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■ PRACTICAL FISHKEEPING,
Emee Pursuit, Breton Court,
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● Cover pic. shows a Bengal Loach. Pic by Max Gibbs. The Goldfish Store, Oxford.

AT 41,548 (ABC) BRITAIN'S BEST SELLING FISHKEEPING MAGAZINE

TROPICAL INFORMATION ■

Botia *botia*



Main picture: Wild Furred Rott
Inset: Pedro Loach
All pics by Miri Gibas, The COMBAT BOWL, Oxford.

manza

Nocturnal habits and whiskers characterise this wide-ranging loach family

Our gallery this month features the *Manzanillo*, which are found in the tropical South East Asia. They all have three or four pairs of barbels and spines under the eyes which can be locked in place. While generally peaceful, and often happiest in shoals, they can be very intolerant of similar species (the classic case is an aversion to sharks).

Tanks for these should contain plenty of hiding places under rocks and logs, and a neutral pH of 6.5-7.5. They are very hardy, but are largely nocturnal, and may be seen exhibiting the unusual method of swimming to the surface and gulping down air, which is then absorbed through their gills. This air is then extracted by blood capillaries within the gut, and the rest is expelled from the vent. Blood circulation is not superior, however, as are regular water changes, possibly even more so than other loach.



◀ The Orange or Red Finned Botia or Loach

(*Botia modesta*) is also available in a yellow finned version. This loach comes from Thailand, Malaysia and Vietnam and reaches a modest 4" in length. It likes temperatures up to 86°F (30°C). Shorter and fatter than some of the other Botias, it sports three pairs of barbels, and is largely nocturnal.

Beaufort's Loach,

(*Botia beauforti*) again is found in Thailand. It will grow to around 9". A secretive, mainly nocturnal fish, which prefers slightly acid water, in a dimly-lit tank. Peaceful towards other fish.

Botia the unbred

There have been no reports of Botia spawning in the aquarium. It's believed that they reach sexual maturity late in life. Because of the comparatively high price they command, few fishkeepers have set up a very large (six foot plus) tank; furnished with bogwood and plants to provide a vast number of hiding places; stocked with a large shoal; and provided the live food diet that might bring success. Or do PFK readers know better?

The Clown Loach

(*Botia macracantha*) is the Botia everyone knows. Coming from Sumatra, Borneo, and some off-shore islands, it can reach a foot or more, and is often found for sale at 6" plus. Happiest in shoals, it often forms odd alliances with other fish. It likes temperatures around 75°F/24°C. Occasionally

specimens emit clicking sounds. Clowning around (or seemingly to human eyes) is common, with fish lying on their sides and in other odd positions, appearing to be dead.

The Zebra Loach

(*Botia striata*) is often seen during daylight hours and often



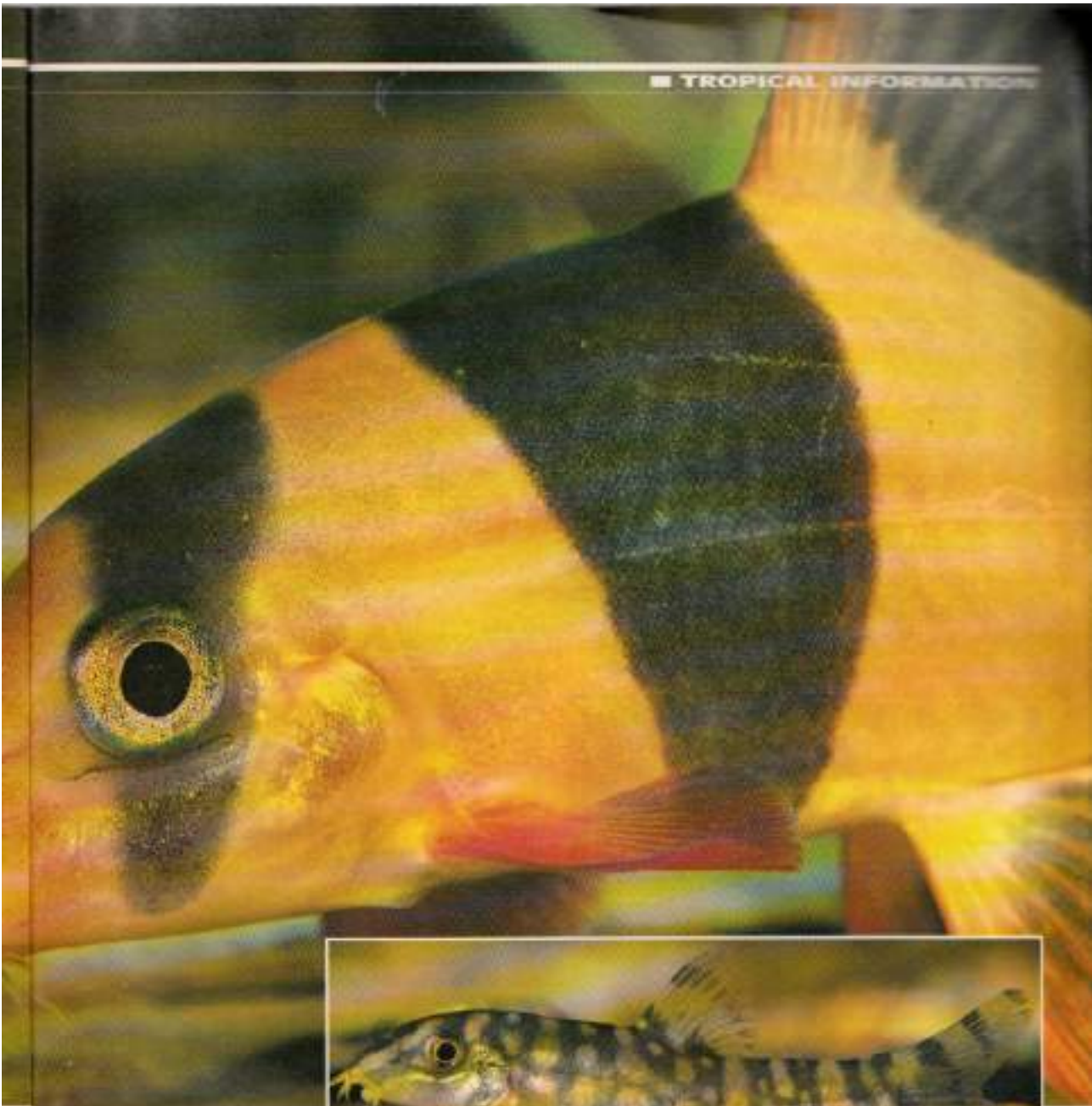
Tiger Loach

With their characteristic stripes of black or brown on a yellow or orange background, several of the Botias have been called Tiger Loach. *B. hymenophysa* (the Banded Loach); *B. striata* (Zebra Loach); *B. macracantha* (Clown Loach); and *B. darlo* (Bengal Loach) have all at times been called the Tiger Loach.

swims in midwater. Happiest in shoals and in slightly cooler water around 75°F, it reaches only 2 1/2" in the aquarium. It comes from Southern India.

The Pakistani or Reticulated Loach

(*Botia lohachata*) can be difficult to identify, as it has widely varying patterns, particularly between juvenile and adult. Sociable and peaceful it likes temperatures around 81°F/28°C. Some authorities say it needs live worm food to survive in the aquarium, where it grows to four inches. ■



Top left: Banggai Loach.
Above: Clown Loach.
Right: Adult Pakistani Loach.
Below: Juvenile Pakistani Loach.



ON THE COVER:

The Bengal Loach (*Botia dario*) is peaceful enough to be kept in community tanks, at temperatures up to 82 F, 28 C. It is a small species at around 3". A useful scavenger, though like all of these loaches it is in pig heaven when fed small live worms.

JERZY GAWOR
continues his
alphabet of
fish health.



Scud is useful in treating disease, but is vital to most freshwater fish.

Practical Fishkeeping's
A to Z
OF FISH HEALTH



Exact analysis of a fish disease situation can only be conducted with the aid of a microscope. Costia, Chilodonella and Columnaris can all be observed and identified. Appropriate treatment of the situation generally results in a good recovery rate for the fish.

Chilodonella and Costia

In my diagnostic work on fish diseases I can honestly say that these two parasites which belong to the Plectonon family of organisms, are by far the most commonly isolated 'Fish Bugs' that I have come across. In situations involving Guppies to Goldfish they crop-up time and again as the causative agents of a number of fish disease conditions including 'fungused' body, slimy skin, gill damage, fin and skin haemorrhage as well as general debilitation.

These parasites are mobile often behaving very erratically in a 'wet smear' slide preparation for the microscope. Viewed even at a low power of say 150x their flagella and cilia (small whip like hairs) by which they propel themselves through the water, are clearly visible - you may need a higher power for Costia.

They are often found to parasitise wild fish populations, but rarely cause any major problems in that environment. However under conditions of intensive culture such as fish farms, ponds and aquaria serious outbreaks and massive losses due to these protozoan parasites can easily occur.

Costia (also known as *Icthyobolus*) can be observed to cause severe damage to the epidermis of the fish, reproducing in large numbers and literally

feeding off the fish's skin cells. This leads to irritation with resultant excessive mucus secretion by the fish. Gills are often affected, the damage and mucus secretion causing congestion, asphyxiation and death.

Chilodonella is an ovally shaped protozoan being about 5 times the size of Costia (approx. 0.070 mm.). It also causes extensive damage to skin and gill tissues by feeding on the contents of epithelial cells.

I have often isolated these parasites from Koi and other coldwater fish which typically show symptoms such as

KEY FACTS

- Choose your fish very carefully. Never buy fish that look unwell especially if they are lethargic, swim erratically, clamp their fins close to their body or have a slimy/fungus look to them. The chances are you may also buy a selection of parasites including Costia and Chilodonella.
- Always quarantine new stock. Treat with a proprietary brand of antiparasite solution prior to introducing them to an established aquarium or pond.
- Always disinfect nets and other equipment after use. These can easily transfer problems from one tank/pond to another.

irritability, scraping flanks against objects, excessive mucus secretion through to lethargy, with gill-congestion and skin haemorrhaging in the advanced stages of the disease.

A salt bath of two minutes duration at a concentration of 8 oz. of salt to 1 gallon of water (approximately 3% solution) is extremely effective at destroying these parasites when present on the fish.

Secondly, by treating the pond with Malachite Green and Formalin to eradicate those parasites still present in the water an effective cure can be obtained in the majority of cases.

Chlorine

Chlorine, a 'halogen' gas, finds wide application in many industrial processes not least of which is the treatment of municipal/drinking water supplies against infectious organisms.

One of the greatest hazards in having any form of 'centralised' water distribution systems as we find in our towns and cities is of course contamination by pathogenic organisms which, if transmitted through the water supply, would cause mass epidemics of many potentially fatal diseases in man.

Chlorine, a powerful disinfectant and oxidising agent, has been used for decades to make our water supplies safe and fit for drinking. However, levels that are safe for humans are unfortunately a potential hazard to fish causing great damage to delicate gill and skin membranes. Where dangerous levels of chlorine have entered an aquarium, pond or other holding system, the fish display immediate distress, swimming vigorously in an attempt to avoid the area of greatest chlorine concentration. This is usually followed by death, probably through damage to the gill tissues.

Chloramine, a more stable and longer lasting product, has found favour with some authorities. This can also be neutralised by certain conditioners.

While research is going on all the time to evaluate new products, methods and alternatives to chlorine for purifying water supplies, it is up to the individual fishkeeper to ensure that chlorine does not cause problems to your fish.

KEY FACTS

- ◆ Never add fish directly into fresh mains tap water.
- ◆ Never add mains water directly into your aquarium (or pond).
- ◆ Always use a dechlorinator/conditioner to neutralise chlorine, or aerate the water vigorously for 24 hours to 'air-strip' chlorine from the water, prior to aquarium/fish use.
- ◆ A level of 0.05mg/L residual chlorine for no longer than 30 minutes within any 24 hour period is considered to be maximum permissible for fish. You can test for this with kits from your dealer.



In commercial set ups where large volumes of water are handled daily, use of industrial equipment, such as this de-chlorinator, is required to purify and adjust the conditions of incoming tapwater.

Columnaris disease

A bacterial disease of coldwater and tropical fish caused by the Gram-ve bacterium *Flexibacter columnaris*.

Flexibacter - because when viewed microscopically the bacteria display a 'caterpillar like' flexing movement, and *Columnaris* - because you often see typical columns of bacteria as they congregate together.

The bacteria affect the skin and/or gills, causing tissue damage, necrosis and death. *Columnaris disease* is often associated with poor environmental conditions, and hence in well managed systems is rarely observed. It is often known as 'cotton-mouth' or 'mouth-fungus', poor terminology as we have known for many years that this is not a true fungus.

Treatment of this infection is by improvement and maintenance of aquarium pond hygiene together with

antibacterial treatment in the system or short term dips of affected fish in solutions of quaternary ammonium compounds. Furazone is extremely effective as it treats both external and systemic (internal) infections. This product is however not readily available in the U.K. and a Veterinary prescription must be sought. Oxytetracycline and sulphamides have been used with some degree of success.

KEY FACTS

- Avoid the following:**
- ◆ overcrowding of fish,
 - ◆ rapid water changes and stress
 - ◆ excessive handling
 - ◆ damage to skin and scales
 - ◆ low oxygen content
 - ◆ high organic debris.
- for fish. You can test for this with kits from your dealer.

Copper

Even though it is classed as a toxic-metal, copper can be a very useful therapeutic agent in treating certain fish diseases most notably those causing parasitic infestations in Tropical Marine Fish. The lethal dose for the parasites is very close to the tolerance limits of the affected fish and great care has to be taken when administering dosages. Use of a copper test kit is always recommended unless the fish are being treated in a bare 'hospital tank'.

Copper sulphate has also commonly been used to clear waterways of excessive weed growth acting as a contact herbicide absorbed by the leaves, and to clear earth ponds and lakes of algae.

As the toxicity of copper is very much dependent on the pH, hardness, salinity, temperature, oxygen content and the presence of other dissolved metals, its use must be carefully controlled and monitored to avoid damage to fish.

Chelated or 'complex' copper products are most in use

today as they offer more efficient absorption across wider margins of safety to the fish.

When not used carefully as a medication Copper can be a hazard to fish, especially aquarium communities, and is lethal to most invertebrates.

For example, it is sensible practice to avoid using water from the hot-water tap as in many domestic installations, this system relies on storing water in a copper cylinder.

In soft water areas where pipework and cylinders fail to become coated with copper salts (which give some protection to the water from absorbing copper metal) it can be even more of a hazard. Remember, the more acid and soft the water in your area the more rapidly and in greater quantity is copper metal dissolved into solution. ■

KEY FACTS

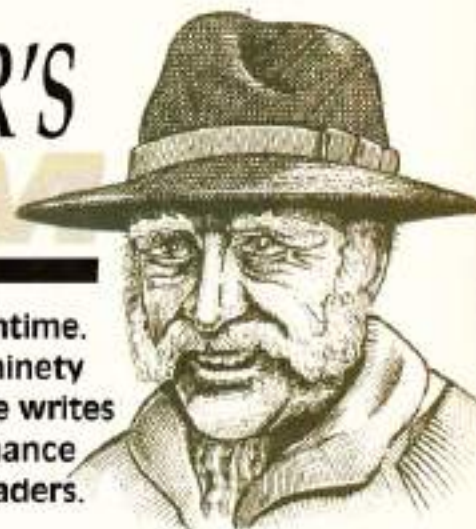
- ◆ Always run the mains tap for a couple of minutes before removing water for aquarium use.
- ◆ If you need to bring the temperature up (e.g. for a partial water change) either use water boiled in a kettle, or better still purchase an extra heater-thermostat and bring the temperature up gradually while aerating and conditioning the water simultaneously.
- ◆ Most good water conditioners contain compounds that will bind and neutralise any traces of copper in the water.

Special note to Marine fish keepers:

When treating marine fish with copper take care when feeding them live shrimp. The shrimps will rapidly absorb copper into their calcareous skins (exoskeletons) which if eaten by the fish in any quantity, will lead to accumulation of copper in the fishes body tissues with resultant problems and possibly death.

◆ Jerry Goswar 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 via *Practical Fishkeeping* enclosing an SAE. All correspondence will be answered personally.

OLD FISHFINGER'S FORUM



Old Fishfinger is a legend in his own lunchtime. He has been keeping fish for more than ninety years - but says he still has a lot to learn. He writes exclusively for PFK and welcomes the chance to share his huge experience with our readers. Well someone has to listen....

Dear Old Fishfinger,
I have set up a heron scaring device which plays loud music when the bird triggers it off. But what music should I play for the best effect.

Andrew Bird-Webbott, Drury Lane.

I have conducted extensive tests to discover which music is most disturbing to herons.

Handel's Water Music, the Birdy Song, the Trout Quartet, the Blue Danube, anything by the Byrds, Fly Like an Eagle and the theme from Where Eagles Dare were useless.

I had to stop using Party Political Broadcast material as it was too cruel. The herons started to lean to left or right, dozed-off and fell into the pond. (For some reason a recording of my famous talk to clubs had much the same effect).

In conclusion almost anything from Cats is usually effective. O.F.

Old Fishfinger is a regular visitor to the PFK offices (every full moon) where he occasionally manages to slip the odd reader's queries into his flake-caked pocket. He is desperate to receive fan mail at the following address:

Old Fishfinger, C/O The Editor, Practical Fishkeeping, Bretton Court, Bretton, Peterborough PE3 8DZ.

● Please do not enclose an SAE for a reply as Old Fishfinger has run out of ink and is a few drops short of a refill.

Dear Old Fishfinger,
I have heard that aerobic bacteria are important in fishkeeping - but how do I identify them?
G. Goddess, Camden Lock.

For this you need a high power microscope and a ghetto blaster. Choose the liveliest music possible with a steady beat. Put a scrap of your filter on a

glass plate under the microscope. The aerobic bacteria will be the ones in straight lines - with little leg warmers on and their arms and legs going in and out to the music. O.F.

Dear Old Fishfinger,
My marine tank has a nasty Tang - any advice?
O. Clark, Bordeaux.

Yes - stop tasting your water. O.F.

Dear Old Fishfinger,
Have you some advice about making a pond safe for children?
M. Hubbard, The Shoe, Gloucester

Yes! First remove all the water, plants, fish etc. and house them safely elsewhere. Then line the sides of the pond with 12" thick ethafoam. This has the virtue of being soft AND slippery. Once they're in there, the little devils won't get out. O.F.

Dear Old Fishfinger,
I'm looking for a holiday fish-feeder at a reasonable price.
T. Wogan, White City.

Thank you for the offer, Tel. How does £5 a week sound? O.F.

Dear Old Fishfinger,
How should I transport valuable fish like Koi home?
N. Mansell, Brands Hatch.

I have conducted extensive tests to find the best method of transporting valuable fish. After trying hang-glider, steamroller, Sinclair C5, Peany Fwering (my usual mode of transport), skateboard, pogo stick, unicycle, parachute, and pedalo I have found that a car is the best option. I hope this is useful. O.F.

Dear Old Fishfinger,
Any advice on choosing lime-free gravel?
Capt. J. Cook, Tegelund

Feel the gravel for stickiness, and look out for any bits of pale green coloured pebb, or little white peeps. It always works for me. O.F.

WIN WITH OLD FISHFINGER

To aid Old Fishfinger with his research we're asking readers to write in with their suggestions (to the address on this page) for the best or the worst music to scare herons.

We'll pay £5 for every one printed.





It is only its sheer size which makes the Gar difficult to keep. They will tolerate most water conditions and accept a wide range of foods.
Pic. by Mike Sanford.

Going GAR GAR

ANDY PARKES is a fan of the weird and the unusual. When it comes to tankbusters there are few species odder than the living fossil garpike.

Does the weird and wonderful fascinate you? One novelty that is now seen on our shores with some regularity, (though few enough to keep them a rarity) are the garpikes.

An added bonus is that they are affordable. The two species that are most usually available are the Spotted gar (*Lepisosteus oculatus*) and the Longnose gar (*Lepisosteus osseus*).

Fossils

The garpike are ancestors of our more-commonly seen modern fish, fossil records dating them in excess of 250 million years ago, when they thrived even in European climates. Now, they are limited to the regions of North America.

There are now some seven species remaining, ranging in size from the relatively diminutive true Florida gar (*L. platyrhynchus*) at a mere 75cm

to, reportedly, in excess of 300cm with the Alligator gar (*L. spatula*).

All possess a similar body shape and colouring, making individual identification difficult, particularly among juveniles.

Tipping the scales

After the elongate body with small, rearward fins and the predatory extended jaws, one of the first noticeable features are the

diamond-shaped scales. These are ganoid scales which are individually set into the skin layers side-by-side, locked together by a peg arrangement, which allows for very limited flexibility. This differs from the modern fish where their elasmoid scales overlap, permitting greater movement along all parts of the body as the scales slide over each other.

There is, however, a hinge, just behind the gills of the gars which provides a limited degree of movement of the head, most noticeable when the fish is hunting and needs to snap rapidly at its prey.

Tank care - feeding

The maintenance of all gars is alike, so I will not deal specifically with any individuals. The upkeep of these fish is relatively simple. It is primarily the size that must be born in mind.

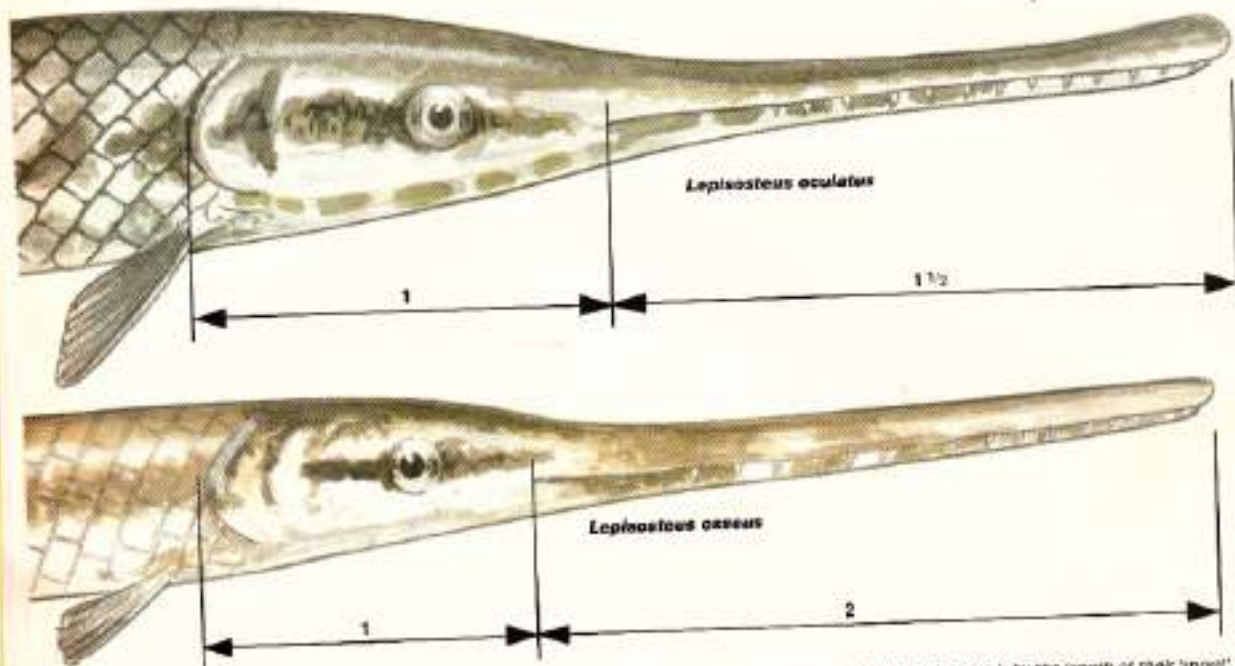
Generally imported at around 10 to 20 cms, it is just about possible to put them then into a four-foot tank.

But remember - their scales do ▶

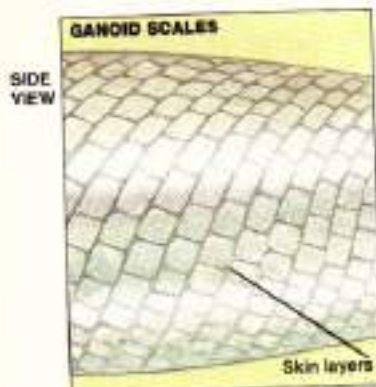


The Spotted Gar *Lepisosteus oculatus* reaches a length of 90cm.
Pic. by Mike Sanford.

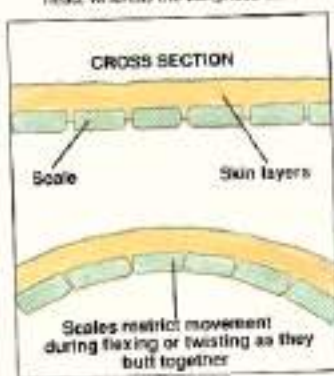
TROPICAL INFORMATION



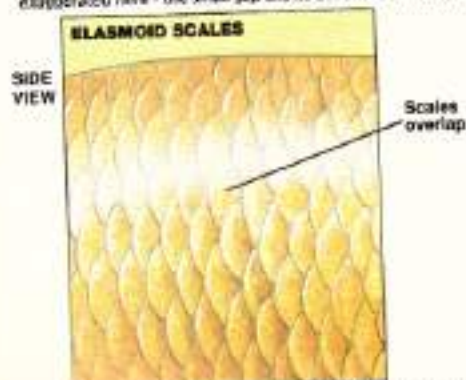
Above: The best way to distinguish between oculatus and osseus is by the length of their 'snout'. Look at the size of the head, from the gill cover to the beginning of the mouth. Compare this with the rest of the mouth. The spotted Gar's jaws are about one and a half times as long as the head, whereas the longnose Gar's are twice this length, sometimes slightly more.



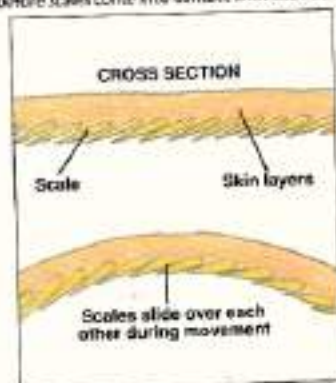
Ganoid scales are laid side by side, each fully embedded in the skin layers. The space between each scale has been exaggerated here - the small gap allows the limited movement before scales come into contact with each other.



Scales restrict movement during flexing or twisting as they butt together.



With elasmoid scales, only the front edge is embedded in the skin. With the rear overlapping, they can slide together, allowing greater flexibility.



Scales slide over each other during movement.

not allow them the ability to flex their bodies very well and, with the fact that they do grow pretty quickly at first, a six foot tank, with as much width as possible, is really called for.

Once settled in and feeding regularly, a small specimen will usually put on about 2cm a month, providing they are not cramped from the word go. This will tail off after about a year, by which time they should be around the 40cm mark. Growth will then progress steadily up to the limits of their quarters. Gars are long-lived, as well as long 'pets'.

Feeding is supposed to be a problem, many books advocating an exclusively live diet. I have only ever fed live food once, theoretically as a treat (for the diners, not the diner), when given some run live-bearers.

This immediately created further problems with their reluctance to return to the usual diet, which I finally overcame by threading cotton loosely through a frozen Lancefish and moving it around as temptingly as I could.

Even if I was prepared to ignore the ethics, I could not afford to continue an endless supply of live guppies or goldfish. Now I tend to provide a varied diet consisting of strips of beef heart, white fish,

earthworms, loachfish, mussels and shrimps. My Gars will also take bloodworm and catfish pellets quite willingly. It is quite amusing watching a 45cm gar nibbling on individual bloodworms.

Tanks

So, if you've decided you fancy one or two of these, and are in a position to house them sensibly, what are their living requirements?

First I have found that they always prefer to be kept in pairs rather than singly, and you will probably find that the asking price can be bargained when taking more than one. (If you don't ask, you don't get.)

That said, it is well worth leaving a deposit on a newly-imported specimen and waiting until you know that it is feeding, (even if this means paying the full price as the dealer will still have to house and feed your fish, at his expense, while waiting.)

Water

They have little preference for pH values and temperatures (20 to 28°C), but of course avoid extremes.

They do prefer reasonably well-oxygenated water, but even this is not essential because they possess an accessory breathing organ, similar to most of the other 'ancient' fish, where the swimbladder doubles as a lung, air being drawn from the surface as they push their noses above water level.

TIP: Before parting with your cash, please take a good look at the Gar's jaws. Being long and relatively delicate, these are often damaged during transit. Apart from the risk of infection, this can also lead to problems with feeding and consequently the risk of losing it.

To maintain these big feeders at their optimum, a power filter is essential. I personally use one in conjunction with undergravel filters, the power filter turning the water over four times an hour. Obviously, the higher the turnover that you can provide, the better, but anything less than twice an hour will be asking for trouble.

Planting

These are one of the few large aquatic pets that not only allows, but positively approves of the

Practical Fishkeeping/May 1992

How to spot a Spotted

As I've mentioned, there are usually only two species available to fishkeepers in this country, the Spotted and the Longnose, although I have once seen the big-brother of Garpike, the Alligator gar. Both *L. oculatus* and are commonly referred to as the Florida Gar. Spotted and Longnose is more accurately applied respectively.

The Spotted Gar is the smaller of the two, reaching about 90cm, and in my opinion the more desirable of the two.

The Longnose will grow to nearly two metres, has a much narrower body and is slightly harder to keep. Despite this, it tends to be somewhat more common.

The easiest way to distinguish the two is by the length of their snout which, although it won't provide a scientific proof of which species you are dealing with, will provide a good guide.

The following are the things to look for. Look at the size of the head, from the gill cover to the beginning of the mouth. Compare this with the rest of the mouth.

The Spotted gar's jaws are about one and a half times as long as the head, whereas the Longnose Gar's are twice this length, sometimes slightly more.

In addition, the colouring usually (but not always) is darker on the Spotted gar, an olive to brown back fading into many vertical bars or spots extending the length of the fish. The Longnose tends to be more brightly silver all over with fewer, more distinct croaker blotches along its body.

As mentioned, the body in the Longnose is also much narrower, particularly as the fish matures.

This may sound like a pretty extensive list of distinguishing features, but don't be fooled. Colours and shapes will vary considerably, and choosing where to take your measurements for the mouth is not always so simple either. You try getting one to stay still when you want it to.

owner possessing green-fingers. Any plants will be appreciated, but I have most success with a variety of Amazon swords and Vallisneria.

These supply the necessary shelter and provide cover from the bright lighting which most of us usually insist on. But don't be afraid that this is going to be a fish that you never see. After settling in, providing refuge is available, I have never found mine to shy away unless unduly disturbed.

Food is very easy after a little initial patience, but please be careful, the teeth are extremely sharp.

I would compare it to a snake bite which, apart from the jaws biting against you, is so fast that you don't realise what has happened in first.

Don't forget that, being strictly a predator, the teeth are all pointed back towards the throat. If the Gar remains convinced that



Take care if you hand feed your Gar -

their teeth are very sharp.

In addition, they are not the immobile statues that they are usually made out to be. Admittedly, they aren't the most animated of fish either, but are still very entertaining to watch. With the pairs that I have had, they all show degrees of exhibitionism between themselves, one swimming backwards in front of the other and then reversing the roles.

Feeding

During feeding time, all reservations are lost. Fixing by

your finger is food and refuses to let go, one or both of you are going to get hurt!

