all the Tanganyikans except the fry to the new tank?**
**3. Leave the Tanganyikan tank as it is and proceed with the Malawi set up as planned?**

**If I take up options 1. or 2., would I be able to add some *Tropheus duboisi* or *Lamprologus ornatipholus* to the Tanganyikan tank?**
**•Ian Meagher, West Sussex**

**A** I would be inclined to leave well alone. Julies are notorious for getting very upset at any alteration to their environment, especially when breeding and they then proceed to kill each other.

If there is any problem later on with the shell-dwellers being "hammered" (and I think this is unlikely) then - but only then - remove them. If their shells are near the Julies, then it might be politic to shuffle them gradually to the other end. If you do have to move the shell-dwellers then a small tank will do for them.

So you can go ahead with your Malawis, but bear in mind that you'll need extra tanks for their fry and for the Julie fry (you need to remove these at about 1" - carefully and gradually, to avoid parental upsets).

One final word - if you add some more Tanganyikans, please don't introduce *N. ornatipholus*, unless you have lots of money and want a huge challenge. This fish is fine with other species, but loathes its own kind and is positively murderous towards them, even in a large tank. I speak from my own - and others' - costly experiences. **MB**

## Breeding Clown Loaches - a success story

**I am writing to you to pass on some information regarding Clown Loaches. In *PFK* September, S. Kyme of Grimsby wrote and asked about sexing and breeding Clown Loach. I had always been under the impression that home breeding was unsuccessful, until I read an account of a breeding success by a Mr. Werner Nowak of Montreal.**

**He had been given six Loaches, two heavy with eggs. They had previously been kept in an 80 gallon tank where the owner had rarely seen them. Mr. Novak placed them in a 35 gallon tank containing three large *Echinodorus* Sword plants and a great deal of driftwood. The peat filtered water had a pH of 5.2 with 2°DH. A power filter was used and the temperature was maintained at 29-30°C (84-86°F).**

**The fish were fed at night, before turning on the lights. A mixture of flake, beef heart, spinach and shrimp pellets were used.**

**Discovery of the breeding came when Mr. Nowak needed a Sword plant and upon pulling it, saw a number of small fish scattering. He observed small Clown Loaches hiding in the roots of the other plants. Seven weeks later he counted 39 fry with an average length of ¾".**

**I hope this account will give encouragement to Loach lovers to keep trying.**
**•Andrew Sharp, South Humberside.**

"Cichlasoma" citrinellum grows to 10" or more. Pic: Jane Burton; Bruce Coleman Ltd

# I'll be devilled

**Q** I have purchased a Red Devil. He/she is 5" long and pure white in colour with slight traces of pink around the stomach and head. Each pectoral has a vertical orange band and there is a small orange spot at the end of the dorsal fin near the caudal peduncle. It is kept alone due to its aggressive behaviour - it attacked two large Pacus and a 1½" long Arrowana and had to be swiftly moved.

After introducing it to an 18" x 12" aquarium I soon found it had re-arranged the substrate to form a small barricade at the front of the tank.

Please could you tell me something about this fish, such as how large it will get, so that I can prepare for re-housing it?

•L. Rhodes, Birmingham.

**A** "Red Devil" is applied to both "*Cichlasoma (Amphilophus) labiatum* (correctly) and to "*C.*" *citrinellum*, whose correct common name is "Yellow Devil or "Midas Cichlid".

Both are available in a variety of colours, so that is no help in deciding which you have. They are best told apart by differences in head shape - labiatum has thicker lips and citrinellum has a larger hump resulting in a steeper forehead profile.

Both grow to 10" or more and a single specimen will require at least a 30" - preferably a larger - tank. As you have discovered, this is an active and territorial fish. The digging is a function of territoriality - most cichlids dig as part of their breeding ritual. Alright, so you have only one, but by all he (by the sound of it) knows, a mate could come along at any minute. **MB**

## Who owns the bogwood?

**Q** I have kept six Clown Loaches in a 36" x 15" x 15" tank with small tetras for over two years, with no problems. The sizes vary from 2" - 3½".

Until recently, the Loaches usually appeared at morning feeding time and then disappeared into a large bogwood cave, which has several exits and entrances, reappearing after lights out and sometimes during the evening.

Recently, however, I have noticed that they are appearing more frequently and seem to be chasing the tetras which gather round one of the exits to their cave. They move around the tank, scattering the smaller fish in all directions, although they don't attack or harm them in any way.

It seems to me that they now resent the presence of the other fish. Why should this be? Do you think I should transfer the tetras to a different tank?

•M. M. Lewis, Manchester

*Clown Loaches may become territorial if there is a shortage of hiding places. Pic: Max Gibbs, The Goldfish Bowl, Oxford*

**A** The behaviour of the Clown Loaches towards the other fish is almost certainly territorial in nature. The loaches regard the bogwood cave as being theirs and will protect it against all possible intruders. I am surprised you have not witnessed "fighting" between the loaches themselves.

As the fish have been living together quite happily up until now, I do not think it necessary to move any fish. What I would be inclined to do is to introduce more hiding places, in the form of additional plants, bogwood and rocks. This would provide cover for all the fish, remembering that the loaches are bottom dwellers, while the tetras are more mid-water. If the tetras can seek their own "space", then they may well leave the loaches in peace.

If you find this doesn't solve the problem, then you may well have to separate the fish. **PD**

***TROPICAL ANSWERS is our FREE reader service designed to help YOU get more from your hobby***

■ Answering general queries and specialising in "oddballs and tankbusters" is **PAUL DONOVAN.**

■ Plant problems are the realm of **BERTI GEETING** of Aquatic World.

■ Cichlid fans deal with **MARY BAILEY,** treasurer to the British Cichlid Association.

■ Discus queries go to **STEVE DUDLEY** of Euro-Discus.

■ For all your technical questions, you can write to Dr **DAVID FORD** of the 'Aquarian' Advisory Service.

■ If your problem concerns Catfish, send it to **GINA SANDFORD** of the Catfish Association of Great Britain.

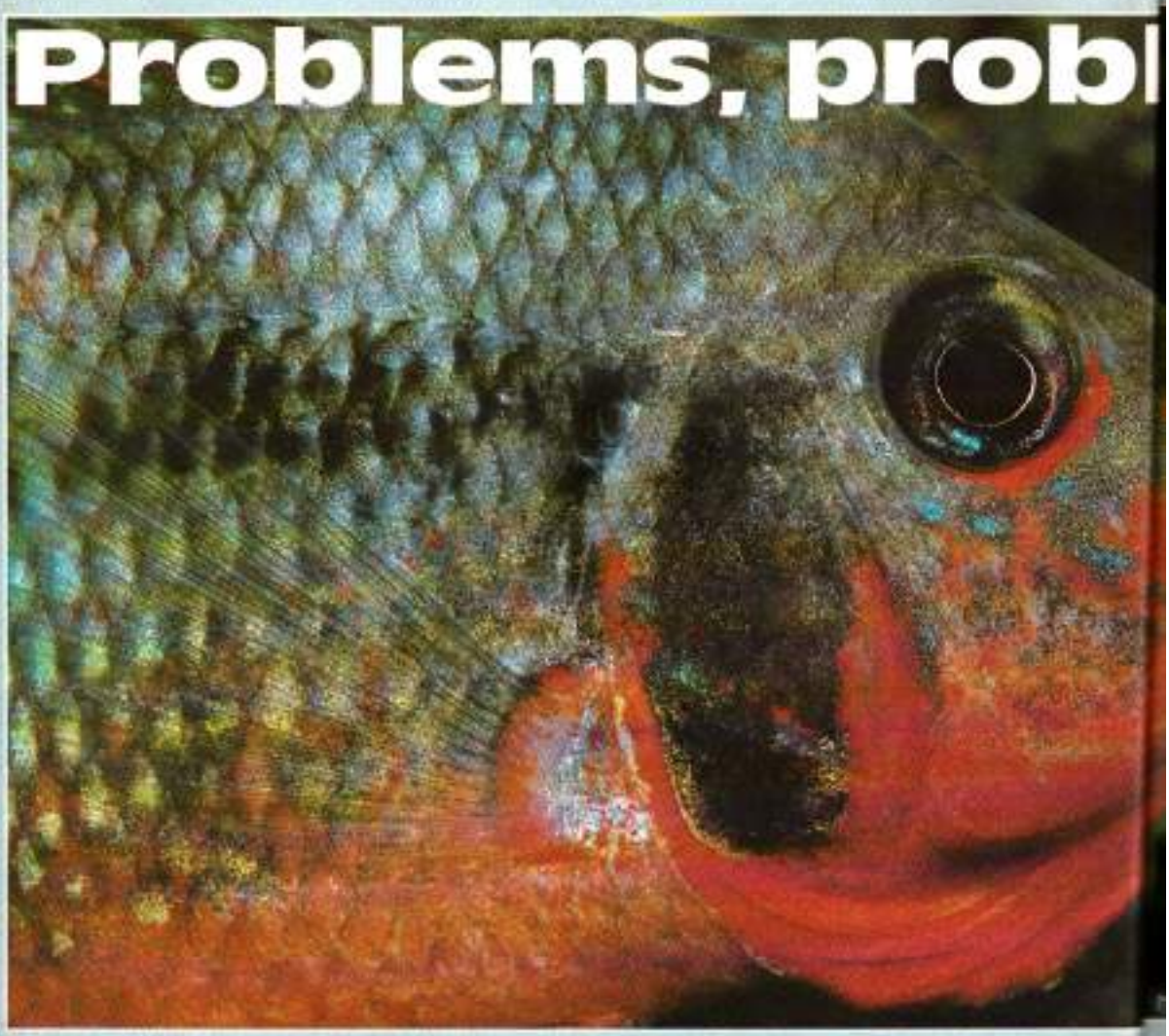
**Just tick the appropriate box below and attach the coupon to the front of your letter. Send with SAE to: Tropical Answers, Practical Fishkeeping, Bretton Court, Bretton, Peterborough, PE3 8DZ.**

**We regret that letters sent without an SAE will not receive a reply.**

**TROPICAL ANSWERS**

- ☐ General queries; Paul Donovan
- ☐ Technical; David Ford
- ☐ Plants; Berti Geeting
- ☐ Catfish; Gina Sandford
- ☐ Discus; Steve Dudley
- ☐ Cichlids; Mary Bailey

# Problems, probl



I have now been answering cichlid queries for PFK for exactly seven years.

What better time to take an over-view of the sort of things I am asked most often, and a look at how the commonest problems can be avoided!

Before I start, if you have written to me at some time and recognise your own problems in what follows - please don't take offence! None is intended - none of us is perfect, and I too have of course been guilty of many an error in my time. What is important is to learn by our mistakes so as to avoid future problems.

**The majority of queries fall roughly into two categories:** 1) "I have done x and y has gone wrong" or 2) "I would like to do such- and-such and would appreciate your advice".

**Thinking about the species I am asked about, the Oscar (Astronotus ocellatus) is way out in front,** with probably 10% or more of queries. There isn't even a close second, but obviously there are a good number of queries on the most commonly kept cichlids - Kribs (*Pelvicachromis pulcher*), Angels (*Pterophyllum scalare*), Rams (*Papilichromis ramirezi*), Firemouths (*Thorichthys meeki*), Severums (*Heros severus*) and Convicts ("*Cichlasoma*" *nigrofasciatum*).

**Where things have gone wrong the two typical queries are:** "My fish are ill/dying/dead/refusing to eat" and "My fish are killing each other", and many of these I find very distressing, as they are usually the result of the hobbyist having failed to do his or her "homework" before setting up their tank or buying a particular species.

There are many excellent books on general fishkeeping, and specialist books on cichlids, available nowadays, and if expense is a problem these can be ordered from the local public library, either free of charge or for a very small fee.

Alternatively it will cost you only a couple of stamps (Ed's note: Do please **always** enclose an SAE) to write and ask me **before** you do something.

Surely it is better to find out in advance than to cause death or suffering to one's fish, grief to oneself, and waste money in the process?

**When it comes down to it, common sense also has a major part to play.** I would imagine that everyone knows that in some parts of Britain water is hard, while in others it is soft. It follows, surely, that this applies elsewhere in the world! Yet so many hobbyists seem oblivious of the fact that different fish come from different types of water, and that they may thus not be compatible with each other or with the local tap water.

Some people try to keep their fish at a temperature of about

# lems

**MARY BAILEY looks back on seven years as the cichlid-keeper's agony aunt.**

70°F (usually in an attempt to reduce the electricity bill) and then wonder why their pets are sluggish, won't feed, and don't show any sign of breeding.

**We have all been exposed to loads of publicity about the poor quality of tap water because of recent low rainfall** - yet a remarkable number of people seem not to have considered the effects of this on small delicate species. A little thought can save a huge amount of trouble.

I can honestly say that of the many hundreds of queries I have answered where fish were dead/unwell, probably less than 1% were suffering from disease caused by a pathogen (causative organism), and about 5% from probable organic failure (tumour, heart failure, and the like).

**By far the majority of sick fish are suffering from environmental problems** - poor water quality, incorrect water chemistry, poor oxygenation, poor diet – often exacerbated by random dosing with patent remedies.

I cannot stress too strongly that it is vital to know what you are treating, and that unless the problem is obviously pathogenic (eg White Spot) or organic (visible tumour) then you should ALWAYS suspect an environmental problem, and usually the culprit is poor water quality.

A quick partial water change will often effect an improvement in a matter of hours. Yet so many people seem to have a mental block on this point, rushing for those little bottles when common sense should tell them that they cannot possibly have some dreadful plague as they haven't introduced any new fish for over a year!

**There is nothing to be ashamed of in having your tank go wrong from time to time** - it happens to me too you know! What is important is to be aware of the normal condition of your fish so as to detect any problem immediately, and so check, and if necessary remedy water quality as soon as any trouble is spotted.

**I cannot end this section without a word on scratching.** Fish do scratch, and this does not mean they are infested with gill flukes. They, like us, get the occasional irritating itch, and of necessity cannot scratch it discretely!

Even if they scratch a lot, it is more likely that their gills are being irritated by particulate matter in the water (coral sand is a common culprit) or incorrect water chemistry/quality.

I have had gill flukes (not personally!) and my fish didn't scratch, they acted as if they were being poisoned (heightened colour, loss of control of movement), possibly because of oxygen depletion due to gill damage.

Only a post-mortem revealed the truth. This ranks as one of the few occasions in the past 20 years when I have forked out for a little bottle.

**Where the problem is cichlids killing each other** it is usually the result of overcrowding or simply failure to realise that the usual rules about stocking fish, ie inches of fish relative to surface area, don't apply.

I am still left aghast at the astonishing numbers of totally incompatible cichlids that are sometimes crammed into remarkably small tanks.

Often the enquirer is asking me about something else entirely and is probably surprised to get a reply warning of impending doom and destruction!

I still recall quite early on, telling one hobbyist that I was surprised he could fit any water in with his fish (and the previous Editor publishing my perhaps less-than-tactful reproach!)

It is sometimes very difficult indeed not to be very cross, and there have been some occasions when I have had to go and chop up a few logs in order to abate my own aggression before replying.

**I do realise that no-one (that I have come across yet) is deliberately cruel to their fish,** but ignorance is no excuse when there is plenty of help ▶

*Above: Popular species like the Firemouth, are well-documented.*

*Right: Knibs are often the starting point for cichlid enthusiasts.*

*Pics: Max Gibbs, The Goldfish Bowl, Oxford.*

*Above right: Water chemistry is vitally important. You can't keep Labidochromis (pictured) with Discus. Pic Peter Hargett.*

and information readily available.

There seems to be a fairly common misconception that cichlids are all cichlids and can therefore be mixed. But when the smallest (some *Apistogramma*s and some Tanganyikan shell-dwellers) are barely 1" when adult, and the largest (*Boulengerochromis microlepis*) 36", then it stands to reason that they won't mix.

**Luckily the majority ask for information on just one or two species.** But what am I to do when someone asks me for everything I know on Lake Malawi Cichlids (as happens fairly often).

All I can do is to tell them of the number and variety involved, and point them to some background reading.

Then there are the people who claim to have conducted a literature search and have failed to find anything on (usually) Oscars or Rift Valley Cichlids.

Many category 2 queries, however, are from people who have done a fair amount of "homework", but have been unable to find out all they would like to know, or wish to check that they have made the right interpretation of their reading.

**It is a real pleasure to answer these letters,** because I know that here are serious fishkeepers who are doing their best to ensure the long, healthy, and contented existence of their pets. Often the species involved are quite (or even very) unusual, and I am sent scurrying off to flick through books and scientific papers, increasing my own knowledge in the process.

**Then there are the would-be breeders** - who have a pair (or think they have) but no fry, or who are looking for a mate for a much-loved large cichlid (usually an Oscar or Severum).

Where they indubitably have a pair, then it is often only patience that is required, though sometimes incorrect pH may be causing problems.

Sometimes eggs are being laid but disappearing, and often it's the catfish which is cleaning up cichlid eggs as well as left-overs during the night.

"Pairs" often turn out to be two females. Or breeding will be a non-starter because the cichlids are inhibited - by too large a gravel size (dwarfs), no gravel, or a gravel tidy too near the surface.

**Usually I can only suggest possible methods of locating a partner for a large cichlid** - unless I have just had a similar query from someone else, in which case I will happily operate a marriage bureau as long as both fishkeepers are agreeable.

As well as the two main categories, there is also a smattering of miscellaneous queries on identification, equipment, sources of fish, etc, which all add variety to the job.

The people I like best of all are those who write to me several times as this gives me "feed-back" on whether my solution to their original problem was correct, or the information I provided useful.

**I am glad (and relieved) to say that no-one has (so far) written again to tell me I'm an idiot or that my advice was useless.** I do realise, however, that there may be people who feel that way but are keeping quiet about it.....

**So far I have concentrated on the sort of things you ask me.** Now a few words on how you can help me to best help you.

**First,** if you have something wrong, please supply me with as much detail as possible: your water conditions, decor, and maintenance routine.

What other fish are in the tank?

What foods are used?

How long has the tank been set up and how long have the affected fish been in it?

Add, of course, any visible symptoms of disease (including abnormal behaviour).

You really cannot tell me too much - I would rather sift through a huge amount of detail and give you a definite answer than have to suggest all the possible alternatives and leave you to figure out which applies in your case.

Please always tell me the scientific name of your fish if possible, even if it means phoning up your dealer to ask what he has just sold you.

Some common names are OK (Oscar, Jack Dempsey, Convict are correct throughout the UK) but "Yellow Dwarf Cichlid" could be any one of several dwarfs from Africa or South America, and "Butterfly Cichlid" can mean at least two different fish.

Many common names are made up by wholesalers/retailers. Different names may be current in any area, so that I give you information on the wrong fish.

**If you want me to identify a fish, remember that a photo, or a drawing, is usually better than a description** - and it is no end of help if you can give me a clue as to where the fish comes from, even if it's only the continent. It also helps to know what the fish was labelled when you bought it.

**Please, above all, remember that I don't know everything (though I'm working on it!)** - I may have to tell you I can't help you rather than pretending otherwise and confusing you.

Chances are I will be able to help you with other topics, so don't be put off writing again because I was no help the first time. And I will be deliriously happy if you write and tell me if you find an answer to your original query elsewhere, as then I will be able to help other people in future.

**I hope this article has given you some insight into what it's like to be on the receiving end of your cichlid queries.** If you have gained the impression that you are dealing with a balding manic-depressive axe-wielding lunatic, then I must hasten to add that I am generally regarded as a bit eccentric but quite harmless by my neighbours! And I still have quite a lot of hair..... ■

*Severums (above) are popular on the problem pages but the Oscar might bring in 10% of queries. Top pic: Max Gibbs, The Goldfish Bowl, Oxford. Bottom pic: Gordon Rogers.*

## DIARY DATES

**SUNDAY OCTOBER 18**
■ **West Cornwall Fishkeepers** are holding their Open Show at **Camborne**. For further information contact: **W. H. Williams, Parc Cottage, Park Lane, Camborne, Tel. Camborne 712971.**
■ **Tamworth & District Aquarist Society** is holding its Open Show (Association of Aquarist Societies Point award) at **Birch Coppice Miners' Club, Watling Street, Fazeley** (details as available from **Gordon Davis, 20 Ester Bank, Kingsbury, Tel. 0827 874911.**
**MONDAY OCTOBER 19**
■ **Bilston and Redhill Aquarist Society** are holding a show and Bye Sale at **Stowmoor Hall, Albert Rd., Bilston, Surrey.** Doors open at 7.30pm, sale starts 8pm. Non club members welcome.
**WEDNESDAY OCTOBER 21**
■ **Hucknall & District Aquarist Society** are holding an open evening at the **Half Moon Public House, Market Place, Hucknall** at 8.00pm. Both novices and experienced fishkeepers are welcome. Further information from **Clive Hinton on 0602 876657.**
**SATURDAY OCTOBER 24**
■ **Ilford & District Aquarist's and Pondkeeper's Society** are holding their annual exhibition at **St. John's Parish Church, Wanstead High Road, Wanstead, Essex.** The exhibition is open from 10am-5pm. Please note that this is not an Open Show. Contact: **R. Dewar, 5 Suffolk Drive, Loughton, Basildon, Essex. SS15 4PL.**
■ **The Northern Goldfish & Pondkeeper's Society** is holding an Open Show at the **United Reform Church, Atherton.** Further details can be obtained from **Alan Rouchffe, 2 Hurstwood Close, Burnley.**
**SUNDAY NOVEMBER 1**
■ **The Portsmouth Reptile and Amphibian Society** is holding its first annual reptile fayre at **Brookfield School, Brook Lane, Locks Heath, Hants.** The fayre is open from 10.30am to 4.30pm. Further information is available from **Jan Hollingworth, 39 Wykeham Field, Wickham, Hants. PO17 5AD. Tel. 4329 833017.**
**FRIDAY NOVEMBER 6**
■ **North West Cichlid Group** is having an ornithopsamma slide show and discussion at the **British Legion Club, Liverpool Road, Skelmersdale, Lancs.** For more information contact: **Brian Wilson on 0695 21406 or Ken Hilton on 0565 633318.**
**SUNDAY NOVEMBER 15**
■ **The Scottish section of the BKKS** is meeting in **Kilmahew.** New members are always welcome – **contact Tom Boyd on 0505 872496.**
**SUNDAY NOVEMBER 22**
■ **The Potteries and District Catfish & Cichlid Group** are holding an auction at the **Heron Cross Sports & Social Club, Whieldon Road, Stoke-on-Trent.** For more information contact: **Mrs M Lawton on 0782 324685.**
**FRIDAY DECEMBER 4**
■ **North West Cichlid Group** is holding its AGM at the **British Legion Club, Liverpool Road, Skelmersdale, Lancs.** For more information contact: **Brian Wilson on 0695 21406 or Ken Hilton on 0565 633318.**
**SUNDAY DECEMBER 13**
■ **The Scottish section of the BKKS** is meeting in **Bridge of Allan.** New members are always welcome – **contact Archie Dick on 0786 832073.**

# HELP – I need somebody...

## The Editor says

Reading Mary Bailey's article this month, which is both a celebration of seven years of service to the hobby, and a cry from the heart to help her to help you, I thought it was time I promoted, explained and outlined our superb readers' query service.

