The NEW

AQUARIST & PONDKEEPER

AUGUST 1996

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Contents

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Features

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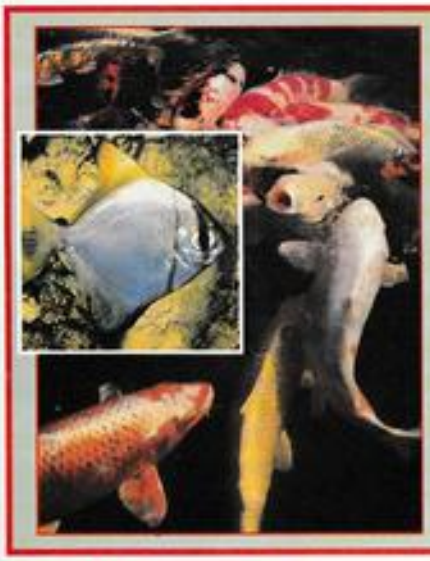
SEE PAGE 39



COVER PICTURES

MAIN PICTURE: GORDON WIGENS
INSET PICTURE: MP. & C. PIEDNOIR

This splendid all-action picture of Koi sums up all the excitement and attraction of this superb fish at its natural best. You can meet all the Koi, and Koi-keepers you want, at this year's National Show at Billing Aquadrome but don't blame us if you get 'hooked' by these magnificent fish.

The Malayan Angel, *Monodactylus argenteus*, is found in coastal waters throughout the Indian Ocean. A large proportion of those available commercially are caught near Negombo on the west coast of Sri Lanka where, in association with Scats, *Scatophagus argus*, they feed in great numbers on materials we'd probably prefer not to know about.

Regulars

Comment

Did you see the recent TV report on the invasiveness of the Water Hyacinth? The dramatic pictures showed a river in Rwanda choked with the plant to such an extent it took three days for a ferry boat to battle its way through! Even more distressing (to UK viewers at least), was the sight of an abandoned British-made weed-clearing boat also trapped in the same river. The results were quite devastating as the plants were blamed for large scale fish deaths, notably those of Nile Perch which were supposed to feed on smaller fishes and thus make themselves worth catching by the local populace for food.

It just goes to show that you can't take liberties when handling any livestock (fish or plants) that might flourish unsuspectingly in other waters. This brings me to this month's point.

Just as restrictions need to be exercised to prevent such occurrences as described above, so too we have to be careful in not only what, but also how, we publish fish-related information (or fishkeeping experiences) however interesting it may be. In the May issue of **A&P** reference was made to 'tropicals' being kept without heat during the summer months with a 'trailer' for such an article in the July issue.

Of course, experienced fishkeepers will know what the article should have said — certain species of fishes will tolerate (nay, even enjoy) a summer break in a conservatory-based pool for instance, but be sure to bring them indoors again when the temperature drops below, say, 65°F.

Now, just suppose that this information was construed as meaning that these species of fish had a normal, downward-extended temperature tolerance and you can easily (and justifiably) see how those concerned with importations of fish could become worried. This could lead to restrictions being applied to what is already imported without hindrance which, in turn, could affect loss of earnings in companies involved in transportation and, in the extreme, even job losses in companies actually catching the fish in the first instance. All this 'aggravation' based on an article about an innocent summertime digression, perhaps by someone who wanted to put some extra size, weight and colour on his Mollies!

So, before anyone gets too over-anxious, do accept that, occasionally, tropical species are kept without heat (should our fickle climate allow) and no, it is quite unlikely that such species would survive into the range of temperatures which would qualify them for importation restriction as applied to more temperate zone fishes. But, as the old slogan went: 'You can't be too careful'.

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BREEDING AQUA

DEREK LAMBERT TAKES A LOOK AT THE VARIED WAYS FISH BREED.

• PHOTOGRAPHS BY THE AUTHOR •

From the very earliest days of fishkeeping it has not just been the lovely colour and graceful movement of aquarium fish which has captured aquarists' interest, but the fascinating breeding habits of many species. Some people think all fish scatter their eggs over the gravel or in plants and that is the last the parents have to do with them. Aquarists, however, have found out this is very far from the truth for many species. Whilst lots of species do just scatter their eggs and swim away, others try to protect them from predators. The humble Stickleback (*Gasterosteus aculeatus*), which most children catch in their local park pond, builds a nest from plant material on the bottom of the pond and guards the eggs and young. Other species, such as the Honey Gourami (*Colisa chuna*), build a nest of bubbles at the water's surface and place their eggs in this. The male guards the nest until the babies are able to fend for themselves and swim away.

Other species of fish go even further to protect their eggs and hold them in their mouth until they hatch. Quite a number of Cichlids, Anabantids and some Snakeheads use this method. Other species site their eggs on different parts of their body. Some Catfish hold them on their lower lip. Sea Horses place them in a pouch on the male's stomach, whilst *Xenopoecilus sarasorium* have them hanging down from the female's vent on a thread, like a bunch of grapes. All these methods increase the chance that the eggs will survive until they hatch.