The food is usually taken with a sideways slash of the jaws before being turned lengthways in the mouth and, although the mouth looks very narrow, it is surprising just how wide they will extend. I feed only once every two to three days until their belly is beginning to swell, but they will continue to take the pellets and other tiny morsels offered to my outfish. Once the pellets have settled on the substrate, the gars move over the

area, flaring vigorously with the pectorals while trying to twist the caudal fin round as far as possible, increasing the turbulence and lifting whatever they can - which is picked off as it rises. Although this appears extremely hard work for almost no reward, it is most entertaining and can only be a beneficial dietary supplement.

Companions

As companions to these large fish, anything large enough not to be swallowed is fine, but I would not recommend anything too fast swimming.

I currently keep my two with a 20cm *Hoplias malabaricus* (Tiger fish/Mud chanin), a 10cm *Acanthopoma occidentale* (Giraffe catfish), a 30 cm langfish (*Prognathodes dolus*, I think) and a couple of 15 cm *Danios* (*Danio rerio*) (Siamese Tiger Fish). Oh, and a pleco of course.

Breeding?

Forget it. I'm not saying it is impossible as it has been achieved in massive vats and lakes, but let's be practical...

If you wanted to try, the breeding season is March to May, when they pair off and lay adhesive eggs on plants and rocks. There are few details available, and no reports of parental guarding, but the eggs are poisonous, so it is probably not necessary. ■

■ If anyone has any experiences or problems with the gars, or any other unusual fish, I would be delighted to hear from you.

In addition, I am interested in the gars' and catfish of reverse-Bow-tail. I keep meaning to set it up in a tank, but have never got round to it yet. So, has anyone with big fish found it especially useful?

I look forward to hearing and will happily answer all letters, but as S.A.E. would be appreciated. Write to Andy care of PFK and we'll pass on all letters.

clowning about

Keeping the Clown Knifefish is definitely no joke. A. M. I. C. OUGHTON explains why this may be a fish for the more experienced fishkeeper.

Clown Knifefish have been known to flourish on an inexperienced fishkeeper's Neons and Cardinals. So there's no question that this is one fish that needs a species tank, and a very specific set of conditions.

Notopterus chitala, also known as the Clown Knifefish, originally comes from Borneo, Burma, India, Java, Malaya, Sumatra and Thailand.

It belongs to the family Notopteridae, and like all species of this type of fish, it has a tapering, compressed body that is covered with small scales.

The main propulsion unit of the *Notopterus* is provided by its long anal fin, combined

with its small tail, and the fish is able to move forwards or backwards by undulating this fin.

The *Notopterus* also has a dorsal fin - unlike the *Tetraodon* knifefish from tropical Africa - a large mouth armed with many small teeth and a pair of tube-shaped nostrils on its snout.

The most beautifully-marked *Notopterus* specimens are those that come from Thailand. They have a line of black spots along their sides, which are usually encircled by well-defined white rings.

The number of these spots can vary, both from fish to fish - usually five to ten per side - and by one or two spots from side to side.

Growing to about 32" in

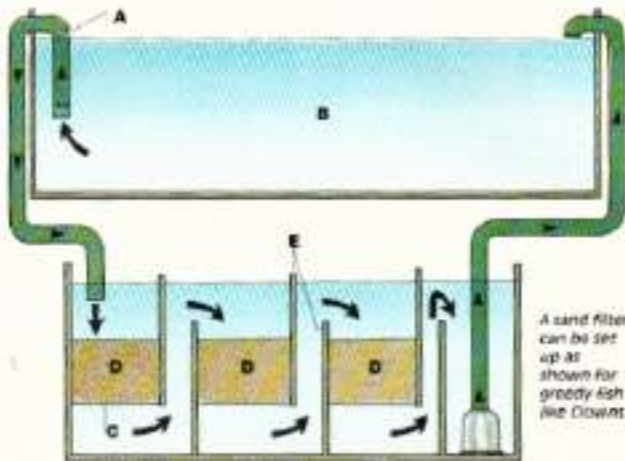
length - although on occasions they have been known to reach 39" - the Clown Knifefish needs plenty of room in an aquarium, as it can be argumentative, even among its own species.

However, there is less likelihood of fights if you keep two or three small specimens together from the outset, rather than introduce a semi-mature fish to an already-established specimen or group.

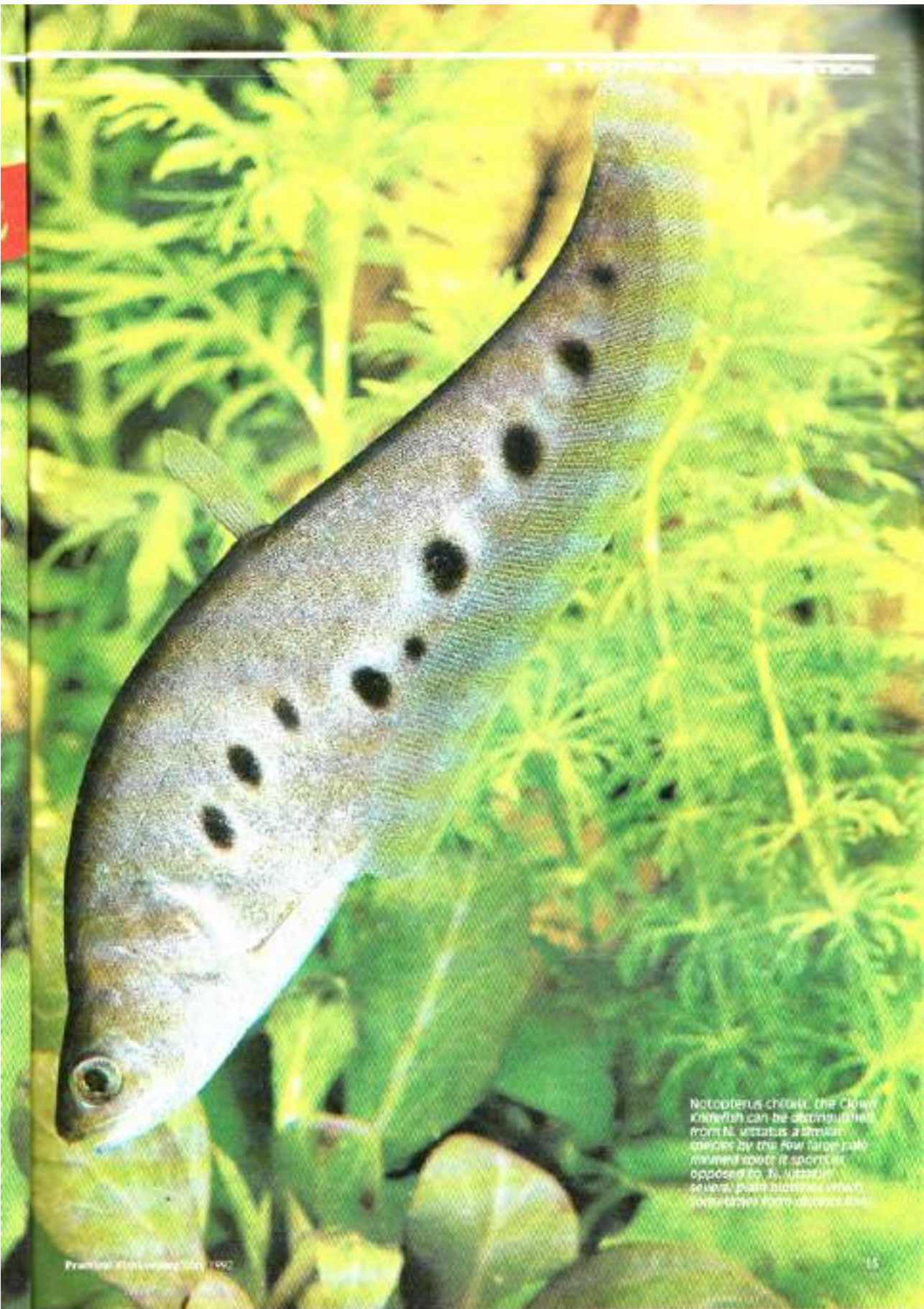
As *Notopterus chitala* grows to such a size, they must be kept in a large aquarium. Although the largest you can afford is normally an acceptable starting point, anyone considering keeping a Clown Knife should eventually be prepared to house them in a tank of at least 72" by 30" ▶

KEY:

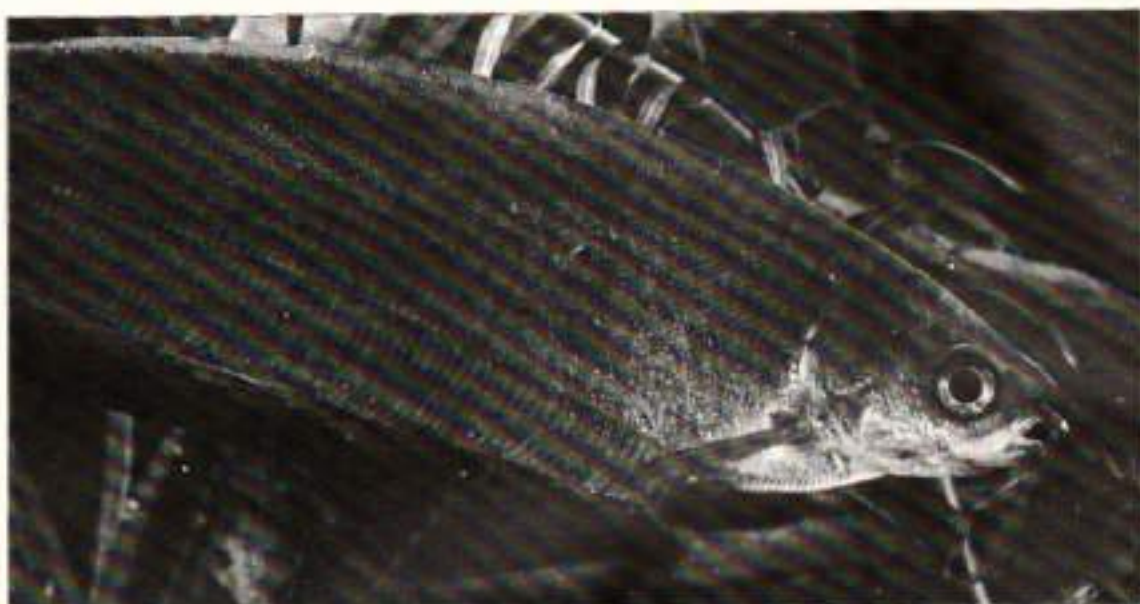
- A The anti siphon hole in the overflow pipe prevents the overflow acting like a siphon and emptying the main tank in the event of a pump failure or power-cut.
- B Main aquarium.
- C This is corrugated plastic sheeting, supported by runners. Holes are drilled in the sheet, and it's sealed to the filter tank glass. It may be necessary to add sheets of gravel tdy to contain the sand.
- D Filter media - different grades of sand starting with coarse and getting progressively finer. There could be any number of weirs, depending on the size of the filter tank.
- E Glass or acrylic sludgers.
- F Powerhead or submersible pump.



A sand filter can be set up as shown for greedy fish like clowns.



Notemacheilus chiklu, the Crow Koi fish can be distinguished from *N. vittatus* a similar species by the few large pale marked spots it sports as opposed to *N. vittatus* several pale stripes which extend from dorsal to



The African Knife fish *Xenomystus nigri* lacks a dorsal fin but sports odd nasal protrusions.

- ◀ tank of at least 72" by 30" by 30" the minimum size for large mature fish.

Breeding

In the wild spawning occurs during May, June and July; and after laying her several thousand eggs, the female leaves the rearing of the brood to the male.

He guards the eggs and fans them with his tail, preventing the water's sediment from settling on them and reducing the possibility of fungal disease. At this point the male will fearlessly defend his territory and drive away any intruders - whether fish or human. Given an average water temperature of 31°C or 91°F the eggs hatch within 5 to 6 days.

General tank care

Due to *N. chitula*'s size the need for a big tank is obvious; and a good filtration system is also essential as the fish is a messy feeder and produces large amounts of high-protein waste.

Filtration

A gravity-fed rapid sand biological filter would be ideal for the size of tank required to house an adult Clown Knife fish.

This type of filter is often used by commercial fish farms and

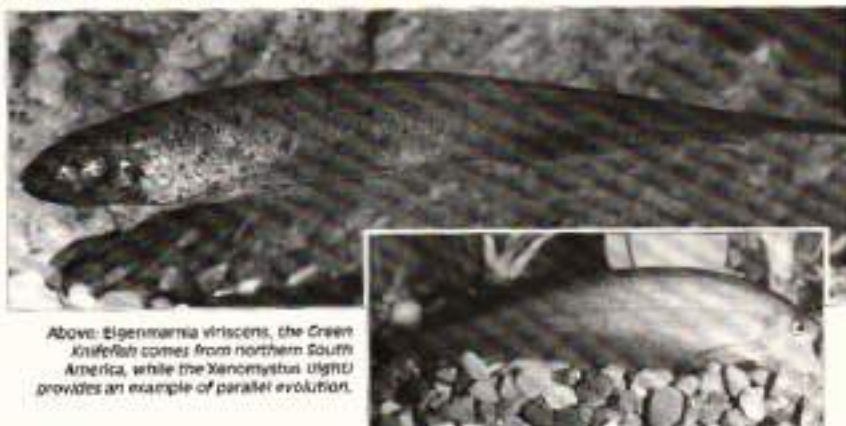
public aquariums; and a scaled-down version can give amazing results.

Such a set up has to be planned at an early stage, however, as it is more efficient if the filter tank is located beneath the aquarium.

Since the Clown Knife fish's natural habitats include rivers, canals and swamps, it is able to survive in a wide variety of water conditions; although you must ensure that there is no build-up of Ammonia or nitrite. *N. chitula* is

suffice - my suggested regime is 10-15 percent of the tank's volume every 10-14 days - provided a larger water change of about 25 percent, is carried out every month.

The maintenance of the filter



Above: *Eigenmarmia viridescens*, the Green Knife fish comes from northern South America, while the *Xenomystus nigri* provides an example of parallel evolution.

Heating

As large fish are capable of breaking heaters and thermostats, a good way of avoiding this is to incorporate these elements into the separate tank of the biological filter. Not only does this stop your fish breaking valuable equipment (and possibly damaging themselves), but it also removes unsightly wires from the aquarium.

also able to tolerate higher temperatures than are considered normal for tropical aquarium fishes, but an ideal range would be 24-30°C or 75-85°.

Maintenance

To maintain water quality in the aquarium it is vital to change the water regularly. No filter, however efficient, can do this for you. However, partial water changes on a regular basis will

also consist of regularly stirring the filter beds and washing the various media to remove detritus and organic sludge.

Feeding

When in its natural habitat, the Clown Knife is a predatory fish that feeds on small fish, shrimps and insects. However, in the aquarium they can be tempted to switch to pieces of fish, shrimps and meat. ■



The blue platy has the crescent "moon" marking in its tail which gave the original domestic varieties of the platy their popular name. However, this particular variety is one of the more modern strains to have been developed. Some front lighting is needed to show this colour off to full advantage.

In praise of **PLATIES**

MAX GIBBS
of Oxford's
Goldfish Bowl
takes up camera
and pen to
write about his
favourite
community fish.

There can't be many fishkeepers who aren't looking for bright colours, in ever-active, peaceful, easily-kept and easily-bred tropical fish.

The Platy (*Xiphophorus maculatus*) or Moon Fish is a perfect candidate to fulfil these requirements. Selective breeding has resulted in an impressive selection of varieties with an amazing spectrum of colours. Other varieties sport flamboyant finnage.

Livebearers

Being a livebearing (ovoviviparous) species, the Moon Platy presents many unsuspecting fishkeepers with the delight of baby fish appearing in the aquarium.

Although many babies will probably be eaten before they can hide away and grow to a safe size, there are often a few which manage to survive the initial and critical first few days in the community aquarium, eventually venturing out from the security of a rocky cave, or thicket of plants.

The thrill of such chance-breeding success will frequently encourage the fishkeeper to set up a separate tank for breeding, and so begin the process of becoming a committed enthusiastic hobbyist.

The anal fin of the male Platy is formed into a tube-like "gonopodium" through which it will propel sperm "packets" into the female. From the time of fertilisation the eggs will develop within the female Platy for about four weeks.

Although the male Platy will continue to court the female, the sperm will remain stored within

TROPICAL INFORMATION ■

her for many months, enabling her to fertilise future batches of eggs without the need for further attention from a male.

The gestation period is variable, depending on such factors as the age of the fish, water temperature, diet, and duration of light. Young females might expel just a few fry at a time over a period of days, while mature females are more likely to release the full batch of 50 to 100 youngsters in one session.

In the wild

The wild Platy from Central America and Mexico is rarely available to the hobbyist, and is a rather plain, dull green colour. The tail might have the black crescent marking which used to be prominent in the earlier domestic strains, and which gave the fish its popular name of Moon Fish, but is not often featured in modern strains.

From this unimpressive wild stock, fish breeders have developed the many lovely strains which are freely available today. By cross breeding with the Swordtail, a close relative of the Platy, even more potential has been realised.

The male red hi-fin platies on the right of the picture show how much more developed the dorsal finnage is, as opposed to the female on the left. Not all offspring of this strain will display such development. There would be varying degrees of extension to the finnage, from widely spread high sails of fin, to the compact standard dorsal fin.



Colour varieties

Some basic features may be seen in every colour variety.

There are "comet" types which have a black wedge of

colour at the top and bottom of the caudal fin.

"Wagtail" types have black finnage contrasting with the rich body colours.

"Hi-fin" varieties may be quite spectacular, with huge dorsal fins which are fanned out like full sails when courting a female or sparring with a competing male.

Less frequently seen are the "pin-tails" with an extension from the central rays of the caudal fin giving a streamer effect.

Oddly, the "moon" marking which distinguished the earlier developed varieties is perhaps the least seen of these features.

Colours are:

■ Yellow, through orange, to blood-red.

■ Reflective blue, and a blue-green variety overlaid with black speckling.

■ Black - not a matt black as in the mollies, but usually spangled with metallic-blue scales. Black wedges of colour from the caudal peduncle fading off towards the gills produce the "mooedo" varieties. Black spotting or peppering is a common feature in several varieties.

■ An off-white base colour overlaid with prominent black spotting is also popular.

The combinations of colours can be stunning. For example, the

Red tuxedo platies are very popular with the prominent black area contrasting strongly with the red edging. This black area is speckled with sequin-like scales which reflect the light and confer what might otherwise be a matt-black, dull flank. Not all tuxedo varieties are so heavily marked with black.



Hi-fin golden varietal platy males, such as this one, may carry extraordinarily well developed and flamboyant dorsal finnage. A canary-yellow dorsal fin and red caudal fin is quite a usual configuration for Varietas strains. Even a few females will carry paler versions of this colour pattern.

Golden Sunset Platy has a rich golden-yellow body with bright red colouring which gradually suffuses the caudal fin from its clear outer edge until it reaches the base of the fin where it is already a solid bright red. This red colouring continues into the body, progressively blending with the yellow, the two colours effectively merging at about the half-way mark.

Just as effective can be a single coloured fish, such as the blue platy with a clear, shining, sky-blue body which reflects frontal lighting with dazzling effect. Or the blood red variety which has a velvety appearance setting off the rich, even colouring.

The Golden Platy is probably enhanced by having the comet markings in the tail, although the 'red top' variety with a red dorsal fin and red colouring in the dorsal area of the body is in no need of such additional adornment.

Platies in the community

In a community setting the Platy is a perfect subject. It has to be said that any species of fish which is by reputation generally peaceful, can have its 'black sheep', and Platies are no exception. However, it is rare for a Moon Platy to be anything other than a peaceful asset to the aquarium.

Although undemanding with regard to special food (able to exist on a dry food for its lifetime), as with any aquarium fish there are tremendous advantages to be enjoyed by feeding a more varied and interesting diet. The healthy 'bloom' seen in well-fed fish contrasts with the comparative dullness of those denied such indulgence. Some salt in the water suits them well, although it is by no means a necessity.

Platies will rarely damage even the finest-leaved plants, and are not given to digging holes in the gravel. They display constantly, appearing to enjoy being seen, only hiding away if bullied or off-colour. They have no favoured strata to cling to in the depth of the aquarium water, and so bring

their colour and bustling activity to any part of the aquascape.

Although they are at their best in temperatures of about 75 - 78°F they are most adaptable and will flourish at temperatures of up to six degrees either side of this optimum once acclimatised.

Naturally-planted tanks, as opposed to those decorated with plastic, will normally induce richer colouring from Platies.

Variatus Platy

The beautiful Variatus Platy (*Xiphophorus variatus*) is quite different in many ways from its Moon cousin.

It is certainly even harder, and in this respect it is probably better as a beginner's fish.

The main disadvantage over this species compared to the Moon Platy is its less-peaceful disposition. It is not an aggressive fish generally, but the occurrence of a bullying male is more likely to be experienced, as it can be with the other close cousin, the Swordtail (*Xiphophorus helleri*).

The body shape of the Variatus Platy is more elongated than the roly-poly shape of the Moon Platy, and it resembles the Swordtail again in this respect.

The metallic colours of modern varieties, especially when seen in association with the extravagant finnage of the hi-fin types, is particularly effective.

The range of colours is certainly more restricted than those available with either the Moon Platies or Swordtails, but those on offer are very beautiful.

It is the males which carry the colours. The females are comparatively colourless. This feature is another distinct difference between the Moon and Variatus Platies.

The dorsal and caudal fins carry the more vivid, solid colouring, while the bodies of the more-popular varieties have highly reflective metallic scales.

Tending to be somewhat less prolific than the Moon Platy and needing to be a larger size in order to display the beauty of their colouring, the Variatus Platy is usually more expensive. ■



The Taxedo parrot platy combines the beauty of the yellow dorsal and red tail with a largely all black body, resulting in a contrasting colour scheme which is particularly pleasing to many hobbyists. The fish must be quite well grown and approaching maturity to display such distinct colouring as this.



The pinstriped red waptail platy displays the elongated central rays of the caudal fin. This variety is only occasionally available, not having been produced commercially by the larger fish breeders. The modest stocks reaching the UK market originate from Eastern Europe. Most platy varieties are coming in from Far East breeders.



Coral sunset platies are a development of the Golden sunset platy with a more intense red back half of the body. The tail carries the same rich colouring. This is one of the most popular of all the varieties of *Xiphophorus maculatus*. The beautiful effect of the red blending into the clear yellow catches the eye to great effect.

■ The blanket heading of Platy embraces a collection of many different varieties which will bring lively splashes of colour peacefully to the community aquarium, without the need to make any special preparations. With some luck the stock might well replenish itself from chance-breeding or give encouragement to the aspiring fish breeder who provides a separate aquarium for the purpose.

Few community tropical fish can match their qualities.



KIT TIP

No 4. The Hydrometer

How does it work?

A hydrometer consists of a weighted bulb with a long, narrow stem. The stem is calibrated and easy to read. When placed in the water it sinks, indicating the s.g. (specific gravity) or salinity of the water. The lower it sinks, the less salts are present.

What extra equipment do you need?

Nothing but water and a packet of sea salt.

How do I use it?

Place the hydrometer in the tank and wait for it to settle down. Read the level from just below the water line. Freshwater contains no salt, so the s.g. will be 0.000. Marine fish and insects require an s.g. of 0.021-0.023. Add more sea salt to increase the s.g. and freshwater to reduce it. The s.g. should always be taken at the same temperature - 77°F - as different temperatures cause the s.g. to fluctuate. Wait until all the salt has dissolved before you take a reading.

Good features

Hydrometers are very simple to use with no electronics or wiring to go wrong. If you treat it with care, it will last for years. Some hydrometers incorporate a thermometer.

Are there any drawbacks?

The glass models should be handled with care as they break easily - they roll off tables too. Make sure you wipe them after use, as dried salt will give an incorrect reading. You may need to turn off all the filtration and aeration if you wish to take a reading from inside the tank. Any water turbulence will cause the hydrometer to bob about uncontrollably, making correct reading virtually impossible - it will probably make you sea-sick if you try.

Young fish

Underwater Safari



The Corixa.

This month in our series on aquatic insects we take a look at the *Corixa*.

Corixids, or lesser Water Boatmen, are often in appearance to beetles. They live in shallow in areas where there are plenty of weeds. The species in this article are not needed to constantly return to the water surface where it can breathe to oxygen supply. For the most part, it is unusual to find Corixids in water which is more than 2' deep. They vary in size depending on the species from 5mm to 2cm.

■ Pic by Roy Shaw.

BLASTS from the past

Twelve years ago.....

- New technology hit the fishkeeping market, with the launch of the first two silicon chip controlled aquarium heaterstats. The manufacturers responsible for this major step forward were Gemini and Interpet.
- Clown Loaches were considered to be difficult fish to keep for any length of time. Their unusual antics of "playing dead" for which the species is well-known, was thought to be the "first sign of trouble". Many fishkeepers were put off by this reputation - and by the "very high price of £2.50".
- A new catfish was discovered and introduced to the world of fishkeeping. An outstanding feature of the fish were the feathered barbels, which branched outwards. This new fish was *Mochokiella paynei*.
- More blasts from the past next month.

DID YOU KNOW...?

- The slowest grower in the animal kingdom is the Deep Sea Clam (*Tindaria calicutiformis*) which comes from the North Atlantic and takes one hundred years to reach a length of 8mm.
- The most venomous fish in the world are the Syngnathidae, or Stonefish. Any contact with the poisonous spines often proves fatal.
- The oldest known goldfish was called "Fred" and lived in Sussex until its demise in 1980, at the grand old age of 41.

fishkeeper

Check it!
When buying your new, improved fish tank, remember to look for the cartoon fish. The cartoon fish is the trademark feature you can start to work on your fish.

WIN YOUR OWN RUINED CASTLE

Just find the hidden words to enter our competition

Fed up with your tank decor? If you'd like something a little different, we suggest you enter this month's Young Fishkeeper competition. We're giving away a Shoreline corner castle to the winner and there are three runner's up prizes, all continuing the ruined castle theme. They're great to mask upris and other bulky equipment.

All you have to do in order to enter this month's competition is find the ten hidden words in the wordsearch grid. They're all fishkeeper-related and to help you along, we've given you the first letter of each word.



Complete the entry form and send it, along with the wordsearch grid to: **Young Fishkeeper Wordsearch Competition, Breiton Court, Breiton, Peterborough, PE3 8DZ**, before the closing date which is **May 21**. All the entries will go into a hat and the sender of the first correct entry drawn after the closing date will win a corner castle. The next three drawn will each win a runner's up prize. You must be aged 17 or under to enter.

U	R	J	P	E	U	Q	L	P	E	J	F	O	W	S
P	S	E	U	D	R	F	S	P	A	I	M	I	L	L
V	R	M	Y	W	U	R	P	N	I	H	F	C	A	P
C	B	V	L	X	K	A	E	B	F	L	A	H	M	L
P	L	T	I	D	G	K	Z	V	I	V	I	D	L	A
B	R	A	N	V	Y	L	L	O	M	L	Y	D	I	T
A	P	N	P	N	I	P	E	L	K	F	P	O	A	Y
R	O	P	I	E	L	P	D	O	O	G	P	B	T	B
B	D	G	K	P	S	E	A	B	I	N	U	K	D	F
G	J	A	E	K	A	M	U	R	I	U	G	Q	R	J
H	L	P	T	J	P	L	G	O	O	B	R	T	O	P
N	S	G	O	O	D	E	I	D	E	U	D	O	W	S
E	P	M	P	V	R	S	P	J	L	L	S	K	S	B
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YOUNG FISHKEEPER WINNER
The winner of the My-Do pump in the March competition was **Richard Martin** of **Lovesloft**, aged 15.

Name

Address

.....

.....

..... Age

Floyd by fran



AIRLINE ANGLES

YOUR free gift this month is airline from ALGARDE. While it's always handy to have some spare airline around, we thought we'd offers some tips and ideas to make the most of it.

Airline makes an ideal gentle syphon tube when cleaning out the tanks of small fry (see also this month's project pages). It will suck very gently and can be easily controlled by the use of an airline clamp.

It can be used to syphon dirt and debris from areas of the tank which are difficult to get to, such as behind rocks and decor or in corners.

RECHARGING RESINS

Airline is also useful to trickle brine steadily through a charged up resin like zeolite or a nitrate remover. Set up a reservoir of brine on the draining board, and lead an airline from this controlled by a small air tap (or with a clamp on the line) and syphon a slow trickle of brine down into a container stood in the sink.

The bag of resin (or other substance) should be placed

inside the container so that it can be submerged easily. Brine will gradually fill the container and as it removes the charging-up chemical from the media by osmotic effect it runs to waste down the sink.

A similar set-up could be used to perform steady acclimatisation water changes or to trickle medication into a treatment bath.

FEEDING RINGS

In some cases it can be useful to keep floating pellet or flake food

tightly-controlled in your tank, so that any excess can be removed. A floating "feeding ring" can be made with a circle of airline plugged and joined with an airline connector or a piece of wood. Feeding can then take place within this ring and any excess (and the ring) can be netted out.

SPRINKLING AND BUBBLING

Airline can be pierced with a hot needle, and is easily blocked at one end with wood or by pinching and gluing.

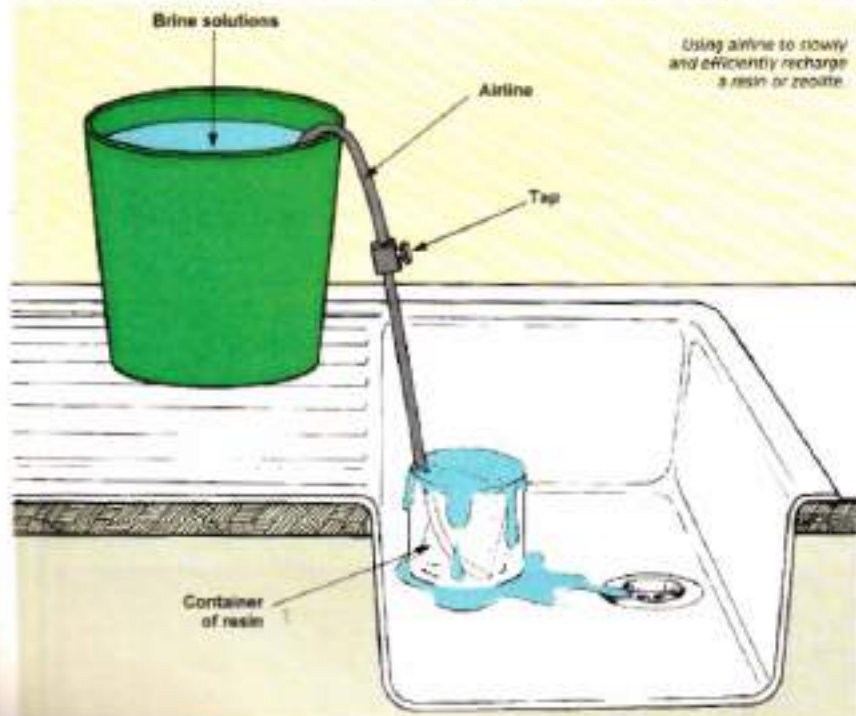
Weighted down (with planting lead) varying lengths of airline will make an emergency airstone or air curtain in the tank.

Equally, clipped in place above the water, the pierced airline will make a temporary replacement trickle bar.