It's been an ever-present feature in *PFK* – but has never been as large, colourful, or as popular as at present – number one in *almost* every reader survey of the past few years. It's a feature we always enjoy compiling as we never fail to learn something from it.

Occasionally we're criticised by our more experienced readers for the simplicity of some of the questions we publish. But we know we have readers at all levels (as befits Britain's best-selling fishkeeping magazine) and newcomers arriving all the time.

This service deals with 100's of queries a month and each one gets a personal reply. Only a few answers are actually printed of course, and we endeavour to choose questions ranging over a large area. Inevitably cichlids, catfish and oddballs draw the more "interesting" questions with their eccentric behaviour.

Most of our panel do the job on a semi-voluntary basis, mostly for the love of the hobby, and out of concern for the welfare of fish in general.

(It's worth noting that all of these experts are freelance and **NOT** available on the 'phone. We get many disappointed callers to our editorial offices – though often the *PFK* staff can solve your problem. Note, too, our new "phone lines on the third page of Newsround).

Occasionally as Mary describes, our panels' fingers are severely tested by fishkeepers who can't or won't do the basic background reading for themselves.

Often the answers are, or have been, in *PFK* on several occasions. But sadly, the general quality of fishkeeping books is not good, I feel, which may account for some of the specific problems we encounter.

My favourites are the hobbyists who wish to attempt an unholy mix of fish – and who often seem to think that a 4' tank is huge. But then I have unprintably strong views about the keeping of the larger tankbusters, so I'm probably biased. (Our big fish man Andy Parkes tells me he prefers the name Oddballs for the fish he keeps – he feels a tank buster is a fish that "has to be turned round several times a day" – which sums up how I feel!).

By contrast the most depressing problem is the large number of people who have been sold a new tank set-up and a complete stock of fish virtually simultaneously...

Whether you love cichlids or would rather keep wasps for a hobby, can I urge you to read Mary's article in case you ever wish to take advantage of our service. It will cost you two stamps, and I'm afraid, a wait of up to a month, as our volunteers deal with the huge response we get.

■ With your support, *Practical Fishkeeping* has maintained its increasing readership with yet another new record sales figure. (This is despite the birth of our new sister title, the superb *Fishkeeping Answers* now the clear number two in the market more than doubling the sales of any other rival).

Not a small part of this success can be attributed to our growing team of new writers. The vast majority of these are hands-on experts – professional or semi-professional fish breeders; highly qualified aquarics experts; and best of all, fanatical hobbyists like our readers.

STEVE WINDSOR

## FACTFILE

### Our monthly question and answer session with a well-known fishkeeper

Name: Derek Lambert.
Home town: Paddingworth, nr Market Rasen.
Occupation: Mainly fish breeding.
**Hobbies (apart from fishkeeping)?** Reading, particularly science fiction, travelling, and fell walking.
**Years of fishkeeping experience?** 22 yrs.
**Favourite type of fishkeeping?** Breeding any fish.
**Best book on fishkeeping?** All about tropical fish by Derek Millvery.
**Favourite species?** The Purple Spike Tailed Platyfish *Xiphophorus alpichthini*.
**Least favourite species and why?** None – I find all fish fascinating.
**How many tanks do you own?** 210 of which 180 are in use at the moment.
**What was the first tankfish you ever had?** Goldfish in a small 10" x 8" tank at the age of 8.
**What was the first fish you ever bred?** A Platy – I waited up until 2am to save the babies. The first eggtayer I bred was a Siamese Fighter.
**Worst mistake in fishkeeping?** Building a stand for 25 tanks of too thin wood and then placing it on a creaking floor. What a mess!
**What's the most you've ever paid for a fish?** £50 for a fancy goldfish.
**What do you think is the most important current issue in fishkeeping?** The E.C. and how its legislation may affect our hobby.
**Biggest fishkeeping gripe:** I'm a doer not a moaner, if I feel something is wrong I try to change things, not complain.
**Are there any fish you wouldn't keep – and why?** Any species that I know I couldn't provide the proper conditions for.
**Which fishkeeper do you most admire – and why?** Jim Langhammer of Detroit U.S.A. for his fishkeeping abilities, knowledge and willingness to help other hobbyists.
**Favourite fishkeeping myth?** "All livebearers are easy." I don't know too many people who are breeding the Great White Shark, do you?
**Biggest fishkeeping ambition?** The successful conclusion of my latest project – whatever that happens to be at the time.
**If you were reborn as a fish, which fish would you be?** A Great White Shark, because it's a livebearer that even cichlid fanatics would have to respect.
**How would you like to be remembered in fishkeeping?** For my fishkeeping abilities, knowledge and willingness to help other fishkeepers.

# ch....Newswatch....Newswat

**● A Darlington woman had her goldfish pond raided after thieves scaled an 8' high fence. But the thieves had eccentric tastes - they stole two goldfish, her cascading waterfall, a stone ornamental duck and a stone toadstool - plus a bucket to take away the fish. (Northern Echo)**

● The Glasgow Sunday Mail reports on what is really a fishkeeping success - trying to turn it into a horror story. Karen Wilson purchased a Porcupine Puffer from the local shop, being told that it would reach just 6". In fact despite being in what's described as a small fish tank, the Puffer quickly grew to 12" and for some reason, would inflate himself to the size of a basketball at 8pm each evening. Considering the number of PFK readers who would like to see their Puffers inflate just once (though arguably as a sign of stress this isn't such a great idea) many marine fishkeepers would have been thrilled. The Wilsons however found it all a bit much and thinking their tank threatened, have moved the fish on to Blackpool's Sealife Centre.

**● The same paper reports the finding of a dead Striped Dolphin (normally a Mediterranean species) on Islay, the third found on the Scottish west coast this year.**

● Scotland's *Sunday Mail* managed to satisfy quite a few fishkeepers' preoccupations by combining beer and fish in not just one but two stories. The simplest reported that two Octopuses at Portsmouth Sea Life Centre required the use of two giant beer coolers from the Carlsberg brewery to chill the Solent sea water used in the tanks when it reached 22°C. They prefer temperatures below 14°C.

The wider story noted the "controversy" about a new Tennents lager ad which showed a goldfish in a golden bowl of lager - complete with foaming head. But apparently the SSPCA condemned the ad which "could make tiddlers tipsy" should there be anyone around who might take it seriously.

"We don't like anything that might give someone the idea to stick a poor fish in beer.

"There's a time and a place for a joke, but this isn't it.

"You can't be flippant about such matters."

Oh yes we can.....

**● German scientists (reports the *Daily Telegraph*) have found a way of utilising enzymes to break down nitrates to nitrogen gas. The method is aimed at large scale tap water treatment, but may be too expensive for current use.**

● The Liberal Democrats, said to be anxious to climb on the green bandwagon, are proposing an Animal Protection commission with varying responsibilities from farmyard animals to goldfish in petshops. At present animal welfare responsibilities are spread around 14 Ministers in various departments.

**● A speech from Patrick Franklin, a fisheries consultant, suggested that Tilapia and Carp could replace sea fish in the British diet. A Sea Fish Industry spokesman responded by saying carp had a "sandy nondescript taste" with lots of bones.**

**The point is that both Tilapia and Carp can be fed on a mainly vegetable diet whereas farmed cod, haddock, and whiting are carnivorous and apparently need to be fed with other sea fish.**

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***● Do you have a story for Newswatch? Send us your clippings, stating clearly where they have come from and the date. We'll pay £3 for every one printed.***

This month's contributors: PFK staff, Ralph Bradley, Mollie O'Finn

GOLD LINE FEEDS

# PRIZE CROSSWORD

**Here's the latest in our series of prize crosswords sponsored by Gold Line Feeds makers of Phoenix 2000 fish food.**

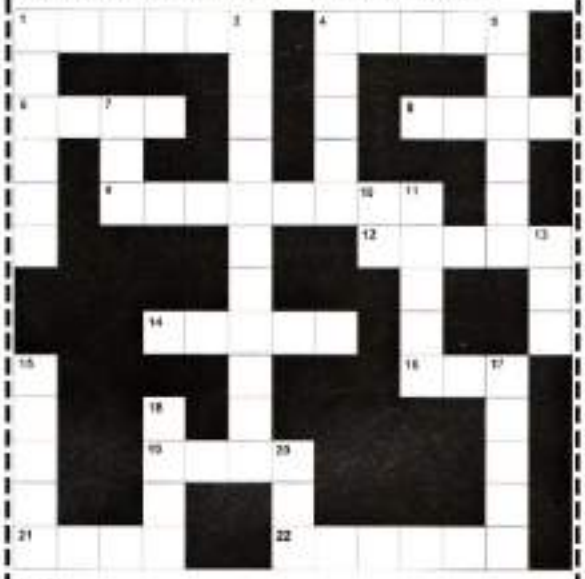
**This month's prize is:**

**A £75 voucher from Thackers Pet Wholesalers of Burton-on-Trent.**

**Cut out the completed crossword and send it to *PFK Crossword, Gold Line Feeds, Pinfold Farm, Welham, Retford, Nottingham DN22 0SD* to reach them by first post on November 12.**

The winner of the September crossword competition was Paul O'Connor, W. Yorkshire.

***■ If you'd like to try your hand at making up a crossword for the contest you can send it to the same address. Crosswords must be on a 13 x 13 grid.***



**Name** .....

**Address** .....

.....

.....

**ACROSS**

**1.** Fish disease (6)
**4.** Outdoor homes for fish (5)
**6.** Large, single version of 4 across (4)
**8.** Aquarium equipment sunk by Bismark (4)
**9.** Type of 1 down (8)
**12.** Tubular connectors (5)
**14.** One type of this characin has his name in lights (5)
**16.** Old witch of a fish (3)
**19.** Ole suckermouth (4)
**21.** Essential element in tropical tanks (4)
**22.** Fish thrown about? (6)

**DOWN**

**1.** Aquatic purification equipment (6)
**2.** Measurement of heat in tank (11)
**4.** Invertebrate used in cocktails? (3)
**5.** Once living creature found in the bathroom (8)
**7.** Very popular pond dweller (3)
**10.** Sigh of relief (2)
**11.** Often found clowning around (5)
**13.** Ultimate in marine aquaria (3)
**15.** Coarse fish (5)
**17.** Fish organs - not for music (5)
**18.** Three _____ Gourami (4)
**20.** Marine fish who's had his chips? (3)

### ALL WINNERS

- The winner of the filter mat competition in the July issue was **Phil Whitfield**, from Mid Glamorgan. He wins a "lifetimes" supply of filter mats.
- The runner up was **Stuart Smith**, from Norfolk who gets a consolation aquarium.
- The winner of the August phone-in competition was **Andrew Weston**, from Kidderminster. He wins a Panaview 200T tank complete with cabinet, hood, lighting and filter, from John Allan Aquariums.
- The August wordsearch competition was won by **W. A. Frankie**, from London. He wins a tank, hood and cabinet from Aquaria, Cabinets and Hoods.
- The three winners of the Goldfish prints in the September write-in competition were: **S. D. Gehan**, from Merseyside; **M. Johnson**, of Wirral and **Phillip Edwards** of Cardiff.
- The winner of the September phone-in competition was **Linda Hutton**, of Worcester.

# London Zoo is falling down...

It appears that London Zoo and its aquarium has been saved from the axe yet again - at least for the time being.

Just a few weeks before the zoo was due to close at the end of September, a meeting of the Zoological Society of London, which owns both Whipsnade Wild Animal Park and London Zoo, revealed that after struggling on despite falling attendances, the zoo's finances had finally broken even. This was partly the result of a gift of £1 million from the Emir of Kuwait, along with a rise in the number of visitors which has generated around £.5 million.

The staff admit that a sudden rise in entrances to the zoo was likely to be largely due to an interest by the public who wanted to visit it before it finally closed and they agree that problems remain for the future.

The zoo is now considering a number of proposals which includes one submitted by the staff and another by New Zoo Developments Ltd along with an in-house plan which the Society has been developing for some time.

But would we really miss it if it closed?

There are those who would argue that it's a part of British heritage - but then one of the problems with London Zoo is its age. Many of its buildings are listed which places severe limits on any alterations.

The Victorians had very different ideas on keeping animals in captivity to those we hold now, and many of the buildings are totally unsuitable by today's standards.

But because they are listed, many of the more badly deteriorated buildings and terraces cannot be demolished and rebuilt with more modern structures - and are left empty, because the zoo doesn't have the funds available to repair them.

The aquarium is a prime example of an out-of-date building which badly needs bringing into the 1990's. At a recent meeting it was disclosed that £350,000 was needed - just to bring its electrics and equipment into line with the Health and Safety Act. This doesn't include the money which would be required for modernisation.

Built in 1925, the aquarium still has many of the original tanks, with slate sides and bases. Some of the filtration systems are just as outdated and ready for modification.

Over the years, zoos have declined in popularity. Many parents are becoming increasingly uneasy about taking their children to see "animals in cages". London Zoo has been particularly badly hit.

In reality zoos are responsible for much more good work in the way of conservation, than their overall appearance may suggest. Some publicise it more than others.

London Zoo has lagged behind, not in conservation projects but in publicising them. Behind the scenes at London Zoo, staff have been responsible for some notable breeding achievements among rare and endangered species.

In the zoo's aquarium, for example, there are thirteen particularly endangered species, of which the staff have bred eleven. These include several Lake Victorian cichlids *Astatoreochromis alluaudi*, *Haplochromis* Black Blotch and *Haplochromis sibanaeli*. The latter is actually breeding quite happily in the show tank.

Other successes on the endangered list are the Monterrey Platy, *Xiphophorus couchianus* and the Butterfly Goodeid, *Ameca splendens*.

Unfortunately, the conservation side has hardly been publicised in the case of London Zoo - and in these pro-environment days where so many people are "going green", this is a great shame. It may still be too late for London Zoo.

**Karen Youngs**

### AQUACHAMP 1992

The AQUACHAMP fishkeeping club quiz sponsored by *'Aquarian'* and *Practical Fishkeeping* reaches a climax in November as the top scorer's nationwide meet for a free weekend for themselves and a partner at the Pontin's Weston Super Mare-based **Supreme Festival of Fishkeeping. On November 7 and 8 they'll take** part in a new two-section grand final, with a specialist round on the Saturday and a general fishkeeping knowledge round on the Sunday.

Next month you'll get your chance to test your knowledge as we print a selection of the Aquachamp Club Quiz questions.

# CALL THE PFK PROBLEM PHONELINES

**■ From this month we offer a new service to *Practical Fishkeeping* readers. We have always done our best to help readers with their problems, and over the years we've noticed the same questions coming up again and again. As we're not always available on the 'phone, and then only during the expensive office hours, we have set up four 'phonelines to answer many of your queries.**

**☎FOR TROPICAL FRESHWATER & MARINE FISHKEEPERS:**

**GENERAL EMERGENCIES - What to do if your fish appear stressed; if you overdose your fish; dealing with powercuts; tank leaks; aggressive fish; and unexpected births.** **0336 404046**

**☎FOR TROPICAL FISHKEEPERS:**

**NEW TANKS AND NEW TANK SYNDROME - avoiding the problems of fresh water, new equipment and stocking new fish. Listen to this one before you set up your new tank.** **0336 404047**

**☎FOR MARINE FISHKEEPERS:**

**NITRATE IN THE MARINE TANK - the problems, and the possible solutions to the marine fishkeepers' major bugbear.** **0336 404048**

**☎FOR PONDKEEPERS:**

**OVERWINTERING YOUR POND - What to do when autumn comes & how to help your fish through the winter.** **0336 404049**

*Calls charged at 38p per minute cheap rate; 48p per minute at all other times.*

# Altern medici fish

## General Tonic Recipe

1/2 tsp. parsley

1/2 tsp. fennel

1/2 tsp. mint

*Garlic - use only a tiny amount, no bigger than 1/4 of the size of a garden pea*

*Six pumpkinseeds*

*Chris has developed this recipe as a general tonic and also to treat cuts and fungus. It's important to stick to the proportions of ingredients given, as too much of one herb can cause problems - e.g. too large a dose of garlic can blister the skin. Remember that this will act as a food as well as a remedy, so to avoid any risk of pollution, don't feed the fish for a couple of days before you dose them.*

*These measurements are sufficient to treat a four foot tank. The quantities should be reduced for smaller tanks.*

■ Grind the pumpkinseeds to a paste. Add the finely chopped garlic and the rest of the herbs. Scoop the mixture out into a mug and add 100ml of boiling water to make a "tea". Leave it to cool.

■ Pour it into the tank where the fish usually feed.

■ Giving the fish the herbs in a "tea" form helps in two ways. In addition to eating the herbs, they will bathe in the water, helping the mixture to work externally as well as internally.

■ Don't redose for at least a fortnight although it's generally unnecessary anyway.

■ If you have pondfish

It's probably better not to add the water, but roll the herbs into pellets instead. You may need to add a couple of drops of water just to make the mixture moist enough.

The successfully-treated Goldfish

The shelves in the living room of Chris Cobley's London home are filled with certificates and trophies, including numerous "firsts", which have been awarded at local shows for the high standard of his fish. In the corner of his room stands one of several tanks in his collection, containing a selection of community fish and plants.

None of the fish in any of his tanks are what you could call unusual - Corydoras, Barbs, Livebearers, a couple of splendid wild Angels, and a Red Tailed Black Shark make up the majority of the stock. Outside is a small garden pond. Impressed? Probably not, so far, but Chris Cobley's approach to fishkeeping is ... well ... a little bit different.

Over the last fraction of his 34 years' experience in the hobby, Chris has dispensed with all the traditional off the shelf treatments and remedies for fish and has turned to "natural medicine", centred mainly around the use of herbs - with great success.

**Many of the herbs Chris uses for treating his fish would be accessible to them in the wild.** Some grow much better in damp places where the fish could nibble at them when they felt like it or if they needed to - in a similar way to a dog eating grass - and for much the same reason. Chris stresses that herbs should not be given to the fish as a substitute for food.

Finding the right herb to cure a particular ailment requires a little research. Chris uses the *"Interpet Book of Fish Health"* to find out what causes the complaint - and then looks the problem and suggested treatment up in *"Helping Yourself with Natural Remedies"* by Terry Willard - which is actually aimed at humans. From the list given in the book, he chooses only herbs which grow in wet places that the fish would naturally have access to. He tries to obtain fresh herbs where possible, and grows a few in his garden as a standby, although dried herbs do work if the fresh variety is not available.

The herbs are ground together and either rolled into pellets for pondfish or made into a kind of tea which is added to the aquarium water.

Once he began to recognise the key herbs to use, Chris started to experience success with all kinds of ailments and has developed several recipes, such as the one for a general tonic listed here.

He has recently treated a friend's goldfish (pic left) for swimbladder problems. The affected fish had previously been swimming on its head and its spine had become deformed due to its awkward position. After one treatment the fish has made rapid progress and is now able to swim upright.

Another breakthrough Chris has made is with Neon Tetra Disease. Although he has not been able to cure it, he has found it possible to slow the disease down so that it stabilises, banishing the symptoms to allow

# ative ine for ?

**What do herbs have to offer fish apart from a better flavour? KAREN YOUNGS went to visit CHRIS COBLEY to find out.**

Above: Small 'ponds' for outdoor tropicals. Left: The surface of Chris' 'natural' planted tank. Below: Mixing herbs into the successful recipe.

## Planting for healthy fish?

Chris believes that some aquatic plants may also make our fish healthier. For example, Cryptocorynes are used for stomach disorders in India. So perhaps we should look harder at the plants we keep with our fish.

the fish to grow and feed. In order to keep the disease in check, the fish need to be redosed every six weeks, but Chris is certain that with a little more research he will eventually find a cure.

**In addition to his herbal remedies, Chris has also experienced success in treating white spot - using daphnia.** He has found that by lowering the temperature of the tank to 72-73°F, the white spot are slowed down and the daphnia, which feed on the parasites remain active. A very dense cloud of daphnia will soon dispose of the disease and, what's more, the fish get so sick of eating the daphnia that they will leave it alone and take flake.

Chris also uses daphnia for quarantining fish. This method is ideal for nervous species, because the fish can use the daphnia to hide among - and they only have to open their mouths to eat. It also prevents white spot taking a hold.

Chris has his own daphnia culture outside in his garden. Feeding the culture presents no problem - he just raises out yoghurt pots and dog food tins into the water.

**All the tanks in the house are unheated** and rely on the room temperature - which was 74°F while we were there. Chris believes that the constant temperatures provided by heaterstats are not good for the fish and he does have a point - where in the world does the water temperature remain stable all year round, both day and night?

He doesn't raise the temperature for sick fish either. He holds the view that an ill fish won't sit in full sun in the middle of the water, where it runs the risk of predation, but will hide, usually in the shade at the edge ▶

◀ of the water, where the temperature will be much lower. Cooler water slows down the fish's metabolism. This in turn reduces the bodily functions which are under attack from the disease organism.

Rainwater is used for water changes. At the beginning of the year Chris allows the water level in his tanks to drop quite considerably (up to 6-7") and in mid-February to March he fills the tanks to the top with cool water to simulate the Monsoon. Although the amount of new water is minimal, compared to the real Monsoon, he still finds it stimulates breeding.

All the eggs are left in the tanks with their parents. Chris disapproves strongly of artificial methods of rearing, even if it means that he may only get one or two fry from a brood. He believes it's a way of ensuring only the best survive, as they would in the wild.

*All* the fish are fed on Hikari goldfish food or cichlid food. This is supplemented by pieces of dog biscuit, cornflakes and even pieces of banana. Live food consists of river shrimp and - of course - daphnia.

**The aquarium fish form only a part of Chris' hobby.** Outside he has a small pond, containing Goldfish, Rosy Barbs, Mosquito fish, Guppies and *Corydoras aeneus*, many of which have spawned outside during the summer. He is trying to produce a generation which will eventually stay outside all year round.

More of these "coldwater tropicals" are housed in outside containers which are planted with Water Lettuce. This hasn't grown so well this year compared to previous summers, probably because of the lack of really bright sunshine. Chris has just started bringing in the "tropicals" for the winter.

## Dosing with herbs

The old rule of not overdosing your fish still applies, whether you are using off-the-shelf remedies or natural medicine.

Some of the herbs Chris commonly uses include mint (a good antiseptic), garlic (antibiotic), and pumpkinseeds (good for skin tissue - humans take them for worms).

Chris stresses that some herbs can be dangerous if not used properly. Garlic, for example, must only be used in tiny amounts or it will blister the skin. And you should not repeat any treatment for at least ten days.

Taste a little of the mixture before you feed it to the fish. Chris insists that you shouldn't give them anything you're not prepared to eat yourself.

Another point Chris would like to stress is that he has only tested his herbal remedies on tropical community fish (which are mainly acid-loving) and goldfish - he doesn't know how more specialist hard water fish, such as Mbuna, which come from areas with virtually no plants, would react.

**He has also experimented with aquatic plants.** One particularly interesting example is the Ivy Leaved Cryptocoryne which he is growing using three different methods. The first is planted in one of the tanks, another is in a mini greenhouse without water made from a plastic bottle. The third - and the most vigorous grower - is planted in ordinary compost in an empty sweet jar which has a polythene bag over the top.

## Fish in parsley sauce?

Chris believes that it is no accident that many of the herbs which are associated with fish and cooking, such as parsley and fennel, grow better damp places where fish have access to them. These herbs would have been among those grown for medicinal purposes by the monks in days gone by and they may well have been planted by ponds stocked with carp in the grounds of the monastery. By eating the herbs, the fish would have taken on a slight herby flavour themselves. This could have led to the monks experimenting with other herbs in sauces.

When the bag deflates, Chris uses a piece of airline to refill the bag using his own breath, adding natural $CO_2$. He finds it a great method of growing your plants on prior to introducing them to your tank.

On the whole, Chris finds his plants grow better using normal light bulbs, rather than fluorescent tubes. One of the tanks has been planted and left to grow virtually untouched for about twenty years. It contains Amazon swords, Salvinia, Water Lettuce, Cryptocoryne and Indian Fern. Over the years the plants have moved around to wherever suits them best, so that the effect is almost as natural as you could hope for in an aquarium. Chris occasionally removes some of the surface plants, but does very little else, except for a few water changes.

The tank is unfiltered but contains only a very few fish at any one time. Wild Angels have bred in the tank quite happily on numerous occasions. ■

**■ If you wish to contact Chris Cobley, write, enclosing an SAE c/o *PFK* and we will forward the letters on.**

Top: Chris keeps some of his tropicals in this pond through the summer. Above right: Daphnia are grown-on in these tanks. Left: Chris rolls his herbal remedies into pellets to feed to his goldfish.

PRACTICAL
Fishkeeping
COMPETITION

the filter tech 8 - the pre-filter unit shown is also included

# WIN an A-TECH Filter Tech 8 trickle filter from REEF AQUATICS

**Your chance to acquire a new British designed and built trickle filter, constructed from special grade heavy duty plastic, with reinforced corner design for strength and rigidity.**

The large media chamber allows extensive amounts of media to be used, while the filter should still fit most cabinets.

This is backed with Bioball media; an Eheim 1060 pump; and the unit's own pre-filter.

**HERE'S WHAT THE LUCKY WINNER GETS:**

■ The Filter Tech 8 for aquariums up to 500 imperial gallons. It has 8 cubic gallons of media capacity but will fit most cabinets.

■ The Filter Tech Pre-Filter - a syphon and skimmer box with two chambers for carbon and resins.

■ Bioball media

■ An Eheim 1060 to run the unit.

**THE TOTAL VALUE IS OVER £500 R.R.P.**

## THE RULES

■ This month's competition begins on *October 14* and to enter all you have to do is study the three questions below.

When you think you have the correct answers, dial our competition hotline on 0891 600 067.

■ The recorded message will read out the questions in the order they appear below, and the choice of answers (a, b, or c). All you have to do is say "yes" to the answers you think are correct.

■ If you answer all three questions correctly, you will be asked to leave your name and address. Please state which you would prefer, and whether you would be willing to receive details of any further promotions.

■ Keep the competition handy when you phone. Calls cost 36p per minute cheap rate and 48p per minute at all other times.

■ The names and addresses of all the correct entrants will go into a draw after the closing date, which is *November 13*. The first name drawn will win the trickle filter.

## QUESTIONS

**What is the address of Reef Aquatics?**
a) Dogsbowl Road
b) Catfoot Lane
c) Catsbell's Street

**Where is the Filter Tech designed and built?**
a) Korea
b) U.S.A.
c) U.K.

**What background colour are the pages of the Reef Aquatics advert this month?**
a) White
b) Yellow
c) Black

**• DIAL 0891 600 067 •**


# Conserv

**Question: What do you do when your 7000 gallon Koi pond falls prey to subsidence and springs a leak? Answer: Evacuate the pond, install a conservatory and create a new indoor home for your fish. TIM PAYNE went to visit JOHN and JENNY EMERY.**

It took John and Jenny Emery much sweat and toil over a two month period to create a beautiful addition to their home - and a comfortable, well-controlled environment for their fish.

John and Jenny have been keeping fish for nearly six years. They began almost by accident, when the house they bought contained an unfiltered ornamental pond.

The 7000 gallon pond covered one corner of their garden. John installed a filter and later added a waterfall, but a rapid drop in the water level one day spelt trouble and somewhere in the region of 180 assorted fish had to be found a new home.

Friends stepped in to offer temporary residence, while the other fish were transferred in large, polythene bags and a baby bath to John's back-up tank in the garage.

*The filter system is outside the house*

## First steps

As Jenny wanted a conservatory and the fish needed a new home, a plan evolved to combine the two. The first step was to completely drain the old pond and remove all useful fittings.

John had decided to retain the filter system from the old pond. The whole 10' x 4' x 4' unit was dragged across the garden using ladders and chain blocks. It was then placed alongside the house on top of two 10' railway sleepers, which allowed room for pipework in the hollow sections beneath the filter unit.

The whole unit was then double-insulated with a wood-polystyrene-wood sandwich construction and an intricate maze of pipework was developed to handle a projected water capacity of 3300 gallons.

## Excavation

We all know that the key to success is preparation. For John, this meant hours of excavation work. Unfortunately, due to the layout of the property, utilising a JCB was out of the question. Shovels, wheelbarrows and a friend were pressed into action.

John had decided to dig a depth of nine feet, but after removing four feet of earth, the men hit a hard band of shale and a Kango breaker was hired to remove the remaining debris. The freshly-dug earth was used to fill the old pond, which now forms a neat rockery around the patio.

# vatory Koi

To create the sloping sides in the base of the pond, John built up three layers of bricks from the edges, sloping inwards towards the centre. A 9" concrete base was laid and after the conservatory was installed by contractors, a double-thickness (6") brick wall was built up around the edges of the pond, to a height of 2' 6" above ground, following the shape of the conservatory. After their previous experience of leaky ponds, John and Jenny were taking no chances with the strength of the retaining wall.

The final dimensions of the pond were 14' x 8' x 7' 6" deep. To Jenny's relief a surface water drain beneath the conservatory prevented the pond from becoming any wider, ensuring the adequate seating area inside the conservatory.

A brief inspection for one of John's favourites

Above: Comfort and style for both koi and owners
Right: Little hint of the splendours within.
Diagram below shows pond and filter system.

## Lining

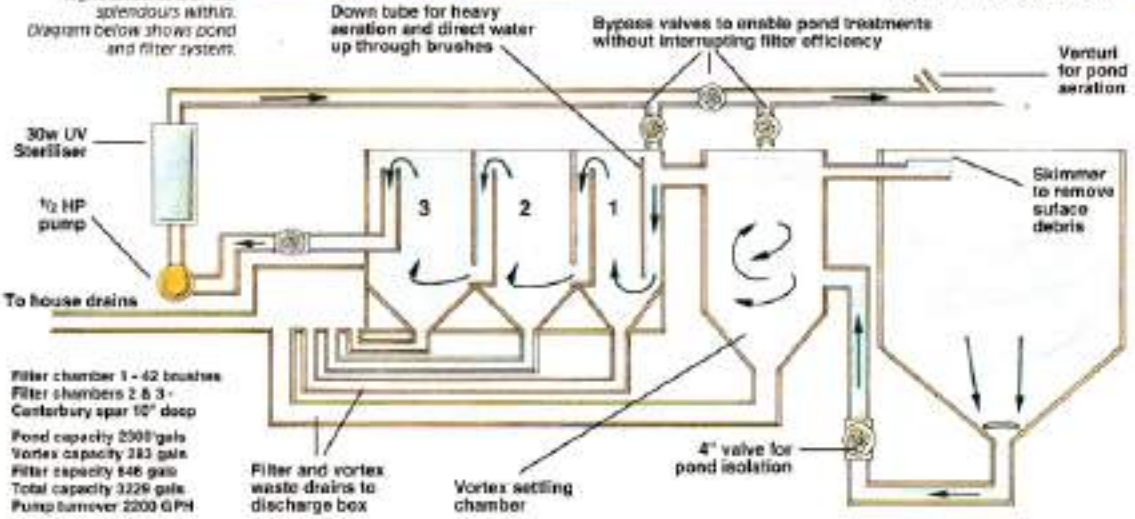
John had considered fibreglassing the pond, but instead got in touch with local man Barry Heythorne, who travels the world applying linings to swimming pools.

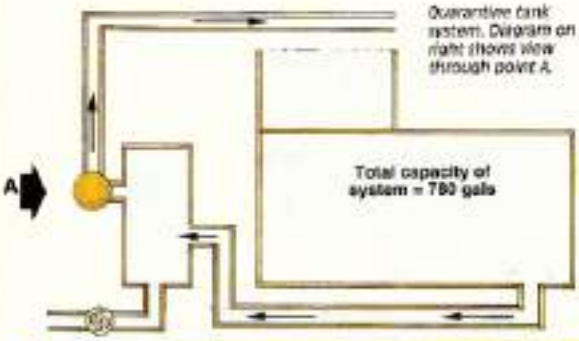
A continuous roll of liner was cut to shape and "heat-sealed" into place. A separate piece formed the base lining of the pond.

Barry returned the next day to add the finishing touches. A vacuum cleaner nozzle was inserted into a hole in the lining and all the wrinkles were sucked out of the material to leave a completely smooth, seamless finish.

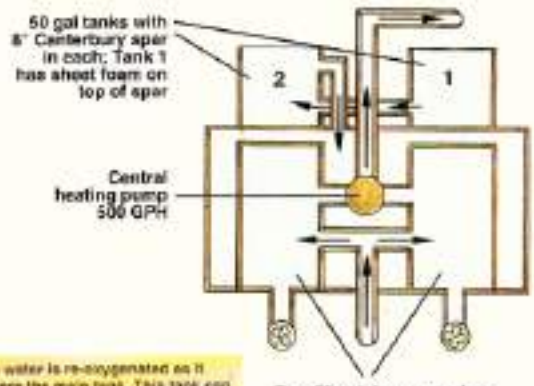
## Setting up

John retained all the filter media from the old pond in ▶






Quarantine tank system. Diagram on right shows view through point A




Two 50 gal drums used as centrifugal settling units. Each has own drain to waste

Water is gravity-fed from the main tank to two fifty gallon drums where the flow rate is halved between the units. From the top of the drums, water is pumped to Tank 1 via the spray bar down through the foam and spar, from where it is transferred to Tank 2 up through more spar. It overflows into a 3" diameter down tube where the water is re-oxygenated as it enters the main tank. This tank can be kept at a temp of 22-24° throughout the year using three 300 watt aquarium heaters.

large sacks. The media was only lightly rinsed to help re-seed the new filter. Water was added and once he was satisfied with the Nitrate level and pH, John introduced three or four small goldfish to help the biological process along. As conditions improved, the more hardy Koi were introduced, the rest following over a period of weeks.

The quarantine filter set up

## Quarantine

A back-up tank of 780 gallons is set up in John's garage for quarantine and emergency purposes. Water is gravity-fed into two 50 gallon drums, passing through layers of Canterbury spar via a spray bar before being pumped along a down-pipe back into the main tank. A central heating pump provides the power.

The back-up tank proved a real life-saver following the leakage in the original pond. The tank became a temporary home for most of John and Jenny's livestock during the creation of the new pond.

## Filtration

Pump capacity is 2200 gallons/hour. A skimmer removes surface debris and water is forced through a centrifugal settlement chamber (283 gallons) and into the first chamber of the filter. Chamber 1 contains forty two 10" x 4" diameter brushes for mechanical straining. Chambers 2 and 3 contain Canterbury spar to a depth of 10". Flocor is also included in chamber 2. Water progresses through each chamber and is returned to the pond via a ½ HP ITT Marlow pump and a 30W steriliser encased in 4" ABS piping.

Pond aeration is provided by a venturi and a bag of Clarisan is suspended over the outlet pipe to help control blanket weed.

All pipework is fully insulated and the whole filter unit is covered by a padded insulation cover.

A stop valve prevents complete emptying of the pond in the event of an accident and by-pass valves enable water treatments to be added to the pond without harming the biological balance of the filter.

Stand pipes, linked to each chamber of the filter, feed into the surface drains.

## The water

The pond has a natural temperature of around 21°C during summer, due to the excellent insulation of the filter system and the natural properties of the conservatory. The conservatory is light and airy, but remains sufficiently shaded to prevent summer temperatures of getting out of hand.

During winter the temperature does not drop below 10°C which means that the dormant winter period ususlly associated with Koi in outdoor ponds is avoided.

The pH remains between 7 and 7.5 and the water is moderately hard.

How to view Koi in year-round comfort

## Maintenance

John's water changes consist of 50 gallons (1.5%) every 2-3 days, using his stand-pipe system. Topping up is by a hose, placed so as to pass water through the filter before reaching the pond.

The Canterbury spar is raked over occasionally to break up any "dead spots" in the filter and surface mulm is syphoned off once every fortnight.

As John remarks, a healthy, biologically balanced environment should require minimal maintenance and effort.

## The fish

John and Jenny have a wide variety of Koi from various sources, including Showa, Tancho and Utsuri, but the family favourite is a huge, chocolate brown Chagoi, appropriately named "Bournville". The fish all appear to relish the extra attention they get indoors.

John has also become quite adept at treating fish and he has bought several with faults and restored the to full health.

## Conclusion

What started out as a potential disaster provided a great opportunity to create something really different.

After two months of solid work and more than a little imagination, John and Jenny have created a marvellous centrepiece for their home. The fish are thriving in their stable, controlled environment and the Emery family are able to view their fish all year round. ■

PFK PROJECTS

# A taste of HONEY

**Pro fish breeder DEREK LAMBERT breeds the Honey Gourami; with additional tips from fellow Honey Gourami fan ANDREW SMITH.**

*The Honey Gourami is one of the smallest species, reaching only 4cm. Pic: Hans Reinhard, Bruce Coleman Ltd.*

Of all the commonly-available gouramis my favourite is the Honey Gourami.

This is one of the smallest species only attaining an adult size of 4cm for both sexes. However, despite its diminutive size, it is well able to fend for itself in a mixed community tank, protecting its territory against all comers, even if they happen to be twice its size.

Juveniles and non-breeding adults have much the same colour, being pale silver with a black stripe running from the eye to the caudal peduncle. This stripe tends to fade when the male is in breeding condition and leave the fish looking an all over silver, with a hint of blue along the throat and belly. There is just a touch of yellow along the very top of the dorsal fin.

**ANDREW SMITH'S TIP: The Honey Gourami can be found in the Brahmaputra Basin, India Assam, Bangladesh, and around Dacca. Chuna, is the local name for this fish in India. In some literature, this fish is described as C. sota. Others describe C. chuna and C. sota as separate species as "sota" is also a local name for this species. Its natural habitat offers water that is on the soft side, slightly acidic and heavily vegetated. They also seem to shoal more than other species.**

**ANDREW SMITH'S TIP: Before the fish colour-up, look closely at the dorsal fin. The male's is slightly more pointed than the female's.**

When the males are in breeding colour they are a truly spectacular fish. The whole body turns an intense orange with the dorsal fin lemon yellow and the throat and anal fin a brilliant blue. All in all a lovely sight to behold. Diet presents no problem, as they will eat all foods.

**ANDREW SMITH'S TIP: When keeping any bubble-nesting Anabantoid, it is good practice to include floating plants and plants that reach to the surface to provide hiding places and nest sites. Plant out the rear and middle ground of the tank as well as the sides, and leave a nice area at the front for swimming. Remember that almost all Anabantoids need to be able to reach the water surface to take air through the Labyrinth organ, so make provision for this.**


## Breeding

**Step one: conditioning**

Although these fish are not picky eaters, for breeding the addition of some live food when conditioning the fish is advisable. This is particularly true for the female, as she must be in top condition to make good quality eggs prior to spawning.

**Step two: territory**

Once the male comes into spawning condition he will select a suitable territory and start to build a bubble nest. This territory is usually where the plant growth is densest at the top of the aquarium or, if there is no plant available, a corner of the tank will be used.

If the male starts to build his nest in a community tank, he will attack any fish which comes close. Normally he does little harm, but if other male gouramis - even other species larger than himself - are present, he may kill them to protect his breeding site.

**Step three: Spawning tank**

Ideally the pair should be moved to a 10 gallon tank with ▶

e bare bottom and a pot of low growing plants for the female to hide in.

### Step four: Plants

The other end of the tank should have a clump of plants floating on the surface. These can be any species but Cabomba or Myriophyllum seems to be preferred because of the small leaf structure.

### Step four: temperature and water

The water should be 75°F to 85°F and while they will successfully breed in hard alkaline water with a 7.8pH, better results may be obtained in somewhat softer and more acidic conditions.

**ANDREW SMITH'S TIP: I use 50% of the holding tank water and 50% rain water and set the heater stat to a degree or two higher (around 78°F to 80°F) than the maintainance tank.**

### Step five: Nest construction

The nest is constructed from bubbles of air coated in saliva. Some species of gourami will use pieces of plant to help bind the nest together.

These can be just those pieces which they find lying around the surface or they can be ripped off the growing plants. Dwarf Gouramis are particularly bad at damaging the plants when spawning, but Honeys use only what comes easily to mouth and even then it is a minor addition to the nest.

**ANDREW SMITH'S TIP:The nest of this fish is a rather tatty affair that soon falls into disrepair and if there is not enough plant material to fix to, can develop into a vast platoon of bubbles.**

### Step six: Find a mate

Once the nest is completed, the male sets off in search of a female. As soon as he sees one, he will try to entice her to his nest.

This he does by turning straight up, with his head towards the surface and wraps his body around to show off his lovely colours. If the female is ready to spawn she will follow him to the nest. If not, she will pretend to look straight through him and pick at a plant leaf hoping he will go away.

## Popular gouramis

**Why are gouramis one of the most popular groups of aquarium fish? They seem to possess all the attributes which are essential to life in a community aquarium, being hardy, peaceful and of a suitable size.**

**Being a member of the Anabantidae family, they have an auxiliary breathing apparatus called a labyrinth into which they draw air from the surface.**

**Once in the labyrinth the oxygen is absorbed and carbon dioxide released. The waste gas is expelled when the fish next rises to the surface. This enables them to survive in very polluted waters with low levels of oxygen.**

Above: Despite its size, the Honey Gourami will defend its nest to the last. Left: Bubble nest viewed from above. Pics. by Derek Lambert.

### Step seven: mating

Once the male has the female under his nest, he will embrace her forming a 'U' around her body. As he gently squeezes, she will release from 5 to 20 eggs which he fertilises. These float to the surface among the bubbles. Once the pair have recovered they will embrace several more times. Eventually there may be well over 100 eggs in the nest.

The male is usually left in the tank to keep the eggs clean. These hatch in two days and the fry are free swimming on the 5th day.

After the 5th day it is usual to remove the male. In the wild the male remains with the nest, protecting from all intruders except other females which he will attempt to entice in to spawn with. This means a nest may contain eggs through to fry which are just becoming free swimming.

### Step eight: free swimming

Once they reach this state the fry will move away from the nest and face the dangers of life on their own without their father's protection.

**ANDREW SMITH'S TIP: After spawning is complete the male gathers all the eggs together and compacts them all into the size of a hazelnut, where they begin to turn yellow then grey and finally black when the fry hatch out. An interesting behaviour pattern is seen sometimes after all the eggs have been collected. The male positions himself at the edge of the nest and fires a rapid succession of water droplets one to two inches out of the water and onto the nest itself to possibly agitate the eggs for recognition purposes.**

### Step nine: feeding

A few drops of liquifry should be added shortly after the eggs hatch to start an infusoria bloom in the tank; alternatively you can culture this in a separate container and feed it to the fry from the 5th day.

This is one of the most crucial periods when breeding any of the gouramis as the babies are very small and can easily starve to death if enough food is not in front of their noses.

However, it is all too easy to overfeed and pollute the water and kill the babies that way. Only trial and error will teach you the exact amount needed for the number of babies you have.

After about a week to ten days the fry will be able to take newly-hatched brine shrimp and from here on the growth rate is very rapid.

**ANDREW SMITH'S TIP: I change part of the water in the rearing tank about once every other day with water of the same quality and temperature. This may seem a lot, but with many brine shrimp naupili not being eaten by the fry the water could soon become polluted and have a detrimental effect on the fry, whereas "little and often" water changes keep pollutants diluted. Despite their small size the fry are relatively hardy and grow quite quickly, and after a week they will take brine shrimp without any problem.**

### Step ten: breathing crisis

At about 6 weeks old another crisis period occurs. This is when the labyrinth is developing and the young babies, which are about 1cm long by this time, are taking their first gulps of air.