BUBBLE FEATURES

By running an extra length of airline down your undergravel siphon and under the undergravel plate (not always easy to do with standard diffusers), you can have an attractive trickle of air emerging from under the substrate. This does not appear to damage the functioning of the undergravel filter. Some reverse flow powerheads can be fed air which is then sucked down under the undergravel to emerge in a similar fashion.

Airline can be siliconed into any item of aquarium decor, provided it's weighty enough to hold the airline down, and bubbles will emerge attractively.



DO'S AND DON'TS

DON'T place an air pump below the level of the water as it will back up the water and cause electrical damage. If you must place the pump below...

DO use an anti-reverse valve on the airline - though this will reduce the power of your pump.

DON'T allow twists or kinks to develop in airline and put unnecessary strain on the air pump diaphragm.

DON'T leave airline in direct sunlight or expose it to heat as plastics lose their flexibility under such treatment.

DO use a dip in boiling water to soften the end of airline if it won't fit onto an outlet or inlet.



NOISE

An over-busy pump can sometimes be quietened by using an over long piece of airline as an air reservoir. ■

Above: A heavily planted pond may need overnight aeration.

Below: A large pump of this type is ideal to run pond aeration or a large fish house.



PONDKEEPER'S CORNER

Far too few pondkeepers use air constructively in their ponds. Bear in mind those flat calm hot summer nights when oxygen levels can fall to their lowest, especially in heavily-planted ponds. Using a medium power pond pump and a long length of airline with a large airstone can actually save the lives of your larger fish.

Another area that can benefit from extra air is the chambered filter where a selection of airstones run from the largest-sized airpump can inject air into the filter to help the reproduction of aerobic filter bacteria.

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2 ACE

■ Not with those fish

I have a three foot community tank in which I would like to keep Discus. The tank holds Angels and a Red-Tailed Black Shark. Will I need to remove these fish? Do I have to remove the gravel and undergravel filtration system and change to a different media and filter? Would coarse sand be of any benefit?

G. Breatley, Cleveland

Your community tank could not possibly sustain Discus with your present inhabitants.

You would not need to remove your gravel and it could be utilized to create a reverse-flow system. I would not use any sand as there could be properties within which could be detrimental to the well-being of the fish. Discus are susceptible to minute toxic substances, which darken their appearance. PD



The African Pike Characin can reach a size of 40cm. You can keep several together, providing you can get a tank big enough.

On to bigger things

Q I intend to set up a 48" x 15" x 18" tank for either an African Tigerfish (*Hydrocynus vittatus*) or the African Pike Characin (*Hemycraterus niloticus*) - preferably the former. I am having trouble finding any information on either of these fish.

I understand that they can both grow to a large size, so will my tank be suitable?

I'd also like to know whether they should be kept on their own or in groups.

Please could you also give me some information on the freshwater Stingray? What size of tank should I provide?

• Darren Carter, South Glamorgan

A You could best describe the African Pike Characin and the African Tigerfish as being Africa's equivalent to the South American Piranha. Both are highly active and predatory, feeding on anything smaller than themselves.

The Pike Characin, *Hemycraterus niloticus* originates from Senegal to Zambia and reaches a length of 35-40cm. The Tigerfish, *Hydrocynus vittatus* on the other hand, which is found in large African rivers and looks a bit like a salmon with large rear curving teeth, probably reaches a length of 150cm plus. Conservative estimates put its weight at 65-150 pounds.

Both of these fish require a lot of space. I would regard your 48" tank as the absolute minimum. Temperature should be 26-28°C, pH 6.8 and 6.9. Keep them in a species tank only. You should be able to keep them in pairs or trios.

They should be given substantial amounts of meat foods and you should also offer them fish and earthworms. You may find it difficult to wean them off live food.

The freshwater Stingray (*Potamorhynchus latirostris*) is a hardy fish. They are bottom dwellers and can attain a length of up to one metre (less in captivity), so they should be given a tank which is as long and as wide as possible.

Small specimens will be okay in a four foot tank but as it grows I would provide an aquarium which is at least twice as wide as the ray.

The base should be sandy to allow for burrowing and decor should be minimal. The water should be slightly alkaline with a temperature of 25-28°C. It will take earthworms, fish and shrimps. Dead food will be accepted, so long as it sinks.

The tail carries a spine housing a venom, so treat the fish with respect. PD



The Silver Shark hasn't been bred in captivity... yet

Ready to breed?

Q Please could you give me some information on the behaviour of my Silver Sharks?

I have two, which are 6" and 6" in size. They were in a four foot community tank, but have recently been transferred to an 88" x 20" x 27" community aquarium and since then their behaviour has changed markedly.

They chase each other around in a manner which suggests play rather than aggression. When the lights

dim they mouth at one another's flanks and nudge each other. They swim together with perfectly synchronised movements.

Is it possible that they are courting?

• J. Harcourt, Herts.

A There is little published data on captive breeding of Silver Sharks. I don't think they have been bred in the aquarium, which makes the interpretation of possible spawning activity difficult to define. There are two possible reasons for your fish's behaviour.

You may have a possible

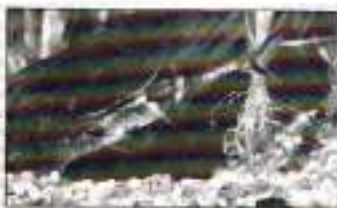
pair. The female will be the stouter of the two. If the fish continue the close synchronised swimming and you see "tail-locking", there is every chance they are on the verge of spawning. The male will fertilise the eggs as they are laid. If they spawn - probably among the plants - all potential egg-eaters, including the Sharks should be removed.

Alternatively, the relocation to the new tank may have brought out a dominant streak in the larger shark which is now trying to assert itself and define its own territory.

If your sharks spawn, I would be interested to hear from you. PD

The best bottom

Q I have read that the Elephant Nose requires a soft, dark substrate. Please could you advise me on what to use? I have tried putting peat into a large jar for a few days to settle, but it clouds very quickly.
• C. Bacon, Kent



A gravel substrate, like this, is not ideal for Elephant Noses, which like to root around for food. River sand is better.

A Elephant Noses are designed to live in dark, muddy waters. They are unhappy in brightly lit, gravel based community tanks and die an early death.

I am pleased to see that you wish to make your tank more suitable for this fish. You really need a species tank with muddy water and a peaty base, but this will cause clouding.

An alternative is to use river sand, which is available from the larger aquatic shops. Don't use builder's sand as this has too much lime and may burn the fish's nose. River sand will not cloud the water.

Provide the fish with a hideaway, such as a plant pot. Remember that you won't be able to use an undergravel filter with river sand. **DF**

Fin damage

Q I have an Albino Corydoras which recently lost its dorsal fin right down to the spine and its barbels are also missing. It is in a community tank along with other Corys, a Pleco and a Synodontis, all of which are fine. What might have caused this?
• G. Quattrucci, W. Sussex

A The damage sustained by your Corydoras was most probably caused by one of your larger cats. Damage to fins usually mends fairly quickly. The barbels may take a bit longer, as they are constantly used when feeding. Keep the condition in the tank good, with regular water changes and a varied diet. At the first sign of a fungal infection, treat the fish with a standard cure.

Which filter media?

I recently purchased an external canister filter. Some of the media the manufacturer recommends for this filter is quite expensive.

Could you please advise me as to whether it can be filled with alternative media at a lower price? Are the filter pads and filter wool suggested by the company absolutely essential? I would prefer to use a foam sponge insert along with media which I can rinse out occasionally and use again.

The filter will be used in a tropical fish tank.
G. G. Brown, Essex

Considering the basic function of the media in a filter is to filter out waste products from the water and act as a breeding ground for the nitrifying bacteria, then almost anything can be used for this purpose.

Of course, filter manufacturers by and sell a "complete range" of filter media to use with their filter and while they recommend you use them, there is no rule which says you have to. You could quite happily run the filter with nylon scourer at the bottom, with a layer of aquarium gravel in the middle, topped off with filter wool. All of these can be rinsed as required.

It's not compulsory to use filter wool or pads, but I would recommend it, as it takes out all but the smallest of waste particles.

It's important to remember that if you invest a lot of money in acquiring fish, why try to save it on such an important item as filtration? The filter is the fish's life support system and without it you won't keep them alive. It's a bit like buying a Ferrari, when you can't afford the engine, so you use one from a VW Beetle instead.

All the filter mediums currently on the market can be freed out and will have a longer life than 'sponge filters', so will save you money in the long run. **PD**

Not just Mbuna..

Q I want to swap my four foot tank from a freshwater community set-up to a Malawi community.

The tank has an undergravel filter. PH is 6.8-7.

Are there any hints you could give me on keeping these fish successfully?

• M. Yew, Swansea

A Lake Malawi is home to a variety of cichlids from all types of habitat. To many hobbyists the term "Malawi cichlid" conjures up a mental picture of Mbuna, but there are also *Aulonocara*, *Utaka*, *Lerobogus* and other specialist "Haps".

It is important to provide the right habitat for the group(s) you decide to keep. If you decide to mix Mbuna with others, make sure the Mbuna make up no more than 50% of the population.

Your pH is too low and must be raised to above 7.5. The best way to do this is to have a substrate which contains about 25% calciferous material, to act as a pH buffer. Dolomite, coral sand and crushed shell is fine. Avoid coral gravel, which is sharp and can get stuck in the fish's gullet. The pH should lift if you run the tank for three or four weeks. If it doesn't, add Bicarbonate of Soda, half a teaspoonful at a time, until you reach the desired level.

Mbuna require a ridiculous amount of rockwork with as many caves as possible. The other Malawis require more open conditions, but will still appreciate some rocks for shelter. **MB**



It is not unknown for Piranhas to undergo a complete personality change. Raising the temperature and increasing the amount of decor might help.

Jekyll and Hyde Piranha

Q My 7" Red-Bellied Piranha is in a three foot tank which has undergravel filtration. Decor consists of a few plants and a flowerpot in one corner.

Until recently it has fed well on chicken, heart, liver and fish, along with flake and the odd live goldfish.

Recently its behaviour altered somewhat. It has stopped eating and spends most of the time attacking its reflection in the glass. It has ripped up the decor and bitten through the airline twice. It has also chewed through the heater's suction clips. Whereas before, it seemed perfectly happy, it now chases up and down the tank.

Water quality is fine and the temperature is steady. Would a larger tank be the answer? I have a five foot tank which is standing empty. Or should I provide a companion?
• R. Huggan, Sussex

A Your Piranha does seem to have undergone a change of personality. If all your water conditions are as they should be, then the fish is almost certainly suffering from a behavioural problem.

I have come across this a couple of times myself. I suggest you raise the temperature of the tank a little to 28°C and increase the decor - particularly in the area where the fish can see its own reflection, as I suspect it is attacking what it thinks is another fish.

I cannot see that moving it to another tank will help and I wouldn't add another Piranha either. One would eat the other.

Incidentally, if your Piranha is taking dead food, I don't see the need for you to feed it live goldfish. In my view, feeding live food to any fish which readily accepts dead food should be discontinued, as there is no real benefit to be gained from it. **PD**

■ Left in the cold

I am writing regarding my breeding pair of *Kribia*s. I accidentally left the heater unplugged and now the male has black marks on the ends of his fins. The female has them too, but her's are not so bad.

What do you think the black edges are?
Stephen Lovell, Staffs.

It sounds to me as if you have either a bacterial or a fungal infection of the fins following the chilling.

However, please do not rush out and tip bottles of fungicide and bactericide into your tank. First check your water quality, particularly nitrate and nitrite. If the concentrations of either are more than minimal, you must take steps to improve the water quality. In my experience a major drop (or rise) in temperature can upset the biological balance in a tank, with a resulting increase in nitrite/nitrate concentrations and it is these, rather than the actual chilling, that lead to minor infections in the fish.

If your water quality is okay, then the fish should recover fairly quickly without any medication. If, however, they do seem to be recovering, or the condition gets worse, I suggest you treat them with Gertan Violet (sometimes called Crystal Violet) which is obtainable from your pharmacist. Net the fish out one by one and gandy paint the affected areas with the dye, using a small artist's brush or a cotton bud. One treatment is normally sufficient.

This treatment has advantages. It is that it is spot, rather than systematic treatment, and causes minimal stress. The fish is quickly returned to its normal environment and if the "infection" is done quickly, it is no more stressful than being netted out for removal to quarantine. **MB**

Don't do it...

Q My three foot tank contains a variety of African cichlids. I have about eight different Mbuna, two *Haplochromis moorii*, one *Haplochromis livingstoni* and one orange *Lamprologus leleupi*. They all live happily together in a rocky environment with plenty of caves and hiding places.

Would it be possible to add a young yellow *Lamprologus leleupi* as I have read they can be very aggressive towards their own species. Would the colour difference help?

• A. Mackersley, Harz.

A Strictly speaking you should not be keeping a Tanganyikan rockdweller in a Malawi tank at all. Normally these small fish tend to be rather cowed by the burly behaviour of mouthbrooders and of course, their



territorial requirements are such that they are unlikely to breed in a crowded mouthbrooder tank.

As all seems to be well, don't worry too much, but if you introduce another leleupi you are asking for mega-trouble. There is bound to be an extremely hostile reaction from the resident one, which may result in the demise of the "intruder", if both

survive this stage then either they will mate and produce cross-bred off-spring, which is not a good idea, or they will live in constant hostility. I strongly advise you not to do it.

There are BCA leaflets available on all the fish you mention, priced at 50p each plus SAE, from BCA (PFFK), 7 Deane Avenue, Sale, Cheshire. **MB**



Like many cichlids, Uaru are nigh on impossible to sex externally. Buy a group of four or five and allow a pair to form naturally. You should have no trouble finding homes for the others.

Keep the water very soft

Q I recently purchased two young Uaru, but have not been able to find any information on them. Please could you help?

• P. Fletcher, Sheffield

A Uaru are Amazonian fish and they prefer very soft, acid water. I kept mine at less than pH 5 and pH 7.5-8 when I was

breeding them some years ago. They like a temperature of 80°F (a couple of degrees higher for breeding). They don't like turbulent water, so avoid filters with a rapid turnover.

A full grown Uaru can reach 15" or more, but not for several years. They become sexually mature at 5".

They are highly vegetarian and vegetable material should form a major part of their diet. Scalded lettuce, spinach and cooked peas are ideal. So are duckweed and

aquarium plants. Tetra pond pellets are ideal and they will also take earthworms, heart and chicken. They don't like fish (cooked or raw) at all.

You will be extremely lucky, statistically, to get a pair with just two youngsters, so if you hope to breed them, you should obtain 7 or 8 more young ones. You should have no trouble finding homes for any spare adults when they reach breeding size in about a year's time. **MB**



Corydoras are not at home when kept singly. You need a group of at least three for them to display anything like natural behaviour.

Unhappy Cory

Q My 24" community tank houses five Corydoras. I have a problem with my *C. trilineatus*, which since introducing these months ago, I have rarely seen. It hides motionless in the back corner of the tank behind the plants and it doesn't grub around as the rest of the Corydoras do. The water quality is fine and the gravel is cleaned when I do my water

changes. Temperature is 24°C. Is it just a shy or more nocturnal fish than my extrovert Breimas? I wish to keep one of the smaller *Synodontis* species. Which type would be best and what size tank will I need?
 • Lesley Webb, Notts.

A In your letter you refer to your *Corydoras trilineatus* in the singular, and your Breimas in plural, so I presume these make up the other four. Corydoras are a

shy fish and the author can be feeling left out while your Breimas have formed a social. I suggest you acquire some more *trilineatus*.

As for your second query, *Synodontis nigriventris* is small and peaceful. It can be kept either on its own or in a group. It can be housed in a small tank, so long as there are plenty of shaded areas. Keep the pH between 6.5 and 8. They require a varied diet with the inclusion of live food on a regular basis.

Worms and nymphs

Q I have a 7" Piranha in a three foot tank with undergravel filtration. I have recently added some plants. I feed him two or three sprats a week with a few prawns in between. I always remove any uneaten food. A couple of months ago I spotted some small white worms and also some insects which look very much like dragonfly larvae, in the tank. They are pure white and measure about 1cm in length. The worms are multiplying, despite my attempts to eradicate them by syphoning out and changing two gallons of water every other day. I understand that dragonfly larvae are dangerous. How do I get rid of them?
 • B. Entwistle, Lancs.

A The white worms you have in your aquarium are almost certainly planarian flatworms. They can reach up to 10mm in length and seem to appear from nowhere. I suspect they were introduced along with your plants. They won't harm your fish. Dragonfly nymphs are quite rare in an aquarium but may have also come in on your plants. They are dangerous to small fish and fry, but won't hurt your Piranha. Flatworms can be usually be eradicated by the introduction of Gosamix, which will eat them - although I wouldn't recommend putting them in with your Piranha. You could raise the water temperature to 36°C or install a diatom filter. Failing that I suggest you scrape the worms from the glass and Hoover the tank out, along with your water changes. The only way to eradicate the dragonfly nymphs is by completely dismantling, cleaning and re-setting up the tank so this should solve both problems. Thoroughly clean the decor in boiling water. **PD**

Groups are best

Q My Dad is in the process of setting up a 52" x 18" x 20" all glass tank in which he wants to stock 15-20 very small Channa Loach. I wonder if you could give us some information on these fish. I know they haven't been bred in captivity, but we would like to have a go.
 • Jonathan Smith, Herts.

A I believe that possibly the only way to breed these fish is in groups, so you have every chance of breeding them. The aquarium should have a layer of soft sand on the bottom and be densely furnished with rocks, bogwood and plants to give the fish areas for possible spawning. The pH should be neutral. Lighting should be slightly subdued. Make sure the water is well oxygenated and filtered. Give them plenty of water changes as it may stimulate them to spawn. Feed a varied diet with plenty of live food such as earth-worms, daphnia, mosquito larvae and so on. **PD**

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

- Answering general queries are NICK FLETCHER and PAUL DONOVAN (big fish).
- Plant problems are the realm of BERTI GESTING of Aquatic World.
- Cichlid fans deal with MARY BAILEY, treasurer to the British Cichlid Association.
- Discus queries go to STEVE DUDLEY of Ruro-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.

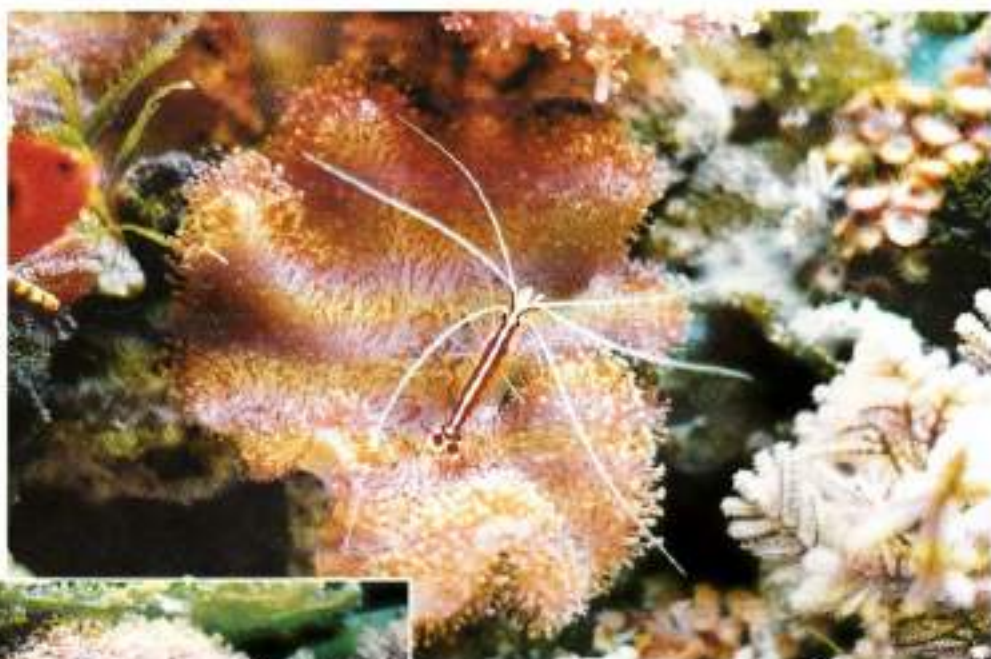
We regret that letters sent without an SAE will not receive a reply.

TROPICAL ANSWERS

- General queries: Nick Fletcher or Paul Donovan
- Technical: David Ford
- Plants: Bertie Gesting
- Catfish: Gina Sandford
- Discus: Steve Dudley
- Cichlids: Mary Bailey

MARINE INFORMATION ■

Right: The set up contains a selection of hard and soft corals and ten different types of marine plants. Other inmates include this Cleaner Shrimp.



Below: Andrew's *Euphyllia* coral has been in his tank for well over a year and is thriving.



Right: A Flame Angel feels at home among the coral.



Above: The tank is relatively small for a marine set-up.

Left: The aquarium has become a flourishing coral reef in only eighteen months.

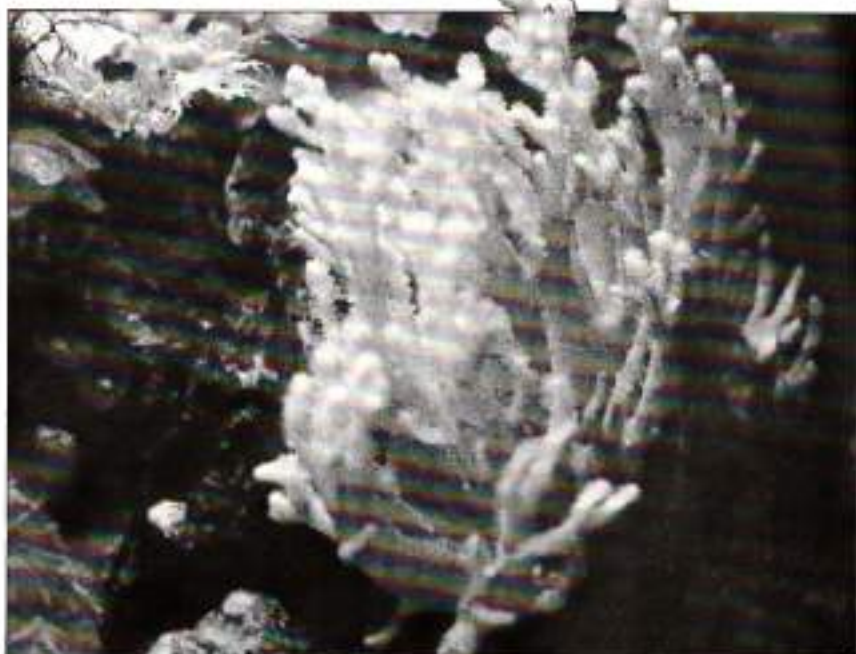
Not so HARD

It's not everyone who can claim success with inverts, particularly hard corals, but **ANDREW TILLET** from Norwich is doing something right. He wins a Nitragon in our Wetpets sponsored competition for marine fishkeeping projects.

Andrew Tillett has had great success with both soft and hard corals in his aquarium. In just a little over eighteen months, he has established a flourishing coral reef, in what is a relatively small tank for a marine set up.

Filtration

The 42" x 18" x 15" aquarium utilizes a reverse-flow undergravel system with two down-flow pipes positioned about 12" from either end of the tank. It's run by an Eheim 2215 external filter, filled with coarse filter pads, carbon, filter wool, sponges and a Polyfilter. For water movement, there are two Aquaclear 301 powerheads, which are situated at the top of the tank at either end and mounted onto powerhead cartridges, which have been cut down in size to save space. Andrew puts a small piece of Polyfilter in each cartridge and he changes this once a month. The tank has excellent water circulation and a tremendous



Lighting is critical for inverts. Andrew has combined powerful fluorescents and a good reflector to meet their needs.

turbulence at water level. Filtration is completed by a Sander WT350 protein skimmer, powered by a Whisper 800 pump.

Lighting

Correct lighting is vital for inverts. Andrew's tank is lit by four three foot Triton tubes and two four foot Actinic tubes which are situated six inches above water level. The Tritons are left on for ten hours a day and the Actinics for eleven hours, coming on half an hour earlier and going off half an hour later than the others. Under the hood, Andrew has fitted a good reflector made from a sheet of stainless steel. The cover glass is removed while the lights are on.

Maintenance and stock

The tank has a 30% water change every week using rainwater, which is collected in dustbins, through a downpipe which Andrew has cut into. He has encountered none of the problems which many marine fishkeepers experience, such as hair algae. Any greenery in the tank is supposed to be there.

Stock consists of many thriving corals, ten different types of marine plants, a Flame Angel, a Mandarin, a Cleaner Shrimp and two Seahorses. ■



Left: The aquarium houses a colony of Sponges, which are difficult in all but the best conditions.

WHAT ON EARTH IS?

A Acid rain: Pollution from burning fossil fuels (hydrogen and nitrogen) produces acid in the atmosphere. Rainwater is already naturally acid and un-buffered against any additional acid. Where it falls in areas of inert rock, it can collect and cause major problems by acidifying lakes, and during times of snow melt or heavy rain, causes acid flushes in rivers.

Air curtains: Usually lengths of soft tubing punctured at intervals to release clouds of fine bubbles in a long thin curtain.

American Flagfish: *Jordanella floridae* a fascinating small fish from the Everglades and other areas with cichlid-like spawning behaviour.

B Brackish: Slightly salty water usually found where the sea meets freshwater.

G Gaseous exchange: In this case the process by which oxygen enters at the surface of the aquarium water and "waste gas" carbon dioxide leaves.

Gouramis: A large family of fish which often inhabit low-quality waters in their natural habitats, and have therefore developed the ability to breathe air through a labyrinth organ, and are remarkably hardy about water quality.

H Hardened water: The water authorities add lime or similar to decrease the acidity of the water to minimise corrosion in the pipes.

L Livebearers: Fish that give birth to fully-formed young as opposed to laying eggs.

M Myxocoprinus: A relatively new genus to the British hobby - the Myxocoprinids are Asian river-dwelling carp-like fish, with small leathery scales, and (often) a high sailfin dorsal. They are very adaptable about temperatures at the lower end of the tropical range.

P Paradisefish: A name applied to several species, including the true Paradisefish *Macropodus opercularis*. Closely related to Gouramis, they are, if anything, even harder when faced with low temperatures and poor water conditions.

R Rift Valley Cichlids: Fish from Lakes Malawi, and Tanganyika where the natural water is very pure, stable, and very hard.

W White Cloud Mountain Minnows: Rarely reaching more than 4cm, *Tenisonitops albonotus* come from the White Cloud mountains near Canton. In their home summer temperatures can reach 26°C, winter as low as 14°C. They prefer to be kept in shoals and are incredibly hardy.



Paradisefish will tolerate a wide range of temperatures.

LIFE S
SYS

Editor STEVE WINDSOR leads beginners through another potential minefield as he considers the factors that combine with filtration to make a stable tropical tank.

We are now masters of two of the most important factors in setting up for tropical fish - the siting and style of tank required, and the all-important business of filtration.

Get our tank set-up in the right position, and create stable and healthy water conditions and we are well on the way to keeping the fish successfully.

But of course, there are other factors to consider. Your first question should be:

Is it simply enough to provide well-filtered and "clean" water?

The simple answer in most cases is yes. The fish most hobbyists begin with (or should begin with) will survive in a wide range of water conditions. Provided they are thriving in the local shop, it is very likely they will thrive in your tank.

■ The main cause for any concern should be the pH of your water.

pH is the relative acidity or alkalinity of your water, on a scale of 0 to 14. The midpoint, 7, indicates neutral water, and with very few exceptions, most tropical fish will thrive in neutral water.

However some fish really need more acid water - the classic examples being Discus (pH 6), Uaru, Rams, or Neon Tetras; while some need hard water in

varying degrees - it's essential for many Rift Valley cichlids, and helpful when keeping rainbows, mollies and some other livebearers and many of the "marginally brackish" fish in the hobby.

Virtually all tapwater will be artificially hardened by the Water Authority to protect your pipes, and will tend to a pH around 8.

To obtain softer water, your best options are to collect rainwater or natural lake water from hilly (typically acid rain-soaked) areas. In both cases the water should then be filtered through carbon to remove airborne pollution.

Heating cables

When trying to grow plants it is often beneficial to have a heating cable under the growing medium. This offers gentle water movement by convection over the roots of the plants, which is beneficial to growth. However, it is usually necessary to have an extra form of heating for the fish.

Various acids and buffers are available to change pH, but this tends to be temporary. Some hobbyists use aquatic quality peat to lower the pH.

Sudden changes of pH, up or down, will stress your fish. Bear this in mind especially when moving a fish from one tank to another.

SUPPORT SYSTEMS

FIRST FOR
PFK
 BEGINNERS



Rift Valley Cichlids need hard, alkaline water conditions in order to remain healthy and breed.

As these are tropical fish, is water temperature important?

Tropical is a relative term when it comes to many of these fish. Some of the hardest ideal starter fish - like the White Cloud Mountain Minnow, American Flagfish, and Paradiisfish - and some of the more advanced fish such as *Myxocyprinus* will tolerate a wide range of temperatures.

Typically such fish come from the southern United States or China. South of such areas live fish with varying temperature needs and tolerations. Typically and understandably, the more stable the conditions, the less tolerant the fish will be of changes.

It is possible to set a midpoint for many of these fish, and most of them will thrive at around 75°F (24°C). A classic case of a

Practical Fishkeeping/May 1992



A heater mat (left) can be placed under the tank, meaning there's less bulky equipment on show, but you will need a thermostat (above) to regulate the temperature.

fish that likes higher temperatures is once again the Discus, which prefers the low to mid 80's°F (around 29°C), while

many of the Gouramis are content to adapt to steady temperatures of anything from 74°F to 88°F.

Again, rapid and erratic changes in temperature will badly stress your fish.

How do I control the temperature of my aquarium water?

There are two basic choices. The vast majority of fishkeepers will choose a simple heater - that is a typical heater element in a glass or plastic tube controlled by a built-in thermostat - usually a bi-metallic strip. The heat is governed by manual adjustments made most often by turning a knob on the top of the heater, guided by a thermometer stuck in, or in the tank.

One step up (or down in some hobbyist's opinion) is a heater controlled by a thermostat. This combination allows the use of either a standard in-tank heater or a heating mat which is placed under the tank. The thermostat

TROPICAL INFORMATION ■

will take temperature readings easier through the glass or (arguably better) by use of a probe in the tank.

Not all thermostats will give an in-built temperature reading - some will need to be set by a thermometer. Others can be adjusted to a particular temperature marked on their dial - a useful feature for those interested in brooding fish when a temperature change can trigger off spawning.

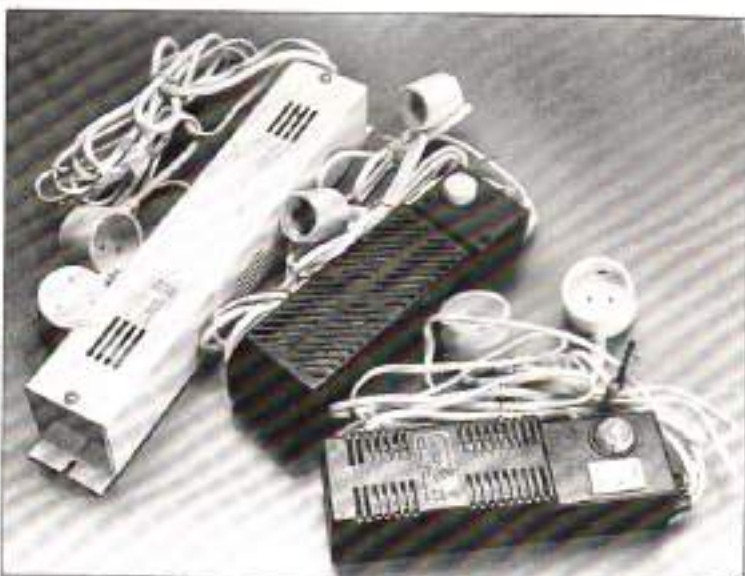
Heaters and thermostatically-controlled heaters can also be positioned in external filters.