Loss rates at this time can be quite heavy with anything up to half the brood dying. A tight-fitting cover or better still cling film will help reduce the deaths because cold draughts seem to be partly to blame. Hot lights should also be left off at this time, once again to minimize the difference between the air and water temperatures. Even so, expect to lose some of the fry despite these safeguards. ■


# In July we asked you for your original ideas on alternative uses for our free filter matting - and offered a prize of a "lifetime's supply" of Crystal Clear airline. Here are some of the best, along with the overall winner.

## Airline winner

### Mopping up eggs

I cut my filter matting into ¼" strips and made two spawning mops which seem to work very well. One floats at the water surface and is tied to a piece of cork. The other lies on the tank bottom and is attached to a lead weight.

**Phil Whitfield, Mid Glamorgan, South Wales.**

**Congratulations to Phil Whitfield; offering the same idea was Stuart Smith of Wymondham, Norfolk. On the toss of a coin he takes a consolation prize of an air pump.**

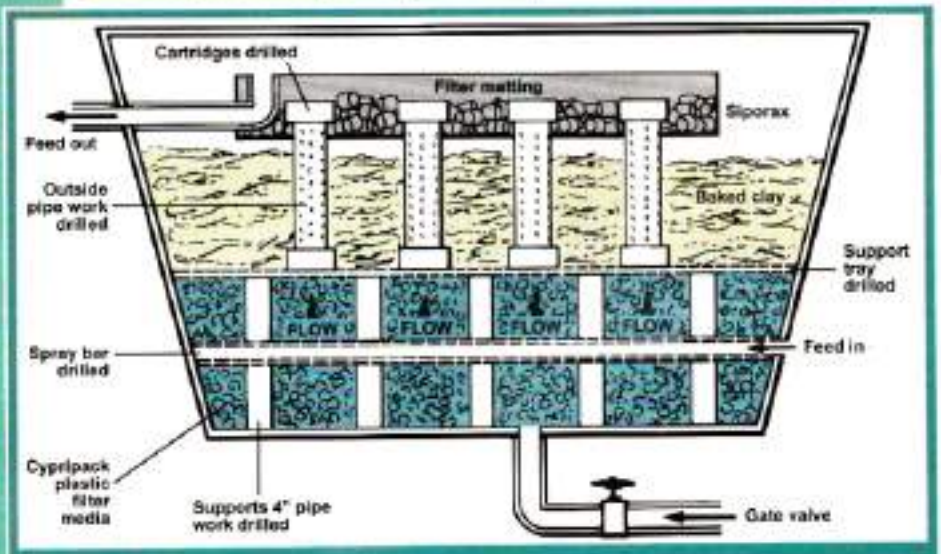
## Efficient For Finches

Pre-packed filtration systems and the growing emphasis on high-tech media are both in danger of making us forget the very important role that floss - and better still, a properly bonded filter mat - can play in ..... raising Zebra Finches.

A few years ago my pair of Zebra Finches decided to become parents. As a complete beginner I did not know what to do. So I purchased a wicker box and waited, but nothing happened. I was told I needed to provide nesting material, but the material I purchased from my local pet shop was so fine that it became wrapped around the parent's legs and caused severe cuts. But then came the springy, difficult to crush and easy-to-use filter matting. I cut a sheet up into 1cm squares and placed this in the bird cage. Since the birds were in a cold room I believe the filter matting provided extra protection from the low temperatures. Three weeks later and thanks to the filter matting, I was the proud owner of five new Zebra Finches.

**C. Nelson, N. Ireland.**

I use filter matting in my wine filter process..... **L. Edwards, Dyfed**




## Plugged pond filter

I have a filter unit which is gravity-fed from a second tank. The water enters through a drilled spray bar and is filtered through Cypripack plastic filter medium under a perforated support tray. On this tray are four drilled 2 ¼" diameter pipes, each of which slide inside another pipe to act as a reusable cartridge. Both pipes are drilled and fitted with drilled stop ends for the use of the filter matting.

The pipes are surrounded by baked clay and the cartridges fit through a drilled basket containing Siporax. The Siporax is only half submerged, so that a head of water never covers the biological media. The water is then fed out to the waterfall.

**Michael Drayton, Beds.**

## The pain out of straining

As a keeper of Cichlids, I often use rainwater in addition to tapwater. The rain which I collect from the downpipe often has debris in it from the guttering. By bunging the end of the downpipe with the filter mat all the debris is filtered out of the water before it goes into the bucket or water butt, which saves time and energy trying to strain it out later.

**L. C. Cross, Leicester**

## Polished performer

The filter matting has proved to be a very effective algae cleaner. It is very fine and so doesn't cause any discernable marks on the glass while cleaning off the algae. Because the matting is white in colour, the algae shows up against the matting extremely well, enabling quick and efficient cleaning.

**Steve Birch, Weres.**

You can use the filter mat to make a Santa's beard at Christmas.... **Steven Lyman, Northampton**

PFK PROJECTS

# Going for GOLD

**Fish breeder JOHN RUNDLE can't understand why some killies are not more widely available. Why not breed your own instead?**

The female Gold Australe is rather dull when compared to the male.

There are few other freshwater tropical fish which have such diversity of colour than the Killifish or egg-laying toothcarp. It also has an interesting way of breeding - and can be kept in small aquaria. All-in-all the ideal fish to keep. So why do we not see more Killies in dealers' tanks?

We're told that it is not a commercial fish to breed in large numbers and that it is a species more suited for the specialist or advanced hobbyist.

Well, no, you cannot breed Killifish as you would Zebra Danios or Angelfish and it's true that some are best left to the specialist.

But of the fish that **are** available to the dealer there is one that stands out: the Gold Lyretail - a very striking species - and ideal for your first attempt at breeding Killifish.

## A brief history

*Aphyosemion australe* (Gold Form), is a man-made colour form of the original valid species *Aphyosemion australe* (Rachow 1921) which originates from West Africa (Gabon and Cameroon).

Both the valid species and the gold form have been available to Killi-keepers for many years.

## Sexing

The male has a gold to orange main body colour enhanced by red markings. The fins are gold-edged with dark stripes, and there are white filaments on the anal fin. It reaches 2½".

The female is rather sombre compared to the male. The body is a light brown with light red flecks scattered on the body and fins. The female grows to 2".

## Water conditions

The Gold Australe adapts to a wide range of conditions if extremes are avoided. My fish are kept in aged Plymouth tap water with a pH of 7.2. When aged, the pH tends to drop slightly and the water becomes very soft.

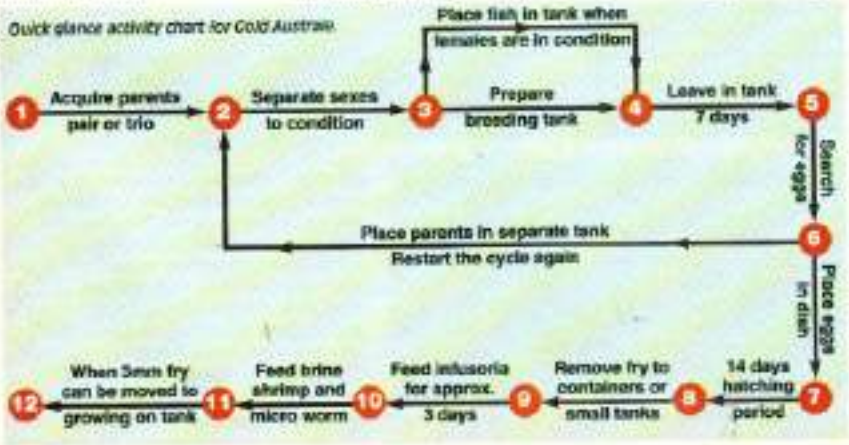
## Feeding

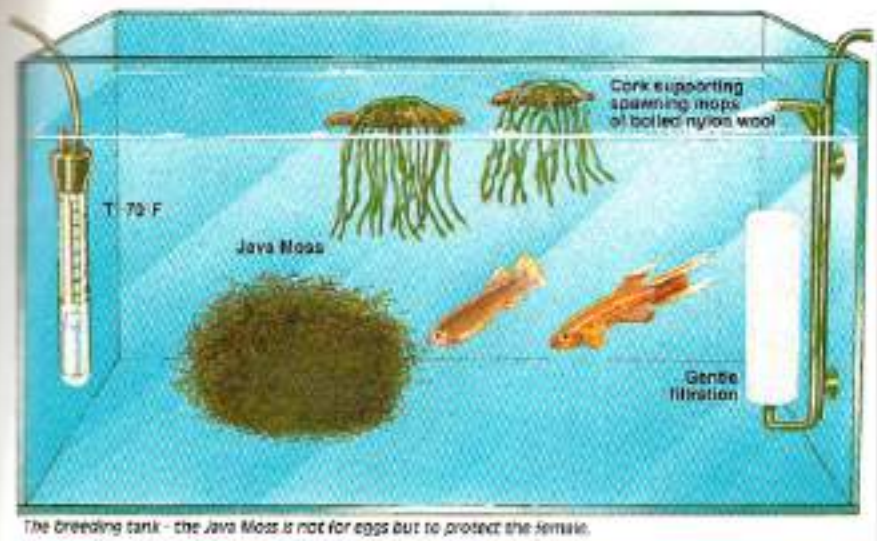
This fish is not a fussy eater and will readily take dry foods, whiteworm, grindal worms and frozen bloodworm. This selection of foods will soon bring your fish into breeding condition.

## Breeding tanks

Killifish can be loosely placed into two categories: top

*Quick glance activity chart for Gold Australe*






*The breeding tank - the Java Moss is not for eggs but to protect the female.*

spawners and bottom spawners. The Gold Australe is classed as a top spawner, that is to say the eggs are found in the top half of the tank.

In a bare tank (minimum size 10" x 6" x 6"), suspend two spawning mops on pieces of cork or polystyrene and place a clump of Java Moss on the tank base for the female to hide in when she requires a respite from spawning. The temperature range can be between 68°F to 75°F - try not to exceed the maximum.

Filtration can be supplied by a small sponge filter or a home-made filter (see Breeding Neon Tetras,July *PFK*. ). When I use 10" x 6" x 6" tanks, no filtration is used, but in tanks larger than this I do install filters. Note that if you go for the unfiltered system, water changes must be regular.

## Breeding

A pair or a trio (1 male, 2 females) can be employed for this project. Prior to breeding, separate the sexes, allowing the females to come into condition and show signs of carrying eggs.

When the fish are placed in the breeding tank courtship will normally start within minutes, the male displaying to the female and driving her into the floating mops. Here she will deposit a single egg which will adhere to the wool by sticky filaments. This spawning procedure will continue until the female has expelled all her eggs. I tend to leave the fish together for a week as there is no problem of egg-eating with Gold Australe. After a period the fish are seperated and the system starts over again.

## Egg collection

The number of eggs laid can vary according to the age of the parents. As many as 200 eggs can be collected over the breeding period. Using this method of breeding Killifish, the eggs are best collected by hand and hatched in small dishes or tubs.

*Killifish eggs attached to spawning mop.*

I leave the fish together for one week, at which time the mops are removed from the tank and the surplus water squeezed out. When you remove the mops, make sure the tank cover is replaced as Killies are good at jumping.

First half fill a small container with water from the breeding tank. The eggs will be placed in this, which is then marked with the date of collection and the estimated date of hatching.

The clear eggs can be found by searching through the mop, strand by strand and removing them by hand. You will find the eggs roll between your finger and thumb without compressing. All infertile white eggs must be discarded. Gold Australe should hatch in 14 days.

I do not use any anti-fungus agents; the occasional fungused eggs are removed as required. The 14 days that follow never fail to amaze me - you can observe the development of the embryo within each egg day by day. Even up to the final days the movement of the young fish can be seen by using a strong eye-glass.

On the 14th day, if the eggs have not hatched, don't panic. I allow another five days and if no fry have appeared by then I drop a tiny pinch of dry food into the container.

The next day you should find the fry have hatched. The tiny fry (about 1.5mm) will be seen darting around the container and they can be removed by using a pipette or a teaspoon.

The number of fry removed determines the size of their next home; small numbers can be held in butter or ice cream tubs but larger broods will need to go into small fish tanks. I add a small clump of Java Moss and a few grains of Aquazorb, which helps to keep the water sweet.

## Growing on

A few drops of prepared infusoria will sustain the fry until they will take brine shrimp which can be as early as three days. Feeding brine shrimp in small containers can spell disaster if fed too heavily. Only drop in enough to match the number of fry in the container. Change the water in these containers every two days, using aged water.

As the fry grow and reach around 3mm in length I move them to growing-on tanks. These are bare tanks with sponge filtration.

*The fry can be housed in a large ice-cream or margarine container. A few grains of Aquazorb will help keep the water fresh. These fry are ready to move on to a larger tank.*

Young Killifish are prone to velvet disease and Gold Australe are not exempt from this problem. Velvet can be kept at bay by good husbandry. This means not over-feeding and ensuring you carry out regular water changes. Velvet can be cured by using one of the proprietary remedies on the market. Any fry or young fish seen sliding on the tank bottom (known as "belly sliders") should be culled.

Gold Australe can reach up to ½" in size in three weeks and they can be sexually mature by the time they are 12 weeks old.

They look particularly attractive in an 18" or 24" planted aquarium. ■

### List of requirements

- Small tank (minimum size 10" x 6" x 6").
- Nylon spawning mops.
- Portion of Java Moss.
- Small containers or tubs to hold eggs.
- Larger containers to house fry.

**I hope that from this feature, readers will want to gain more information about Killifish. There is a wealth of information and a variety of fish available - you can obtain both by joining the British Killifish Association. See page 40 for details.**

# Young fis

## KIT TIP

### The Test Kit

**How does it work?**
Special liquid reagents or tablets are added to a sample of aquarium water. They react with the water chemistry which causes the sample to change colour.

**What extra equipment do I need?**
All the test phials, reagents and other relevant equipment come with the test kit, although refills are available, so you don't have to keep purchasing the entire kit every time. All you need is a sample of aquarium water.

**How do I use it?**
Most test kits are easy to use and the manufacturer's directions are usually very straightforward. The methods of testing varies from kit to kit, but most consist of taking a sample of water and adding a few drops of the special reagent or tablet and giving it a shake. After a few minutes the water will change colour. This is then compared to a colour chart which comes with the test kit, to find the result.

**Which types are available?**
The most important to the average fishkeeper are ammonia, nitrite and pH (with nitrate for marine fishkeepers). More specialist fishkeepers can buy oxygen, general hardness, carbonate hardness, iron and copper test kits.

**Good features**
Most test kits are quick and easy to use and give a good indication of the quality of your water. Regular usage will help to pinpoint a problem before it turns into a crisis.

**Are there any drawbacks?**
If the phial is not rinsed properly after testing, remnants of the reagent or tablet may give a false reading the next time the test kit is used.

Test kits have a limited shelf life which may only be twelve months in some cases. As there is no "use by" date on these kits at the moment, it is probably best to avoid buying them from shops which have a very low turnover of stock.

## FISH 'N' TIPS

If you're travelling a long way to buy fish, it's worth asking for them to be bagged separately and, if they are freshwater fish, take a handful of zeolite with you, which the assistant can then drop into the bottom of the bag to help prevent ammonia problems during the journey. A polystyrene box, or even a cardboard box filled with loads of scrunched up newspaper will help keep the water from cooling down too much on the way home.

When you bring fish home don't just add them straight to the tank. Turn off the lights on the tank (which reduces the stress on the fish) and float them in their bag in the aquarium for twenty minutes to help equalise the temperatures. Then open the bag and add a cupful of aquarium water, followed by another cupful a few minutes later. It's important to do this, because the water chemistry of your dealer's tank isn't necessarily the same as your own, and sudden changes in pH can stress fish just as much as widely differing temperatures. Leave the lights off for an hour or so after you have added the fish to the tank, to give them a chance to settle.

If you're buying fish which are normally kept in brackish conditions, such as Mollies, Puffers and some Gobies, don't automatically assume that your dealer is stocking them with added salt. Similarly, if you are buying Mollies for a freshwater set-up, make sure that the dealer isn't stocking them in brackish water. Ask the shopkeeper which conditions the fish are being kept in, before you buy them, as they may need adjusting a little more slowly.

Sometimes new fish will be attacked by the existing ones. Obviously throwing a bucket of water over them isn't going to do a lot of good, so if there is a likelihood of it happening, you'll need to be prepared. If your tank contains a "chaser", new fish may need to be placed in a breeding trap for a few days until the aggressor gets used to it - or a tank divider is an even better idea. You could move the more aggressive fish to a separate tank - or even the breeding trap - and return it to the main aquarium a few days later, when it will be unlikely to go on the attack, as it will, in effect, be the "new fish". Alternatively, you can completely re-arrange the decor in the tank, so that the bully becomes confused. It will then be so interested in setting up new territories that it will hardly notice the newcomer. If you are using the divider to separate cichlids or other particularly aggressive fish, it's wise to leave it in place for a couple of weeks and then only remove the divider at a time when you are likely to be around if trouble occurs. If one fish attacks the other, you can replace the divider before any real injuries are incurred.

## DID YOU KNOW?

- Bombay Duck is a fish. A small, elongated species, it is caught in large numbers in India and dried in the sun. The dried fish is eaten as an accompaniment to spicy food, providing a contrast and cooling the mouth down after the curry!
- Other fish are sun-dried before being added to food dishes as a flavouring. These include Gouramis and arid some species of catfish.
- The scales of the Arapaima are used as nail files in Brazil, and its tongue is sold as a souvenir.
- The skull bones of the Shark Catfish are used as religous icons. They have a resemblance to the image of Jesus on the cross, and skillful painting brings out the details of this 'sculpture'.

**Quick tip**
- Aim your powerhead at the tank glass if your fish prefer gentler movement.

## Community fish that aren't

Over the last few months we've had a number of queries from hobbyists concerning fish which they have bought for their community tanks, which, despite advice from their dealer, have turned out to be most unsuitable for such a set up. The same species seem to crop up repeatedly. Listed below are some of those to be wary of:

The most commonly misunderstood species seems to be the Elephant Nose fish. It's presumably popular for its unusual appearance, but it requires very dim lighting and a peat or sand substrate in which it can burrow for food. This species will not live long in community tanks.

Another species is the Mudskipper which until recently seemed to have become less available. This amphibian is not totally aquatic, as some fishkeepers have been led to believe and it requires a large, dry area onto which it can climb to feed and preferably burrow. A small piece of floating polystyrene or cork tile is not sufficient. It also needs a good lid on the tank because it can jump great distances.

The third species is the *Ogbunnemus geoarty*, which many fishkeepers know to avoid. The problem is that in its juvenile form it looks nothing like the adult specimen. It grows very large - and does so extremely quickly. It has been mistakenly labelled in the past as the Chocolate Gourami, a small mouthbrooding species which is not always commonly available - this may be the reason why fishkeepers have not spotted the error. In actual fact the two fish are not that alike.

If you are tempted in the direction of a fish you know nothing about, resist the impulse to buy it until you know something about its requirements. You could save yourself money and a lot of grief.

# hkeeper

**Quick tips**

- Use test kits in daylight for maximum accuracy of colour matching.
- Algae magnets can be used to hold down lettuce leaves for herbivorous fish.

## Something ELSE

I suspect that many of you have your tanks situated in your bedroom. This can present a problem if you happen to be the unhappy owner of a particularly noisy air pump. It's suprising how much louder they seem to get when you're bedding down for the night.

Of course you could always just turn it off - but that's not always possible, especially if the air pump is being used to run a sponge or box filter.

There are one or two things you can try, in order to remedy the situation, before you finally throw your air pump out of the bedroom window. For example, try using a longer piece of airline. Standing it on a block of foam rubber, filter matting, or a piece of polystyrene tile can also prove effective. Or perhaps the diaphragm needs replacing. Spare diaphragms are available from some fishkeeping outlets.

If all else fails, then throwing the air pump out of the window might not prove to be such a bad idea after all.

## MAKE A MOBILE AND WIN A TANK!

This month's competition is a little bit different. We're giving you the chance to show us your flair for art and design. We'd like you to make a mobile - with a fishy theme, of course. We're leaving the actual design up to you, but it must conform with the general rule with mobiles: that it moves in the breeze.

It's probably less difficult to construct the frame using coathangers, but you can use whatever you wish in order to make your mobile easier to post, so long as it works properly. And providing you include all the right bits, we can assemble them here, so don't worry about taking it to pieces to post it. The fish which you hang from it can take any form you like (so long as they're not real ones) and can be coloured using whatever method you prefer.

The prizes are well worth winning. We have two **Gem** tanks to give away, complete with matching hoods, from **John Allan Aquariums**. Each tank measures 20" x 10" x 12".

There are two age groups for this competition. One is for ages 12 and under; the other is for ages 13-17. The winner of each age group will receive a Gem tank and hood. Adults can enter if they wish, but we regret that their mobiles cannot be considered for the prizes!

Please send your mobiles to: **Young Fishkeeper Mobile Competition, Bretton Court, Bretton, Peterborough, PE3 8DZ.** Please include the form (or a photocopy of the form) below with your entry. The closing date for entries is **November 15.** We're sorry, but we are unable to return any mobiles.

Please ensure that the mobiles are packaged carefully, so that bits don't come adrift in the post. We will judge all the entries here at *FFK* and the sender of the best mobile in each age group will win a Gem tank, complete with matching hood.

The two winning mobiles will get pride of place over the editor's desk, where he can sit and watch them all day.

**Name** .....

**Age** .....

**Address** .....

.....

**AND THE WINNER IS...**

The winner of the tank and cabinet in the September competition was **Daniel Codrington, from Surrey.**

**Floyd** — by fran

*This Longfin Anthias is probably the sub-species from Hawaii, Pseudanthias ventralis. The upper fish, which is the male, has unfortunately suffered some fin damage to the caudal fin which is normally "pressed".*

## The Threadfin Goldie

**The Threadfin Goldie *Nemanthias carberryi* is mostly received into the U.K. from shipments originating in The Maldives. It has a limited range from the northern and western Indian Ocean.**

**The overall shape is elegantly streamlined, emphasised by a deeply forked, elongated tail.**

**The pink of this species is generally verging on pale purple, and extends from the head in a wedge which tails off to the lower part of the back of the body. A bright yellow mantle starts from the top of the head and broadens as it stretches across the body, extending into the tail. The dorsal fin is ornamented with these two colours.**

**As with all the Fairy Basslets that this species will flourish far better when kept in pairs, individuals often displaying a mere shadow of their potential.**

*The beautiful Threadfin Goldie is often received into the UK market from The Maldives.*

# In the PINK!

**Incongruously sharing the family Serranidae are large and aggressive groupers, and the beautiful little bassiets, popularly referred to as "Anthias". MAX GIBBS looks at some Pseudanthias species as well as other Fairy Bassiets.**

A glance at book illustrations of the more popular Fairy Bassiets will give the immediate impression that pink is the predominant colour in the dizzy range of hues which nature has lavished on them. Complementary colours are generally blended with the basic pinks in a subtle and sensitive way, without any strong contrasts.