Boisterous fish can damage heaters, or move them dangerously around the tank, so protective barriers in corners or tubing around the heater can be very useful.

Finally, in the modern centrally-heated home, very little if any heating will be necessary, as typical ambient temperatures will be around the basic 75°F necessary for tropical fish. One step on from this is the insulated fishhouse or fish room, where the air, not the water in the tanks is heated.

Tanks, don't forget, can get too hot, and aside from the frustratingly common problem of a heaterstat jamming in the on position (usually overcome by using a separate thermostat which will switch off the current), high summer temperatures may make it

Fluorescent tubes (below) are probably the most popular method of lighting fish tanks. They're safe to use, but require starter units, and which makes them expensive.



WHAT DO THEY COST?

Guide prices for heaters
Heating mats: from around £8 to £40 according to size
Thermostats: £10 to £40
Heaters: £7 to £10
Heaterstats: £12 to £15

Guide prices for lighting

Starters: From £10 to £20
Tubes: Huge range available from around £7 up to £20 or more for special uses
Reflectors: Around £5 to £7
Timers: Around £18
Mercury vapour units: Around £50; tubes around £20
Metal halide units: £200 to £300; burners (bulbs) around £30

Guide prices for airpumps

From £10 to as much as £50 or far, far more for a fishhouse unit. Airstones, diffusers etc: From less than £1 to around £10

necessary to cool your tank with an electric fan, or by adding ice cubes in plastic bags.

What should I start with?

Most cost effective choice is likely to be the standard heaterstat with built-in controls (some feature temperature marking for easier adjustment).

Is lighting essential for my fish?

Not really - in fact some fish like catfish will positively relish the gloom of an unlit tank.

But light is necessary to see many of the fish at their best in their full glowing colours (though too much light may cause the fish to become washed-out and drab).

Tanks are usually lit from above, though some back-lighting units are available and regularly advertised at present.

Good lighting is necessary for good plant growth, and it should reflect the spectrum and timing of natural light in the tropics (and be on for ten to twelve hours). This is not a bad regime for your fish either.

Fish can be shocked by sudden switching on of the lights. A good regime is to let natural daylight filter in, followed where necessary by the room lights, then the tank lights. Reverse the procedure (tank lights off, then room lights a few minutes later) in the evening. If you really want to cosset your fish buy a dimmer for your room lights.

Many hobbyists light their tanks with fluorescent tubes. These are not the cheapest method, as they require starter units, but in many ways the safest, as they are cooler, and fit into comparatively waterproof endcaps. Special reflectors are now available to get the best out of your light tubes, at reasonable prices.

Stronger light sources - metal halide and mercury vapour - are usually hung over the tank in free-standing units. They are not really necessary, except perhaps for plant growth, in freshwater fishkeeping.

There is no reason not to use ordinary light bulbs or any of the modern developments in lighting technology apart from the risk of water entering some units; and any excessive heat which might, for instance, damage condensation trays.

Timers can be bought for

lighting or your lights can be separately plugged into a timer plug.

Is there anything else I should consider?

Last month we briefly mentioned aerators. While some fish (and plants) positively detest a tank churned up to jacuzzi standards, the vast majority of community tanks will benefit from extra air bubbles, which (along with the filter) increase water movement, which avoids "dead" or "hot" spots in the tank, and more importantly perhaps, helps increase gaseous exchange by ruffling the water surface, which is beneficial to both fish and filter bacteria.

Air pumps can also be used to run undergravel and box filters. Airstones, air curtains, air diffusers, and a number of "bubbling ornaments" can all be used to distribute the air more finely or purposefully into the tank. ■

■ **NEXT MONTH:** How the choice of fish will influence your final set-up.

THE

WHICH WATER?

MARINE FORUM



Dave Keeley is Underworld's expert.

Q When will I be able to get hold of Reef Crystals which I keep reading about?

A By the time you read this, Reef Crystals should be freely available at all good suppliers. The first UK shipment was sent out to shops in mid April.

Q So what does 'enriched blend' mean? Enriched with what?

A Reef Crystals are designed for Reef situations, and contain the following extras over and above salts designed for every day use:

- 1) Extra Calcium, for animals which form shells or skeletal structures by depositing calcium - crustaceans and corals.
- 2) Extra Trace Elements, in a chelated form, to encourage algae, both stand-alone macro and micro algae as well as internal symbiotic algae essential for anemones and corals.
- 3) Vitamins, designed to benefit the most sensitive marine organisms such as algae, corals and anemones.
- 4) Metal Detoxifier, to help eliminate toxins from the water supply.

Q Why are Reef Crystals only available upto the 50 gallon size? - I always used to buy Instant Ocean in the Bulk box.

A The bulk 600 litre pack of Instant Ocean was never intended for home use, but for major users such as importers and shops who have to do large regular water changes. Since Reef Crystals are intended specifically for the long term maintenance of invertebrates in Reef Type aquaria, it is unlikely that they will be used in the more transient situation encountered in importers and shops, certainly not in bulk of the selling aquaria.

Practical Fishkeeping May 1992

REEF CRYSTALS SPECIAL

Q My local supplier has told me that I need not do water changes in a Mini Reef which I propose to buy in the near future - do you agree?

A I could not disagree more. In theory it is possible to filter out most of the measurable waste products produced by the tank's inhabitants, and in theory it is possible to replenish all those components which are used up by the

Q With the introduction of Reef Crystals, does this mean that I will not be able to get Instant Ocean any more?

A Absolutely not! The two salts are intended for quite different applications, and Reef Crystals are not intended as a substitute for Instant Ocean.

Q I suppose Reef Crystals are going to be expensive. I have always avoided Instant Ocean until last year because I thought that a cheaper price meant inferior quality. When I changed over to Instant Ocean last year, I have to admit through economic necessity, I was amazed at its performance - it is actually better than my previous salt, which costs over 5p a gallon more. I had hoped that it would be equal value, but was amazed that it is actually of higher quality. Even though now that my financial circumstances have improved, I will never stop using Instant Ocean for my 'normal' tank, but hope soon to set up a Reef aquaria? Will I be able to afford it?

A Reef Crystals will be between 12 and 15% more expensive than

marine life by adding a mixture of additives, buffers etc. In practice even the most comprehensive maintenance programme will perform these functions deficiently.

Often get the impression that hobbyists think that there are particularly targeted for water changes, and the rules only apply to them. This is not the case - all public aquaria and all professional and successful breeders, importers and retailers have to institute programmes of water changes - larger installations obviously install more sophisticated systems than hoses and buckets, and may well install at some expense the infrastructure to do a 1000 gallon water change as quickly as a home aquar-

ist can do a 10 gallon change. Nevertheless, I do not believe that there is one major professional handler of marine fish which has found any system of water management more efficient than regular water changes.

Q I am confused with the number of Synthetic salts suddenly available. Without undergoing long term trials of all of the brands, how can I decided which brand is best?

A In a way, you would have the same problem if you were going to buy a new car - how can you tell, not what is best, but what is best for you personally, without trying them all? Salt is easier to decide. Follow the professionals, many of who have quite sophisticated procedures for quality testing. See what major public aquaria throughout the world choose, or closer to home, look what most shops use. Short of a 'Which' style report, you will be best to accept that Instant Ocean remains the world's best selling salt, after 25 years of continuous production, despite many other brands regularly appearing. (And I might add, regularly disappearing.)

The whole raison d'être behind Reef Crystals is that by doing regular water changes, the user is both removing waste material and replenishing depleted material in the correct quantities in a regulated fashion. If water changes were not essential, manufacturers could simply supply a cheap and unsophisticated raw salt along with a bottle of additives, at a far cheaper cost than are current salts. Nobody had yet come near to achieving this.

Instant Ocean. They are still cheaper than some other brands which do not contain the extras included in Reef Crystals, and they will save you a fortune in extra additives.

FREE REEF CRYSTALS

We are giving away 10 x 60 litre packs of brand new Reef Crystals to PFK readers. Simply drop us a line giving your reason why we should send a pack to you, IN NO MORE THAN 50 WORDS, and we will select 10 lucky readers to receive a FREE pack. Send to Underworld Products Unit 1 & 2 Belton Road West Loughborough, Leics, LE11 0TR.

PRODUCT INFORMATION

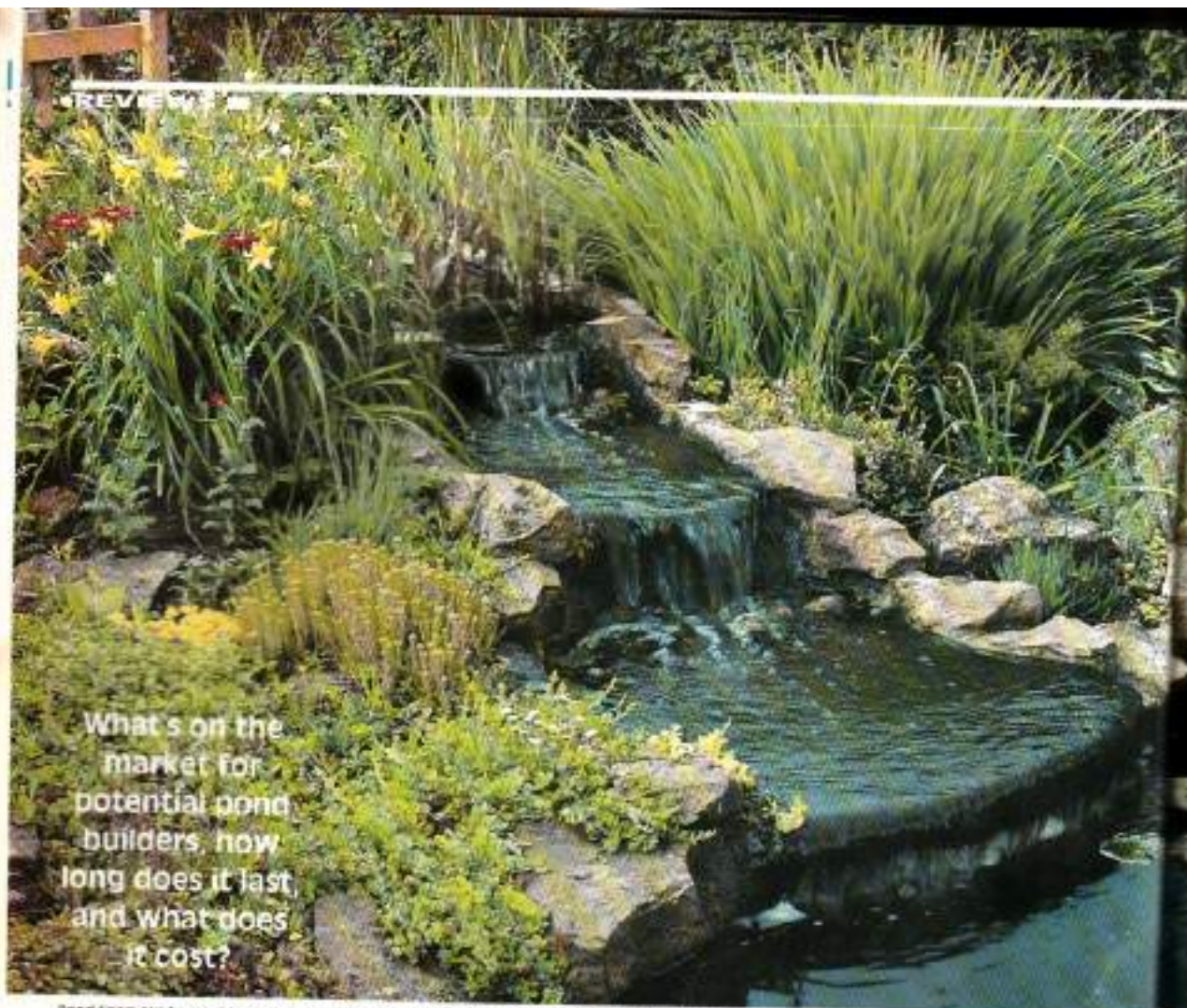
If you would like further information on any of the products featured in Underworld Marine Forum, please complete the enclosed form and send with a S.A.E. to:

Dave Keeley, Managing Director, Underworld Marine Forum, Underworld Products, Units 1 & 2 Belton Road West, Loughborough, Leics, LE11 0TR

Please send me details of:
Reef Crystals Polyfiller
Ocean Nutrition VisiJels

Name: _____
Address: _____

■ THIS ADVERTISEMENT COMES FROM UNDERWORLD, SPECIALISTS IN AQUARIUM TECHNOLOGY, AND ALL VIEWS EXPRESSED WITHIN ARE THOSE OF THE AUTHOR DAVE KEELEY.



What's on the market for potential pond builders, how long does it last and what does it cost?

Pond liners can be used to create more than just ponds - including waterfalls and other features

Luxury Lin



The packaged liner such as these from Ulma and Trident usually comes with helpful pond building instructions.

Luxury Koi ponds apart, (and even including these) the vast majority of pond builders still opt for a liner. These come in a comparatively small range of types, materials and thicknesses, with varying projected lengths of life and guarantees.

In virtually every case, price reflects durability and both the projected life (in virtually every case likely to be longer than the lengths we quote) and guarantee. The more expensive liners are usually easier to repair, too. That

said, there may in some cases be hidden advantages in the cheaper types, such as extra flexibility.

PVC

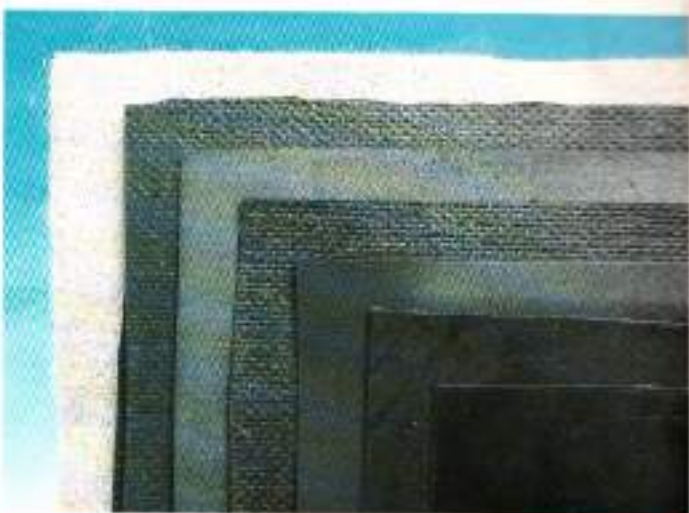
A better choice than the very cheapest polythene liners, PVC will stretch a little when first used, but come become brittle in time. It can be heat welded to join lengths. Laminated PVC is often two coloured offering a choice of green and black (and sometimes blue).

BUTYL

This material is a synthetic rubber that remains flexible in



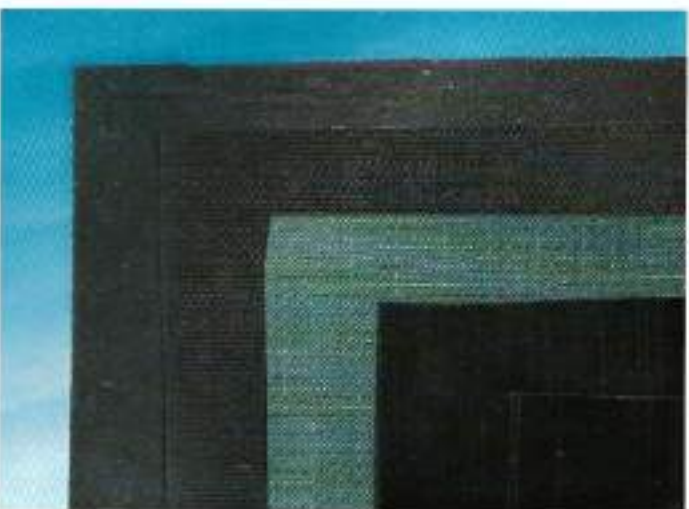
Liners from
Kettering, from
outside in:
polyester
underlay; Buryl;
Aquaflex
rubber; Butyl
again; Aquaflex
PVC; ABSAT and
Romanoid
High-Elastic



Liners
from Reef,
from outside
in: Buryl 80/20;
Buryl 75/20;
DraktechnoFolie;
Reifexfolie



Liners from
Blagdon, from
outside in:
Buryl; ABSAT
ALLDPEI;
laminated PVC
(green/black);
Pondaline S;
Pondaline 10.



liners

the cold, is the longest lasting material currently available and is easiest to repair if the leak can be found.

OTHER MATERIALS

Materials such as Low Density Polyethylene and ABSAT have deliberately been produced with the pond builder in mind, offering good length of life, and excellent flexibility.

UNDERLAY

All pond liners require an underlay (in addition to a smooth, free of stones base) to

REVIEWS ■

◀ minimise the chances of a leak. This can be a purpose-made underlay, sand, or various oddities such as old carpet, newspapers, etc.

THE LINERS

LOTUS

Lotus sell the Toughliner and Toughliner Supreme which are made from a three layer sandwich of LDPE with "special polymers added to make them more supple".

The Supreme is a thicker version of the standard liner. Both are available in very wide (26') sizes without seams.

LDPE features good resistance to heat, cold, and UV light.

For green-minded pondkeepers Lotus state that no toxic chemicals are used in manufacture or given off in destruction of the material.

■ Lotus Water Garden Products Ltd., PO BOX 36, Junction Street, Burnley, Lancashire BB11 0NA. Tel: 0281 207712

BLAGDON

Blagdon are among the leading names in pond equipment and as befits their status they offer a wide range of liners, including sole distribution rights for ABSAT.

They also offer Butyl, PVC, and Polyethylene type liners in sizes to 20' (6m) widths available off the roll. ABSAT and Pondalene are available pre-packaged.

Pondalene is claimed to be very

LINER	LIFE (years)	GUARANTEE (years)	MATERIAL	COMPANY	R.R. PRICE (sq. ft.)
Toughliner	+12	12	LDPE	Lotus	N/A
Toughliner	+20	20	LDPE	Lotus	10A
Reeflexafolie	N/A	20	N/A	Reef Aquatics	24p
Drakatechnafolie	N/A	20	N/A	-	34p
Butyl 75/25	+20	20	Rubber	-	42p
Butyl 80/20	+25	25	Rubber	-	46p
Pondalene 5	10	5	PE	Blagdon	28p
Pondalene 10	30	10	PE	-	35p
PVC	30	15	Double laminated PVC	-	43p
Absat	50	20	ULLDPE	-	49p
Butyl	40	15	Rubber	-	72p
Aquaflex H.D.	20	10	PVC	Kettering A.C.	27p
Absat	N/A	20	ULLDPE	-	38p
High-Elastic	N/A	20	N/A	-	42p
Butyl	50	20	Rubber	-	43p
Aquafast	50	20	Rubber	-	45p

N.B. Prices in bold are shop's prices; prices in light are manufacturer's/wholesaler's RRP.

adaptable with large amounts of "built-in" stretch allowing for subtle movements as a new pond settles. ABSAT is claimed to last a lifetime being extremely slow to become inflexible.

■ Blagdon Water Garden Products plc, Units 6&7, Commerce Way, Walrow Industrial Estate, Highbridge, Somerset TA9 4AG. Tel: 0278 781556.

TRIDENT

Trident offer a number of pre-packaged PVC pondliners with 15 year guarantees to suit various pond styles and waterfalls. They come with pond-building instructions.

Trident also offer a simple

PVC repair kit which incorporates a cleaner in one tube (Methyl Ethyl Ketone) to ensure adhesion and an adhesive in the other tube plus a piece of patching material.

Trident also make a clay stabilised petroleum bitumen emulsion with a small quantity of organic fibre for painting and sealing brick or concrete ponds.

■ Trident Water garden products Ltd., Sooker Place Farm, Stoke Road, Slough, Bucks SL2 4NI. Tel: 0753 692595 OR Carlton Road, Foleshill, Coventry

REEF AQUATICS

Reef stock two German pond liners, Reeflexafolie and

Drakatechnafolie which come at excellent prices. Reeflexafolie is 20 thou thick.

Drakatechnafolie has excellent stretching properties and its molecular structure will adapt well to changes. For extra long life, though, they still recommended Butyl which they stock in two grades. Quoted prices include delivery and Reef offer polyester underlay at 10p

square foot when bought with a liner.

■ Reef Aquatics, Floralands Garden Centre, Catfoot Lane, Lambley, Nottingham. Tel: 0602 262545.

KETTERING AQUARIUM CENTRE

Kettering stock five varieties of liner including Blagdon's ABSAT and Remanoid's High-Elastic. They stock two thicknesses of Butyl, the thickest called Aquafast, and the laminated Aquaflex heavy duty PVC. Their underlay cost £1.12 for a linear foot seven feet wide. They also offer a butyl repair tape ideal for joining waterfalls to the main pool (and of course repairs).

■ Kettering Aquarium Centre, 63-65 Field Street, Kettering, Northamptonshire NN16 8EW.

Calculating liner size

Take maximum length and width of the pond, and add twice the maximum depth. A pond 6' wide x 8' long and 4' deep would require a liner (6 + 4 + 4) 14' by (8 + 4 + 4) 16' or 224 square feet. The most expensive liner above would cost £161.28 for this pond.



Trident products can repair a leaking pond or brick or concrete pool



Do you aspire to keeping the difficult *Neolamprologus brodiei*? Here's how to start.

Avoiding Tanganyikan pitfalls

MARY BAILEY
with a reminder
that success
with cichlids
needs careful
planning.

Most fishkeepers starting with Tanganyikan substrate spawners choose to keep the reasonably well established, small rock-dwelling species such as *Juliichromis* and some of the *Neolamprologus*, but although many of these have been around for 15 or 20 years now, the path to success is

studded with pitfalls. By following this article you should be able to avoid most of these - though as the only predictable feature of cichlids is their unpredictability I will make no promises!

Step one - the tank

First of all, the tank. Many hobbyists try to establish a community as their first

venture into these fish, but I would strongly recommend practicing on a single species in the first instance.

Accordingly, we will consider a 24" x 12" x 15" deep tank which will be adequate for such a set-up.

If you feel you absolutely can't wait and must start off with a community, you can apply the same general principles to a larger tank. You must, however, remember that these fish will not tolerate crowding, and if you try to

NUMBER ONE FOR BREEDING PROJECTS

overpopulate, so that there is not enough territory to go round, they will remedy the situation themselves, **bloodily**.

As a general rule of thumb you need 24" of tank length for the first species, and at least 12" more for each additional species; so a 36" tank will do for a pair of each of two species, a 48" for three species, and so on.

Step two - filtration

I strongly suggest the use of normal-flow UG filtration, with a single uplift driven by air. This will produce perfectly adequate filtration for what is going to be a low-population tank - even when the fry come along - and is preferable to using a powerhead which might cause problems with the tiny fry being sucked into the substrate.

In my experience air-driven UG also provides adequate aeration for this type of set-up, though an airstone can be added if desired. Use a good quality reliable airpump with a high maximum output - better to bleed off excess air than to not have enough. It is sensible to have a spare diaphragm "in stock" (or a spare airpump) as these fish do need artificial aeration, and are likely to die quickly without it.

You will need 2.5-3" of substrate over the filter plates. This should be fairly fine-grained, well-washed aquarium gravel (with a grain size of 1.5-3mm) to which has been added about 25% coral sand to act as a pH buffer (not coral gravel, which is sharp and angular, and may cut delicate mouths or get stuck in gullets).

Coarser gravel might impede any minor excavations the fish may wish to make, and should therefore not be used, and similarly there should be no gravel tidy.

It is senseless to stop cichlids digging if you wish to breed them, as the excavation of pits is a necessary part of the ritual, and no digging may turn out

to mean no breeding. Some people like to use 100% coral sand, but this is unnecessary and expensive, clogs easily, and is too reflective - too bright an environment can make for shy fish that stay in the gloom of their caves all the time.

reach a dangerous temperature, increasing the chances that you notice something is amiss.

These are quite expensive fish we are dealing with, and once fry come along you will have quite a lot of investment tied up in this tank - leaving

will be quite sufficient. We do not particularly want to grow algae for these fish, and plants would be out of place in a simulation of the fish's natural habitat.

Moreover a moderate amount of light will encourage the fish to come out, while brilliant illumination is likely to have the opposite effect. The type of tube is immaterial - better to buy a cheap tube and two heater/stats than to skimp on the heaters in favour of an expensive tube.

Step five - decor

The Tanganyikan we are going to keep spend their entire lives in close association with rocks, and it is vital for their psychological well-being that we provide them with a rocky decor that makes them feel secure.

You can use any rocks as long as these do not contain metallic deposits or other poisonous materials - no need to worry about the lime content as these fish are at home in hard alkaline water, and in point of fact lime-rich rocks such as limestone or tufa are useful, if not essential, additional pH-buffering agents. You will also



N. leleupi - this is a male - are easy to keep.

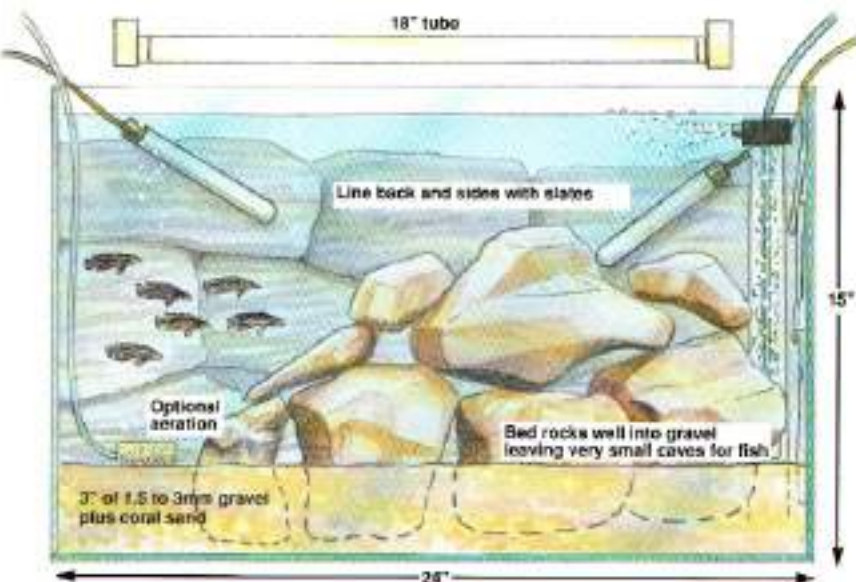
Step three - heating

A single 150 or 200 watt heater/stat should be more than adequate; if the budget allows, however, I would prefer to use two lower wattage heater/stats - then, if one fails in the off position the tank should stay reasonably warm, and if it fails in the on position it will take longer to

aside the fact that of course we should always do all we can to ensure the well-being of our fish, whatever their cash value.

Step four - lighting

A single 18" (or 24" if you aren't trying to fit it inside a 2ft hood) fluorescent



Even a comparatively small tank can be set-up to begin breeding Tanganyikans.

PROJECTS ■

- ◀ Find some old roofing slates (real ones not the modern synthetic ones) useful and a tube of silicone sealant if you wish to create worry-free rockwork.

Step six - getting the right data

You should obtain a reliable and accurate thermometer, and test kits for nitrite, nitrate, and pH. If you have a hardness test kit as well then so much the better, but this is not essential.

Before you go any further, it would be wise, if your tap water is of the much recycled or agricultural drainage variety, to test its nitrate level. If this is high then you will also need to equip yourself with some means of lowering the nitrate level, as Tanganyikan are quite intolerant of any pollution.

Step seven - setting up

Having assembled all the equipment we can proceed with setting up the aquarium.

First position the tank and fit the UG plate (it is a good idea to silicone the uplift to the plate, as it is a disaster if it comes loose later. Likewise seal in any plugs for spare uplifts in the plate). Next take a little time to design the general layout of your rockwork - you don't have to go as far as pencil and paper, but it helps to have a mental picture of what you are trying to achieve. You should also plan where you are going to position your heater-stats - it can be annoying to be sitting back admiring the magnificent effect you have created and to then realise you



N. cyanocephalus - breeding the cichlid successfully is a profitable business.

have left nowhere for the heaters! This is a favourite trick of mine, and I would advise against copying it.

Step eight - rockwork

It is wise to line the back and sides of the aquarium with old roofing slates to protect the glass against knocks from any landslides that may occur - though the rockwork should be carefully structured so as to minimise the risk of collapse; stick together with silicone sealant

if you are of a nervous disposition regarding your carpet!

Slates also make a more natural backdrop than the variety you buy depicting a planted scene and if you want to take pictures of your fish it helps prevent the common problem of flash bounce-back from the rear glass.

As always when positioning rocks for cichlids it is important to have foundations on the bottom of the tank (or filter plate so that there can be no undermining. It's sensible to use fairly hefty building blocks for this layer, even with small fish - perhaps especially with small fish that have the habit of wriggling into small crevices between the rock and the bottom. When assembling the rockwork, bear in mind this liking for small holes, rather than making sizeable caves. As there is going to be just a single pair of fish (and their family) in the tank we do not need the ridiculous amounts of rockwork used in the Mbuna aquarium, where we are trying to create as

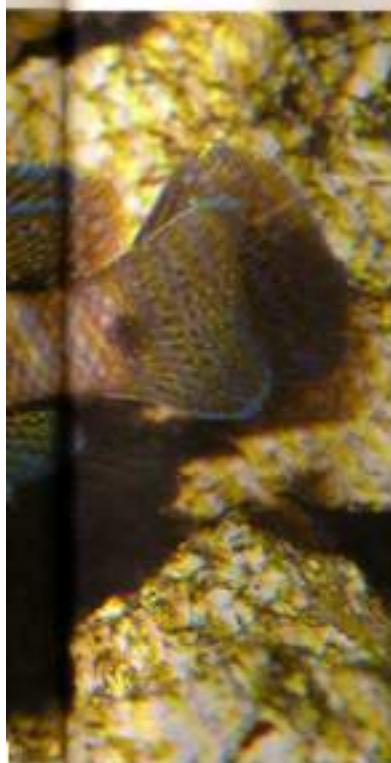
many hiding-places as possible; even so, there should be a reasonably large amount of rockwork to simulate the natural habitat - not just a small structure in one corner.

Once you have a general idea of the layout you require, position your foundation rocks on the filter plate, leaving small gaps between the rocks and the back/sides of the tank. Next infill to 2/3 of the depth of the foundations with the gravel/roar sand mixture, and then use roofing slates to line the back and ends of the tank, slotting them into the gaps you left between foundations and glasses. The slates can be vertical, pushed firmly into the substrate, or slanted to form extra hiding places behind them.

Build up your rockwork, trying different pieces for effect and structural solidity. This involves a lot of fiddling about, even if, as I have, you've had nearly 20 years practice at it. So don't allow yourself to get frustrated if it won't go right first time. And don't forget to position the heaters.



Amblylocheilichthys reginae (Tanganyika cichlid) is a good starter fish.