## The Longfin Anthias

The Longfin Anthias, *Pseudanthias ventralis*, is only about 7cm long at maturity, but packs a tremendous amount of beauty into its tiny form.

Only very few of these pretty little fish reach the aquarium market, coming from the Great Barrier Reef and areas of Oceania. A subspecies comes from Hawaii, and is probably the one pictured.

The light purple flanks of the fish are topped by a golden streak dappled with red and purple. A rich, dark purple edges the dorsal fin, and the same colour suffuses areas of the anal fin.

The sexes are similar in appearance. However, the colouring of the male is more intense, and the finnage is more flamboyant than to that of the female.

## The Banded Fairy Bassiet

The Banded Fairy Bassiet, *Pseudanthias fasciatus* is a very attractive species, with a lateral stripe of vermilion which divides the upper and lower halves of the

*Right: Pseudanthias pulcherrimus is an example of the confusion which can arise when trying to identify fairy bassiets. Those two males would easily pass as P. randalli, coming from an entirely different region.*

## The Scribbled Anthias

A rarer species which appears from time to time is marketed as the "Scribbled Anthias". This beautiful fish is *Pseudanthias bimaculatus* which has been recorded from locations as far apart as Mozambique and Indonesia. However, in 1988 it was observed in The Maldives, approximately half-way between the two previously known locations.

The female has a colour pattern which almost fits that given for the Threadfin Goldie. However, where the two colours merge there is a less distinct division as they mingle in an area of dots.

The male has a more striking appearance with a richer pink and lavender body coloration, superbly ornamented with violet edging to each fin, except the tail which is distinctively tipped in this colour.

The anal fin is spangled with gold spots, and the head is overlaid with violet and red line patterns. The eyes of the Scribbled Anthias have a mysterious metallic green lens.

*Banded Fairy Basslets have boldly defined, striking colours – a feature not common in the delightful anthias species.*

*The Scribbled Anthias is one of the most spectacular species of Fairy Basslets to be occasionally available to the hobbyist. The upper fish the male.*

body. The bright canary-yellow tail is deeply forked with long, fine points. The body has a base colour of yellow, overlaid with orange or flushed-red spots.

Coming from the western Pacific Ocean, it appears to be fished from fairly deep water as it usually swims "tail light" when first received into aquarium life. This moderates in time, after which the fish swims in a normal manner. A depth range of between 20 and 68 metres has been quoted.

An adult size of 21cm is recorded, but the Banded Fairy Basslet is unlikely to reach much more than half this size in aquarium conditions.

## The Hawk Anthias

Another attractive basslet which rarely attains its potential maximum size (13cm) is the Hawk Anthias *Serranocirrhitus latus*. The range of this delightful fish is Southern Japan, Indonesia, Palau, Vanuatu, Fiji, New Caledonia, and the Great Barrier Reef.

In spite of this fairly wide range the Hawk Anthias is not often seen.

The dusky pink body is heavily patterned with golden-yellow spotted scales, this spotting diminishes in prominence as it progresses down from the dorsal area to the belly of the fish. Two bright gold stripes reach back from the eye, through the operculum, to either side of the base of the pectoral fin. A gold spot tops the operculum.

The tail is deeply forked and

## Lyretail Coral Fish

The most popular of the Fairy Basslets is known by many popular names, but very often it is called the Wreck Fish, or Lyretail Coral Fish *Pseudanthias squamipinnis*.

The distribution of this species is very widespread, being found in Oceania, the tropical western Pacific, the Great Barrier Reef, the northern and western Indian Ocean, and the Red Sea. Large shoals may be found on quite shallow reefs or close to the walls of steep drop-offs beyond the protecting reef.

Although all Serranid fish are hermaphrodite, the most commonly quoted example is the Wreck Fish. A single male will control a harem of females, but if he dies the most dominant ranking female will change sex to fill the vacancy.

The male is more richly coloured than the female, and the leading spine of the dorsal fin is very elongated. A prominent blotch of carmine-red is displayed in the otherwise clear pectoral fin. An orange stripe runs from the eye, across the operculum, ending at the base of the pectoral fin. This feature is common to many Fairy Basslets. The female is a paler version, and she lacks the dorsal spike and coloured patch in the pectoral fin.

*The male Wreck Fish is seen in the centre with attendant females above and below, one of which will be a dominant specimen ready to become male in the event of the death of the present male.*

## The Square Anthias

The Square Anthias is one of the larger species and consideration to aquarium space is necessary. The upper fish is the male

**One of the most outstandingly beautiful Fairy Bassiets has to be the "Square Anthias" *Pseudanthias pleurotaenia*.**

**Like the previous species it grows to about 20cm in the wild, but is more likely to attain half this size in captivity. The body of the Square Anthias is quite deep, lacking the streamlined appearance associated with so many of its cousins.**

**The flanks of both the male and female carry a large area of colour which might be anything from bright pink to pale mauve, but in every case this colouring is far more intense in the male. Indeed, the basic body colour is quite contrasting between male and female. The male is usually a marigold-orange, whilst the female is usually a lively yellow overlaid with tiny orange dots. Coming from the Great Barrier Reef and other areas of the western Pacific the Square Anthias is never a cheap fish, but its beauty ensures that it will always be in demand. This species is another of those which should always be considered as needing to be kept in pairs.**

The female P. pulcherrimus is often regarded as a separate species to the male, being quite different in markings.

ends in fine points. The pelvic fins are a shining violet, as is the leading edge of the anal fin. The same colour edges the top and bottom of the caudal fin, but less prominently, fading as it runs from the caudal peduncle along the margins of the fin.

### Other species

There are occasional arrivals of odd specimens of Fairy Bassiets which are not easily identified, and some, as in the case of *Pseudanthias pulcherrimus* from the western Indian Ocean have male and female forms different enough to cause them to be frequently treated as separate species.

To add to the confusion there is another species from the western Pacific which is almost identical in appearance to *P. pulcherrimus*, but is, in fact, *P. randalli*.

The range of Fairy Bassiets is considerable, each species delightful in its own particular way, but with relatively few species readily identifiable from hobbyist books.

Within the space of this article it is only possible to review a very limited range of these beautiful Bassiets. There are many more just as delightful, with bright, cheerful, colouring and peaceful disposition.

### Keeping Bassiets in the pink

A good varied diet and faultless water conditions are necessary to get the best from Fairy Bassiets, just as for any other aquarium fish. A few are difficult to keep, but most are not. Often the key to success is maintaining at least a pair of a species, and sometimes even a small group with one male and a few females is desirable. Isolated individuals are less likely to flourish even though they might survive in the aquarium.

These beautiful fish quickly adapt to aquarium life, and make ideal occupants for the reef style aquarium where they rarely interfere with any of the invertebrates.

With some thought, and the necessary investment, there is no reason why your Fairy Bassiets should not stay "in the pink". ■

**■ A recent change in classification leaves the Atlantic species correctly referred to the genus *Anthias*, whereas those from elsewhere previously classified as *Anthias*, are now of the genus *Pseudanthias*.**

**My thanks to Dr. John Randall for correcting my picture files with this update.**

# SALT WARS

**A war has been quietly bubbling away over the last two or three years, possibly unnoticed by all but the keenest marine fishkeeper.**

Forget Star Wars and the SALT talks - this is the Salt War.

Claim and counter-claim have flooded the market, with everything from the solubility of a marine salt to its tiniest trace element under the microscope. Huge sums have been spent on minute analysis of opposition products - analysis the fishkeeper can't possibly hope to match himself, or in many cases even understand.

Our table lists the factor that influences most choices - the price per gallon - but this should not be taken as a measure of value for money merely as an indicator of price. Note too that these are based on manufacturers RRP and all the salts will often be available at cheaper prices.

We also invited the manufacturers or distributors of the eight salts to give an account of their particular claims in respect of their various salts. These claims are condensed in what follows.


**■ Biosal**
**From New Technology Laboratories, 15 Branbridges, East Peckham, Kent 0622 871387**

Biosal claims to be "instantaneously soluble"; and to be produced from pharmaceutical quality raw materials. Biosal it is claimed, quickly becomes a stable marine mix, while other newly-mixed salts take longer to integrate and stabilise their ingredients.

The salt contains a pH buffer, and only the useful trace elements required by marine life.


From top - Reef Crystals, Biosal, Instant Ocean, Red Sea Salt, Marine Environment, Tropic Marin and centre TAP.


Additives from Coral Reef, Dependable, Independence, New Technology, TAP, Aquarium Life Support Systems, and Rolf C. Hagen.


**■ Instant Ocean**
**From Underworld, Units 1 & 2 Belton Rd. West, Loughborough, Leicestershire LE11 0TR Tel 0509 610310**

Formulated originally in the mid sixties for use in large commercial marine set-ups and improved over the years.

One of the first salts to do away with liquid trace elements, it's produced with a uniform particle size so that all trace elements are equally mixed in.

The salt has been used extensively in its manufacturers' marine breeding projects.

Underworld claims that salt analyses and lists of trace elements

are largely irrelevant, bearing in mind the various trace elements found in simple tap water. Not everything that is naturally occuring in sea water is necessary or beneficial to marine life.

**■ Red Sea Salt**
**From Coral Reef Technology Ltd., 62 High Rd., Byfleet, Surrey KT14 7QL. 0932 355121**
Based on natural salt, 75% of its volume comes from natural Red Sea salt, and a further 12% of its content is derived from the Dead Sea, leading to its claim to be 85% natural and less likely to cause salt rash.

Bulk salt is rigorously tested before being mixed with pharmaceutical grade chemicals. The resulting salt mix has a high alkalinity reserve and is well buffered with extra calcium. It provides a good mix for Reverse Osmosis purified water. Free from nitrates or phosphates.

**■ Marine Environment Dual Phase Salt**
**From Waterscene Enterprise Ltd., 17 Mountbatten Drive, Ringstead, Kettering, Northants NN14 4TX Tel 0933 623106**
The only salt in this survey that uses a two part formula with some trace elements in a separate bottle.

The dry part contains the salt and various trace elements, plus a dechlorinator.

The bottle contains other trace elements and organic compounds, enzymes and vitamins in a "timed or on demand release medium".

Vegetarians should note that Ox bile and Pancreatin are included among these "wet" items.

**■ Lahaina Salt**
**From Lahaina Aquarium Systems Ltd., Kellas, Elgin, Morayshire IV30 3TW. Tel 0343 89209**
Vacuum packed in simple plastic bags and sent out in plain cardboard boxes this German-manufactured salt is phosphate and nitrate free, mixes easily, and retains its powderiness in storage.

Lahaina claim that some salt mixes which claim to be nitrate/phosphate free are not. Gallonage costs are based on the lowest figure, and up to 160 gallons may be mixed from the 20kg pack in a fish-only set-up.

**■ TAP Marine Salt**
**From Technical Aquatic products, TAP House, 542 Filton Avenue, Filton, Bristol BS7 0QG Tel:0272 692345**
Usefully packaged in a re-sealable bucket (in a sealed bag) with a measuring cup which holds exactly the salt for a gallon mix. The salt has high levels of calcium to buffer the water and additional quantities of the elements that are used up by marine life.

Because of the extra buffers this salt does not claim to be the fastest dissolving around, and aerating for an hour after mixing may improve results. Vast quantities of marine salt are produced by TAP at Bristol.

**■ Reef Crystals Synthetic Sea Salt**
**From Underworld (address as Instant Ocean)**
Why two different salts from the same company? This one is specifically aimed at Reef Tanks with invertebrates and consequently contains extra calcium and extra trace elements both of which are used up by reef creatures. The extra vitamins too, are useful to invert life. Finally a metal detoxifier attacks heavy metals like copper that may find their way in through the tapwater.

The end result is far "richer" than plain sea water.

**■ Tropic Marin**
**From Tropical Marine Centre Ltd., Solesbridge Lane, Chorleywood, Hertfordshire WD3 5SX Tel: 0923 284151**
Tropic Marin's philosophy is to replicate sea water as closely as is technically possible. Some 70 pharmaceutical grade trace elements and the basic compound are melted together to ensure a complete mix before being solidified and ground down into the basic salt. This is claimed to ensure that all the elements dissolve fully and equally.

A vapour barrier is formed by packaging the salt in foil lined boxes.

## ADDITIVES

Some manufacturers advocate the use of additives in the marine tank. The most useful of these are probably trace elements, pH and KH buffers and vitamin supplements. All additives should be used with great care, following the manufacturer's instructions and where necessary, used in conjunction with appropriate test kits.

## TRACE ELEMENTS

Trace elements are found naturally in sea water, but need to be replenished regularly in the aquarium. Partial water changes in the region of 10-20% each fortnight, using a good quality salt should provide all the trace elements your tank needs, but a supplement used in between will ensure a continuous supply.

**■ New Wave Marine Zoosal**
**Distributor:** New Technology
**Sizes available:** 125ml
**Treats up to:** 1000 litres
**Price:** £3.50
Easily distinguishable by its bright pink packaging. It comes with a dosage chamber.

**■ Red Sea Fish pHarm Reef Trace**
**Distributor:** Coral Reef
**Sizes available:** 25ml
**Treats up to:** 10,000 litres
**Price:** £3.20

**Thiel Aqua Tech Trace Elements**
**Distributor:** Coral Reef
**Sizes available:** 115ml, 235ml, 470ml
**Price:** 115ml £6.95; 235ml £8.95; 470ml £14.95
Contains over 72 elements.

**■ Reef Care Trace Element Blocks**
**Distributor:** Independance (UK)
**Sizes available:** Box of 4
**Treats up to:** 50 gallons/block
**Price:** £8.89 per box
Contains 25 essential trace elements in each block.

**■ Sea-Chem Trace**
**Distributor:** Aquarium Life
**Sizes available:** 10g
**Treats up to:** 1000 gallons
**Price:** N/A

## VITAMIN SUPPLEMENTS

Vitamin and mineral supplements are used to improve the health and colour of fish and inverts and to promote plant and algal growth.

**■ Vita-Chem Marine**
**Distributor:** Aquarium Life
**Sizes available:** 4 fl. oz.
**Price:** £7.60
Contains 37 naturally occurring extracts.

**■ Red Sea Fish pHarm Reef Vita**
**Distributor:** Coral Reef
**Sizes available:** 25ml
**Treats up to:** 200 litres
**Price:** £3.20

**■ Thiel Aqua Tech Marine Vitamins**
**Distributor:** Coral Reef
**Sizes available:** 115ml, 235ml
**Price:** 115ml £7.95; 235ml £13.45
Over 60 different ingredients. Best added to the food directly before feeding. ▶

■ **New Wave Marine Biotonic**
**Distributor:** New Technology
**Sizes available:** 125ml
**Treats up to:** 1000 litres
**Price:** £3.50
Comes with a dosing chamber

■ **Reef Care Vitamin and Mineral Block**
**Distributor:** Independance (UK)
**Sizes available:** Box of 4
**Treats up to:** 50 gallons per block
**Price:** £9.69 per box

## BUFFERS

Low pH and KH levels in the marine aquarium are dangerous. These are buffered to some extent by coral sand and gravel. Chemical buffers help to restore depleted alkalinity reserves and maintain the pH. Most buffers will not increase the pH to more than 8.3.

■ **Dependable Marine Buffer**
**Distributor:** Dependable
**Sizes available:** 225g
**Treats up to:** 4500 litres
**Price:** £5.99
Raises and maintains the pH and alkalinity.

■ **Red Sea Fish pHarm Reef Buff**
**Distributor:** Coral Reef
**Sizes available:** 25ml, 100ml
**Treats up to:** 3125 litres/25ml
**Price:** 25ml £2.70; 100ml £5.15
Restores depleted alkalinity reserve and helps to maintain the pH

■ **Thiel Aqua Tech Reef KH**
**Distributor:** Coral Reef
**Sizes available:** 470ml, 3.75 litres, 19 litres dry
**Price:** 470ml £7.95; 3.75 litres £13.95; 19 litres £17.95
Available in both dry and liquid forms to enable the correct pH to be maintained.

■ **New Wave Macro-KH**
**Distributor:** New Technology
**Sizes available:** 125ml
**Treats up to:** 1000ml
**Price:** £3.50
Comes with a dosing chamber.

■ **Aqua Hard**
**Distributor:** T.A.P.
**Sizes available:** 300g, 1 kilo
**Price:** 300g £4.99; 1 kilo £9.99
Specially formulated for use in soft water areas.

■ **Aquarium Doctor Alkaline Adjuster**
**Distributor:** T.A.P.

| SALT | FEATURES | RRP PER KG | RRP PER GALLON* |
|---|---|---|---|
| Bio-sal<br>**New Technology** | Claims it is<br>'instantaneously soluble' | 2kg - £5.29<br>4kg - £9.80<br>10kg - £20.67 | 40p<br>37p<br>31p |
| **Coral Reef**<br>Red Sea Salt | Uses Red Sea salt<br>in its production | 2kg - £6.33<br>4kg - £14.33<br>8kg - £27.33 | 62p<br>54p<br>51p |
| Instant Ocean<br>**Underworld** | Claims to be the World's<br>best-selling salt | 2kg - £1.25<br>4kg - £12.50<br>8kg - £23.99<br>20kg - £54.20 | 56p<br>47p<br>45p<br>41p |
| **Lahaina** | German-made nitrate and<br>phosphate free salt;<br>simplistic packaging | 10kg - £25<br>20kg - £48 | 37p<br>36p |
| Marine Environment<br>Dual Phase Salt<br>**Waterscene**<br>**Enterprises** | Has additives in separate<br>'little bottle' | 1.36kg - £5.61<br>3.4kg - £12.25<br>6.8kg - £23.04<br>20.4kg - £69.39 | 59p<br>58p<br>56p<br>55p |
| Marine Salt<br>**TAP** | Comes sealed in plastic<br>in a useful bucket with<br>measuring cup | 1.6kg - £5.99<br>3.2kg - £10.99<br>6.4kg - £19.08<br>20.4kg - £68.74** | 59p<br>54p<br>49p<br>45p |
| Reef Crystals Synthetic<br>Sea Salt<br>**Underworld** | Claimed to be an 'enriched'<br>salt formulation | 2kg - £6.33<br>4kg - £14.33<br>8kg - £27.33 | 89p<br>54p<br>51p |
| Tropic Marin<br>**Tropical Marine**<br>**Centre** | Packed in foil lined boxes | 1kg - £4.04<br>2kg - £7.74<br>4kg - £13.24<br>10kg - £32.42<br>20kg - £62.98<br>40kg - £119.39 | 81p<br>80p<br>66p<br>49p<br>47p<br>45p |

* All figures based on manufacturers' information.
** Based on our weighing of 1.8kg bucket

**Sizes available:** 100ml, 1 litre
**Price:** 100ml £2.99; 1 litre £13.99

■ **SeaChem Reef Builder**
**Distributor:** Aquarium Life
**Sizes available:** 250g
**Treats up to:** 7000 litres
**Price:** £7.95
Raises and maintains the KH without direct impact on the pH.

■ **SeaChem Marine Buffer**
**Distributor:** Aquarium Life
**Sizes available:** 250g
**Treats up to:** 7000 litres
**Price:** £7.95
Adjusts the pH and maintains both the pH and alkalinity.

## CALCIUM SUPPLEMENTS

Living corals, shelled animals and those with exoskeletons require calcium in the water in order to grow.

■ **Dependable Marine Calcium**
**Distributor:** Dependable
**Sizes available:** 250ml
**Treats up to:** 4500 litres
**Price:** £5.99

■ **New Wave Corasal**
**Distributor:** New Technology
**Sizes available:** 125ml
**Treats up to:** 1000 litres
**Price:** £3.50
Not available until November.

■ **Thiel Aqua Tech Kalkwasser**
**Distributor:** Coral Reef
**Sizes available:** 3.75 litres, 19 litres dry
**Price:** 3.75 litres £12.95

■ **SeaChem Reef Calcium**
**Distributor:** Aquarium Life
**Sizes available:** 250ml
**Treats up to:** 25,000 litres
**Price:** £7.50

## STRONTIUM SUPPLEMENTS

Strontium is best used in conjunction with a calcium supplement to help enhance the growth of corals and anemones.

■ **Dependable Strontium with Molybdenum**
**Distributor:** Dependable
**Sizes available:** 250ml
**Treats up to:** 4500 litres
**Price:** £5.99

■ **Thiel Aqua Tech KSM Supplement**
**Distributor:** Coral Reef
**Sizes available:** 115ml, 235ml, 470ml
**Price:** 115ml £6.95; 235ml £8.95; 470ml £14.95

■ **SeaChem Reef Strontium**
**Distributor:** Aquarium Life
**Sizes available:** 250ml
**Treats up to:** 25,000 litres
**Price:** £7.50

## IODINE

Iodine is required by soft corals and moulting crustaceans.

■ **Dependable Marine Iodine**
**Distributor:** Dependable
**Sizes available:** 250ml
**Treats up to:** 4500 litres
**Price:** £5.99

■ **Thiel Aqua Tech Iodine**
**Distributor:** Coral Reef
**Sizes available:** 115ml
**Price:** £8.95

## WATER CONDITIONERS

■ **Fincare**
**Distributor:** Rolf C. Hagen
**Sizes available:** 1 oz, 4 oz, 16 oz
**Treats up to:** 227 litres per oz.
**Price:** 1 oz £0.99; 4 oz £2.99; 16 oz £7.99

■ **Marine Aquasure**
**Distributor:** New Technology
**Sizes available:** 125ml
**Price:** £2.75

## MULTI PURPOSE ADDITIVES

■ **Thiel Aqua Tech Liquid Gold**
**Distributor:** Coral Reef
**Sizes available:** 235ml, 470ml
**Price:** 235ml £6.95; 470ml £11.95
Liquid Gold contains trace elements, vitamins, organic nutrients, minerals, strontium chloride and molybdenum chloride among others. The formulation is constantly being improved as new information comes to light. ■

**ADDITIONAL CONTACTS - see sales for other companies**

**Dependable Products,** 1 Bracken Road, Ingrow, Keighley, W. Yorkshire, BD22 7DF. Tel. 0535 606030.

**Independance (UK) Ltd.** Units 9 &10, Lady Ann Mills, Lady Ann Road, Batley, W. Yorkshire, WF17 0PS. Tel. 0924 422044.

**Aquarium Life Support Systems,** Free Church Passage, St. Ives, Huntingdon, Cambs, PE17 4YA. Tel 0480 68808.

**Rolf C. Hagen (UK) Ltd.** California Drive, Whitwood Ind Est, Castleford, W. Yorkshire, WF10 5QH. Tel. 0977 556622.

# Divide & multiply

**Tropical marine invertebrates are easier to breed in captivity than marine fish, but commercial breeding programmes involving inverts for the aquarium trade are surprisingly few. LES HOLLIDAY investigates, with a look at some of the methods of reproduction along the way.**

Invertebrates are generally defined as animals that do not have a backbone or internal skeleton and that simple definition takes in around 97% of the whole of the living species of animals in the world.

Probably more than half of the two million living species of invertebrates making up this proportion live in the seas covering our planet, and perhaps half of these are found in the tropical waters from where aquarium subjects are collected. They range in size from microscopic flatworms to the giant squid and by the process of evolution over the past hundreds of millions of years, have adapted an amazing variety of different ways of perpetuating their own kind.

Naturally many of these creatures are not of interest to the home fishkeeper, but even so, the scope is still pretty formidable with representatives from all the major invertebrate groups available for the aquarium.

If we take a quick snapshot look at each of the main groups (phyla) we find in the aquarium, there are commonly representatives of the *Coelenterates*, principally corals, anemones and sea furs; *Crustacea* in the form of crabs and shrimps; starfish, sea cucumbers and sea urchins representing *Echinodermata* and various *Molluscs* such as cowries, sea slugs and clams. Even the lowly segmented worms, *Annelids*, have a place with the ever-popular feathery fan worms and tiny Christmas tree-like serpulid worms.

*Above: Colonial Green Anemone*

*Left: Several portions of Stylaria growing from aquarium to form new colonies*

## Several methods of reproduction

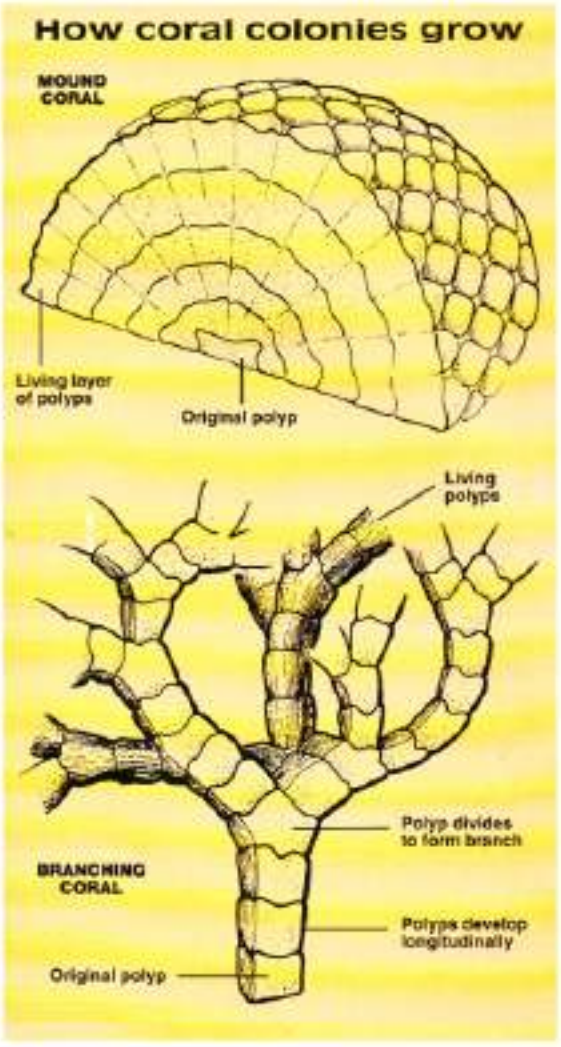
Unlike mammals and other higher classes of animals, marine invertebrates are not always restricted to one method of reproduction and many have a number of different ways of procreating themselves. The Coelenterates, of which corals are a good example, excel in the variety of their means of replication. They can reproduce vegetatively by budding off asexually to form daughter polyps in the same manner as a plant grows. Reproduction can also be accomplished by asexual subdivision of polyps, each polyp dividing to form two. Where this occurs in hard corals without the formation of dividing walls the colony can, eventually, take on the convoluted patterns characterised by brain coral colonies.

Corals, like the majority of marine invertebrates can also ▶

reproduce sexually by releasing eggs and sperm. After fertilization the eggs form larvae that are pelagic and become a part of the plankton for a short period of time before settling on a hard surface to grow into new colonies. In many corals the ripe eggs remain attached to the mesenteries inside the stomach cavity where they rely upon water currents to carry the sperm from other polyps for fertilization. After a short incubation period the fertilized eggs transform into medusa - tiny pear-shaped animals with rapidly beating hair-like cilia which are then released into the water and have a limited ability to swim and survive among the plankton for a few days before settling on the sea bed.

Sponges (Porifera), rarely used as aquarium subjects, also reproduce by releasing eggs and sperm which form free swimming pelagic larvae. However, sponges consist of simple aggregations of cells with no defined organs and tissues and are also able to reproduce by using their amazing powers of cell regeneration. Complete new colonies will grow from small pieces detached from existing colonies and in favourable conditions whole new sponge reefs can result from this process.

## How coral colonies grow




## Tearing itself apart

Only slightly further up the evolutionary scale in terms of reproduction are the Echinoderms. They too reproduce by broadcasting their eggs and sperm into the water where fertilization hopefully takes place. Starfish, the most easily recognisable of the echinoderms have in addition evolved a further reproduction strategy. Their body plan, which is radially symetrical, contains in each of the radiating arms a complete set of the basic body organs for locomotion, digestion, respiration and reproduction. Complete new animals can be reproduced asexually by detachment of an arm and starfish may literally tear themselves apart to reproduce.

Annelid worms are made up of body segments, each of which contain reproductive cells. Some forms are hermaphroditic, having both male and female sex cells in the same animal while others have individuals of either sex. Some species shed eggs and sperm into the water while others rely upon body contact. It is not unusual to find the mobile forms of worm, such as polychaetes, swarming in large aggregations to breed, which is a good means of ensuring a high proportion of fertilized eggs. In many parts of the tropics there are mass spawnings of marine worms at the full moon at identical periods each year, the water glowing phosphorescent green during these mass nuptials.

Marine molluscs, like the annelids, may be either of separate sexes or hermaphroditic. Normally reproduction takes place by the union of two individuals after which the eggs are laid in a cluster on the sea bed, sometimes forming spectacularly colourful whorls or patterns. Larvae may immediately become bottom dwellers or pelagic for a short period to be broadcast over vast distances by ocean currents.

## Elaborate courtship

Octopi and squid are cephalopods, a division of the molluscs which are far more advanced in their

reproductive behaviour. There are separate sexes and the courtship is often quite elaborate with much stroking and embracing. Fertilization takes place after the male places a small package of sperm into the female's mantle cavity.

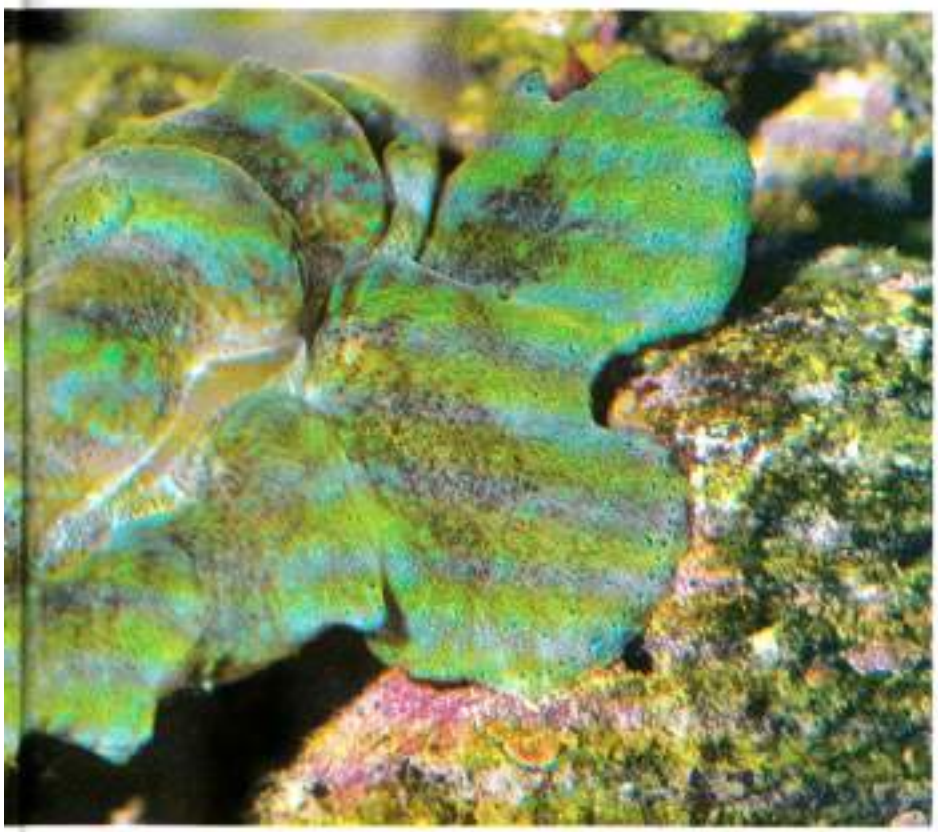
Octopi breed in solitary pairs while squid prefer to collect in huge aggregations producing masses of eggs in sticky clusters strewn unprotected on the open sea bed. The female octopus lays

Above left: Porifera

Above: Tridacnid Clam

Right: Cleaner Shrimp

Far right: Porifera



her eggs in a hole or small cave sometimes attached to the roof of the lair, hanging down like tiny wax candles. The eggs are guarded by the female until they hatch into free-swimming replicas of their parents. Female squid do not extend any parental care or protection to their eggs and may become so exhausted by the act of reproduction that they die shortly after.

Most crustacean species have separate sexes with entirely different body plans. The males of crab species for example may have concave carapaces and the females convex with a brood pouch. There are a few synchronously hermaphroditic species such as the cleaner shrimps which carry both ripe ova and sperm in the same sex organ. Eggs of crustacea are retained by the female until they hatch, either safely tucked into her brood pouch or under the abdomen attached to the legs. They are often laid to coincide with the female's moult to ensure sufficient time for the eggs to develop before the next moult is due.

## Saved for the table

For many marine invertebrates mass reproduction and large numbers of offspring are essential to their survival. Relatively few individuals survive to become adults and most of these seldom live more than a year or two. Consequently, to combat this high mortality rate large numbers of offspring are necessary. This survival technique has been very easily exploited by commercial breeders of marine invertebrates, especially those raising animals destined for the table as food. By arranging to protect and feed the young of shellfish, for example, the commercial breeder can cut the normally high mortality rate quite dramatically and raise more juveniles to become adults than could ever occur in nature.

One simple technique employed in this country is to set out mesh racks, which look like square sand sieves, in open water when the pelagic larvae of oysters are free swimming. Many of these juveniles, called veliger, settle on these nursery racks. Later the racks, complete with baby oysters are lifted and placed in net bags and returned to the sea. Safely protected from predators in their net bags the oysters are able to filter feed and mature. At the end of the growing season bags full of adult oysters can be lifted ready for market.

## Commercial breeding and the fishkeeper

Unfortunately at present there is little activity towards similar exploitation of this form of over-production in nature by commercial breeders for the aquarium. However with the advent of the reef aquarium, hopefully, the greater demand may encourage breeders who have confined their efforts only to breeding aquarium fish in the past, to turn to commercially rearing invertebrates.

Already there are restrictions on the importation of hard corals from many countries and other invertebrates such as tridacnid clams are now ranked as an endangered species and banned from importation. It seems good sense for us to take advantage of such bounties of nature in order to conserve the limited resources of their coral reef habitats.

Tropical marine invertebrates, unlike marine fish which are notoriously difficult to successfully breed in captivity, are far more accommodating. Anyone who has been successful with a reef aquarium will agree that most sessile invertebrates such as colonial anemones, soft corals and sponges will soon start to colonise the aquarium under the right conditions. Some forms of mobile invertebrates like, for example, Cleaner Shrimps, also regularly spawn in the home aquarium and could be ideal for a first attempt at home breeding.

Public aquariums are a good source of information regarding the status of of captive breeding of invertebrates. The curator of Miami Seaquarium, Warren Zeiller, in his book *'Tropical Marine Invertebrates of Southern Florida and the Bahama Islands'* (Wiley-Interscience Publications) chronicles the captive breeding successes of Miami Seaquarium and provides some very valuable information. The aquarium has been successful in reproducing anemones, sunburchins and

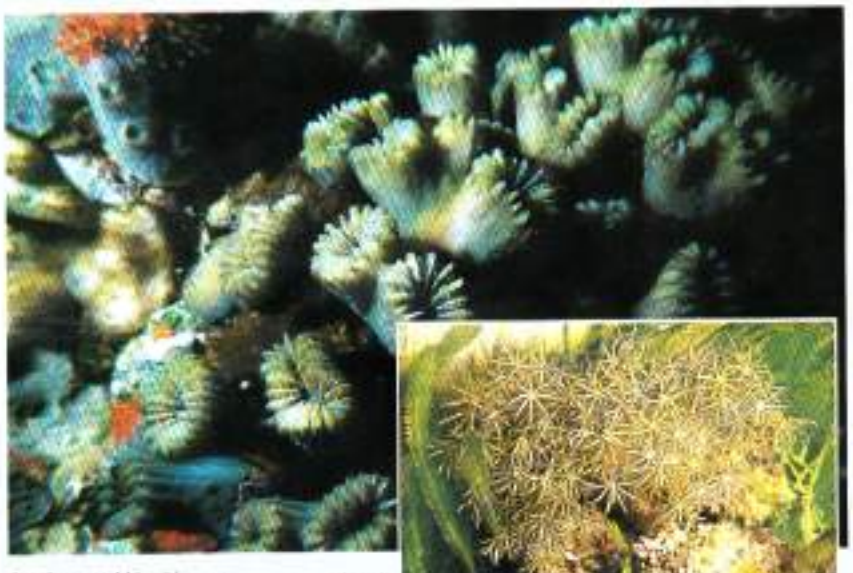
various shelled molluscs, octopods, Crustaceans, especially shrimps, with a view to commercial farming for the aquarium; and starfish which have proved so bountiful that their eggs and young provide an endless supply of food for other specimens.

The obvious candidates for commercial breeding programmes in this country would be the Cleaner Shrimps, *Stenopus hispidus* and *Lysmata amboinensis*, which spawn freely in captivity with young that should be no more difficult to raise than brine shrimp. One importer suggested to me that there was a reluctance to start up commercial breeding of these species over here and the reason for this was largely political. It seems that Cleaner Shrimps represent more than 15% of the total imports of invertebrates form the Far East and the damage to that trade would be significant if alternative captive-bred sources were developed.

Commercial breeders abroad, who are mainly rearing animals for the table, of such subjects as the Queen Conch (*Strombus gigas*) and various species of edible Tridacnid clams in the South Pacific, have turned their attention to the opportunities provided by the aquarium animal trade.

Young Queen Conch make admirable aquarium subjects and are valuable controllers of hair algae, their basic diet, in the aquarium. They are far easier to transport than Turbo Snails, the popular imported snail for algae control, which has a high mortality rate in transit, sometimes up to 80% dying before reaching their destination. It is excellent news that there could be this move towards a captive-bred substitute.

Similarly the status of the Tridacnid clams in terms of conservation was very worrying until recently when captive breeding and replenishment programmes began to achieve success. The main thrust has been towards breeding *Tridacna gigas* and *T. derasa*, the common edible species, but with aquariums in mind commercial breeders are now raising the beautiful *T. crocea*. ■



Above: Euphyllia

Above right: Zoanthus

Right: Parazoanthus

Left: Bivalve sheltish veliger.

## How you can breed your own inverts

Hobbyists are also well-placed for their own experiments in breeding inverts. In just promoting ideal conditions in the reef aquarium for sessile invertebrates, such subjects as anemones and soft corals can reward you by reproducing asexually either by polyp division or budding. There are also ways of helping nature along. Soft corals, especially tree corals (*Sinularian*) and pulse corals (*Xenias*), respond to dividing or cutting off small portions and resiting these to form new colonies. Small portions of these types of soft coral also become detached from the main colony naturally and it helps to relate these offspring away from the parent colony to avoid competition for light and food which results if they are left too close together.

Leather corals (*Sarcophytons*) are easy to grow soft corals which regularly bud from the base to produce 'Y' shaped colonies. Cutting through the base of the Y with a sharp blade, together with the base material to which the colony is attached, is a recognised method of successful propagation of this species. Each piece, given space, will grow much more quickly than leaving the budded offset attached to the base of the main stalk.

Hard coral colonies of species such as *Goniopora* and *Faviites* are made up of individually small polyps and it would be possible to divide a colony into several separate pieces. This is not advised however, because once the film of living tissue which covers the hard skeleton is broken and breached, bacteria and protozoans soon find a way below the remaining film and destroy the polyps.

A word of warning also for anyone thinking of attempting to tear starfish apart to produce new animals. In aquarium conditions such attempts are usually doomed to failure due to bacteria attacking the severed portions before the wounds heal.

Amateur experimental breeding of Cleaner Shrimps has already been mentioned as a good example of a mobile invertebrate which could be chosen. The challenge here is in raising the fry which in normal aquarium conditions are either drawn into the filter or eaten by the other inmates of the aquarium. Females about to release larvae could easily be isolated into a purpose-designed nursery tank, and with good aeration and the proper food, success - according to Warren Zeller of Miami Seaquarium - is not too difficult.

# Dakin IN DEPTH

## One of the most common problems in marine tanks concerns nitrate. NICK DAKIN takes a look at some of the solutions.

**Q** **I am having a real problem with nitrates, not only in my aquarium which is fish-only but in my tapwater as well. The tank reading is well over 50ppm and the tapwater is about 45ppm. Can you tell me how to reduce it as I have lost fish for no apparent reason and I suspect it may be connected to the high nitrate level?**
• S. McKenna, Suffolk.

**A** Many marine fishkeepers are worried about unduly high levels of nitrates in their tanks and tapwater, and quite rightly so. While nitrate is not as potent as ammonia or nitrite, it can still considerably weaken fish, leaving them open to nitrate poisoning and a variety of lethal diseases. Invertebrates fare very badly, even at the very lowest levels for many species.

### Tapwater

Nitrates in tapwater are now relatively easy for the hobbyist to eliminate. In addition, other potentially harmful compounds such as phosphates and sulphates are often extracted at the same time. Resins, deionisers and reverse osmosis units will all do the job.

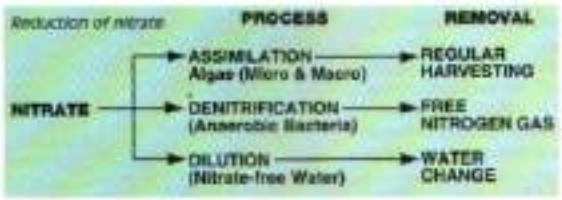
While r.o. water will give impeccable water quality, it is also the most expensive option (but well-worth paying, in my opinion). Most hobbyists, however, usually end up investing in a rechargeable resin that is effective and easy to use; the original and best-known resin cartridge is the Nitragon.

### The aquarium

The build-up of nitrates in the aquarium is a slightly more complicated affair. Not only can it be introduced by contaminated water changes but it is also self-generated as part of the biological filtration cycle. Heavily stocked or overfed tanks suffer the most and nitrate levels can quickly rise out of control if great care is not taken.

### Reducing nitrates in the aquarium

■ The first, and simplest method, is the regular water change with nitrate-free water. Depending on how heavily stocked they are, most tanks require a 15-25% change every fortnight. This method of control is called **dilution.**



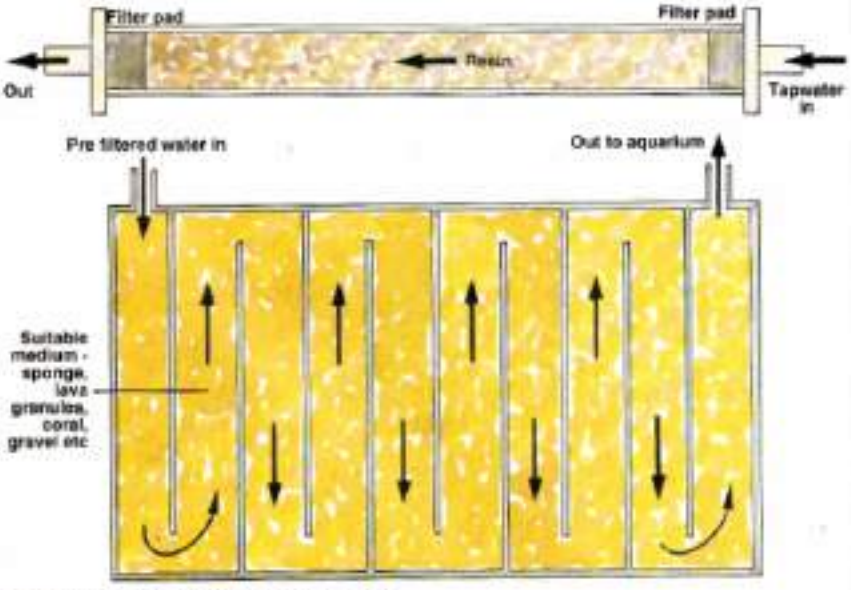

■ The second, less-predictable method, is to grow plenty of macro algae such as Caulerpa spp. Algae uses nitrate, along with other compounds, as a food source.