Step nine - wiring up

You can now wire up all the electrical equipment - if you are unsure how to do this then get help from someone who knows how, even if it means paying an electrician.

You would otherwise be risking not only the lives of your fish, but those of yourself and your family. Fit the hood and turn the light on so you can get a better impression of the rockwork **before** you add water - you may wish to make last minute alterations when you see it illuminated as it will be when the tank is running.

Step ten - water

Ideally this will have a hardness of 12-15 dGH and a pH of 8 or higher. If, however, your tap water has a different chemistry then don't panic. The hardness is not critical - I am happily breeding Tanganyikans at a hardness of about 3 dGH, and it doesn't have any apparent ill-effect on their life-spans.

Under no circumstances follow the all too common practice of adding common salt (NaCl) in an attempt to harden your water - it doesn't actually have that effect. I'm afraid I think this applies to special "Rift Valley Salts" as well, which, judging by their taste, owe a lot of their content to sodium chloride.

It is, however, absolutely vital to have an alkaline pH, even if it isn't as high as the optimum 8+.

If the pH is below neutral then you are likely to have corpses in short order. For this reason if there is any sign of discomfort in the fish (rapid respiration, shimmying, etc) then you should check the pH as well as the nitrite level. But as long as you have added coral sand to your gravel as suggested, there should not be any problem of this sort. That said you must not allow metabolic wastes to build up (more of this later).

It is unlikely that your initial pH will be less than 7 as water companies are required by law to supply water in a slightly alkaline state; but you should use the pH kit to test, and if it is below 7 then you must remedy this before adding any fish.

Don't use patent pH adjusters; instead either let the tank stand until the coral sand does its work, or else add Bicarbonate of Soda, 1/2 teaspoonful at a time then test again, until a satisfactory level is reached.

There is no need to age the water when first setting up the tank, as you will not be adding your fish until it is biologically mature, which will take 2-3 weeks.

Step eleven - maturing the tank

Once the tank is filled then set the filters, heaters, and lighting going. The tank must now be allowed to mature, and during the time this takes you can adjust the heater(s) until the temperature is stabilised at about 80°F. If you have another tank which has been running for some time you can "seed" your filter bed by sprinkling a handful of "dirty" gravel over your substrate. This should reduce the maturation period from

three weeks to about 10 days.

"Feed" the filter during this maturation period by putting a little food into the tank every day. Monitor the nitrite level on a daily basis. After a few days it will be lethal, but thereafter should decrease slowly but surely to near zero as the filter starts to mature. When it has stabilised at near-zero you can add the fish. Don't rush - it isn't worth the risk.

Step twelve - choose the fish

There are quite a lot of different species you could try in this set-up, but as all Tanganyikans are on the delicate side it is sensible to stick to those which:

- Have become fairly well acclimated to aquarium life.
- Which are available as reasonably priced tank-breds.
- Which are fairly outgoing in their habits.

It is no use, as a beginner, choosing one of the *Atilamprologus* species (*compressiceps* or *calvus*),

Parachanna, *regani*, *stomatodes*, *Nelotemprologus* *brichardi*.

N. "Daffodil", *N. kareusi*, *N. buscheri*, *Telmatochromis vittatus*, *T. zohrenae*. All these are reasonably easy to breed as well.

Step thirteen - pair forming

I suggest that you start with half a dozen juveniles of about 1", and you should be aware from the outset that unless you are extremely vigilant and quick to act, then you will end up with just a pair (or possibly a male with multiple females in the case of *N. brichardi*).

As soon as a pair forms they will set about eliminating the opposition, and this has to be accepted as a fact of life. With the Julies (*Juulidochromis*) you should avoid too much disturbance if you try to rescue the surplus fish, as this may cause the pair to fall out and turn on each other. It is difficult to do, but it may be better to sacrifice the spares rather than lose your pair.



Atilamprologus calvus is a very shy difficult fish

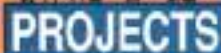
even though these are fabulous fish and the set-up would suit them. The problem is, they tend to disappear into the rockwork after any move, and that may be the last you see of them for 6 weeks or more.

It is very difficult for even the experienced Tanganyikan-keeper to resist the temptation to check up on them, but it is essential to leave them alone as any fiddling will only make things far worse.

Species which are suitable are any of the *Juulidochromis* (*marini*, *ornatus*),

In any case, you often don't realise what is going on until it is too late, as the victims tend to disappear into the rockwork - permanently. Don't let this put you off though - yes, it is sad to have these deaths occur, but by letting nature take its course you will be applying the law of "Survival of the Fittest", which can only be for the benefit of the captive population of the species. And in the wild far fewer fry would be likely to survive than in the aquarium. ■





When his Angel eggs failed to hatch, TOM SAVILLE designed an 'incubator' to resolve the problem. He tells us how to make one - and offers a few tips of his own on successful breeding.

In the late 1940s, when the trauma of World War II was over, the tropical fish hobby was the perfect pick-me-up for many people. This resulted in a real "boom" in fishkeeping, creating a demand for certain species which was difficult to fulfill.

One of the most popular species was the Angel Fish, which at that time, was considered rather difficult to breed.

I was then assistant to a man called Bob Jackson, who was offered four adult pairs of Angels. We had no information regarding the origin of the fish, whether imported from the wild, or aquarium-bred.

No filtration

Bob had a fairly large fish-house, at one end of which was a glass-fronted concrete

An incubat



Once Angels pair off, your problems are still not solved, getting the eggs to hatch can be very difficult.

aquarium 10' x 2' x 2'. The Angels were given sole occupancy of this, and soon settled in, feeding well on Daphnia and other live foods.

The water temperature was held at a steady 85°F; pH value 7.2. Aeration was provided by four big diffuser stones. There was no filtration - we felt it was hardly necessary, with only eight fish in 200 gallons of water. The bottom of the aquarium was bare slate; commercial

breeders don't bother with gravel. Cover was provided by several clumps of Amazon Sword plants in large earthenware plant-pots.

Eggs - but not for long

Whether the eight fish were really four pairs was questionable, but it wasn't long before two pairs started spawning, followed by a third pair. Despite the vast amount

of room provided in this big aquarium, they all chose one particular secluded clump of plants on which to deposit their eggs. Angels have the reputation of being fairly good parents, and we thought that our fish would tend their eggs satisfactorily, but within hours of being laid, each batch of eggs disappeared, eaten either by the parents or by the others. In a commercial fishhouse, there is plenty of human activity, and perhaps

tor for angels

the fish were disturbed by this.

Previously, we had not attempted to breed cichlids. Parent egg-layers were always removed from the breeding tanks after spawning, but we knew that good cichlid parents kept the eggs clean and fanned fresh water over the eggs. We didn't want to upset the fish by removing them from the aquarium. In any case, trying to net all the fish in such a big tank was a task we didn't relish.

Poor rate of success

The alternative was to remove the eggs and transfer them to the safety of a rearing aquarium. We had several specially-made shallow aquariums 36" x 15" x 8" which we used as breeding and rearing tanks.

We cut off the egg-bearing plant leaf, wrapped lead wire round the stem, and placed it on the bottom of one of these completely bare aquaria, with the water temperature at 85°F, and no filtration. Enough Methylene Blue solution was added to turn the water a medium blue, as a guard against fungussing of the eggs (there were none of the modern fungicides available then). One diffuser stone was placed close to the eggs, to replace the fanning of the eggs by the parents. Only a few of the eggs hatched. Something was wrong.

pH problems

Some intense checking of scientific publications unearthed information on the pH value of the fish's natural habitat ideally neutral at pH7. We made many trips in Bob's little van and brought hundreds of gallons of naturally acid water from the Welsh moors, with a pH of 4.

Gradually, over a period of a month, we replaced some of the aquarium water with this moorland water. Testing

each time, with B.D.H. Universal Indicator, we slowly brought the pH down to 7. This neutral water, taken from the big aquarium, was used to fill the rearing tank.

While this was going on, I gave some thought to the problem of water circulation

A cure for poor circulation

Using pieces of 0.25" thick clear Perspex, glass, and Durofix adhesive, I put together the gadget shown in the diagram. Nowadays, clear silicone adhesive replaces the old-fashioned acetate glue. A

narrow end. The air bubbles, travelling along the sloping lid, created a current of water directly over the eggs. Methylene Blue was again added. The results were perfect. Virtually 100% hatched every time.

Rearing on

As soon as the fry were free swimming, the "incubator" was carefully removed, and aeration reduced to a level which didn't create too great a movement for the fry to battle against. Food was newly-hatched brine shrimp, fed four times a day, so that the fry continually had pink stomachs. As soon as possible, the brine shrimp was replaced with sieved Daphnia and Microworms.

Every week, half the water was replaced. The fry grew much faster, compared with those in tanks which received no change of water. In those days, we knew little about the toxicity of nitrites and so forth. The water changes probably kept the nitrite at a safe level. ■

Cheap at half the price

In the late 1940's, young Angels, about the size of the current 5p piece, fetched £1 each in the shops - quite an expensive fish, considering the average income of £750 per annum.

The result of cracking the incubation problem was that we produced thousands of Angels, and generated enough capital for Bob Jackson to become one of the most important suppliers of fish and reptiles in the 1950s. I'm sure we couldn't have done it without the little "incubator".

round the eggs. Merely placing aeration near the eggs did not seem to match the close attention given by the parent fish. Obviously, the current of water had to be channelled accurately over the eggs.

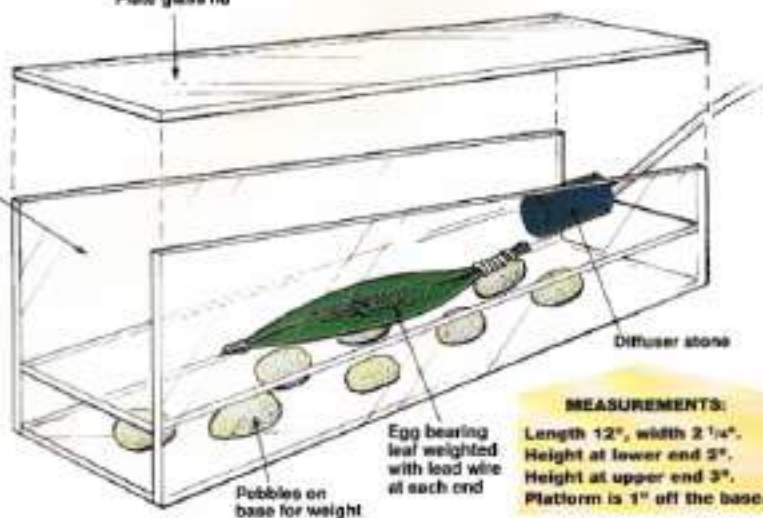
few pebbles weighted it down, and the 'lid' was quarter plate glass, heavy enough to remain in place. The egg-bearing leaf, weighted with lead wire, was placed on the central platform, eggs uppermost, and a small diffuser stone positioned at the

The incubator.



Plate glass lid

Plate glass



MEASUREMENTS:

Length 12", width 2 1/4".
Height at lower end 2".
Height at upper end 3".
Platform is 1" off the base.



A pair of Spike Tailed Paradise fish in the act of spawning - and tending the nest they built, showing the broken off leaf fragments.



The Spike-tailed Paradise fish builds bubble nests but may have a preference for spawning under large leaves or in caves. Make caves out of flowerpots, rocks and roofing slates, or coconut shells. A large potted broad-leaved plant should be placed in the centre of the tank to provide building materials should the fish go for a combined plant and bubble nest.

Foa



Anabantoid ace
ANDREW SMITH
gives his tips for
breeding a
variety of
bubble-nesters.

Pics: Max Gibbs, The
Goldfish Bowl; Spike
Tailed Paradisefish and
nest Mike Sandford.



■ The **SPIKE-TAILED PARADISE FISH** is a small Anabantoid that will also readily spawn in the set-up used for the Honey Gourami but, it has a preference for spawning under large leaves or in caves. In fact this is a most resourceful species when nest sites are few. Place two or three small flowerpots on their sides in the tank or make caves out of rocks and pieces of roofing slate. You can also use coconut shells to imitate the caves.

Position a large potted broad-leaved plant in the centre of the tank. The Amazon sword plants (*Echinodorus* spp.) are an ideal choice for this purpose as is the Giant Hygrophilla (*Nemaphylla stricta*). If some of the leaves break off and float to the surface don't worry about taking them out as they too will serve as a possible nest site, and for all your efforts will probably be the one used.

These fish lay sinking eggs and the collecting is often undertaken by both sexes. The male alone will tend the brood and although the female is in no particular danger if she remains in the breeding tank, she is best removed when spawning is complete.

P. dayi will not produce as many fry as the larger Anabantoids but monitor the growth of the fry and make provision for moving them into larger quarters.

Spawning Frenzy

IT'S always very tempting to try to breed gouramis. In many cases a pair will even try to nest and spawn in the comparative "busy-ness" of the community tank. This group of projects suggests the best set-up for the cultivation of some of the easier and more difficult bubble-nesting anabantoids.

Most of the readily-available anabantoids construct bubble nests. This is achieved by the male of the species taking in air at the water surface and spitting out mucus-coated air bubbles that adhere to themselves and to plant matter.

Some gouramis construct such a nest at the water surface, some use floating plants or plant leaves that have broken away from the main plant, and others actually use pieces of plant and fibres incorporated within the body of the nest.

There are a group of Anabantoids that spawn in mid-water using a broad leaf as a nest site, whereas others are known as cave spawners, using bogwood or stones made up in the shape of a cave.

Some members of the genus *Betta* and *Sphaerocorys* are mouthbrooders, that is they spawn and take the resultant eggs into their mouths for the incubation period, and the fry are released when they are scaled-down replicas of their parents. Unlike cichlids, however, the fry are not taken back into the mouth and are left to their own devices. These tank designs are aimed at the bubble nesters.

Size them up

The first thing to ascertain is the size of the parent fish, the possible brood size and the availability of space to raise

such a brood. Pairs of Siamese Fighting Fish have spawned in quart jars which is all well and good, but you would have little chance of raising many of the brood.

Having chosen the particular fish to breed, set your tank up accordingly.

For this purpose, I shall use the following examples. Honey Gourami (*Colisa chuna*);

Moonlight Gourami (*Trichogaster microlepis*); Spike-Tailed (or Day's) Paradisefish (*Pseudosphromenus Dayi*); and Siamese Fighting Fish (*Betta splendens*). ▶



The Honey Gourami can be kept and spawned in quite a small tank.

THE HONEY GOURAMI, is the smallest of the genus *Colisa* and can therefore be bred in a smaller aquarium, from 15" x 12" x 12" upward.

A substrate is optional and often better left out for reasons of cleanliness.

Plants can be either floating; or fine-leaved that reach to the water surface, Indian ferns (*Ceratopteris* spp.), and Riccia are ideal as the floating plants, and a few bunches of Cabomba or Myriophyllum even draped across the water surface will assist the fish with the nest site.

Place these plants at either end of the tank and put a small flower-pot laid on

its side, in-between the two. The pot will give the female refuge if she is harassed by the male.

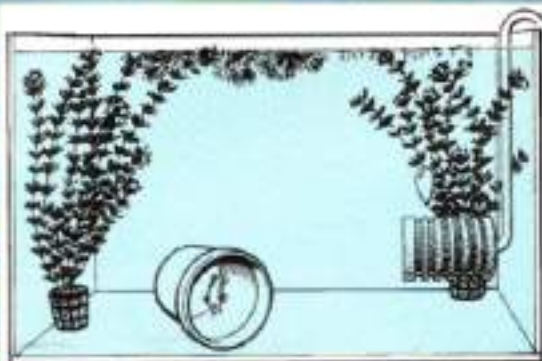
She will also need to reach the surface for air, and one of the clumps of plants will allow her to do so as the nest will occupy one end of the tank and she the other.

Filtration and aeration are not required at the moment but if a filter were to be an integral part of the raising of the brood then the sponge variety is ideal as the flow can be altered to suit the situation.

This applies when breeding most of the bubble nesters. The nest of this species is not a very robust construction and if the water resembles a Jacuzzi it will simply not hold together.

Run the filter fans at one large bubble to every three to five seconds for example and the agitation of the water surface will be minimal.

Whatever your preference, include the filter in the preparation, to mature the filter and make minimal later disturbance to the brood that will, in this case, number one-hundred-plus.



The Honey Gourami spawning tank should be 15"x12"x12" upward, with no substrate. Floating Riccia is ideal plus a few bunches of Cabomba or Myriophyllum. Put a small flower-pot in the middle for harassed females. Use a sponge filter on "low power".



Moonlight Gouramis prefer densely-planted tanks.

■ **THE MOONLIGHT GOURAMI** is the only member of the genus *Trichogaster* that actually incorporates plants and plant material in the construction of the nest. This fish constructs the nest by using mucus-coated air bubbles to bind together plant pieces and even whole plants, and the bubbles are more foamy in appearance.

The nest will often jut out of the water like a dome. Moonlight Gouramis, like all the other species in the genus, are extremely prolific and the conditions in which they are bred should be a reflection of this.

Set up a tank of at least 20 gallons or more (preferably), and include many clumps of plants both floating and weighted, with the provision for the female's hiding that was explained earlier. There is every possibility that a good spawning can produce several hundred, if not thousand, young that will all want feeding and adequate space if the project is to succeed.



The Moonlight Gourami tank should have plenty of plants at the fish constructs the nest, with plant pieces. Use a 20 gallon tank to include many clumps of plants both floating and weighted, and don't forget the female's hiding place.

◀ Care after spawning - Labyrinth organs

So, four set-ups to offer basic guidelines for the cultivation of bubble nesters.

Once the pair have spawned, the eggs have hatched and the parent fish have been removed, it may be a good idea to lower the water level to around three to four inches, to allow for the fry to properly develop swim bladders, and make the water surface easily accessible for the development of the Labyrinth organ.

This is a critical stage in the development of juvenile

Anabantoids. The temperature of the air above the water must be the same (or very similar) as the water temperature for this organ to form properly. If the young are subjected to cold draughts, this could have a disastrous effect on them.

To be certain that you have the correct temperatures, make sure that there is a good lid on the tank. This can be anything from the most expensive of hoods to simple things such as perspex or cling film.

Other problems

That said, the chief killer of very young free-swimming fry

is not temperature or pH or water quality, but starvation. Feed the fry with infusoria, rotifers or liquid fry food until they are free-swimming when

they should be weaned onto newly-hatched artemia nauplii, micro-worms and the like, and finally onto cleansed Tubifex or Iska.

TIP: Syphoning with airline (above right) is monotonous at the best of times, so why not try this idea? Place the container of fresh water on a surface higher than the tank and put one end of the airline in until it touches the bottom of it.

Fix bits in position by clipping the line to the side of the container with a clothes peg. Now draw the water through and place the other end in the tank.

If the flow of water is too strong, then tie a loose knot in the air line to stem the flow. You are now free to carry out other tasks while the tank is filling.

Water "changes" can also be achieved when the water level is low just by topping the tank up every other day but, the time will come when the base of the tank will need attention.

Hygiene

With all this food going in to the tank, hygiene will be a problem if sufficient water changes are not made. This can be difficult as the tiny fry could so easily be syphoned out with the muck on the bottom of the tank.

To combat this, use a length of standard airline and either attach an airstone or a small piece of stocking or tights (old of course) fixed well with an elastic band.

The water can now be removed without losing the fry.

To replace with fresh water use the air line again. ■

Take all these factors into consideration, and you should soon have a self-perpetuating stock of gouramis - and a few more besides.

To sum up, gouramis are easy to spawn, but the fry are at times troublesome to raise.

But with good food, rational rearing, and patience, the results can be very pleasing.

■ One of the most commonly-bred Labyrinth fish must be the SIAMESE FIGHTING FISH. These fish will spawn in very small areas as in the wild, but it is unfair to subject the female to the type of rough treatment that the males will often show toward a reluctant or unready mate. It may be a good idea to place both sexes in a tank with a divider that restricts access but enables the pair to see each other.

Plants are rarely used in the construction of the nest and need not even be included in the tank set-up. Include plenty of hiding places for the female.

The bubble nest is usually built in a corner of the tank where it adheres to the glass.

Sometimes the addition of a small polystyrene tile floating in the tank will provide a site.

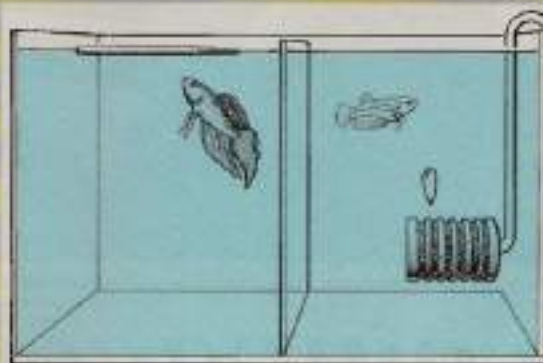
As soon as spawning is complete the female should be removed as she will be chased and harried to the point of being (albeit unwittingly) killed.

An unusual quirk with this species is when the male is removed from the breeding tank and

the female left in, she will often care for the brood herself. This has been observed in *Macropodus* also where this occurrence is quite common.

Remember that male fighters do not tolerate each other after around three months or so, and each male from a spawning will need a special container if he is to develop fully.

It is so good moving the whole brood to a large tank at this stage, as the males will begin to see their brothers as enemies when they are moved no matter how peacefully they co-existed before.



Siamese Fighting Fish will spawn in very small areas, but protect the female from the male before spawning with a divider. Plants need not be included. As soon as spawning is complete the male, the female, or both, should be removed.



Male Siamese Fighting Fish can be highly aggressive to other males and to females during spawning.



Hull reader
B. ALLISON has
an excellent
pond design for
the small
garden.



Neat, tidy, and self-contained, this pond might be ideal for the smaller garden.

The compact pond

With time on my hands after retirement, and space in the back garden to use, I set out to build a 10' x 5' x 3'6" deep pond.

To stop the dog paddling in the pond I elected to build an 18" wall around the pond. It was then that I spotted a a filter system I liked the look of (PFK August 1991). It seemed a good idea, and I could lengthen the brick wall,

and fit a rock garden with waterfall from a built-in trickle filter system.

The filter

This is set at the top of the pond, and feeds out into the waterfall. Instead of buying a tank, I adapted a 45 gallon round polyvinyl drum that had held detergent. After a thorough clean, I cut into it to make the tank shape shown.

I did have to purchase some plastic sheeting to make a separate chamber which ensures that the filtered water

builds up to one side before flowing down the 1 1/2" pipes to the top of the waterfall or back into the pond.

A drilled 4" pipe at the base was covered with Canterbury Spar media, then a few plastic sphericals, all covered with foam. Above this two drilled 1 1/2" pipes trickled water down.

Settlement chamber

At the lower end of the pond, I now needed a settlement chamber. This was made from another well-washed drum. I drilled the bottom of this and fitted a bottom drain which flowed into the main drain. Two inlets from the pond flow in. The outlets run via central heating pumps. An overflow from the tank keeps the pond level.

This was then loaded with 18" x 30" Black Knight Brushes which hang straight down filling two thirds of the tank, and cover the sides of the tank. Detritus is caught in these as the water is drawn out by the pump.

I then bricked in all round it, and covered it to make a useful seat.



The filter above the waterfall - without media.

Two pipes feed the settlement chamber - one is at present capped off while the other starts with a swept bend and a length of pipe that goes down to 2" off the bottom. In the autumn this can be turned to take water from higher up.

Simple system

I'm sure the system would work just as well with only one 1 1/2" pipe connecting the two tanks (at present I am running it on only the one central heating pump which is all I could afford).

In summer I will increase the speed of the pump and uncap the waterfall pipe to set this going again.



The settlement chamber before bricking in.

Buckets and hides

ANDY PARKES of Blandford, Dorset has another use for those invaluable five gallon brewing buckets.

As we all know, it is necessary and important to carry out partial water changes from time to time, and the replacement water must be of suitable quality or it may do more harm than good.

This may not be too much of a problem with smaller aquaria, but I am aware that many people are having larger aquariums installed with larger fish, and this begins to pose a few additional headaches. I know I don't have room to acclimatise forty or fifty gallons of water beforehand, so I have had to find an alternative solution.

All you need is a bucket, and a power filter. You can take this set-up as far as you like, but I will describe my own system.

I use a five gallon beer bucket, into which I have

siliconed an Eheim tap, with a length of tubing connected to another Eheim tap. To strengthen the seal in the bucket, I siliconed on the layers of plastic sheet (available from most good model shops) before drilling the hole through at the bottom of the bucket.

The sealing ring was then removed from the tap, silicone put all around the tap and the thread pushed through the hole in the bucket. Then it was tightened up again, adding more silicone.

Once this has fully cured, a length of hose can be fitted to the other side, with the appropriate connecting tap on the other end, ready to be fixed to the inlet side of your power filter.

If you don't wish to cannibalise your bucket, the inlet pipe from the filter can

simply be placed into the bucket.

The important part is to have a correctly-measured quantity of water that can be checked to whatever conditions you require, before it goes into the aquarium.

Use a measured bucket of suitable size (I suppose you could use a pint jug if you want) into which you add your cold water, two kettles of boiled water to bring it to the temperature you require, adding the appropriate conditioners and purifiers.

I pump the water through a small power filter, containing carbon and Siporax just to be certain, at a slow speed.

I find my Eheim 2211 will lift the water from the floor to a height of fifty inches without any problem from the back pressure, but please keep your eye on it just in case. Should the set up start to back syphon your floor will be soaked in no time at all.

Of course you could syphon the water in if you do not have a power filter available, or you may be able to raise the bucket above the tank and trickle it in by gravity.

I have used this technique successfully many times now, and hope it will be of some use to others.



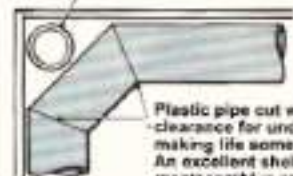
A 45° cut, when the pipe is turned to mate the cut faces, will give a 90° right angle



Pipe held in vice to ensure both cuts are vertical



Two cuts of 22½° gives two angles of 45°. Ensure they are cut opposite ways to produce a staggered right angle



Plastic pipe cut with two 22½° angles. This gives clearance for undergravel siphons, as well as making life somewhat easier for any occupants. An excellent shelter for Synbranchus, Mastacembelus and anything else that fits.



Shelters can be made from piping or guttering and silicone.



TIP: As an added bonus, an extra length of hose can be made, and drilled with holes every couple of inches. Why? To water the garden. Just lay the drilled hose across your vegetable patch, and leave the main hose feeding the supply bucket; or use the system to recycle your old water as fertiliser. Of course, DON'T add garden chemicals if it is to be used for fish.

What do you do with all that silicone you have left?

Make some shelters from plastic piping. You can get them in all shapes and sizes, or make your own as shown. I find that 1½" plastic sink pipes are ideal for most species, but I also use (and need) the 3 and 4" drain pipes cut in half for bigger fish. With these, you can use them as an unobtrusive barrier to build up the level of gravel behind them.

Don't forget to halve the angle that you cut, because when you turn the pipe around to join up again, it will be doubled (see the diagram).

Once the pipes are joined and the silicone cured coat them in more silicone and cover with gravel. For £10 I can make eight shelters 15" long. ■

A recent article in *PFK* leads one to believe that hard corals are almost impossible to keep in the home reef aquarium. Yes, I agree that novices should not be tempted to buy them, but hobbyists with say a year's experience and with the correct set-up will find little difficulty in maintaining them indefinitely and in perfect health as I have done over the last few years.

There are several vital techniques (each interdependent on the other) and practices which should be followed by any serious hobbyist.

Lighting

A combination of Metal Halide and Actinic 03 provides the best possible light spectrum for Zooxanthellae to flourish within the tissue of hard corals, and for that matter, all light loving invertebrates. My 100 gallon system is illuminated for twelve hours daily by 2 x 150w Metal Halides - which are ex-shop lights that can be bought quite cheaply - and 2 x 40w Actinic 03 Blue Tubes. Mercury vapour offers a cheaper substitute, but is slightly-less efficient.

Filtration

Hard corals require consistent high quality water. This can easily be achieved by way of a modern Wet/Dry-Trickle Filter.

Undergravel systems usually deteriorate after eighteen months to two years, and a build-up of detritus and debris will cause phosphates and nitrates to rise to unacceptable levels.

Remember, undergravel systems



The hard coral controversy

are twenty times less efficient than the modern trickle filter.

Highly efficient protein skimming is a 'must' as a means of enhancing nitrate reduction and the removal of undesirable elements. A skimmer will reduce the load placed on your filtration system and the importance of efficient skimming cannot be over-emphasised.

Domestic Water Supply

A major source of contamination in reef aquaria can be attributed to high levels of phosphates, nitrates and other harmful minerals which arrive by way of tap water.

However, maintaining zero

nitrate and negligible phosphate levels should prove to be a fairly easy task, simply by using boiled rainwater collected in a plastic water butt or storage tank. This should be used to make up loss due to evaporation.

In areas of high industrial pollution, distilled water or the use of a reverse osmosis unit may be a safer bet.

A Nitrogen unit will remove all traces of nitrate from tap water and should be used for monthly water changes where tap water contains unacceptably high levels of nitrates, say over 20 ppm.

A domestic improvement in water quality will be achieved together with a marked reduction in undesirable hair algae. Macro algae will grow at a controlled rate and will require very little thinning.

Living Rock

The importance of good quality living rock cannot be over-emphasised. Aim at a minimum of 50%. Our system consists entirely of this material which functions as a highly efficient natural denitrifying filter. Many sponges, ascidians, algae and even soft corals will spring up from good quality living rock.

Maintaining Hard Corals

We have successfully kept the following hard corals for several years and many are slowly increasing:-

Euphyllia plecteli - Healthy specimens will have a pinkish membrane surrounding the rim of the calcium carbonate body.



Euphyllia plecteli - Dog's Foot
Coral. The healthy specimen has a clear pink membrane around the rim.



Left: *Diploria litorea* - Brain Coral during daytime with a healthy membrane below rim. Symbiotic algae produce the green coloration in the coral tissue.

Right: By night - feeding tentacles extended to capture food.

Below: *Euphyllia picta* - Tooth Coral. By day the coral expands to about four times its size.

of the coral is imminent. Recovery is possible in ideal conditions. Growth about 5-10 mm annually. This coral is dependent on *Zooxanthellae* and does not accept proprietary frozen foods.



***Plerogyra sinuosa* - Bubble Coral** Feed about twice weekly during darkness when sweeper tentacles are active to trap passing food as on a natural reef. A 3-4 mm piece of minced mussel will be taken quite rapidly.

Placement of hard corals

Allow plenty of room around your corals as they emit poisonous sweeper tentacles which will seriously damage or kill nearby invertebrates. These 'sweepers' will extend some way from the main body of your hard corals.

Provide plenty of water turbulence to simulate the natural reef, offer no invert food, trace elements or vitamins as these tend to enrich water and are contrary to conditions found on the natural reef. We have experienced no benefit from

these additions when first used for one year. The last three years they have been withheld without detriment to the invertebrate.

Feeding

Hard corals are in the main, night-time feeders, their polyps expanding to trap food during darkness.

Offer food only when these feeding polyps are expanded, which may be only two or three times a week. A two to three mm piece of minced mussel may be placed onto the polyps, and will be taken quite rapidly, which is similar to their feeding habits on the living reef.

Conclusions

Hard corals are easy to maintain provided sound modern reef management techniques are practiced. Your corals should be collected immediately they arrive at your dealer's.