If harvested modestly on a regular basis, the toxins are removed from the aquarium and new growth is encouraged to carry on the good work. This is called **assimilation.**

■ The third method, **denitrification,** is certainly very effective but requires a separate filter compartment. Here, an anaerobic (oxygen-free) environment is created through which the aquarium water is slowly trickled (not to be confused with aerobic trickle filters). Bacteria then work on the nitrates converting them firstly to nitrous oxide and then to free nitrogen gas.

Flow rates through the denitrification filter have to be carefully monitored; too fast and nitrates are converted back to nitrite; too slow and deadly hydrogen sulphide with its distinctive rotten eggs smell is produced.

Some commercial units are available, the most common being the Sera Denitrator and many 'total systems' have them integrated as standard. It is also fairly easy to construct one from plastic waste piping as featured in my article (*PFK* **May 1991**).




*Above: A resin cartridge. Below: A denitrifying filter.*

Of course, there is nothing to stop the marinist practising all methods of nitrate reduction to be on the safe side.

It is wise to aim for nitrate ($NO_3$) levels of less than 25ppm in the fish-only tank and 5ppm in the invertebrate aquarium.

### Other nitrate sources

It is also worth noting two other potential sources of nitrate pollution that one would not normally consider.

Some low-grade salt mixes have been found to give high nitrate readings, as have some algae fertilizers.

Every marine fishkeeper needs salt and it would be wise to check your brand after mixing with confirmed nitrate-free water.

Algal fertilisers (totally unnecessary, in my opinion!) are nearly always based on sodium nitrate and the same test procedure should be conducted as above if it is found absolutely imperative to use it. ■

# Marine Answers

## Which fish should I add first?

**Q** **I am intending to set up a 60" x 20" x 20" aquarium to house fish and inverts. I would like to include a pair of Clowns, one or possibly two Mandarins and a Dwarf Angel. Should these be added in any particular order?**

**Lighting will consist of two 48" Actinic and two 48" Triton tubes. Is this sufficient for inverts and would reflectors make any improvement?**

**The area in which I feel I know the least is that of inverts. I propose to add some living rock, but only when the filters are fully matured. I would like to stock Tubeworms, anemones, soft corals and shrimps. Should they be added in any order?**

● Paul Carter, S. Humberside

*Mandarins should not be added until the tank is well established. Pic. Jane Burton, Bruce Coleman Ltd.*

**A** I would add the Clowns first and then the Dwarf Angel. Leave the Mandarins for a while until the tank is established and they have plenty of micro-organisms to feed on. A pair can be safely introduced at the same time; the male can be recognised by the extended first dorsal ray which is absent in the female.

While waiting to introduce the Mandarins (approximately six months), you could add a Dwarf Wrasse or Goby.

Reflectors would help the lighting immensely. You are probably going to require an extra two tubes - Aquastars, for example - if light-loving inverts are to be kept.

All the inverts that you are considering are suitable over the long term, but do steer clear of hard corals. There is no particular order in which to introduce them as long as it is done reasonably slowly.

*Regal Tangs require plenty of free swimming space. Pic. Max Gibbs, The Goldfish Bowl, Oxford.*

**LETTER OF THE MONTH**

**K. Merritt of West Sussex, wins an Interpet test kit for her Letter of the Month.**

**Q** **We have a 36" x 18" x 12" tank, furnished with living rock, lava rock and Caulerpa. Stock consists of a Percula Clown and a Regal Tang. The Tang is shy and hides a lot and has recently started to look a bit tatty and pale in colour, although he feeds well. The water conditions are fine, with the Nitrate, Nitrite and Ammonia levels at nil. What could be causing the Tang to act this way?**

**A** It does not sound as though your Regal Tang is diseased in any way, but I do think it has "coloured down" because it is unhappy with its surroundings. These fish are naturally shoaling and like plenty of space. They do not usually have hiding places, except at times of stress. You may be able to solve the problem by introducing one or more Regal Tangs to give a sense of security in numbers, but there is no guarantee of this and you may end up with three nervous fish instead of one.

You may decide that this is not the sort of fish for a small tank and exchange it for a more suitable species. The choice is yours, I'm afraid.

### ■ Increasing the stock

**I have a 34 gallon set up with an undergravel filter and external canister filter. If I build a trickle filter, holding approximately 10 gallons, will I be able to increase my stocking level?**
**P. Dominy, Kent**

It is not good practice to use extra filter capacity to increase stocking levels in the main tank. Fish tank cramped if there are too many of them and mixed results as babies, as disputes are likely. Water quality would not be improved because of the extra load on the system, which defeats the object. It is best to base stocking levels solely on the capacity of the main aquarium.

### ■ Add an anemone

**I have a Goniopora coral and my Clownfish lives in it as if it were an anemone, which is not doing it a lot of good. Is this normal behaviour?**

**I have noticed some silvery bubbles on my living rock which look like air bubbles but are solid. Have you any ideas what these are?**
**R. Baker, Lincs.**

Clownfish in the absence of an anemone, will often take refuge in a related species of invertebrate, such as Goniopora or Tooth Coral. The easiest solution would be to introduce a suitable anemone for it to occupy.

The solid, silvery bubbles are most probably a species of algae called Solio's Eyelash (lovely name!), which live in small, isolated colonies.

### ■ Aggressive Angels and Clowns

**I placed three new fish in my tank separated by a divider. After three days I moved the decorations around and removed the divider. The new Maroon Clown fights with the established Tomato Clown, and the new Elbil Angelfish fights with the established Coral Beauty. I had to replace the divider.**

**Will they settle down?**
**Marisa Michaelides**

Both Clownfish and Dwarf Angelfish are very territorial. Once established they will rarely tolerate a similar or identical species in the same tank. Newcomers get a severe beating and may be killed.

## Sticking to rock

**Q** I was recently at a fish shop, looking at the stock, when I witnessed the purchase of an anemone. It took two members of staff about ten minutes of tugging to remove the anemone, by which time it had become ragged and contracted. Please can you tell me if this is the correct procedure for purchasing anemones and corals, or should they be bought with the rock they are attached to? Should you pay more for the rock - especially if there is something else attached to the rock, other than your intended purchase?
• M. Tyler, Essex.

*You may need to purchase more than just the anemone you require*

**A** If an anemone cannot be easily removed (and without damage) when you buy it, then I would certainly seriously consider buying the rock it has attached itself to as well, damaged anemones are open to all sorts of bacterial diseases which can be fatal.

*The quarantine tank came too late to save a reader's bitten Lionfish.*

## A word of warning...

**Q** I purchased a Lunar Wrasse for my 72" x 24" x 24" tank. It was about 4" long at the time. I added it to my stock which included Damsels, Clowns, a very tame Lionfish and various Inverts. A few weeks later I noticed that the anemone crab had disappeared and as more time went by, my fish stock began to decrease, although I never found any dead fish in the tank. The water conditions proved to be perfect.

I then noticed how large the Wrasse had grown, snatching the food from my fingers before I could offer it to my other fish.

One morning, when I put the lights on, the Lunar Wrasse had the Lionfish cornered and was taking chunks out of it. I removed the Lionfish and put him in a quarantine tank, but he died. I exchanged the Wrasse (by then measuring about 10") for another fish at my local shop. Everything since then has been fine.

I think readers should be warned to steer clear of these fish in the future.
• G. Kane, Swansea

**A** The Lunar, or Moon Wrasse, *Thalassoma lunare*, is a commonly available fish, but its full potential is not often appreciated by the hobbyist. This is a species capable of growing to well over 12" in length in double-quick time, under the right conditions. It also has a very large appetite, as you have found to your cost, and may attack smaller or less aggressive species (and fishkeepers' fingers).

## Mixed set-ups

**Q** I have decided to set up a 48" x 18" x 15" fish only aquarium, with a view to changing to a mixed fish/invert set-up and I am now contemplating which fish to buy. Leaving aside personal choice, compatibility and so on, can I introduce fish into the aquarium when it is ready and matured and add the invertebrates at a later date, or will it be necessary to completely re-stock the aquarium, thus getting rid of the fish which are already in-situ?

Also, would you recommend traditional or reverse-flow undergravel filtration for a mixed set-up?
• Keith Turner, Kent.

*It's probably best to establish the inverts before adding any fish.*

**A** It matters little whether you introduce the fish or invertebrates first into a properly matured aquarium, as long as the maximum fish stocking level of 1" of fish to every six gallons nett after one year is observed and, of course, the fish are compatible with inverts. If I had to choose, I would establish the inverts first.

I prefer reverse-flow undergravel filtration and an Eheim 2215 would suit your purposes quite well.

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MARINE ANSWERS

■ Nick Dakin

# Dakin IN DEPTH

## Our marine expert, NICK DAKIN, takes a more in-depth look at a reader's filtration query.

**Q** **I am planning a 48" x 15" x 12" marine tank and wish to use undergravel filtration. Please could you outline the procedure for both downflow and reverse-flow?**
•Miss N. Hunt, Swindon, Wilts.

**A** Undergravel filters still remain the most popular form of biological filtration for marine aquaria, and while they do it is important that the hobbyist gets it right from the outset.

### The Downflow Method

Downflow is the most widely adopted method because it is easy to arrange and it is the most traditional system.

Start by covering the base of the tank as fully as possible with undergravel filter plates. These can either be the small, lock-together types, or the larger, all-in-one, finely slitted type. Some people prefer to glue these to the base glass using silicone sealant but, in my opinion, this is not really necessary.

Next, for a four foot tank, an uplift should be fitted to the plate(s) at either end in the back corner. The tubes may have to be cut to accomodate a powerhead pump on each one. It is best done at this stage to avoid unnecessary disturbance later on. Uplifts can still be operated using an airpump, but powerheads are much more efficient.

Once the plates are in position, cover them with a suitable coarse medium such as coral gravel, crushed shells or dolomite at a rate of 10lb per square foot of base area. In this case, 40lb in total.

A gravel tidy, which is no more than a fine plastic mesh, should then be laid over the coarse medium and should be neatly trimmed to fit snugly into all the corners and around the uplifts.

Next, cover the mesh with a layer of coral sand, again at a rate of 10lb per square foot. The gravel tidy prevents the two media from mixing together and forming a tightly packed, ineffectual filter. (Note: don't be tempted to use filter floss as a gravel tidy substitute as it will become fully clogged and impenetrable to water in a very few months.)

It is wise to wash all media thoroughly and to give it a good visual inspection for foreign objects and contaminants. An algae magnet is a plastic bag can be passed over the sand and gravel to remove any metal fragments. The plastic bag can be removed when you have finished and the magnet will still remain clean.

The powerheads should draw the whole volume of the tank through the filter bed at least three times each hour. If several powerheads are being used, they should all be of the same make and power rating to provide maximum efficiency.

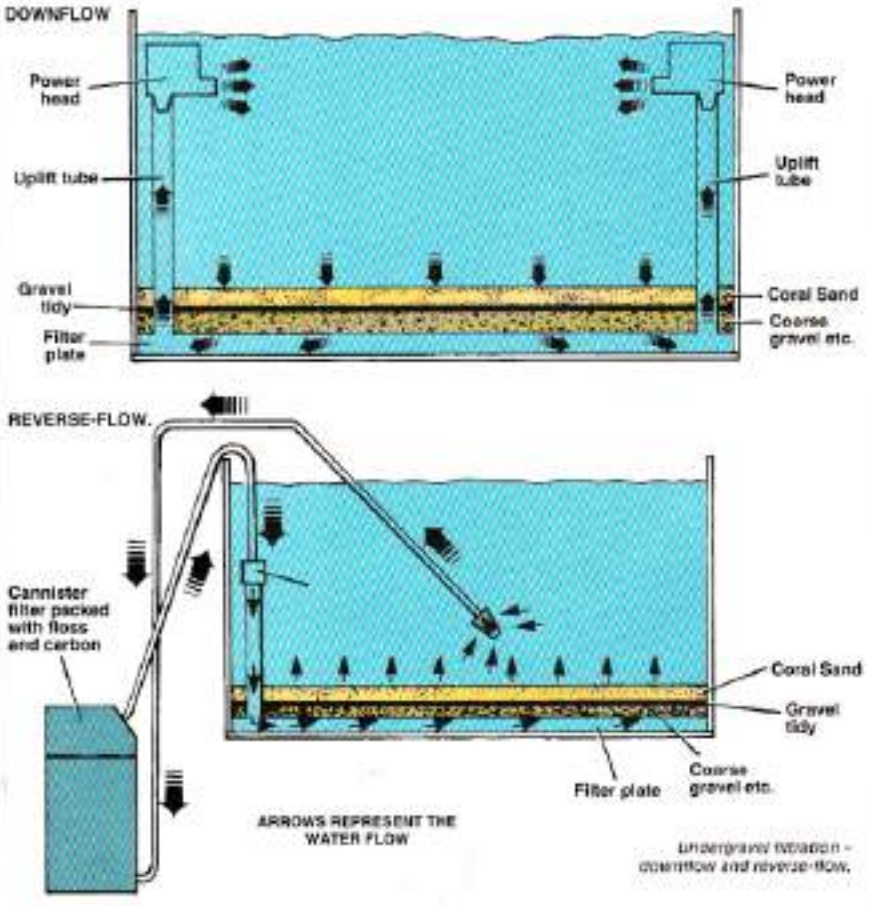
The coral sand will need raking through regularly to prevent it packing down solid and reducing the through-flow. Any mulm and detritus can be syphoned off at the same time.

### The Reverse-Flow Method

The filter bed arrangement for reverse-flow is exactly the same as the downflow method, but the direction of water is reversed and pumped down the uplifts and up through the various media. Power for this method is best supplied by one or more external canister filters, which should be capable of turning over the tank water at least three times each hour. For the best distribution of water throughout the filter bed, a finely slitted filter plate is usually more effective.

An extra water pump in the form of an internal power sponge filter will be necessary for good water circulation.

The advantage of reverse-flow is that the water can be constantly filtered for detritus and debris that would otherwise be held in the coral sand and gravel and cause it to pack down and clog. Therefore, only mechanical (filter floss) and chemical (activated carbon) needs to be packed into the canister. Biological media is totally unnecessary and a waste of space. Remember to change the filter floss weekly and the carbon every two months if the tank is fully stocked. ■




Undergravel filtration – downflow and reverse-flow.



*Main pic: Fancy Goldfish can be kept in ponds during the summer, but will need to be removed when temperatures fall. Inset: Goldfish have been kept in Britain for almost 300 years. Pics: Jane Burton; Bruce Coleman Ltd.*

# GOLDEN *fish*

**Lest we go Koi mad, Dr DAVID POOL of the Tetra Information Service reminds us that there are other rewarding pondfish.**

Although there is a very wide range of coldwater fish which may be kept in a garden pond the majority of pondkeepers choose Orfe or some of the many varieties of goldfish.

These two species could really be described as ideal fish for the ornamental pond, being widely available, hardy, active and brightly coloured making them easy to see even if the pond water is slightly cloudy.

## GOLDFISH
**(*Carassius auratus*)**

The goldfish is deservedly the most popular species of fish kept in garden ponds and few, if any, ponds in this country will not have had goldfish in them at some time.

## Varieties for the Pond

Goldfish were first kept as pets by Chinese fish breeders over 1600 years ago. Since that time they have been selectively-bred throughout the world to produce the 100 or more different varieties that are available today. Unfortunately not all of these varieties are suitable for keeping in a pond.

Many of the fancier varieties (eg Bubble Eyes, Ranchus and Orandas) are a result of many generations of selective breeding and require the constant conditions which can be provided with care in an indoor aquarium. In a pond the temperature variations which occur from day to night will affect the buoyancy of the fish's swimbladders, causing them to float to the water surface or sink to the bottom. The colder temperatures which occur in the winter can also prove lethal.

These fancy varieties of goldfish can be placed in the pond during the warm summer months, but need to be removed when the water temperatures fall below 10-14°C. Such transfers need to be undertaken with care to avoid damaging the fish or subjecting them to sudden temperature changes.

More hardy varieties of goldfish, such as common goldfish, Comets and Shubunkins can safely be kept in the pond throughout the year. Try to prevent the water temperature falling too low in the winter by minimising any water flow in the water. This will leave a deep layer of warmer water at the bottom of the pond, in which the goldfish will thrive.

In a pond goldfish will grow considerably larger than if kept in an indoor aquarium. Common goldfish for example may reach a length of 45cm (18 inches) given sufficient space and good water conditions. Shubunkins and comets are slower growing but can still reach a length of 8-10 inches.

## Goldfish Facts

**Family:** Cyprinidae (Carp Family)
**Scientific Names:** Carassius auratus
**Origin:** Southern China
**First kept as Pets:** 265 AD by China, but now found in the wild throughout the world.
**Introduction to Britain:** Around 1700
**Distribution:** Originated in China, but now found in the wild throughout the world.
**Identification:** Distinguished from Koi by the lack of barbels around the mouth (Koi have 4; goldfish 0). Crucian carp are also very similar but goldfish have a less-deep body and a shorter dorsal fin.
**Life Span:** Given good conditions a goldfish will live for 10-20 years. In occasional cases they may live for over 40 years.
**Colouration:** Goldfish may have a range of colours from black and brown, through gold to pure white. As they age goldfish tend to become paler.
**Size:** Goldfish may reach a length of 20-25cm after 4-5 years.

If the pond is overcrowded the fish will not grow to their maximum size, therefore it is advisable to follow the recommended stocking levels of 7.5cm (3") of fish length for every 900cm (square foot) of water surface area. These stocking levels should take account of all fish present, as one small goldfish in a pond densely-stocked with koi will still not grow.

## Feeding

Goldfish feed on a very wide range of food items found in the garden pond, including large quantities of algae, insect larvae and invertebrates. However, unless the pond has a very low stocking level, there will not be enough natural food available to maintain the fish in good condition.

It is therefore necessary to provide the fish with a balanced diet such as TetraFin Goldfish Flakes, TetraPond Flakes or TetraPond Sticks. As an occasional treat the goldfish can be given a number of other foods such as brown bread, sweetcorn, prawns and worms.

If fed at the same time each day the fish will quickly learn to recognise their owners as a source of food and rise to the surface to be fed. With care they can also be trained to feed from your hand.

Unfortunately this appealing behaviour can also be the goldfish's downfall if your pond is visited by a heron with the fish greeting the herons arrival by rising to the surface to be fed. Goldfish are particularly prone to predation by herons due to them being slow swimmers, and brightly-coloured.

The use of a heron scarer or wires around the perimeter of the pond, or a net over the pond is advisable if your pond is visited by herons.

## Colouration

The colour pigments which result in the bright colouration of your goldfish cannot be manufactured inside the fish's body. Instead they have to consume foods such as shrimps, snails, algae and insect larvae. In the confines of a pond, natural colour enhancers can be given in diets such as TetraFin and TetraPond Koi Sticks.

As the goldfish age their colouration can change considerably. Young fish are often dark in colour, and will acquire their bright colours after 6-8 weeks or even longer. Once they reach an age of 4-5 years the goldfish will often start to lose their colouration and gradually become paler. It is not uncommon to find old goldfish that are pale lemon or even white in colour.

*The pond provides a useful source of live food and algae for the fish, but they will still need a balanced diet of flake or pond sticks.*
*Pic. Hans Reinhard, Bruce Coleman Ltd.*

Orfe are shoaling fish and are happiest in groups of four or more. PIC: Hans Reinhard, Bruce Coleman Ltd.

## Golden Orfe Facts

**Family:** Cyprinidae (Carp Family)
**Scientific Name:** Idus idus
**Origin:** Europe
**First kept as Pets:** Around 1910
**Introduced to Britain:** Around 1930
**Distribution:** Widely kept as pets throughout Europe. Golden orfe are found in the wild in certain parts of Britain and Europe.
**Identification:** Easily distinguished from other ornamental pond fish by the lack of barbels around the mouth, elongate shape and short dorsal and anal fin. Similar to the dace (*Leuciscus leuciscus*) which is native to Britain. Can be differentiated by means of its concave anal fin.
**Life Span:** Given good conditions can live for 10-20 years.
**Colouration:** Golden upper surface occasionally with red tints; pale yellow lower surface. May have markings.
**Size:** Golden Orfe can reach a length of 60cm (24 inches) in lakes. Usually 30cm (12 inches) or less in garden ponds.

## GOLDEN ORFE

***(Idus idus)***

The Golden Orfe is a very active fish which will add considerable interest to any pond. They contrast well with slower moving goldfish and koi, and spend most of their time just under the water surface searching for any dried food or insects which may fall onto the water.

### Varieties available

The golden variety of the Orfe is the most commonly available and is the best for the pond, due to its bright colouration making it easy to see. Some Orfe are also available which are basically of the golden variety, but which have varying amounts of black on them. These black markings can be in the form of small black spots or larger markings.

Blue Orfe are also available. This is a more silver version of the orfe with a bluish back colour. These fish will form a shoal with the golden varieties and will stay just under the water surface. However, unless the pond is clear, the darker colour of the Orfe will not be seen, with their presence being shown by occasional splashes on the surface at feeding time.

Golden Orfe will grow to a size of approximately 30cm (12") in larger ponds, but will reach less than half that size in a small pond.

They are naturally a shoaling fish found in large waters, therefore always keep them in groups of four or more individuals. Single fish will behave unnaturally and will be more prone to disease. Being active fish they require a lot of space to swim and grow, therefore they are best kept in a pond with a surface area of 50 square feet or more.

### Sensitivity

Orfe are generally a very hardy species and can easily withstand the cold winter temperatures that will occur in the pond. They can suffer if exposed to a temperature of 1-2°C for long periods, therefore minimising water movement in the winter to maintain a warm deep layer of water, is important.

High temperatures can result in more problems for Orfe due to low oxygen levels. Oxygen depletion will affect Orfe before other pond fish species, therefore on hot still nights when they are most at risk, ensure there is good water movement in the pond (via a waterfall, venturi or fountain).

Golden Orfe are very sensitive to the addition of certain disease remedies, and all of the Orfe in a pond can easily be lost following careless treatment. If treatment is necessary ensure that you select a remedy which does not harm Orfe. Any remedy which does affect Orfe will say so in the instructions.

### Feeding

Golden Orfe will feed on the same diet as goldfish.

Orfe are ideal inhabitants for a planted pond, as they only eat small amounts of plant material. Even when large they will not uproot oxygenating plants or damage lilies.

If looked after correctly, and given suitable conditions both goldfish and Orfe will live for 10-20 years in a garden pond. They will also readily breed in the spring and early summer, providing an area of further interest. ■

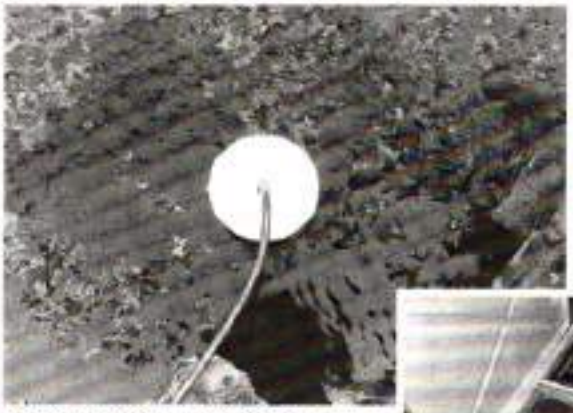
**■ Further information on goldfish and orfe is available in the following texts:**

***Fancy Goldfish Culture*** **by F Orme, published by Salga books**

***Water in the Garden*** **by J Allison, published by Salamander**

# Practical Pond

**NICK FLETCHER offers an autumn checklist of pond tasks.**



*Left: Waterfalls can chill your water in the winter unless you divert the flow with a length of pipe. Above: In shallow ponds, a pool heater will generally keep an area ice-free. Right: Chambered filters can be cleaned in the autumn – one chamber at a time.*

# Putting your pon

Autumn is the season to best appreciate your pond fish and, at the same time, to make simple preparations that will ensure they enter the cold months fighting fit.

The weather has been turned on its head in recent years, with the transition from autumn to winter taking place anywhere from early October to late November. But, as a very rough guide, the first frosts – occurring around Guy Fawkes' night and corresponding with intensive leaf-fall – mark the time when your fish will cease to be active and enter a state of semi-dormancy.

## Feeding

Before that, however, things need to be done. On mild autumn days, pond fish will be feeding enthusiastically, building up their fat reserves.

But, as ambient water temperature falls, they will need food that is easily digestible so that, should a sudden cold snap occur, there will be little or no waste matter to decay in their gut. Floating wheatgerm pellets should be gradually phased into their diet until they replace the normal, high-protein formula. Try and feed the fish first thing in the morning and around midday, not in the evening.

Pay special attention to removing any surplus food before it decays (hence the suggestion that you keep with floating, rather than sinking, pellets). Otherwise, malign bacteria will multiply.

## Wounds

Bear in mind that a fish's immune system ceases to function below about 50°F... any wounds or bacterial lesions that have not healed by that time will worsen during winter, for unfortunately the bacteria have a lower temperature tolerance than the fish.

## Parasites

Give your fish a close visual inspection: flukes should not be a problem at this time of year, but you may have introduced anchor worm (*Lernaea*) or fish lice (*Argulus*) with new stock... no dealer worth his salt would sell infested fish without first having dealt with these parasites, but it happens.

Malachite green and formalin-based medications are like fish, in that they are temperature-dependent, and these chemicals should not be used in water below 50°F. Nor should you use any remedies of this type if a white, crystalline precipitate is visible in the bottle: however tempting it might be to use up chemicals bought in the spring.

Remember, too, that Orfe and Rudd are damaged by some antiparasite preparations. They will have to be separated from Koi and goldfish and housed in a separate pond or large tank: if they, too, bear parasites, these will have to be individually removed (tweezers for anchor worm, cotton buds for fish-lice).

## Handling fish

To minimise damage, always handle fish with wet hands and place them, either on a wet towel or (better) upon what carp anglers call an 'unhooking mat'.

These are padded mini-mattresses covered with smooth plastic, but you can make your own from rubberised carpet underlay.

## Filters and pipework

Late autumn is a good time to clean out chambered filters holding spar, lilag or other granular materials. But, obviously, do not wash all the media in one go: stagger the chambers at weekly intervals, so there will always be a large enough population of nitrifying bacteria left.

The task is made easier if the chambers have isolation valves and individual drains to waste. It is then possible to pump pond water into each, agitating with a smooth stick such as a length of broom handle, leaving the drain valve open until the water runs clear. The purpose of such an exercise is not so much to remove dirt (mulm is a healthy filter is quite inert), so much as to

*Above: Always handle fish with wet hands. Left: Lily leaves should be cut back cleanly, never pulled.*

# ...d to bed

restore the even filtering capacity of the media.

Gravel, spar, etc. tends to compact down and, because water always takes the line of least resistance, 'tracking' may occur: instead of an even spread through the media, channels will form. This leads to dead spots, a breeding ground for anaerobic bacteria.

Even if filter pipework appears clear, it will always benefit from a pull-through with a soft flue-brush, the type with a flexible handle.

As a "for instance", I was recently perturbed by an apparent leak in the smaller of my two ponds, which shares a common circulatory system with the larger Koi pool, and is fed by a return waterfall. But all that was happening was, the overflow pipe from the Koi quarters was partially blocked: this meant that an abnormally high head of water was building up in the main pool, bringing the level above the sealed junction between liner and blockwork.

I was amused and relieved at the easily-remedied cause of the blockage: cased caddis larvae.

## Plants

If your pond is planted, now is the time to cut back dead growth: although this year it seemed a pity to butcher my waterlilies, which continued to flower right through until late September.

Lily leaves should be cut cleanly, not pulled: this applies equally to marginal or bog plants.

In fact, if you have a cold greenhouse or well-lit shed, I think there is a good case for removing all containerised aquatic plants and overwintering them in trays just deep enough to allow an inch of water over the compost in the pots.

The less plant matter in winter ponds, the better. Loose oxygenators can be removed altogether, keeping back just a few rooted cuttings for the following spring.

If, like me, you have learned that a certain amount of filamentous algae is an inevitable fact of modern pondkeeping, you may have been tolerant of its growth during the summer months.

Providing it does not clog filter intakes, it has a few things going for it: it can act as a curb on nitrate and phosphate levels, provide shelter for any overlooked fry and even supplement the fish's diet in holiday periods.

However, once it starts to turn brown, separate away from the pond walls and fall to the bottom, it must be removed. A square net (enabling one to reach into corners) does the job well, and the resultant goo goes on the compost heap, joining all the iris stems, *Gunnera* leaves and duckweed.

## YEAR OF NO TROUBLE

**I have had the most trouble-free year's pondkeeping since my Koi pool was built in the spring of 1988. Yet, because of other commitments, I have arguably spent less time than ever with my fish.**

The only 'disasters' (and that's overstatement) involved close encounters of the animal kind. In March, I had a week of sustained psychological warfare with a heron: it would hunch on the garage roof as I left for work, and I could well imagine the thoughts of piscicide running through its reptilian brain.

Luckily, it confined its attentions to the goldfish pond while I balanced the relative merits of a net against the highly illegal option of a catapult.

The net prevailed, and the heron left for easier pickings. In July came the first visit from the phantom night hound. I have not seen this wretched dog, only heard the clinking of its collar tag as it shakes itself dry after a midnight dip in the goldfish pond.

It disregards the net put there to discourage the heron, and I come down in the morning to find a dog-shaped depression in the mesh and all the fish having a nervous breakdown.

■ Spring saw the arrival of the A1GSM filter, courtesy Peter Oakes. The 'magic' medium in this endearing space-hopper device is Sporax, claimed to work wonders in nitrate-removal, though my levels stuck resolutely at 36ppm and all I could see in terms of visual improvement was a better class of blanketweed: sort of lusher, hair mean?

Actually, this was easily explained away by my insistence on regular partial water changes (my pond having a guzzling bottom drain to waste). The nitrate came in via the tap, this being Fenland, where 'traditional' agricultural run-off enriches the fertility of that which we are supposed to drink.

It may just have been coincidence, but since the A1GSM went in, I have had no trouble at all with fish ailments. No ulcers, no fukes, nothing.

Even fish-pox on a couple of Koi had vanished without trace, and the growth rate of some (not all) of the fish has been encouraging. It may be a truism, but good water quality is 90 per cent of the battle.

■ I have also resisted the temptation to dose up the pond every time I saw a fish flick or flash. There was a time when I was a pondkeeping hypochondriac on the fish's behalf, but this was the year when all chemicals stayed on the darkened shelf.

■ It was the year, too, when I decided my fish had been eating better than I had. So, instead of pricey treats packaged small and elaborately, I invested in a large sack of pellets that claimed to do nothing except provide their dietary needs.

This was divided up into smaller bags which were re-sealed and used as necessary (leave a large bag open to the air and the fats in the food will oxidise, turning it rancid).

The fish will get their wheatgerm this autumn, end of story.

## The Autumn leaves

Fallen leaves in autumn/early winter should not be that much of a problem if you have sited your pond away from deciduous trees, but often we have to make compromises, especially if space is limited.

I prefer not to stretch a net across the pool, for two reasons: it hinders viewing of the fish at a time when their colours are at their best, and it is a nuisance if the need arises to do any in-pond ▶

◀ maintenance, such as washing foam pre-filters.

I deal with direct leaf-fall, and any subsequent stray leaves blown in by winter gales, again with that square skim-net (actually an old angler's landing net).

## To run or not to run?

Most ponds in Britain, despite the high-profile exposure of upmarket Koi pools are under 1,000 gallons and kept sweet by quite basic above-ground external filters (though UV sterilisers are becoming a common extra.

Such filters should be kept running right through the winter, although the water circulation need not encompass the whole pool: in other words, move your submersible pump closer to the filter so that there is a shorter "loop".

While you are doing this, check that the impeller is clear and that hose connections are tight.

The pump should sit on a firm support to keep it clear of the bottom of the pool, and a good idea is to use one of those ornamental concrete blocks that has a recess in its base. This gives small fish an ideal resting place; but please treat any concrete in contact with water with a sealing agent such as G4.

While you have the tin to hand, go round any blockwork or crazy paving and make sure all the mortared joints are firm and tight. If frosts freeze water that has seeped into imperfect joints, the expansion will force them farther apart, with disastrous results.

## Current concerns

Autumn is the time, too, to check your pond electrics. Are any weatherproof switches properly protected from the elements? Do your circuit-breakers work properly (most models have a test switch). And does the tube in your UV unit, if fitted, need replacement?

A good idea is to attach stickers announcing when the last change was made: otherwise, you can be running a clapped-out tube at the very time it's most needed.

## Freezing

When was the last time your pond froze over? Last winter round here there was nothing more alarming than a little cat-ice in the margins, gone by midday, and it's now at the stage where I think advice on constructing insulating entire pool covers may have been overtaken by the global weather pattern.

Ice is not a problem, anyway, in deeper ponds, while in shallow water (2' or less) a proprietary pool heater will always keep a small area clear.

This item, in short-term use and probably trailing exposed cable, must be teamed with a circuit-breaker.

It's not a good idea to keep fountains running in the cold months, because they exert a chilling effect and, of course, the jets in the nozzles will be the first to ice up in a frosty snap.

Waterfalls, however, often serve as a filter return: the chill factor still applies unless you divert the flow with a length of guttering pipe or similar.

It's not as pretty as water cascading over rocks, but it's less likely to freeze.

## Overwintering fry

Summer 1992 was a good year for casual spawnings, and my smaller pond is home to countless Orfe and goldfish fry.

I do not try and coaxe these over winter by placing them into a separate tank in the garage, reasoning that the survivors will be the toughest of the bunch and more likely to make up into sturdy adult fish: come spring, they are distributed to friends.

However, if you are the proud parent of more valuable Koi fry, where is the cut-off point for outdoor survival? I reckon anything over an inch long by November has a good chance of making it. If you wish to increase the survival rates, by all means overwinter the little fish indoors, either in a coldwater aquarium or a filtered vat in shed or garage.

Serious Koi keepers should have such a system installed as a matter of course, for if a fish falls sick in winter it will need to be gradually warmed up until its immune system again begins to function, and until the water temperature is high enough for medication to be effective.

Such overwintering vats should be as simple as possible: externally filtered zeolite somewhere in the system to cope with ammonia.

Daily tests on nitrite, nitrate and pH should be carried out while fish are undergoing treatment. ■

## TANGLED TEMPTATIONS

**There must be something about carp, be they Koi or their semi-wild cousins, that inspires fierce devotion. I have re-discovered the joys of carp fishing, if you can call an obsessive, time and cash-consuming anti-social pursuit joyful.**

Curiously, the attitude to fish of those who either lovingly hand-feed them pellets or seek to put them on the bank is equally caring. And the army of companies, seeking to relieve angler and fishkeeper alike of their hard-earned, tap up both by playing on the twin human weaknesses of snobbery and one-upmanship.

The carp-fisher, with his array of matched stepped-up rods and baitrunner reels, electronic bleepers and buzzers, swaids and bobbin indicators - not to mention baits that require a degree in organic chemistry to fully understand - is no different to the Koi-keeper who must have the latest colour-enhancing food, all-dancing filters and show-quality fish.

Material possessions proclaim, to the uncomprehending outsider, the 'competence' of their owners: to those in the know, the reality is rather different.

I have seen Koi survive and thrive in the most unlikely ponds, providing their owners provide knowledgeable T.L.C. and I have witnessed good carp caught by anglers using rods apparently fit only to support runner beans.

That said: it's nice to have the right gear and use it sensibly. I was browsing through a carp baits catalogue and came out of the experience dazed and amazed. The 'boilie' (a spherical, tough skinned bait in every imaginable flavour from salmon and shrimp to tropical mango) contains not only every element essential to a balanced diet, but amino-acids to trigger feeding and even substances to encourage the healing of damaged tissue.

In other words, carp baits have ceased to be merely baits: they are being catapulted in their thousands into every water in the UK to feed up carp that may never be caught.

Don't think, for a moment, that giving pet-names to fish is the sole prerogative of pondkeepers. Every carp water has 'known' fish that are caught regularly and are given handles relating to some physical peculiarity: so we have 'Nelson' (one-eyed), 'Smallpocs' (little fins), 'Gutbucket' (self-explanatory) and 'Elseif' (a fawlty-pounder).

The day may soon come when manufacturers of pond food cotton on to boilie-type foods as an alternative to pellets. But they'll have to change the recipe if Koi are to remain Koi-shaped.

Fact is, carp on many waters are enjoying the good life to the extent where they are developing 'boilie-belly'.

As a final instance of the merging of interests of carp angler and pondkeeper, many waters are now stocking up with ghost Koi (Ogon/Common carp crosses), not to mention Orfe and Grass carp. My feelings, on recently landing one of these ghostlies, were mixed, to say the least. I picked a fish-louse from it as it lay on the unhooking mat, dabbed a bit of waterproof ointment on a small wound on its flank, then slipped it back into the water.

The angler in me said "5 lb 8 oz".

The pondkeeper in me said: "Fifty quid down at the aquatic centre".

Do others who share my fish-related hobbies suffer a similar identity crisis?

## WINTER KOI SHOW

Last month Nick suggested that Winter Koi shows (Japanese style) were a far better idea than stressful warm weather events. Since then we've heard of the BKKS Northern Section's organisation of the UK's 'first ever' winter show on November 14, when the Section claims "Cooler temperatures at this time of the year make it easier to maintain water quality, Koi are less stressed at being moved and look their very best."

The under cover event just outside Great Sankey nr Warrington is benching between 8am and 12pm - entry is free - with judging 12.30 to 3pm. Entry to the show is £1.50 per person and car parking 50p. **More details from Derek York on 0925 724680.**

# Coldwater Answers

### ■ Live food

**My pond is well stocked with goldfish and Orfe. During the summer I often feed them with worms, beetles, woodlice and slugs from my garden. Am I doing them any harm?**
**B. Wall, Manchester**

There is no harm in feeding the fish with bugs and beasts from the garden and it's probably very good for them, supplying very fresh food. So long as the fish enjoy feeding on this natural food, it is worth continuing the practice. **BB**

### ■ Orandas and plecs

**I have a 4½' tank with 4 Orandas, approximately 3" long, excluding their tails.**

**I use two 20l powerheads and a Fluval 1 containing carbon. A large air pump operates two airstones. A heater keeps the temperature at 70°F, enabling me to keep 5 Cardinal Tetras and a 3" plec.**

**Is my filtration adequate?**

**Can I keep one more 3" Oranda?**

**Can I keep another plec with the existing one?**

**Should I keep my Cardinals in this tank?**
**Darren Knight, Plaistow.**

Your filtration sounds adequate, and should cope with another Oranda and another plec. Plecs can be intolerant of their own kind, though.

Cardinals need a temperature between 73-75°F (23-24°C), and would be better off in a warmer tank of their own. **PD**

*If you want to attract newts and other wildlife to your garden pond, it's best not to add any fish, as they will eagerly consume the tadpoles. Pic. shows a pair of Crested Newts by Jane Burton. Bruce Coleman Ltd.*

## Should I add any fish?

**Q** **I recently became the owner of a pond which I planted and then left for a few weeks before I put the fish in. But during this time the pond started buzzing with activity as it filled with frogs, tadpoles, newts and pond skaters to name but a few. In the last few weeks loads of newt tadpoles have hatched.**

**Can I still put some fish in the pond or will they eat the wildlife?**
•L. Sugden, Herts.

**A** Fish will indeed eat the newly-hatched tadpoles of frogs and newts and regard them as something of a delicacy. They can decimate the population of these baby amphibians in a pond system. It depends on whether you want a natural pond to encourage newts, frogs and toads. If you decide to stock the pond with fish, frogs may only become a nuisance in the spring, as unattached male frogs can cling onto the fish, causing them distress and have even be known to suffocate them by clamping onto their gills. I should add that these instances are very rare and on the whole fish and frogs can live together perfectly amicably. **BB**

### Shining bright

**Q** **Please could you give me some information on Red Shiners, as I would like to set up a coldwater tank in which to keep some. What do they eat?**

**A** The Red Shiner, *Notropis lutrensis*, is a North American Cyprinid. It grows to around 8 cm in length. The male is a little larger than the female and has very bright orange ventral fins when in breeding colouration.

Red Shiners prefer an unheated aquarium with a temperature of 72°F or below. They are not very difficult to feed and will eat a wide range of commercially prepared foods, including flake, although the odd offering of live food will be greatly appreciated.

*Left: Red Shiners will be happiest in a water temperature of less than 72°F. Pic. by Dora Travers.*

### Wood underwater

**Q** **I am building some decking on to one end of my 10' x 8' x 3' pond. Is there a wood preserver I could use on the wood which would be used for support piling, or will I have to replace it as and when it starts to rot?**

**The pond will house a mixture of goldfish and Koi.**
•Paul New, Essex.

**A** Avoid any creosote-based wood preservers. Cuprinol (clear), as sold in aquatic outlets, is really a concrete treatment, but I imagine it would also seal wood with a couple of coats.

Sadolin is also a safe preservative, giving a very attractive finish, but to be absolutely sure, ask at your source of purchase.

Failing that, untreated coniferous wood, such as pine, lasts a long time underwater.

If your support piling is not going to be visible when installed, why not consider materials other than wood?

I can see applications for square-section PVC piping, for instance. **NF**

## Fungus Infection

**Q** **I have lost 3 Shubunins, 3 Sarasa Comets and 3 Goldfish with fungal complaints, and the last one had a blood spot on its nose. The remaining Ghost Koi, Koi and golden Orfe feed well and are very active. Any ideas?**
• Les Swain, Huntingdon.

**A** The fungus that affects fish is present in all ponds, but often it requires the skin of the fish to be damaged in some way to allow the fungus to grow on the body of the fish. The blood spot on the nose of the last fish leads me to wonder whether the fish were initially suffering from some infectious agent, such as a bacterial pathogen.

Many pathogenic bacteria are quite specific in the species of fish they affect, leaving other species in the pond unaffected.

As the remaining fish are healthy, this pathogen is probably no longer in the system. **BB**

## Split fins

**Q** **We have a 10 gallon tank with an undergravel filter containing two common goldfish, one fancy goldfish and a Moor.**

**For the last couple of months the Moor has had problems with a split tail and fins. The splits are clean and always heal after a dose of finrot remedy, then about a week later they start to shred again. This often appears to happen overnight. It seems healthy otherwise.**

**The fish are fed sparingly once a day and I carry out a 20% water change every ten days when I use a vacuum to clean the top layer of gravel. I always keep a close eye on the water quality with test kits.**

**I feel I can't keep dosing the tank with finrot remedy. None of the other fish are affected. Please can you help?**
• Helen Mann, Aberdeenshire

*The long finnage of fancy goldfish is easily torn by other fish or by unsuitable decor.*

**A** Fin rot is quite distinctive and appears as the bony rays of the fins are exposed, with a white line of necrotic tissue followed by a red line, where there is an inflammation response. I suspect that what you are describing may be caused by the other fish nipping and damaging the fins. It may be worth separating the Moor and see if the symptoms persist. It is unlikely to be finrot. **BB**

## Unfiltered pond

**Q** **I am building my first pond and I would be grateful if you could tell me if it's possible to keep Koi without pumps and filters. If not, are there any fish I could keep in such a pond?**

*It's possible to keep a few goldfish in an unfiltered pond, as they are hardy enough to tolerate less than perfect conditions.*

**A** I would strongly advise that a filtration system is added onto any pond if you wish to keep fish. The filters act as a small sewage treatment plant for breaking down the toxic fish urine, which is in the form of ammonia. In an unfiltered pond, the ammonia accumulates in the water and will kill the fish. It is also essential that some form of aeration is used in a pond containing fish. Although plants will add oxygen to the water during the hours of daylight, at night the cycle is reversed and the plants compete more successfully than the fish for available oxygen - this is also true of the so-called "oxygenating plants".

It would be possible for you to keep a limited number of goldfish, as they are very hardy and can tolerate a very harsh environment. **BB**

## Causes of Popeye

**Q** **Recently my son enlarged our garden pond and while moving the fish into their temporary quarters, we noticed some of the Koi had protruding eyes. We examined them closely but couldn't find any other apparent problem. The pond water wasn't ever such good quality and we wondered if this may be the cause. Please could you tell me what I should do to treat the problem?**
• Betty Cox, Norfolk.

**A** The commonest cause of protruding eyes is a condition known as "Popeye" (Latin name *Exophthalmia*). It is the result of a fluid build-up in or behind the eyeball and may effect one or both of the eyes.

It is caused by bacteria or parasites or poor water quality and the only sure treatment is antibiotics, preferably by injection. It is not ever so contagious, so as more than one of your fish was affected I would put it down to your water conditions. **NF**

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