The longer they remain there, the quicker they deteriorate unless optimum conditions are provided and are evident in the dealer's tanks. ■

Hard corals are some of the gems of the reef and we are quite right to advocate their preservation, but they are just as easy to keep as the so called 'hardy' invertebrates if the right conditions are provided. After all nothing will survive for long if you don't obey the rules and this applies to all invertebrates!

coral
ersy

LEON TAYLOR has his say - and offers some tips on keeping them successfully

Damaged areas will slowly recover in ideal conditions. The coral opens out to several - times the size of its original calcareous body.

***Goniopora lobata* -** The soft membrane or skin surrounding the stony body must not be damaged, otherwise deterioration will set in without recovery. Our own specimen is in good health after thirteen months.

***Leptoria sp. (Brain Coral)* -** An off-white membrane extends some 1" below the rim and will indicate all is well. It is similar in form found in tooth corals. A damaged specimen has recovered fully in our system.

***Euphyllia firmata* - Dog's Tooth Coral** - A 1-1.5" deep off-white membrane surrounds the rim of a healthy specimen and when this dissolves the loss





Starfish will keep the bottom of the aquarium clean by picking up any leftover meaty foods, a task they perform mainly at night.

Feeding, filters and filter feeders

The filtration systems in modern marine tanks can spell trouble for filter-feeding invertebrates. LES HOLLIDAY looks at the best invert foods and at ways of overcoming that filter problem.

Many elements of marine aquarium care are interdependent and inexorably entwined.

Perhaps the easiest relationship to understand is the connection between feeding and water quality - the animals take in food and after digesting and extracting nutrients, get rid of the balance as waste.

This increases what is termed bioload, the amount of biodegradable waste that the bacteria in the filtration system need to break down to return the quality of the water to acceptable levels. Obviously the more waste the greater the bioload and even the most efficient filtration system will not prevent changes in water chemistry after feeding, if the aquarium is overstocked or the filtration system is not yet fully-mature.

In terms of maintaining good water quality the feeding regime and stocking levels have a very big influence and a careful balance must be maintained between the capacity of the filter and the imposed bioload if detrimental fluctuations in water quality are to be prevented.

It bears repeating that the most common causes of these fluctuations are overfeeding, over-stocking, too heavy initial

stocking or rapid increases in stocking levels.

Lighting and water movement are also important to feeding because they influence the way many relatively-immobile sessile marine invertebrates gain their nutritional requirements.



The Tridacna Clam is a daytime filter feeder.

These orders of marine creatures have evolved feeding techniques which rely upon their food coming to them, either by strong water movement or by farming microscopic algae in their tissues which can harness the radiant energy of the sun to manufacture nutrients by photosynthesis.

Lighting and water movement for these types of invertebrates are as important as the foods placed in the aquarium and this is often little understood. Living on sunshine, or in our case metal halide lighting, is not an easy concept to appreciate, but sunlight is the basic energy source for a coral reef's food production.

Feeding invertebrates

Invertebrates are far more diverse in form than fish and the feeding patterns of some forms are quite exotic or even unique. There can be great difficulties in deciding exactly how they feed and what it is they feed upon. It is not easy to categorise.

One distinction can be made, that between **fully mobile** and **non-mobile forms**.

■ **Fully mobile** forms include most crustaceans, gastropods, some molluscs and echinoderms and annelids. Principal among the **non-mobile** forms are coelenterates such as corals and anemones, acidians and sponges.

Most of the mobile forms of invertebrates are carnivores and active hunters of the sea bed and many are feeders upon sessile non-mobile forms of invertebrates.

Brightly-coloured nudibranch gastropods feed exclusively upon coelenterates, acidians and sponges, often specialising in attacking just one particular species of coral or sponge. They are obviously a poor choice for the aquarium as either they will die of starvation if their target food is missing or make an expensive meal of a choice coral or sponge.

The slower-moving and non-mobile forms of invertebrate have a variety of ways of gaining

INVERTEBRATE FEEDING MODES AND DIETARY PREFERENCE

FISH FAMILY	Natural feeding, mode and preference In the wild			Recommended aquarium food			
	FEEDING PATTERN	FEEDING METHOD	PRINCIPAL DIET	LIVE FOOD	SOLUTION FROZEN FRESH DRY PANKTON	OTHER MEATY FRESH/ FROZEN FOODS	NATURAL ALGAE
Anemones Cnidivata	4D	FF/F/S	Micro/macro plankton, High light levels, Solution	AN/R	YES	YES	
Clams Pelecyopoda	4D	FF/F/S	Macro plankton, High light levels, Solution	R	YES	YES	
Corals Cnidivata	4N	FF/F/S	Micro/macro plankton, High light levels, Solution	AN/R	YES	YES	
Crabs/Lobsters Crustacea	3D/N	P/S/G	Small invertebrates, algae, detritus	A		YES	YES
Grinwids Echinoderm	1N	FF/S	Macro plankton, Solution	R	YES	YES	
Sea Cucumber Pseudocolochia	3D	FF/S	Macro plankton, detritus, Solution	R	YES	YES	YES
Sea Cucumber Stichopus	3D	GF/S	Sediments/detritus, Solution	-	YES	YES	YES
Sea Urchin Echinoderm	1N	SF/G/S/SC	Sediments/detritus, algae, organic matter, Solution	-			YES
Shrimps Crustacea	3D/N	P/S/G	Small invertebrates, algae, detritus	A		YES	YES
Sponges Porifera	4D/N	FF/S	Macro plankton, Solution	R	YES	YES	
Starfish Echinoderm	3N	P/S/G/S	Molluscs, small inverts, Solution	-		YES	
Tube Worm Annelida	3D/N	FF/S	Macro plankton, Solution	R	YES	YES	

KEY

TYPES: 1. Carnivore 2. Herbivore 3. Omnivore 4. Omnivore/omnivore
MODE: D daytime N nocturnal
METHOD: FF Filter feeder F Farmer P Predator S Solution feeder G Grazer
 SF Sediment feeder Sc Scavenger

LIVE FOODS: N Freshly hatched nauplii A Adult nauplii R Postlarva

NOTES: 1. All solution feeders benefit from additives
 2. *Particle size & very important must conform to feeding method.

feeding (20 or 30 minutes) to prevent this, although as water movement acts as a stimulus to most filter feeders, any pumps solely employed for producing currents should be left on to reproduce the natural constant stream of passing food.

Many filter feeders also feed nocturnally, as mentioned earlier, but provided their feeding can be triggered off by adding a little crushed mussel or fish, or an appetite stimulant to the system an hour or so before feeding proper commences, there is no need to resort to night-time feeds.

The live foods applicable to bottom-feeding predators are usually sessile invertebrates such as corals, sponges and tunicates. Normally we would not introduce predatory corals such as the Flamingo Tongue (*Cyrtina gibbosa*) and any of the nudibranchs into the reef aquarium for this reason. Similarly the predatory molluscs such as *Cotus*, *Murex*, *Turris* and *Oliva* would not be welcome and in the case of the *Cotus* a dangerous practice to release because of its potentially dead-ly.

There are a surprisingly large number of herbivorous feeding invertebrates which feed upon algae encrusting dead coral rock. These range from small crustaceans such as shrimps and hermit crabs to various molluscs and sea urchins.

There is usually abundant algae growing on the glass and aquarium furnishings to satisfy the needs of this group. However I would not advise introducing more than one or two sea urchins as they are a little indiscriminate in their feeding habits and ingest lots of calcium which they grind off coral rock together with anything else which may be attached.

Non-live foods for the invertebrate aquarium usually take the form of solution, frozen or freeze-dried plankton and liquidated frozen sea food products for filter feeders and frozen or fresh sea foods for mobile predators.

The main difficulty in feeding filter feeders with non-live foods is the risk of polluting the aquarium by over feeding. Bearing in mind that many filter feeders are also photosynthetic

The main difficulty with feeding non-live foods to filter feeders is the risk of pollution.



and gain the largest proportion of their nutritional requirements from their zooxanthellae the amounts of food required are very small. Because of this reef aquarium owners may only feed non-live foods once or twice a week in very small quantities in order to avoid the build-up of nitrates and phosphates due to unmet surpluses which encourage blooms of hair algae.

Localised feeding using a syphon tube or pipette to direct the food solution directly to the filter feeders can also be employed to avoid releasing large quantities randomly into the aquarium.

Sediment and detritus feeders need no special attention in regards adding non-live

nutrients to the substrate.

There is always a small accumulation of detritus hidden away in most aquariums with an aggregate substrate, which more than caters to their needs.

Our final group, the solution feeders, take up nutrients in the form of organic compounds dissolved in the water. These are not the tiny particles of food organisms mentioned earlier, but more basic organic chemical compounds such as sugars, vitamins and trace elements.

Fine filtration and ozone can quickly deplete these nutrients, and there is a growing following for regularly replacing vitamin and organic compounds by the use of various additives for the aquarium. ■

Marine Answers

Filter of the future?

Please could you explain the purpose and function of reverse-flow undergravel filters and trickle filters? Andy Barnes, Norfolk

Reverse flow filtration is where pre-filtered water is pumped, usually by a canister filter, down the upfl tubes and up through the filter bed. This has the benefit of keeping the substrate cleaner by extracting solids in the canister filter.

Trickle filtration is sometimes referred to as "wet and dry". It utilises an external box filled with a suitable medium, over which the aquarium water is pumped and then returned to the tank. In my opinion, this is the filter of the future and is gaining in popularity. Trickle filters benefit from increased bacterial cultures, better gaseous exchanges and greater flexibility.

Shrunken anemones

I have two anemones which have shrunk since last September. Is my lighting at fault? In addition, I recently lost my Common Clown and since then the Royal Tang hardly ever comes out. G. Williams, Herts.

I suggest you fit three or four fluorescent tubes and run them for twelve hours a day and fit a protein skimmer, if you don't have one. Carry out a 15% water change every two weeks with nitrate-free water.

Tangs are sensitive to poor water conditions and tend to not flourish if the quality is bad. Shrunken anemones rarely recover, unless treated to perfect conditions.

TIP OF THE MONTH

Syd Robinson of Cleveland, wins an Interpet test kit for this month's tip.

I have devised the following method of cleaning the inside of the long plastic pipes fitted to external filters.

Use a length of plastic coated sprung wire - the type used for hanging net curtains is ideal. Screw one of the small eye screws in one end and thread a piece of folded wet cloth 5" x 2" halfway through the eye screw. This plastic coated wire is rigid enough to be pushed through any length of tube but flexible enough to go round any bends. The wire is then drawn through the tube and the cloth is drawn through after it.



Gobies are a suitable choice for inclusion in a mixed fish/invert tank. Pic. by Max Gibot.

What can I keep with my inverts?

Q I intend to set up a marine fish/invert tank. My intention is to have living rock, anemones, soft corals and other inverts, such as crabs or shrimps.

Please could you tell me if there are any species of Butterflyfish, Angels or Tangs which would be suitable? I would like to have a *Platax pinnatus* and possibly a *Lisefish*. Would these be safe?

• Barry Malloes

A Butterflyfish and large Angelfish, especially the Majestic Angel, *Euphygops savaynesi* are unsuited to the invertebrate aquarium for one very good reason... they eat them. *Platax pinnatus* (Red-Faced Butterfly) is a possible contender, but it's an extremely difficult and sensitive fish

and should only be attempted by the most experienced of fishkeepers. Older specimens could do some damage to inverts.

It would be better to stick with Dwarf Angels, gobies, damselfish, bicinies, clownfish and Grammas for a harmonious mixed fish/invertebrate system.

Not an easy subject

Q Recently I purchased a small *Nudibranch* for my mixed fish/invert tank. There is hardly any green algae, but there is a lot of brown slime algae, which I find uncontrollable. My dealer told me the *Nudibranch* would eat this algae, along with a liquid invert food.

• R. Fulford, Surrey

A *Nudibranchs* will certainly not eat slime algae. Neither will liquid foods be of much use as they are not filter feeders. Most have specific diets of a particular sponge, sea squirt, soft coral, etc., and this is what makes them so difficult to maintain in captivity.

Sea Hares (*Aplysia dactylolepis*) are the exception, feeding on green algae. In future, it would be wiser to investigate creatures of this nature before purchase.



Nudibranchs can be difficult to keep for long periods and are not recommended for beginners. Pic. by Alex Kerstitch.

Shrimps in shock

Q The other week I bought a Cleaner Shrimp. I acclimatised it to my tank over an hour and a half, but it died a couple of hours later.

When I went back to the shop, the dealer offered to sell me another at half price. I asked him what his s.g. was. He tested it and it went off the scale, but he said his inverts were normally kept at 1.025. The new shrimp also died when I put it in my tank.

I have recently lost a Mala anemone which has withered away. Do you have any ideas as to the cause?

Please could you tell me whether heavy smoking in the room can affect my inverts?
• P. Roberts

A I would be almost certain that your Cleaner Shrimps died from osmotic shock due to the differences in s.g. between your water and that in the shop. There is

no reason why your shop cannot keep a more reasonable s.g. of around 1.022, especially as most customers will have tanks adjusted to this level and it certainly will do the invertebrates no harm.

Mala anemones usually shrink for two reasons: either lack of light, or deteriorating water quality. I suggest you try to improve both.

Yes, heavy smoking in the same room as sensitive invertebrates will have an adverse affect.

Too much food

Q I have a three foot tank with an undergravel filter. I have tried to stock it on three occasions with the following fish.

1. Pyjama Tang, Puffer, Striped Damselfish
2. Valentini Puffer, Dogface Puffer, Koran Angelfish
3. Peacock Wrasse, Coral Beauty, File fish.

All were fed on a variety of frozen food, including brine shrimp, mysis, cockle, mussel, lancefish, whole shrimp and live shrimp.

On each occasion, the fish have died after about six months within a few hours of each other. Each time a couple of days later, millions of small 1mm long white creatures cover the glass of the tank.

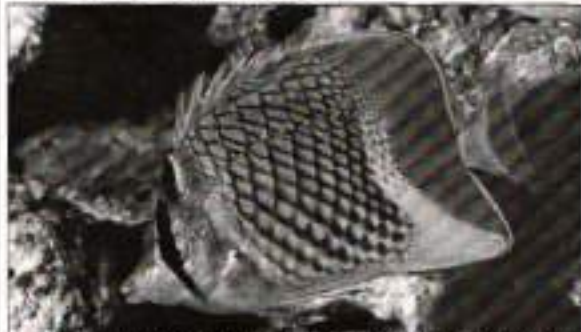
My dealer told me they were the cause of overfeeding and advised me to wash everything in very cold water. I did this, but the same problem always occurs within six months of setting up the tank. The nitrate levels at this point tend to be around 100ppm.

Where am I going wrong?
• Neil Dorrington, London

A I am almost certain from your description of events that you have grossly overfed your fish. One sparing food once a day is quite enough. The fish should not be given any more than they can eat in about three minutes, and any uneaten food should be removed from the aquarium immediately.

The very high (in fact, lethal) level of 100ppm nitrate reflects the overfeeding and possible lack of water changes - 15% each fortnight at a minimum.

A 36" tank is quite small for marine and is not suitable for larger fish such as Koran Angels, Puffers and the like. So stick with smaller species that require less food and less space.

LETTER OF THE MONTH

It's not advisable to keep fish in your quarantine tank full time. In case you need to use it in a hurry.

An Interpet test kit goes to Mr S Clarke, from Surrey for his Letter of the Month.

Q I am soon to set up a separate quarantine/hospital tank. Due to space restriction, I can only have a two foot tank.

I intend to use reverse-flow undergravel filtration, but I'm unsure how to power it. Should I use a Marathon 200, with a Fluval 103 set up as standard with a spray bar, or an Eheim 2015. The canister will be packed with carbon. There will be a protein skimmer.

Would it be beneficial to use a UV in the tank? I'd like to keep two Green Chromis in the tank as permanent residents. Is this advisable?

A You are to be highly commended for having the good sense to set up a permanent quarantine tank. It is a practise often recommended in the hobby, but rarely taken advantage of. It can be an ideal opportunity to keep an eye on a new fish before introducing it into the main tank, as well as being used to treat sick fish.

In your case, I would use the Marathon 200 and the Fluval 103 without the spray bar for good circulation. The Eheim 2015 could be used on your main tank. Don't forget most medications are adsorbed by carbon and should not be used at the same time. The use of a UV steriliser would be fine.

I would not keep any fish in the quarantine tank as it really complicates matters if you need to use the tank. A few drops of maturation fluid every week is enough to keep the whole thing established.

Avoid overstocking

Q Please could you tell me if I should include my filtration system when calculating the stocking capacity of my aquarium?
• Ray Whittingham, Derby

A I personally do not take into account filter chambers, sumps and so on, when calculating the net capacity of a tank for stocking

purposes, but I do for medication. This is because it is all too easy to overstock the livestock space. Let me give you an exaggerated example: say you had a 20 gallon tank and a 20 gallon filter. On the face of it, you could keep 35" of fish eventually - but 35" of fish in a 20 gallon, three foot tank?? Obviously this would be ridiculous, but any overstocking is to be avoided if livestock is to be kept unstressed and happy.



NICK DAKIN
is your expert on the saltwater scene

You must include a stamped, addressed envelope and attach the Marine Answers coupon, below, when you write in with your query or your tip to: Marine Answers, Practical Fishkeeping, Bretton Court, Bretton, Peterborough, PE3 8DZ.

We regret that queries sent without a stamped, addressed envelope will not receive a reply.

■ DON'T FORGET - the Star Letter and Tip of the Month in every Marine Answers wins an Interpet Test Kit.

Use the address above for tips and letters.

MARINE ANSWERS

Nick Dakin

How GREEN is your water?

Dr DAVID POOL of the Tetra Information Service with some solutions to those green grumbles - coloured water, and blanketweed.

Spring, Summer and Autumn are seasons when the pondkeeper should be able to relax by the side of a well planted pool with its beautiful fish and sound of running water, and forget about the troubles of the Winter months. But for some pond owners a new problem is just emerging - that of green water and blanketweed.

In most ponds problems arise from time to time as a result of algal growth. In many cases the

trouble sorts itself out, but in others it is necessary to take remedial action. Why do these troubles occur and how do we overcome them?

1. GREEN WATER

Green water is a problem that affects most ponds at some time, and, if you are unlucky, affects your pond every year for long periods.

The green water is caused by minute green plants known as algae which occur in vast quantities when the conditions suit them (bright light and a plentiful supply of nutrients).

In some cases, when the pond

resembles pea soup, there may be over 40,000 algae in every 5 millilitres (= 1 teaspoonful) of water! New ponds are particularly at risk, because the nutrients in the tapwater provide ideal conditions for the algae to grow and multiply.

Benefits

The algae do little harm to the fish, even when the water resembles pea soup. In fact they actually improve the condition of the fish by releasing essential vitamins and iodine into the water. These substances improve the overall health and vitality of the fish and result in a very intense colouration.

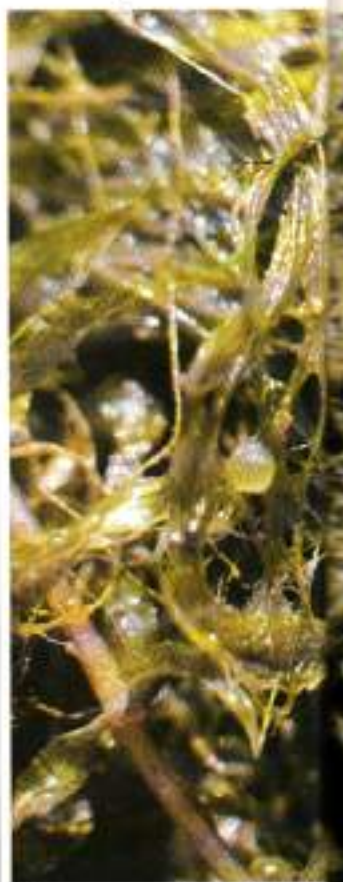
Unfortunately in a green pond these benefits cannot be seen.

Water conditioners, such as Tetra Koi Vital, are available, which provide the benefits of green water, without the green colouration.

They can be used in any pond, or even in an aquarium to bring out the best colouration in your Koi and goldfish, as well as improving their general health and vitality.

Disadvantages

In certain circumstances the green water in the pond can cause problems to the fish. At night the millions of algae that are present in the water are all respiring, that is taking in oxygen and giving out carbon dioxide. On hot calm nights this can result in an oxygen shortage in the pond which in severe cases can be fatal for the fish.



If you notice your fish gasping under these conditions a partial water change coupled with increasing the water circulation using a fountain, pump or aircore should save them.

Such events only occur infrequently and the algae has far more effect on the plants which are starved of both light and nutrients. This results in the plants growing very slowly, if at all, and eventually dying.

But by far the greatest disadvantage with algae is the fact that they prevent the fish and plants from being seen.

Control

There are several different ways of controlling algae, but one of the most successful is to kill the algae using a good quality algicide and then to prevent it returning.

- By installing (or improving) filtration.
- Adding more plants.
- Adding a vegetable filter or.
- Providing some form of shade.





Climbing blanketweed has its bonuses - like these safely covered Goldfish eggs.



First step - Algicides

Good quality algicides can be used to successfully treat the majority of algae found in garden ponds without damaging the fish or plants.

However, it must be remembered that when the water appears green, it contains many thousands of algae, and if these are all killed (when the algicide is added), they will all sink to the bottom of the pond and start to decompose, so polluting the water.

To avoid this there are two courses of action which may be followed.

■ The first is to change half of the pond water to remove the algae, and then treat the pond to prevent it returning.



Practical Fishkeeping/May 1992

Right: A disadvantage with Blanketweed is its tendency to smother plants, like these lilies. Below left: Green water disappears bright colours. Far left: A possible solution? The vegetable filter.

■ Alternatively the pond can be treated with algicide and left for several days for the dead algae to sink to the bottom before syphoning it out.

Whichever option you choose, it is important to ensure that the algicide is evenly distributed in the pond following its application. This can be achieved by first diluting the required dose of algicide with water and then applying the solution evenly over the pond surface using a clean watering can. Avoid getting the algicide solution onto floating Lily leaves as the strong solution can cause areas of the leaves to die.

Aquatic Plants

Once the algae has been killed the pondkeeper can concentrate on preventing it returning.

This is achieved by altering the conditions in the pond so that they do not suit the algae, that is by removing the nutrients or the light that the algae require to grow.

Nutrients can be removed by adding more plants to the pond, particularly the fast growing varieties such as *Elodea* and *Ceratophyllum*, or by installing a vegetable filter.

Vegetable filters are particularly useful in Koi ponds, where few, if any plants are present. The vegetable filter is a container or raceway which receives water from the filter and is heavily-planted with fast-growing plants such as watercress.

Shading can be achieved by adding surface dwelling plants such as lilies, by planting tall

marginal species such as yellow Flag Iris or by covering the pond with a coarse mesh. Add sufficient Lilies to cover 30-50% of the water surface.

Ultra Violet Light

Many pond keepers have achieved great success in controlling green water by using an Ultra Violet (UV) Sterilising Unit incorporated into the pipework to or from the filter.

Algae passing through these units are killed or damaged by the UV light produced.

This causes the algae to form clumps which sink to the pond bottom or are removed by the filter.

In order to maintain permanently clear water, it is important that you select a unit designed to treat the volume of water in your pond.

When first installed the UV Steriliser will kill all of the algae within 2-3 days.

Without the algae to use up

nitrate in your pond, it is likely that the nitrate level will increase. Regular monitoring using a Tetra Nitrate Test Kit is therefore advisable.

If the nitrate reaches dangerous levels it is advisable to undertake frequent partial water changes, add more plants to the pond and/or install a vegetable filter.

In Koi ponds the raised nitrate levels can encourage rapid growth of blanketweed if it is not controlled in some other way.

2. BLANKETWEED

Blanketweed is not in fact a weed, but is the collective name for several species of filamentous algae.

As with the algae responsible for green water, filamentous algae thrive in bright conditions where there are abundant nutrients. Where favourable conditions exist the blanketweed can grow at a phenomenal rate, doubling its own weight in only 24 hours.

Advantages

To many people's surprise there are a number of advantages of having blanketweed in the pond. First, it will only occur in water where the ammonia, nitrite and nitrate concentrations are reasonably low, therefore its presence indicates that the conditions in the pond are suitable for fish.

Blanketweed also absorbs ammonia and nitrate from the water as a source of nutrition.

Both of these substances are toxic to the fish and plants at raised levels and so the algae actually improves the water conditions within the pond. If properly managed it will act as a vegetable filter, removing the ammonia and nitrate that are produced as the fish waste decomposes.

By removing the blanketweed on a weekly basis you can greatly reduce the pollutant levels in your pond and maintain perfect water quality.

Most of the fish kept in ornamental ponds are omnivorous, eating both plant and animal matter. This can include large quantities of filamentous algae. Not only this, the algae also provides a rich food source for many invertebrates.

Examine a handful of blanketweed from your pond and

you are likely to find a range of bloodworms, shrimps, waterbeetles and fly larvae, all of which are eagerly consumed by the fish, and which keep them going while you are away on holiday.

Blanketweed is regularly used by fish as a spawning medium. Both Koi and goldfish will spawn on long strands, often favouring it to artificial spawning media and plants. The algae also

Control

Before choosing a method for controlling blanketweed, the pondkeeper should consider the advantages and disadvantages in the pond in question, and then decide if eradication is necessary, or whether reducing the growth would be a better alternative.

There are a number of successful control methods which can be used:

Clutching at straws?

A new development is the use of barley straw as a means of controlling algal growth. Research work on the use of straw is being undertaken at Reading University and is still not finalised. But early findings suggest that barley straw, when added to a pond, gives off a chemical as it decomposes and this chemical prevents the growth of algae without adversely affecting the fish or plants.

The straw has to be left in the pond for 3-4 weeks (and longer at cold temperatures) before it becomes effective. Thereafter it can be effective for up to 6 months.

Rapid control of algae in your pond is not possible with straw because of the time taken for it to decompose. Therefore algicides or ultra violet units should still be used.

When using straw use approximately 50g of untreated barley straw for every 1000 litres (220 gallons of water).

Untreated straw is available from stables and for pet foods - the straw for animal bedding is often treated with a fungicide and is unsuitable. Place the straw in a fine meshed bag and hang this in a stream of oxygenated water. An ideal place is where the water flows into the filter.

As the straw decomposes it will use up some oxygen and produce pollutants such as nitrite. However the quantities produced will be quickly used by the filter ensuring no adverse effects on the fish or other pond inhabitants.

If any pondkeepers have used straw, I would be very interested to hear if it has been successful and how the straw was used.

provides a safe sanctuary for the newly-hatched fry from their ever-hungry parents.

Disadvantages

By far the greatest disadvantage with blanketweed is due to it choking everything in the pond. The algae filaments become entangled as they grow and if left unchecked, will block the filter, smother the plants and reduce the area in which the fish can swim.

When present in such large quantities the blanketweed can greatly reduce the oxygen levels in the pond, particularly on still warm nights, when the algae photosynthesise rapidly and little oxygen is absorbed into the water.

A further problem can arise in the autumn when the blanketweed starts to die. At such times the large quantities of dead plant material will start to decompose and rapidly pollute the water.

Manual Clearance

Manual clearance is unlikely to completely remove the filamentous algae unless you drain and scrub the pond, sterilise the filter and throw away the plants. However it can be kept under control through removal by hand, or by twisting it around a rake or stick. This method is quite successful in a clear pond or in open water, but great care has to be taken around plants to avoid damaging them. In mid-summer it can also be a fruitless task, with the blanketweed re-growing very rapidly.

Algicides

Reliable algicides can be used to effectively eliminate blanketweed without damaging the fish or plants in the pond. The death of large quantities of filamentous algae, followed by

its decomposition, can rapidly pollute the water and affect the fish.

It is therefore advisable to combine algicide treatment with manual clearance. In this way you can remove as much algae as possible and then treat to prevent it returning. If, despite this, you see signs of the fish gasping at the surface of the water, removing as much dead algae as possible combined with a partial water change should remedy the situation. When treated with an algicide, the algae stop growing, stop producing bubbles of oxygen and appear very stringy. Some fibrous species can remain green for some time, not because they are still alive, but simply because it takes several days (or even weeks) for them to decompose.

Use of Plants

Blanketweed requires the same conditions for growth as the algae responsible for green water. Therefore, by planting the pond or vegetable filter with fast growing healthy plants (to remove excess nutrients) and tall marginal plants or water lilies (to provide shade), the blanketweed growth can be greatly reduced.

The use of plants is most effective before the blanketweed becomes established. If you add the plants after it has taken over, you may get the wrong result, with the blanketweed starving the plants.

A combined approach

Each of these methods of control can and has been used to successfully control blanketweed. However, using a combination of methods is perhaps the most successful once the blanketweed is established. A proven formula is to manually remove as much blanketweed as possible, treat with an algicide to kill the remaining shoots and then heavily-plant the pond to prevent it returning. ■

■ If you require further information or advice on pondkeeping, please write to me at the Tetra Information Centre, Lambert Court, Chestnut Avenue, Eastleigh, Hampshire, SO5 3ZQ.

Everything you wanted to know about...

KOI

NESTA VICKERS looks at the ideal Koi pond for owner and Koi alike

Creature Comforts for Koi? If the quality of life is to be good for the fish, that of their owner must be considered as well - the two have a direct bearing on one another.

For, the more irksome a task, the less likely it is that it will be

performed regularly or properly. Ponds that impose unreasonably time-consuming demands will quickly cease to be a pleasure and become, instead, a liability and a source of concern.

Worse, the health of the fish will suffer when, invariably, corners are cut.

Techno-Koi

Koi-keeping in Britain has been popular for some 15 years now, but is only just at the stage where technology has caught up with enthusiasm.

A bit like motoring, really - my parents' first car was a 1947 Morris Ten which spent more time in bits than it did on the road. It guzzled petrol and oil, had a terminal rust problem, caused ricked backs and splayed knuckles when the starting handle had to be brought into play; the battery was strapped under the back seat, and made us kids sick on all but the shortest journeys, yet it was regarded as one of the family, for all its faults.

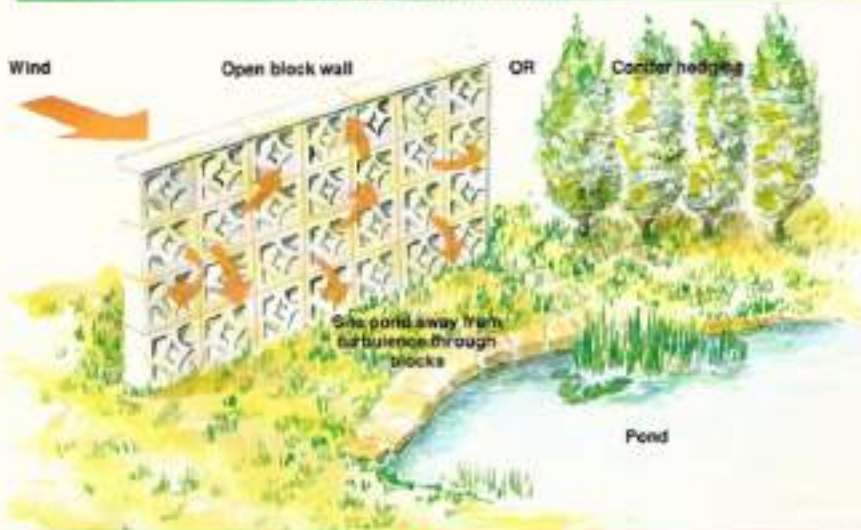
Now, the old couple whizz around in an anonymous little red number that is virtually maintenance-free, reducing the care factor to the bestowing of a bucket of suds every Sunday morning. For 'car' read 'pond' and you'll see the parallel. Concrete loaked, pumps packed up, filters consisted of beds of heavy Canterbury spar, and every Koi pool worthy of the name necessitated a daily ritual involving the pulling of standpipes and the wastage of a great deal of water.

Some still do, a minority of Koi keepers are happy to devote many hours a week to such chores. But most of us now drive hatchbacks, not Morris Tens, and prefer to devote what precious leisure time we have available to the wonderfully idle and passive pastime of fishwatching!

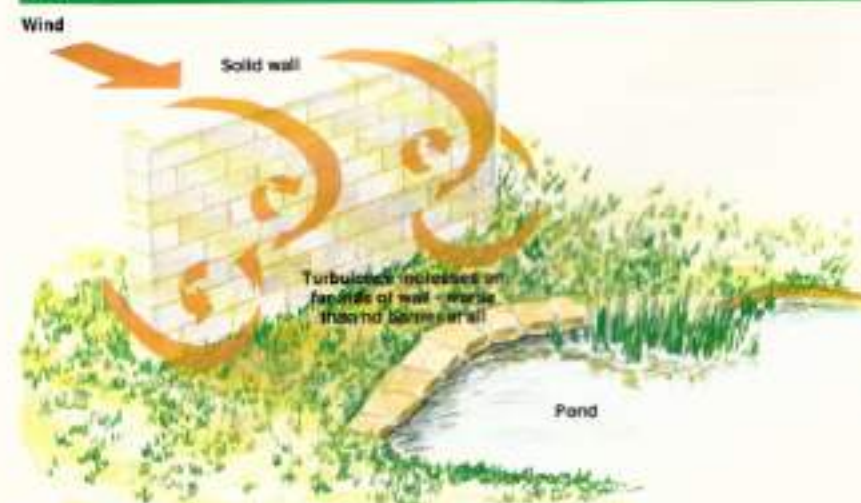
Koi comforts

Here, then, are some factors you might consider before embarking on the building of a Koi pond. They will all make life - for you and your fish - that much easier.

CORRECT SCREENING



INCORRECT SCREENING



4 Shape, size and contours

Unless you purchase a costly pre-formed pool, your options come down to either a liner or blockwork construction (the latter forming a 'key' to a choice of finishing coats, i.e. glassfibre or fibre-reinforced rendering). Simple shapes are the easiest to construct and maintain and (in the case of liner pools) the most economical on materials.

Squares, rectangles, ovals, round or elliptical ponds are often termed 'formal', but there are many dodges you can adopt to soften or radically alter visible contours. Actually, formal ponds fit much better into the average modern garden layout than fussy attempts to imitate natural ponds.

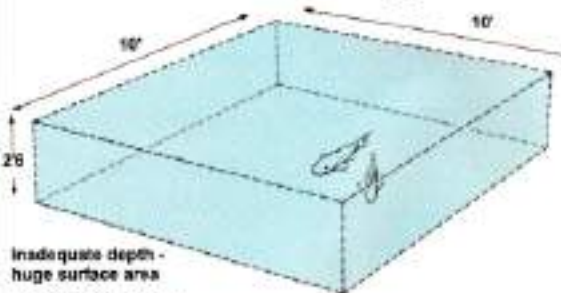
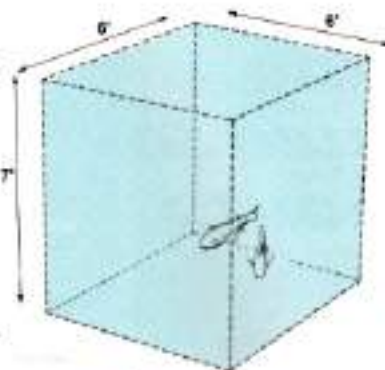
More important, however, is that simple, regular shapes enable water to circulate freely, without those 'dead spots' which are backwaters for debris-build-up and associated problems with the parts that probably the best filter in the world can't reach.

There is a hitch with square or rectangular sheet-lined ponds, in that those 90-degree corner angles slow down water circulation. This is compounded by the plains (unless you opt for a box-welded liner) that you need to make to minimise folds and wrinkles.

Also, sick fish will hole up within your Buryl Orzami, getting sicker because you fail to notice their hiding place. No such disadvantage with a blockwork pond, because you can round off the corners as you apply the internal rendering. The smoother this finishing coat, the less frictional resistance to water circulation and the less chance of fish rubbing themselves raw if they should pick up irritant parasites and 'flick' or 'flash' to try and rid themselves of these passengers.

More than adequate depth - but little surface area in relation to volume.

PLUS POINTS: Steady temperatures; vertical swimming space
MINUS POINTS: Very poor air/water interface, would need colossal aeration to succeed.



Inadequate depth - huge surface area

PLUS POINTS: None
MINUS POINTS: Swift to respond to T° changes; rapid algae growth; no opportunity for vertical swimming; prone to evaporation.

Pond extremes of the same capacity. One could only work with high aeration and turbulence; the other shows the most common error of depth sacrificed to surface area.

There's yet another plus-point in smooth pond walls, in that they don't readily encourage blanketweed. *Spyrogyra* and the other chain algae need a rough anchorage, which is usually provided (in hard water areas, at least) by limescale. And Buryl, unfortunately, is the perfect attractor.

Even if blanketweed does get a hold on fibreglass, you can be fairly vigorous in removing it: a yard-broom or a pan-scourer would be risky business on a rubber membrane.

So, cost apart, the modern labour-saving Koi pond should be regular in shape (but contoured) and smooth-walled.

As to size of pool, thinking has changed quite a bit from the days when 'the bigger the better' was standard advice.

Quite apart from the fact that modern gardens tend to be 'compact' (as the estate agents euphemistically term them), there is little point in building your pond so large that the fish are not always in view. They must, in any case, be 'to hand' in case

they need to be netted out for treatment. Try chasing fish around a lake with even a long-handled net...it's no fun.

Big ponds were once the norm because it was felt that the greater the gallonage per fish, the happier they would be. And, with Koi capable of reaching a metre or more, even in chilly Britain, who would have argued?

Siting the pool

There's usually a credibility gap here between the ideal and the possible. In a perfect world, the Koi pond would be close enough to the house to be viewed from indoors, yet far enough away so as not to interfere with the foundations; sheltered from the wind; receiving no more than four hours' direct sunlight a day; within easy reach of services (water and electricity supplies and domestic drainage); secure from predators animal and human, and sited well away from trees whose leaves and blossom are, at best, a nuisance when they blow into the water and, at worst, downright toxic.

To this, I would add 'far enough away from a road to avoid being affected by vibration from traffic'. Quite apart from juggernauts shaking loose pipework connections, and cracking concrete foundations, they can have an alarming effect on fish! Mine dive like U-boats every time a lorry rumbles by.

You can easily overcome wind-chill by building a barrier upwind of the pool. This can take the form of a line of conifer hedging, or a screen wall of perforated blocks which will ideally have some decorative effect - stepped, to hold Bonsai, for instance? The barrier must not be solid, however, nor too close to the pool, otherwise it will create, rather than prevent, air turbulence. Given the choice of a site with no sun or too much, opt for the latter. Shade for your Koi can be provided in a number of ways - water-lily pads, overhanging plants with umbrella-like leaves (*Gunnera manicata* is a good one) or wooden decking.

Water supply

Electric cables can safely be run underground in conduits, and accidents prevented by installing RCCBs (circuit-breakers).

Even if your pond cannot be plumbed into an inspection chamber so that waste water can

Depth does matter

Just as important as pond size (surface area) is depth. To impress home this point, consider the disadvantages of a Koi pond that is too shallow (opinions vary over the minimum desirable depth, mine settles at around four feet).

1) It warms up and cools down far too rapidly: the pond can be viewed as a heat-exchanger, and the wind factor can become a fish-killer.

2) It does not allow the fish to swim as properly. Koi don't just swim in a horizontal plane, but up

and down - at least, they should. 3) It does not give them security. Koi are friendly creatures, but if they don't have the option of removing themselves from danger, they will be permanently stressed. And stress leads to disease.

4) It does not give the Koi-keeper the opportunity of drawing water to the filter from more than one level.

In ponds over four feet deep, however, it is possible to draw bottom water during the summer (when waste products from fish

respiration and food excretion are at their greatest level), switching to middle-water draw-off in winter. This leaves a layer of relatively warm water below, in which the Koi spend the cold months in semi-dormancy.

So, to sum up on pond size: Keep it manageable, but make it as deep as you can. An extendable net handle gives you a reach of about eight feet; two such nets make it possible to trap fish in a pond whose maximum dimension does not exceed 16 feet.

be carried away, there are usually ways round the problem. But a pond without ready access to a water supply is a pain in the neck.

At the very least, install an outside tap adjacent to a large capacity storage reservoir. Better still, arrange for a ballvalve fed automatic top-up, so that you are freed from worrying about evaporation in summer, while you're away on holiday.

Such valve arrangements will usually feed into a ground-level external filter, rather than direct into the pond and, if you are concerned about the quality of your tapwater, a proprietary water purifier can be plumbed in-line.

Here, though, I would advise a bypass valve: if you have a constant, trickle top-up operating through the ballcock, the levels of chlorine etc. in tapwater will be so dilute in relation to the pond volume as a whole that they will not be harmful. For major water changes, however, the tapwater should first pass through the purifier.

Aeration/surface turbulence
 "My pond is heavily-filtered, and the volume is turned over once every two hours, yet all my fish died one night last summer," goes a frequent and plaintive plea to PFK. "Why is this?"

Actually, the fish probably 'drowned' because dissolved oxygen levels fell. This situation is liable to occur more often in planted than unplanted ponds, and the first casualties will be the largest fish.

It rarely happens in ponds with fountains, large waterfalls or efficient venturis, all of which create surface turbulence and, effectively, increase the air-water interface.

It goes without saying that the smaller your pool, the greater attention you must pay to this basic need of your Koi. But they are not the only creatures in the pool that rely on oxygen to function properly. The billions of aerobic filter bacteria, too, require the gas to break down nitrogenous waste.

For this reason, it pays to introduce oxygen into the filter beds, particularly in warm weather, for the higher the water temperature, the less dissolved oxygen it is capable of holding. A large airpump, housed in a waterproof chamber and bubbling air into the void beneath the media support plate of any filter will substantially increase its efficiency.

Another way to help your fish through muggy nights is to incorporate some form of island in the pool, but not centrally. That way, assuming the water is circulating properly, there will be narrow channels where the current is relatively rapid. All fish like to 'hold' in a current when the weather is hot.

Cosmetic Maintenance

Obviously, at the heart of maintaining any pool, for Koi or other coldwater fish, is the running of an efficient filter. Filtration will be discussed in detail next month.

wonderfully scientific nutritional formula that says "what goes in, must come out."

A surface skimmer is an inexpensive way of ridding the vital air-water interface of filmy grime. It usually feeds into the settlement or brush chamber of a gravity-fed filter. Suspended solids will eventually be drawn into the filter chamber where they will be taken out of circulation by the media (foam, matting, brushes) or a settlement process, either gravity or vortex.

But it goes without saying that if you are to have clear water, there must be a good turnover of pond volume. Solids that sink to

they will break up apparently solid faecal matter and put it back into suspension.

So, in the labour-saving pond which we seek, the logical combination of solid waste removal would be threefold: surface (skimmer), midwater (filter feed to settlement) and pool base (bottom drain). Not all ponds are blessed with bottom drains, however, and then the option is to use a vacuum.

There are good ones, bad ones and terrible ones: clogged strainer pots and flooded flowerbeds are a feature of the worst, whereas at the top end of the scale are vacuum units which team with the more sophisticated external pumps that power your filter.

Obviously, if you can't reach the whole of your pond base at full stretch with a vacuuming device, you should have installed bottom drains, or contented yourself with a smaller pond!

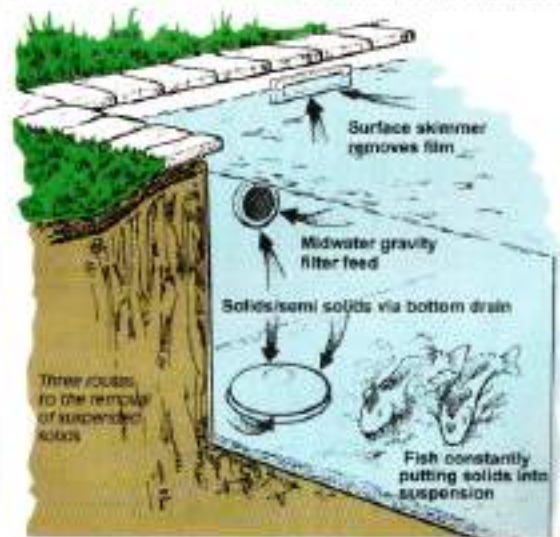
Clear water

Not all clear water is good water: not all murky water is bad water. Koi, given the choice, would most around all day in a mud-bottomed pond.

However, a murky pond is one where the fish aren't always visible, and so what's the point? Ninety nine per cent of clarity shortfalls are down, not to suspended solids, not to bacterial problems (when the water takes on a milky hue, by which time, hey, are your fish in trouble...) but to single celled algae - so-called 'pea soup'.

The remedy is absolutely simple, harmless and inexpensive: fit a UV! You will benefit in being able to see your fish, and they will benefit: a) Because you can now spot any incipient disease problems or unusual behaviour leading up to trouble b) Because you will no longer be torturing them with chemical green-water treatments that ruin water quality, or huge partial water changes which do the same thing, and encourage still more lurid algal blooms.

To be effective, a UV unit needs to be of sufficient wattage for your pond gallonage; needs correct contact time between water and lamp chamber; and needs to be backed up by a filtration system capable of taking out the flocculated (clumped) particles of algae. ■



Bottom Drains

If your pond has a bottom drain, don't expect it to perform miracles - it can draw water from only a limited circumference, generally held to be around six feet around the exit pipe.

Also remember that each drain should have its own pipe, to waste or to siltament; in a shared pipe, pulling power is reduced by half. Bottom drains can be made more efficient in two ways: installing a 'mushroom cover' ensures that water is drawn in horizontally from the pond bottom, rather than in a vertical, downward column. And contouring the pond base, so that the lowest point is at the bottom drain, will help, too - though only if the base is smooth. Any irregularities (for instance, a crease in liner material) will act as a silt trap.

However, while a biological filter takes care of toxic (and invisible) waste products, there will always be a certain amount of gunk that is produced in, or finds its way into, the pool.

In industrial areas, it might be dust or soot that settles on the surface; then there are leaves and twigs that blow in, snails and unpalatable insects that fall in; plant debris; not to mention the obvious results of that

the bottom are dealt with in two ways: they either exit via a bottom drain (continuously, as filter feed, or periodically, in the purge mode) or are removed with some sort of vacuuming device.

In the matter of solids, the term 'suspended' is a little misleading. In a totally still body of water (which a pond is not), then everything in suspension will eventually settle. Equally, when fish are rooting around,

Practical Pond

Right: Chinese Black Koi - in China, white fish are not popular, for white is the colour of death!
Below: Large goldfish are very popular, especially on the Continent.



Practical pondsman NICK FLETCHER goes out and about again, as he continues his spring look at the trends in the pondkeeping hobby.

Koi on



On arrival, the fish go into this polytunnel for their acclimatisation period, and any necessary medication.

The coldwater hobby is booming. Recession? What recession? Tell them about it in Britain or, for that matter, Germany, where five years ago there were just one million garden ponds. By 1995, that figure is set to rise to nearly six million.

Whatever the economic policy differences within the EEC, there are clearly no divisions within the ranks when it comes to a love of Koi and fancy goldfish.

But who will serve this ever-

expanding market? Clearly not the Japanese alone, whose fish-farmers are still geared very much to quality, rather than quantity. Only five per cent of Koi produced in that country are shipped abroad, the rest finding eager home buyers (it's a myth that Koi-keeping is limited by lack of living space and high-priced land except, perhaps, in Tokyo itself!).

A Niigata Prefecture hill-farmer is still locked into an almost Medieval ethic, whereby from perhaps half a million fry, and after meticulous culling, he will sell only one per cent. The unit price is high, and it has to be.

What fish do find their way out

of the country (increasingly, via European dealers who travel over personally to select their own) have their price further inflated by air-freight charges - and by the nature of the journey, do not always arrive at their destination in peak condition.

Lift up our eyes to Israel?

So, do we have to look to Israel as the spring that feeds the ever-rising tide of demand for reasonably-priced, healthy Koi and goldfish? There, until a few years ago, there was just the reverse of the situation in Japan...virtually no culling took place, and in the Jordan valley, where temperatures remain high year-round, the fish were a reliable cash-crop, on a par with citrus fruit.

You could have an eight-inch, marketable Koi in no time at all, but its pedigree was non-existent, giving rise to a justifiable reluctance by anyone with pretensions to knowing anything about fish to give these "mongrels" swimming space.

Among those instrumental in changing the public image of Israeli Koi have been Adrian Barnes and Martin Symonds. Their company not only has fish farms here in England and in Israel, but holding facilities in Japan, Hong Kong and Europe. They are red-hot on quality control, the word "fragile", so

often ignored when applied to fish by unscrupulous consolidators, being fully recognised in their acclimatisation, quarantining and distribution policies.

Adrian Barnes has been involved in aquaculture for the past 15 years, but not always with fish. He began with a team from the Hebrew University of Jerusalem, developing hatchery pond production and post-harvest technology for freshwater prawns. Then he became manager and consultant to many

countries in Asia, Africa and Europe, advising on fish-farming.

For the past eight years, he has been refining a family-run fish-farm producing ornamental coldwater fish of all types, but specialising in Koi, in Israel.

In 1989, fish production was moved to Kfar Ruppin and expanded dramatically, but Adrian is no "assembly-line" manager. All the Koi from Israel are now first-generation fish from Japanese broodstock, and some of the varieties now coming

out of the Middle East are approaching their Japanese-bred counterparts in quality - notably self-coloured fish such as Ogoni, but increasingly Showni, Asagi and Showa, too.

■ The crunch came when a 30-inch Israeli Doitsu Ogon was judged - by Japanese - best in its class at a show in Stafford. When the origin of the fish was discovered, there was some hasty backtracking, but the point had been well made.



This is wholesaling on a grand scale.

demand?

Something different for your pond?

Looking for something "different" in the way of pondfish this year? Two species caught my eye, not for their vibrant colours, but for their curiously value.

Both, I am told, are fully hardy in outdoor pools and create no special problems in terms of feeding or compatibility with other pond inmates. Black Koi from Hong Kong are not to be confused with Nagoi (the dark wild carp from which the Japanese developed all

Koi varieties), nor with Karasugoi.

The latter are shown in the Kawarimono class, and both the all-black fish ("Black Crow") and those with white on fins or body are highly-prized and highly priced.

Black Koi from the Colony are fully-scaled, ebony-hued fish when viewed from above, but turn them over and their bellies are red, not the white that is the mark of a good Karasugoi. And their shape gives them away, too

- they are not the classic Japanese torpedoes, so much as rotund little chaps which would outdo a mirror carp in the portly stakes.

Nevertheless, they are said to breed true, unlike their Japanese Doppelgangers, and they are almost as inexpensive as comparably-sized goldfish. Twin Mill also sells a variant called 'red diamond', in which the underlying bolly colour shows through on the flanks.

Back in the U.K.

What of the UK end of operations? This had its origins in the 1970s when, to satisfy the demands for fish to stock into the Symonds family's angling waters in Norfolk and elsewhere, a commercial carp farm was set up in Essex.

In 1980, another farm was established in Norfolk, this one expanding into the breeding and rearing of ornamental, as well as native, fish. It is still producing fish for Poles.

But the ball really started rolling in 1984, with the building of Twin Mill in Hertfordshire. Aside from being a fish-farm, this is also a progressive water garden centre with extensive stocks of both tropical and coldwater fish, plants and all accessories for the hobby indoors and out.

Since I was last there, the wholesale side of the business has expanded out of recognition,

with separate holding sheds for Koi and goldfish and all the facilities for receiving worldwide shipments, quarantining and disease-checking, and then sending the fish off to customers here and abroad.

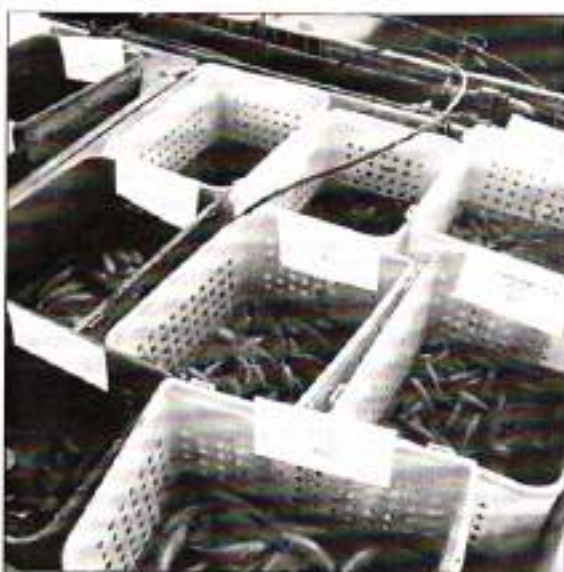
Containers and quarantine

Martin Symonds was proud to tell me that containerisation now plays a big part in operations, and there to prove it were stacks of the brightly-coloured units. Between January and October, between 60 and 80 containers arrive at Tewin. Koi from Israel will have been starved for up to two days to reduce waste-production in transit, graded according to size, variety and quality, bagged and then cooled down to 52°F over a 72 hour period.

This slows down their metabolism and reduces the "culture shock" of life in a warm climate, changing to a chillier daily routine in a typical British summer...

Each container will hold, depending on the size of individual fish between 40 and 5,000 fish. Once through customs, the fish arrive by the lorryload at Tewin where they are released from their bags and still in their containers, which serve as hygienic temporary accommodation rest for 24 to 48 hours inside a polytunnel.

Each tunnel has a series of filtered compartments lined with a removable net and, once inside these, the fish are given twice-weekly health checks by Adrian Barnes, who holds an M.Sc. in marine Ecology along with his extensive practical knowledge of freshwater fish-culture.



Levisham or Lago? These fish are ready for despatch.

Once the fish have the all-clear, they will be transferred into their transit tanks - in the case of the Koi this means a building housing up to one million fish, housed in adapted free-standing swimming pools, each with its own bottom drain and each circulating spring water passing through a 100-ton filter bed.

■ The other holding building has even more of an international feel to it. Awaiting shipment are likely to be goldfish from Israel and China, and British home-bred Orfe, Tench, Rudd and carp.

Israeli goldfish (like a certain brand of lager) are, according to Martin Symonds, "probably the best in the world" in terms of health and quality, especially the Sarayas, although also in mass production over there are

Red Comets, Blue Shubunkins and Oranda Fantails.

For the more esoteric varieties - Lionheads, Telescopes, Pearlscales and Bubble-eyes - China is still ahead in the race. The fish come in with production-line efficiency, and go out in just the same manner.

Where do they go?

Daily orders can be destined for just up the road in London, or as far afield as Nigeria. Each batch of fish is sorted into a slat-sided plastic basket, through which water can circulate until it's time for despatch.

Then, in a process that can't but remind one of the way apples leave the orchard, the fish are bagged and travel along a roller-conveyor whose one operator can administer precise quantities of water and oxygen, pack the bags into cardboard crates and from there (in the case of the distance-travellers) into containers bound for London Airport.

Mass-market stuff it may be, but what strikes me about the setup at Tewin is the care given to every single fish, whether it's a two-inch Shubunkin or a 26-inch Japanese Koi with a £500 wholesale price tag.

(Perhaps it's that Martin Symonds is a keen angler as well as a producer of pondfish: he still lets fishing in Norfolk, but only to members of the Carp Society, which ensures that no

Caviar comes from the virgin Sturgeon...

The Beluga sturgeon, whose roe appears on the tables of the rich, and whose alleged virginity was the inspiration of a well-known foggy ditty, is now a protected and endangered species.

But this family of primitive fish has several branches, one of which, the Sterlet, grows to a manageable three feet and is becoming popular with pondkeepers.

Sterlets are farm-bred in France and Czechoslovakia, primarily for restocking into the Black Sea, where they are still a catch crop. But they are also finding their way into the ornamental fish trade. Each adult fish, when stripped, can yield up to 20 million eggs (that's a lot of caviar).

The fry survival-rate is a mere 0.01 per cent, but once past the critical stage, these fish are quite hardy.

They need live food but will also take pellets (these need to be small, as the Sterlet has a tiny mouth situated well back from its prominent snout).

To take floating food, the fish turns on its back, which adds to its overall shock-like impression. But these are peaceful beasts which, I am told, will quickly become hard-core.

They are as fussy as Koi over water-quality, however, and water temperature must not rise above 35 deg C. Also, make sure your pond does not harbour too much bottom blanketweed, for Sterlets are prone to rooting around and may otherwise snag themselves up.

mistreatment takes place of those prized carp).

Martin and Adrian are also directors of OFI, and one of the aims of this watchdog body is to improve, generally, wholesale fish-retailing standards, here and abroad.

Random checks by men from the Ministry are to be feared only by the 30 per cent (Martin's estimate) that don't come up to scratch. But as far as Pisces Aquaculture Tewin Ltd are concerned, their fish-house is in apple-pie order. ■

Practical Fishkeeping/May 1992

Cool in the pool

Af Tewin Mill's Koi are housed in European-made portable swimming pools... but it's not only dealers who may find such things useful. This one-point household corner under the pool if disease breaks out and fish have to be isolated for medication, when broods of fry need to be kept away from adults, or if fish are bought at the "wrong" time of year and need to be over-wintered under cover.

Great pools have zinc-coated metal frames with polyester feet and aluminium accessories. With no rust or bolts to worry about, they can be assembled in an hour or ten minutes. The liner is reinforced, puncture-proof, plastic coated and resistant to ultraviolet degradation.

These pools come in capacities from 1,150 litres up to 100,000 litres, in square, square or circular shapes, even hexagons, octagons and semi-circular sections (though the latter are pricier, the most practical shape is the hexagon). Prices start at around £120 (details from Tewin Mill on 0423 877 8228). Oh, yes - you could always swim in them, too.

Star ratings

Don't bother	*
Barely acceptable	**
Average/adequate	***
Good	****
Very good	*****



Voluminous volumes

Fish Diseases by Wilhelm Süßgen, published in two volumes by A.A. Balkema, at £92.

This is the fifth updated, revised and enlarged version of this work, which is not for the fishkeeper who likes everything neatly spelt out for them. An extremely academic book of very wide scope, it encompasses the work of many Ostery experts from Germany. A very technical work, the price reflects both the costs of delivery from its Dutch publishers, and the fact that it is a serious work for the badly committed fishkeeper. SW

• Copies are available from A.A. Balkema Publishers, PO Box 1675, 3000 BR Rotterdam, Netherlands at £92, payable by English cheque, Eurocheque in Dutch currency, UK bank draft, or most major credit cards quoting card number and expiry date.

Star rating

Readability	**
Information	*****
Illustration	**
Price	**

WHAT'S



The new Interpet pond range.

Interpet's greener ponds

Interpet have recently relaunching their range of pond treatments and brought out a range of new products, some of which could be termed "greener" as they're harmless to aquatic wildlife. The range covers most eventualities, from new ponds to sludge and includes a couple of treatments especially aimed at Kod.

All the bottles feature a special dosing chamber, which makes correct treatment less difficult.

For new ponds there's **Fresh Start** to eliminate chlorine and introduce protective colloids. It's also recommended for use when

topping up the pond or carrying out water changes. It's priced at £3.95 for 250ml, which treats 2,250 litres. Larger sizes of 1 litre and 4 litres are available. It won't harm aquatic wildlife.

You can keep an eye on your water quality with the **Pond Check Tablet Test Kit**. Priced at £5.86, the kit tests both pH and Nitrite and contains enough tablets to last you the season. Separate refills are available for the pH and the nitrite, priced at £2.75 and £3.11 respectively. If your pH isn't as it should be, you may need a **pH Adjuster for Ponds**. There are two types, one for acid ponds

and the other for alkaline. They're priced at £3.95 each.

To protect fish from raised ammonia and nitrite levels when adding new stock, Interpet also produce **Pond Guardian Tonic Salt** priced at £4.23 for a 2.27kg bag. **Pure Pond** is a disinfectant and general tonic which is available in 250ml, 1 litre and 4 litre sizes. It costs £3.95 for the smallest size which treats 2,250 litres.

If you're having problems with disease, there's a wide range of treatments. **Anti-Fungus and Bacteria** and **Anti-Parasite** are available in three sizes: 250ml, 1 litre and 4 litres. The 250ml size costs £3.95 and treats 2,250 litres. Interpet have recently launched two new treatments. **Anti-Ulcer** can be used on the fish while they're still in the pond. It comes in either 250ml or 1 litre bottles. The smallest size is priced at £6.49 and treats 2,250 litres. **Anti-Parasite 3L** acts against fish lice, leeches, anchor worm and gill maggots. It's also available in 250ml or 1 litre sizes and costs £6.00 for 250ml. Both **Anti-Fungus and Bacteria** and **Anti-Parasite 3L** are harmless to aquatic wildlife.

...REVIEW UPDATES...

Pearlco Vivaria heater

March's review of the new Pearlco Vivaria-75 calls for further comment.

Pearlco's sample was in fact a prototype and therefore not finished to their normal factory quality.

Pearlco are also anxious to point out that all such units require thermostatic control not just the Pearlco unit.

Nor is an additional light (as a radiant heat source) necessary as the unit is designed as an "overhead" radiant heater which is itself designed to give a radiant field for animals to "bask" in as well as provide sufficient convected heat for intake

enclosure heating with an economical 75 watt rating.

The estimated price that Pearlco gave us for this unit was £56; but vivarium owners will be pleased to hear that many retailers are selling the unit below the indicated price.

Algae Buster 2 U/V

The prices for Algae Buster 1 units were given in last month's review of the new U/Vs from Aegason International Trading Co. Ltd.

The correct prices for the **Algae Buster 2** units are 8 watt £63.72; 15 watt £111.62; and 30 watt £155.02.

NEW?

The latest fishkeeping equipment and books reviewed by Editor STEVE WINDSOR and Staff Writer KAREN YOUNGS.

If your pond contains only Koi, you might like to use one of the special Koi treatments, such as **Koi Anti Parasite F5** or **Koi Anti Fungus and Bacteria**. Both of these are available in 250ml, 1 litre and 4 litre sizes. The 250ml size is priced at £4.44 and treats 2,250 litres. These treatments must not be used with fish other than Koi.

For clearer ponds there's **Green Away**, to deal with algae and **Clear Pond** to clear cloudy water and aid filtration. Both these cost £3.95 for 250ml which, in the case of Green Away, will treat 11,350 litres and 5,675 litres for Clear Pond. Neither of these products will harm aquatic wildlife. **Pond Trizyme** comes in easy to use sachets and has been formulated to control toxic waste and sludge. £6.21 will buy you ten sachets which treat 9,000 litres. If you're plagued by Blanketweed, you might like to try **Pond Balance** which won't harm any of the other plants or wildlife. It comes in granulated form with a special dosing spoon and costs £4.94 to treat 6,825 litres. Larger sizes are available.



Pond Guardian Tonic Salt

To give your pond plants a boost, Interpet also market a plant food. **Flora-Boost** is nitrate free and should not encourage excessive algae growth. It comes in 250ml, 1 litre and 4 litre sizes, with the 250ml which treats 2,250 litres, costing £3.95. **KY**

Star rating

Quality	★★★★
Practicality	★★★★★
Price	★★★★

Practical Fishkeeping/May 1992

PRODUCT NEWS

No3 FREE?

The tapwater filter people, **Purity on Tap**, have introduced a new nitrate removal filter to the market which offers continued removal of chlorine, pesticides, herbicides and other nasties plus nitrate in one package.

It has a calculated life of 1500 litres at 1.5l per minute. First tests suggest that it can be used safely to change 5 gallons a week for six months, will remove 20ppm nitrate and does not dump previously collected nitrate.

All such units must be flushed before reuse - and the first few gallons be discarded on first use. Optional additional pods are available to remove heavy metals and bacteria.

The units are priced at £55 for the basic pod; £119.50 with bacteria removal pod; £185.50 with bacteria removal and heavy metal removal pods.

New NO3 cartridge £20.50; ceramic candle for bacteria £16; nitrate cartridge PX1 £44 (12 months maximum life).

Units are available from **Purity on Tap**, Wickfield Farmhouse, Shefford Woodlands, Newbury, Berkshire RG16 7AL and from **Top-Up Aquatics**.

Aquarian apologise

From Graeme Butt, Marketing Project Manager, 'Aquarian'

'The 'Aquarian' brand owes Ken Hunter an apology. In our recent advertisement for 'Aquarian' featuring top aquarists we gave the impression that Rob Kirkup won 'Best in Show' at last year's Scottish Aquarist Festival.

In fact Rob won in 1990 and last year's winner was Ken Hunter from Workington.

It was to some extent an understandable mistake given the outstanding success Rob Kirkup achieved in 1991 when, among other awards, he won 'Best in Show' at the British Aquarist Festival and the Association of Aquarists Superbowl.

'On behalf of 'Aquarian' I have already apologised to Ken for any embarrassment caused, and I feel we owe your readers an apology as well. We have always been careful to apply the highest standards to testimonial advertising.

'All fishkeepers who appear in 'Aquarian' advertising agree in writing for their photograph to be used and confirm their recommendation of 'Aquarian'.

'I think it is important that you and your readers should be able to trust advertisements from major manufacturers. Thank you for the opportunity to put the record straight.'

In-car aeration

There are one or two battery air pumps already on the market, but Rena have gone one step further with their new Air Walker. In addition to being battery-powered, it has an attachment hidden inside, which enables you to plug it into the cigarette lighter of your car. The question is, hasn't anyone thought of this before?

The pump has an output of 70 litres/hour when run off the car battery and 40 litres/hour using two R20 batteries. A green

indicator light tells you when the batteries need charging (normally after around 50 hours).

The Air Walker clips onto a bucket at the side of a tank and crosses with 20" air line and an air stone. The air line could do with being a bit longer, but you can always swap it for a longer piece of your own. **KY**

The Rena Air Walker costs £24.95. For further details contact Rena (UK) Ltd, The Bury Farm, Polton Road, Cheston, Bucks, Tel: 0494 786759.



Springflo sweet chariot

Launch your **Spires Aquater** media - an unlikely style of media resembling nothing more than that rough packing tape, used among other things to pack bundles of magazines.

Surprisingly for so simple-seeming an idea, Springflo has won instant acclaim and has been remodelled and relaunched.

Originally only available in large quantities it now comes in smaller sizes. What is in fact standard parceling wrapping is coated with 30% calcium carbonate which makes the tape sink, before being very heavily embossed to increase the surface area for bacteria by over 50%. The resultant media is ideal for biological and fine settlement stages, impossible to clog and easy to clean.

The material is now green. As it's very springy it positively explodes when unrolled from the reel. It's impossible to re-pack but easy to stuff into your filter!

We tested this media last year and it's still going strong in our correspondent's filter. **SW**
 Price £19.99 for 16.5 square metres; £9.99 for 5.5. More details on 0527 821601.



Star rating

Quality	★★★★
Practicality	★★★★★
Value for money	★★★

PRACTICAL Fishkeeping COMPETITION

TOP-UP AQUATICS

WIN AN MIRACLE ACRYLIC AQUARIUM FROM TOP-UP AQUATICS

This month there is a state of the art 2' x 16" x 16" *Amiracle Acrylic Aquarium* complete with canopy worth £450 to be won from *Top-Up Aquatics*.

This good-looking new series of acrylic tanks are virtually indestructable, stronger and lighter than glass, with no joints, and do not require a polystyrene underbase.

The tanks come with their own integral internal trickle filter system with no syphon tubes or skimmer boxes.

Ideal for marine, tropical and coldwater fishkeeping, they are available in 24", 36" 48" and 68" sizes.

■ This month's competition begins on *April 29* 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 *Amiracle Acrylic Aquarium* from *Top-Up Aquatics*.

■ 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 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 *May 14*. The first name drawn will win the tank.

QUESTIONS

1. Which new hobbies are now catered for by *Top-Up*?

- a) Herpetology
- b) Arachnology
- c) Both a&b

2. Is herpetology the study of

- a. fish?
- b. reptiles?
- c. spiders?

3. Is arachnology the study of

- a. reptiles?
- b. birds?
- c. spiders and scorpions?

■ For more information to help you answer these questions see the *Top-Up* advertisement on page 124 to 129

• DIAL 0891 600 067 •

Coldwater *Answers*

■ Natural diet

The Golden Oris in my pond will only eat worms which I wash and clean out. I am unsure what type of food to give them, as they won't touch the pellets I give the rest of my fish. They look healthy. Can you advise?
D. Jenkins, Kent

In the wild, Oris feed on adult insects, larvae and bottom-dwelling invertebrates. By nature they tend to be rather nervous and therefore far less likely to come to the surface to feed on floating pellets or foodstuffs. No doubt your Oris will supplement their diet with the insects and other invertebrates through the spring and summer months. **BB**

■ Time for alterations

I am entering my Koi pool, so could you please advise me on which is the right time of year to do so? I have a holding tank which is 5' x 3' to put my twelve fish in. Where would be the best place to site it?
E. M. Serby, Leeds

It is very difficult to suggest the right time of year for pond alterations. Late winter and early spring can be a good time as the fish are still fairly inactive, but the water in a 5' x 3' holding tank will be subject to quite rapid temperature fluctuations. A sunny spring day can cause the water temperature to rise several degrees, but such days may be accompanied by cold, even frosty nights, causing the temperature to plummet - and this is not good for fish health. Place your holding tank in a garage, if possible, to protect the fish from fluctuations in temperature.

It is possible to undertake the work in the summer, but the fish are much more active and produce more waste. Monitor the water daily for ammonia and nitrite.

If the holding tank is to be situated outside, it should be in the shade to protect the fish from excess sunlight and to help reduce the heating of the water directly by the sun.

Fish which are transferred from a pond to a holding tank may well try to jump out, so I would suggest to make some kind of temporary cover. It should not be a light.

The filter should be connected to the holding tank to prevent the water from becoming polluted. You will need to add an airtight cover on hot days. **BB**

Do I have too many plants?

Q Please could you tell me whether my goldfish is likely to regenerate the top portion of its tail, which was bitten off in a fight? It healed with no infection.

My pond is 10' x 8' and holds 10 goldfish. It's full of oxygenating plants, including masses of watercress. Nitrate is a terrible problem here, but I find that the plants eliminate much of it from the pond. Will the plants harm my fish at night?

I am also unsure about treating my pond. I use Aquafloxin in the spring and autumn when the water reaches 50°F in temperature. My fish have no visible infections.
J. M. Field, Lincoln

A Fish have remarkable abilities to recover from quite horrific injuries or wounds. Certainly the top portion of the tail of your goldfish will eventually grow back, but this could take several years, depending on the extent of its injury.

The prophylactic treatment of a pond in the spring and autumn is



Oxygenating plants are fine for removing nitrate, but they can cause problems during summer nights when they will compete with the fish for oxygen.

very much one of personal preference. I very much believe in leaving the fish alone unless there is an obvious problem.

The only comment I would make with respect to your pond is to watch the dissolved oxygen level in the summer months. As the temperature increases, the solubility of oxygen into water decreases. This is further compounded by the

presence of plant life, including so-called "oxygenating plants". During the hours of daylight, all plants will release oxygen into the surrounding water, but at night they actively compete with your fish for available oxygen. As fish grow bigger, their demand for oxygen also increases. A classic symptom of an oxygen-starved pond is the overnight death of the largest fish. **BB**



Goldfish don't necessarily take on their familiar colour for several years.

Colour takes time to develop...

Q I have been keeping goldfish for the last three years. Last year I managed to breed them. However, the goldfish have not changed colour, but stayed grey. Is there a reason for this or is it normal?
P. Moore, York

A It's quite common for young goldfish to be black in colour. Sometimes, as the pond warms up through the summer months, they will begin to turn the familiar gold colour. Alternatively, it may take several years. **BB**

Minimum depth for Koi

Q Please could you give me some information on setting up a Koi pond which will be 14' x 7' x 4' deep? Can you tell me whether this will be large enough and deep enough?
D. A. Wotton, Coventry

A The most important starting point with a pond is to make drawings of the prospective pond and filtration system. It is also a good idea to talk to your local Koi dealer who should have a great deal of experience in the construction of Koi ponds and will be able to give you some advice if you get into any difficulties.

The dimensions of your pond are both large and deep enough for keeping Koi, but make sure the depth is not less than four feet. You may find it a worthwhile exercise to contact a number of manufacturers of pond liner materials, asking for the technical data on their product and from this select the material that you think will give the best value.

It is very important to include a filtration system with the pond and this should be roughly one-third again the surface area of the pond. Ultimately, the size of the filter is dependent on the stocking density, but the fish will increase in size and as they do so, it will place a greater demand on the filtration system.



A good Koi pool should be no less than four feet in depth, with a filter system one third the surface area of the pond.

Gravel is a risk

Q My pond is two feet deep and holds 750 gallons of water. It has a layer of washed gravel in the bottom and five baskets with a water lily in each.

I installed an internal Oase pump/filter when I built the pond and it has run continuously since.

During the summer the water went very green, although it cleared last November. I would like to know if a UV filter would keep the water clear.

The pond is stocked with a

mixture of Orfe, goldfish and Koi.
 • R. Dawkins, Southampton

A If I understand your letter correctly, you have covered the bottom of your pond with a layer of washed gravel, but not incorporated it into any form of filtration. This is inadvisable for several reasons. It is liable to puncture the lining when the time comes to spring-clean and far from helping water quality, it will harbour anaerobic bacteria as it compacts down. Gravel is only of

use when water is circulating through it to encourage the growth of aerobic (nitrifying) bacteria.

The Oase TSE/P6 is an admirable, no-loss internal filter and the pump is first rate. But even the fine granular media contained in the filter body will not intercept single-celled algae. So yes, a UV is your answer, but it cannot be easily teamed with the Oase, unless you extend the outlet pipe into a separate box-filter. But then you would be losing the beneficial turbulence created by the pump. **NP**



Wildlife ponds will attract amphibians, such as frogs and newts. Pic. shows a Crested Newt, by Michael Edwards.

Fish and wildlife ponds

Q At present I have a 13' x 7' pond on a sloping site, with goldfish in it. I have space on the higher part where I wish to put a wildlife pond with a waterfall from this new pond flowing into the one containing the goldfish.

I understand it's not advisable to put fish in a wildlife pond, but would minnows be alright, just to provide a bit more activity?

• M. Heron, Devon

A I am all for wildlife ponds, but what you're proposing is not ideal, because it will link with a pool containing goldfish and water will circulate between the two.

If you are going to have a wildlife pond, it should be on low ground, shallow, heavily-planted and unfiltered - just about the reverse of the requirements for successful fishkeeping. The object is to encourage mainly invertebrates, along with amphibians, to colonise it naturally. If you go ahead as planned, at best you will have a trickle-fed

supply of live food finding its way down the pipe waterfall into the lower fishpond and at worst, you could end up with larger invertebrate larvae, like dragonflies and water beetles, reaching a size where they would be of danger to those soft-shelled fish, as and when they migrated from one pond to the other.

Minnows may be smaller than goldfish or orfe, but they are voracious

consumers of live food. If you had even a couple in your top pond, you could wave goodbye to daphnia, hydra, cyclops, nymphs and the rest.

At least, with a filter installed between the top and bottom ponds, invert life would have an intermediate haven and fly-larvae and crustaceans actually contribute to the efficiency of biological filtration into the bargain. **NP**

Why are my fish so thin?

Q I recently bought several Japanese Koi which I am keeping indoors temporarily. Two of them are very thin and are holding their dorsal fins close to their bodies. The tail fins have a thin white edge and are rotting away. The other fish seem to be fine. Can you help?

• M. McDonald

A Poor water quality can cause fin rot. It might be worth checking yours with an ammonia and nitrite test kit.

There are a number of possible causes of emaciated fish. Small fish may have tapeworms in the gut and in large numbers they can effectively cause the fish to starve. Such fish can also be prone to other parasitic infections such as *Costia* or *Trichodin*. Infection by bacteria causing tuberculosis can also cause the fish to become progressively thinner. If the cause is such an infection, the disease can be transmitted to other fish in the tank if they feed on an infected fish. Lastly, over-treatment could induce the symptoms you describe. **HR**

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

■ Taking care of your general coldwater queries we have our regular expert, **DR DAVID FORD**, Senior Consultant to the 'Aquarian' Advisory Service

■ Koi and pond enquiries go to **NICK FLETCHER** or **BERNICE BREWSTER**.

Just tick the appropriate box below and attach the coupon to the front of your letter.

Send with SAE to: **Coldwater Answers, Practical Fishkeeping, Bretton Court, Bretton, Peterborough, PE3 8DZ.**

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

COLDWATER ANSWERS

General queries;
Dr David Ford

Koi or pond queries;
Nick Fletcher
 or **Bernice Brewster**

DIARY DATES

FRIDAY, MAY 1

■ The North West Cichlid Group are having a meeting, featuring a talk on Central American Cichlids with Graham Ash. The venue will be The British Legion Club, Liverpool Road, Shakerdown, Livers, at 8pm. Contact Brian Wilson on 8695 21486 or Ken Hillon on 8565 433138.

SUNDAY, MAY 2

■ King's Lynn Aquarist Society are holding an open show at Tansley Market Place, King's Lynn, Norfolk. Running from 10am-12.30pm. Contact Bob Usher on 8553 74932 or Mike Lamb on 0853 787473.

■ Swanton Aquarist Society are holding their 10th open show at Upper Shear Community Centre, Sheering from 10am-12pm. Schedule available from Kevin Curtis on 0793 728194 or Chris Lawrence on 0793 814026.

■ The Stafford Aquatic Society is holding an open show at The National Gardening Wholesaler Company's Garden & Social Club, Denny Road, Stafford. Contact Larry Laidlaw on 0795 84486.

SUNDAY, MAY 10

■ Scottish Section BKCS is holding a meeting at Bunkidol, nr Perth. Contact Alan Christie on 0758 83476.

■ Aberdeen Aquarist Society are holding their open show at the Abercrombie Rugby Club, Abercrombie, nr Aberdeen. Contact either Mr. B. Ross on 0885 877119 or Mr. A. Jones on 0885 878672.

SUNDAY, MAY 17

■ Gateshead Aquarist Society is holding an Open Show at Gateshead Leisure Centre, Alexandra Road, Gateshead. Booking is 11am. Judging starts 1pm. There will be an auction. For further details, contact Mr. Hancock, 891 2724220.

MONDAY, MAY 18

■ Roggan and Robb's Aquarist Society is having a bring and buy sale at Strayton Hall, Albert Road, Melling, Surrey. Doors open at 7.30pm. Sale starts 8pm. Contact Jeremy Agnew 0201 812851.

TUESDAY, MAY 19

■ South Park Aquatic (Study) Society meeting 8pm, with a talk on Shubunkins, by Bill Leach at Westminster Community Centre, 28, St. George's Road, Whitehead, SW79. Contact Larry Brown 8932 86261.

THURSDAY, MAY 21

■ Texas Talking Fish arrives at the Open University, Milton Keynes. The subject will be "Maintaining a Perfect Pond". Tickets £5 in advance from: Terry, Lumber Court, Chestnut Avenue, Ewelham, Bucks. SN6 3JQ.

SUNDAY, MAY 24

■ Bridlington and District Aquarist Society is holding its annual open show at Hildborough Junior School, Staflathery Road, Bridlington. Running 12 noon - 1.45pm. Judging 2pm. Contact Mick Jordan on 0142 074189.

■ Paisley and District Aquarist Society will be holding their open show at the Victoria, 8th Street, Paisley. Running from 10am - 1pm. Judging 12.30pm. There will also be an auction. Contact George Andrews on 8328668 2859.

SUNDAY, MAY 24

■ Scottish Tweedwater Society hold their open show at the EMCA B&B, North Street, Glasgow, G16. Contact Andrew Muir on 8592 754628.

■ The Peterborough and Cambridgeshire Section BKCS has its annual fun show at Bretton Wood School, Peterborough. From 10am-5pm. There will also be a craft fair. For further details call Barry Adams on 8733 36200.



Killing kindness?

We frequently help you to breed your fish in this magazine, with articles that embrace the simplest one-tank project through to the fully fledged fishhouse. Many fish are easy to breed, and many of the more difficult ones like, say, Discus or Uaru, or even some of the marine fish, are being regularly bred by amateurs.

Your fish spawn, and by lavishing the right attention on them, you come up with a brood of 50, 100, perhaps 500 or more half inch fry, each one seemingly perfect. But they're not of course.

In the past I've pointed up the problems of in-breeding which are always likely to strike. Even if you've bred from wild caught fish, nature isn't perfect. The very reason that the vast brood is produced is to allow for those though aren't up to par, that fall by the wayside, are predated, lost or diseased. Only the fittest are intended to reach breeding age in the wild, and the losses are high. I've just picked up a popular book on breeding tropical fish from our shelves and tried to find some mention of culling. There's none. I went to an ever-useful dictionary of aquatic lore, but still found no mention.

In the near future I hope to publish an article on the ins and outs of humane culling so I won't go into detail on the various methods. What I am concerned with here is the whole argument of to breed or not to breed.

It goes something like this.
PRO: Breeding fish expands the interest of the hobby and is extremely satisfying.
AGAINST: Breeding fish gives the fishkeeper the chance to play God.
PRO: It's important to breed fish in this country to preserve wild stocks.
AGAINST: Maybe - but why are you breeding those firstly- available Danies that come in by the thousands from Singapore?

PRO: I breed fish to offset the cost of the hobby.
AGAINST: Oh yes? And who will buy those Danies at

The Editor says

anything like a sensible price?

PRO: I give a lot of my best fish away to friends.

AGAINST: So you only sell the weak stock?

PRO: No, I use the best brood stock, then cull my fry to leave only the best.

AGAINST: How do you feel about killing all those little fish...

The fact is that the breeder has every right to breed his fish, and is likely, in the end, to only do the image of the hobby good if it becomes more and more self-supporting in fish.

But in many ways while he's doing this he has duties to himself and fishkeeping.

■ Not to produce odd hybrids and let them out into the hobby where they do more harm than good.

■ Only to breed fish that there is likely to be a demand for (finding out how the local shop feels about buying it) - though of course we must all learn on "easy" fish first.

■ To join clubs and build contacts with other breeders.

■ Only to retain the best and

healthiest of his stock even if it's only for his own use.

■ To avoid in-breeding in his stock.

■ To cull quickly, wisely and humanely.

To sum up, my feeling is that breeding fish is a pleasure and a responsibility, one not to be taken lightly. But what's your opinion?

Fishkeeping Answers and our new date

First reports suggests that PFK's new baby *Fishkeeping Answers* is already the second best-selling fishkeeping magazine in the UK, and I'm delighted to announce that it's already fit to leave the brood tank and go out into the community on its own.

Fishkeeping Answers goes monthly from May 28, and due to this change, PFK was on sale a little earlier this month (April 25), and the June issue makes the big leap back to May 14. From then on Britain's biggest selling fishkeeping magazine will be on sale on the 14th of the month.

Steve Windsor

STEVE WINDSOR

STAFF WRITER NEEDED FOR THE UK'S BEST-SELLING FISHKEEPING MAGAZINE

Due to the expansion of *Practical Fishkeeping* we require a staff writer.

■ The successful candidate may be a keen fishkeeper bursting with ideas for the magazine, who understands the readers and aims of a magazine like *Practical Fishkeeping* and can demonstrate organisational and writing skills.

■ *Practical Fishkeeping* is the best-selling fishkeeping magazine in the UK. We aim to keep it that way, and we won't do that by resting on our laurels. We are constantly changing the magazine to preserve our position as simply the best.

■ The ideas of prospective candidates are more important than their journalistic experience. But don't apply if you just want a quiet life taking orders; or if you think that the magazine's perfect as it is.

■ This (very) full-time position is based at Bretton Court, Peterborough. Applicants should write and impress the Editor with their ideas for features and the magazine's overall development.

The address is: The Editor, *Practical Fishkeeping*, EMAP Pursuit Publications, Bretton Court, Bretton, Peterborough, PE3 8DZ.

FACTFILE

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



Name: Max Dibbs
Home town: Oxford
Occupation: Aquatic retailer and photographer
Hobbies (apart from fishkeeping): Photography - apart from fish, travel, and recently snowedling
Years of fishkeeping experience? 46
Favourite type of fishkeeping? Fancy goldfish
Best book on fishkeeping? *Freshwater fishes of the world* by Dr. Günther Stead (now out of print but out of date)
Favourite species? Blannoc Fancy Goldfish
Last favourite species and why? Also much thought, I really can't think of one.
How many tanks do you own? One privately and many more professionally
What was the first tankfish you ever had? My first tank was a pressed-steel barrel 16" x 10" x 10" to replace my battery jar. First fish were *Stubbinias*.
What was the first fish you ever bred? Very ordinary guppies.
Worst mistake in fishkeeping? Leaving the roof vents closed on a fish house in

very hot weather and buying a proud stock of fancy goldfish as a result.
What's the most you've ever paid for a fish? In comparative terms, £25 for a not-very-good female Redfinor 30 years ago.

What do you think is the most important current issue in fishkeeping? The threat from over the big regulation of the trade in ornamental fish.

Biggest fishkeeping gripe: The general lack of professionalism in the business, resulting in retarded growth of a potentially flourishing activity.

Are there any fish you wouldn't keep - and why? Moonfish etc. - having seen these fast-moving fish in coral reef settings, I wouldn't wish to try to adapt them to aquarium life.

Which fishkeeper do you most admire - and why? An old-time aficionado who worked in J.A. Rath of Holland who produced the best fish I have ever seen, and who inspired me in my early days in the trade.

Favourite fishkeeping myth? Cockerel fish are easier than brook trout.

Biggest fishkeeping ambition? To breed some marine fish species in large retirement. It is just a dream.

If you were reborn as a fish, which fish would you be? A male Black Molly - just watch how he spreads his legs.
How would you like to be remembered in fishkeeping? As the old guy who lived a healthy active life in his hobby until his 125th birthday.

AQUACHAMP 1992

Here's five teasers for you.

1. What is the obvious difference between a Neon Tetra and a Cardinal Tetra?
 2. What is the common name of *Echinodorus bleheri*?
 3. The ideal temperature for community tropical fish is 75°F. What is this in centigrade?
 4. Give one of the two popular names for *Blossoma evergladesi*.
 5. What chemical is traditionally used to treat *Oodinium* disease in corallfish?
- If you got all these right then you're well on the way to becoming our new Aquachamp in 1992.
- Aquarian* and *Practical Fishkeeping* are again combining to bring you the Aquachamp club quiz, culminating in a grand final for six competitors at Weston Super Mare in part of the FBAS Supreme Festival of Fishkeeping on November 7 and 8.
- This year's final will be in two

Practical Fishkeeping/May 1992

parts, with competitors answering on a chosen specialist subject on the Saturday, followed by a general round on the Sunday.

Every club in the country should shortly be receiving an invitation to enter. If you're a club secretary and you don't receive an entry invitation in the next few months, you should write to Aquachamp Contest, PO Box 67, Elland, W. Yorks, HX5 0SJ.

You'll receive everything you need for a club quiz night, including prizes of "Aquarian" food and winners' certificates.

If your top club member is in the six highest scorers in the country, he'll be invited to Weston (with wife or companion free of charge to enjoy the the show and take part in the final.

Answers: 1. The Neon has a short red stripe, the Cardinal a long one. 2. Amazon Sword 3. 24°C 4. Pygmy or Dwarf Sunfish 5. Copper.

ch....Newswatch....Newswa

• A serious start to Newswatch this month with several readers sending us the story from the *Scottish Sunday Mail* of a youngster from Midlothian who contracted salmonella from the water that his fish - a Tiger barb - had been imported in. It's believed the child put his wet fingers into his mouth, catching *Salmonella* java, the first case ever reported in Scotland.

• The *Daily Telegraph* reports that Elephant Fish and trout are being tested by Thames water to determine which species is the most reactive to pollution. For 12 years the trout has been used in this role - but it now seems likely that the Elephant Fish is a better choice - something that the readers of PFK could have told them for free....

• The *FunDay Times* (who sport a columnist known as the Intelligent Cod), is a feast of fishy news. It tells us that the Blue Streak car manufactured by Graham-Paige motors in 1932 was painted with iridescent paint containing fish scales.

Another snippet reports that a carp leapt from an Italian canal and knocked scooter-riding Carmen Malavasi from her bike. She was apparently unhurt, the carp got eaten.

And there's more: Piranhas have now been found living in the drains in Singapore, and more surprisingly in the River Garonne in the South of France.

Meanwhile Fergal Parkinson from Sheffield buried his Goldfish Sammy - only to find that after 40 minutes it had wriggled and dug itself free from the ground, returned to its tank, it carried on now the worse, we're told....

• The *Daily Telegraph* and other papers reported that a New Zealand bar has been selling tequila and lemon cocktails containing "live" goldfish. The *Mailfax Evening Courier* elaborates - the drink is called a Goldfish layback, with more than 100 fish swallowed in a few days. Bar manager Lance Maxwell-Burt is quoted as saying, "It's good. I've had a couple."

• The *Daily Mirror* reports that a human thumb was found in the stomach of a Lake Trout and was traced to its owner six months after he lost it. "Owner" Robert Lindsay intends to "keep it in on the shelf to show people."

• The *Forfean Times* also monitors the press and reports that between June and August over 50 people trod on the venomous Weaver fish on the Isle of Wight.

Tropical Trigger Fish are appearing in increasing numbers off the Irish coast. The fish are drifting north on the gulf stream - yet another sign of global warming?

How did Chinese Mitten crabs establish a colony in Yorkshire? Apparently the burrowing crab is quietly undermining the flood defences around the Ouse and the Wharfe. Originally from Shanghai, the crabs first appeared in Germany and France in the Thirties.

• Too late it seems to save her marriage, Fergie is reported by *The Sun* to be gazing deeply into an octagonal fishbowl - while sitting under the much reported mystical pyramid in the Eden Sunningdale pile. According to "Psychologist Diane Vaughan" "Beautiful fish swimming gently in an aquarium is very soothing" if only *Practical Fishkeeping* readers had told her this sooner... wonder who gets custody of the fish?

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

This month's contributors: Sheila Unsworth, Derek Mackenzie, Gordon Hope, C. Bates, Gina Smith, Sean Felds, Chris Down, PFK staff.



Abnormal bloom on *Nymphaea vesuvi*. Note: Waterlily Beetle.

Lily's little problems



Lily expert **HARRY HOOPER** outlines the cures for the blessedly-few problems that can affect your prized lilies.

Waterlilies can be affected by pests and diseases just as any other form of plant life.

There is a problem with treating aquatic plants with either insecticides or fungicides. Normally there are fish present and using chemicals of this nature could be harmful if not fatal to fish or any other form of wildlife living in the pond. So,

the utmost precautions must be taken when using chemicals near ponds.

Pests

The most common pests to attack waterlilies are aphids, which can cause extensive damage to the leaves of the plant. Soapy water will encourage aphids to breed at an alarming rate, and just at the peak of summer when you should be enjoying your

lilies at their best.

If your waterlilies become infested with aphids, the best method of destroying them is to spray vigorously with a jet of water from a hosepipe. This will dislodge the pests, and your fish will normally eat the stranded aphids.

■ Another destructive waterlily pest is the Waterlily Beetle. Normally it is the larvae of the insect that is noticed feeding on

the leaves of the plant leaving a trail of tattered and unsightly remains. The only way to minimise the destruction caused by this bug is, as soon as there is any sign of its presence, to remove the entire leaf, bug and all, and destroy it immediately.

The Waterlily Beetle hibernates among the poolside plants reemerging during early summer to deposit its eggs on the leaves of the waterlilies.

TIP: Aphids deposit a large brood of eggs on plum or cherry trees - including the ornamental varieties - so if your lilies have been infested with aphids it would be advisable during the winter months to spray any nearby trees of this type with a solution of tar wash oil available from most garden centres.

■ Another culprit in the destruction of waterlily foliage is the caterpillar of the China Mark Moth. This caterpillar will shred the lily leaves to ribbons.

The only positive way to destroy this trouble maker is to hand-pick the caterpillars as soon as they are noticed or remove infested leaves entirely and destroy them.

Diseases

Fortunately disease in waterlilies is not very common. The most worrying complaint known to waterlily enthusiasts is an outbreak of crown rot. The first sign of a plant infected with this disease is the yellowing of the foliage and (with closer inspection) the inside of the

plant's rhizome, which will have started to turn black and decay.

Whether there is more than one type of crown rot is debatable as some plants will recover from this disorder. Sometimes a part of the root stock will have grown

■ Most varieties of waterlily are produced from the eyes that form on the plant's rhizome.

Depending on the variety and growing conditions some lilies will produce more eyes than others.

root stock and discarded.

■ On occasions some of the popular varieties of Waterlilies will for some reason produce an unusual flower.

There is no cause for alarm as

Right: Lily rhizome affected with crown rot.

Below: Lily affected by fasciation.



These eyes will eventually become the part of the lily whose cuttings are available for young plants.

For some reason waterlilies are prone to a disorder known as **Fasciation**.

This condition will encourage a part of the root stock to produce an abundance of eyes, that sadly only produce deformed terminal shoots that are of no use whatsoever.

Although this disorder is not contagious, the best solution is to cut away the affected areas of

this can often happen in other

TIP: If you have had the misfortune to experience the damage caused by the Waterlily Beetle, cut back and burn all decaying foliage of the marginal plants surrounding the pond during the winter, to deprive the beetle of its haunt.

types of plants. It is suggested by many plant breeders that this disorder is the reaction of the plant to its chromosomes acting irregularly - and possibly due to the chosen varieties used in creating the hybrid.

This irregularity will cause to turn to the plant and under normal circumstances will correct itself on the next bloom. ■



Nymphs seen from above - the 'nymph' and 'nymph' marking is attractive - but not 'normal'.

■ **HARRY HOOPER** is Secretary of the U.K. Branch of the I.W.L.S. He will be pleased to forward information on the society to potential members. Write to Harry Hooper, Mill Lane Nursery and Water Gardens, Mill Lane, Bradfield, Manningtree, Essex CO11 2QP. Please enclose an SAE.