One group of fish, however, make certain of this by holding the eggs inside their body until they are ready to hatch and then give birth to free swimming babies. These are the livebearers and it is these fish which are very often the first species of fish an aquarist will breed. As a group they are very diverse, but most aquarists only know them from four of the most popular aquarium fish. These are Guppies, Platies, Mollies and Swordtails, however, these are only a small fraction of the fish which use livebearing as a reproductive strategy.

Personally, it was a livebearer giving birth in my community tank which hooked me on breeding aquarium fish. The fish concerned was a Yellow Wagtail Platy which started to drop babies at 1 o'clock in the morning. I sat up all night carefully catching each baby and placing it in a jar floating in the tank. The next morning I rushed down to the local aquarium shop to buy a net cage in which the babies could be reared whilst suspended in the main tank. This was soon followed by more tanks in which to breed egglayers and other livebearers.

Honey Gourami (*Colisa chuna*). This species builds a nest of bubbles at the water's surface and places its eggs in this. The male guards the nest until the babies are able to fend for themselves and swim away.

Betta dimidiator is a mouth-brooding Anabantid which holds its eggs in the male's mouth until the fry are free swimming.

RIUM FISH

Twenty five years later I have more than 200 aquaria and make my living from breeding fish, but the fascination of seeing a new species reproduce for the first time is still as strong as ever.

Breeding aquarium fish can be divided into several distinct parts. First and foremost is obtaining breeding stock. Many aquarists tend to fall at this first 'hurdle' because they go out and buy large adult fish and try to spawn them. This can work if you are really lucky but more often than not the adults you see for sale are well past their prime as breeders. It is a much better idea to buy a group of young fish and rear them up yourself. This way you can pamper them from an early age with lots of good quality food and regular feeds of live foods which will help bring them into breeding condition. When they reach maturity you can select the best pair to breed from.

Once you have your potential breeding stock the next stage is to create an environment in which they will breed and the eggs produced will stand some chance of survival. In a community tank situation even those species which care for their young are unlikely to be successful in rearing their babies. A breeding tank will, therefore, have to be set up. This need not be anything fancy, or particularly large. Most commonly kept aquarium fish will only need a 24in long aquarium to spawn in, although some of the larger species may need a 36in long tank and deep bodied fish such as Angels will need an aquarium of 15in depth to be comfortable.

How you set up up the breeding tank will depend on which species is going to be bred. Those fish which care for their young like Cichlids are best set up in an aquarium as though it were going to be their permanent home. This means rockwork and possibly some growing plants as well. Filtration will have to be considered but, since the tank will hopefully one day contain small babies it is wise to steer clear of filters which produce very strong water currents. Personally I prefer bubble up sponge filters for breeding tanks. These produce enough filtration to maintain the water quality but cannot suck small fry up.

Other species which do not care for their young can be divided into continuous spawners and those fish which lay a large batch of eggs at one time. Continuous spawners include most Killifish and many of the small Rainbowfish. These need to be set up in much the same way as fish which care for their young, only this time a suitable spawning medium which can be easily removed needs to be included in the set up. A nylon wool mop is often used for this instead of natural plants. This is usually suspended from the surface but those species which would normally spawn in rock crevices need it placed on the bottom. Every day or so the mop is removed and the eggs picked off and placed in another small aquarium to hatch. If the eggs are too small to handle then leave the mop for four or five days before removing it to the hatching tank and replacing it with a new mop.

Species which lay one large batch of eggs are only going to be in the breeding tank for a day or two at the most and do not need anything other than a suitable spawning medium. These include the vast majority of commonly-kept aquarium fish such as Barbs, Danios, Rasboras, most Tetras and many of the larger Rainbowfish. The biggest problem with these fish is that most of them will eat their eggs once they have finished spawning. Various methods have been devised to protect the eggs from cannibalism. Those fish which scatter

The Green Lamp-eye (Pnaalepis gracilis) is a continuous spawner which should be set up in a permanent aquarium where the mop can be removed and the eggs picked off to be hatched in a separate aquarium.

TROPICAL
Breeding Aquarium Fish

non-adhesive eggs over the substrate (such as Danios) can be prevented from eating their eggs by covering the bottom with a double layer of marbles. If these are too expensive then a large grade of pea gravel can be used. Alternatively a plastic trap with bottom grid can be used but these only work with small species.

Xenoporcilus sarmaticum carry their eggs hanging down from the female's vent on a thread, like a bunch of grapes.

Those fish which lay their adhesive or semi-adhesive eggs in plants present more of a problem because their eggs will be accessible once the fish have finished spawning. The only really satisfactory method I have found with these species is observation. Most fish breed in the morning, so I keep a close watch on all breeders at this time and once a pair start spawning I keep an eye on them until they have finished and then remove them. Before I worked with the fish full time I had to set up my breeders on a Friday evening so that they would spawn on Saturday or Sunday morning when I could spend the time in the fish room with them. To be sure the pair were ready to spawn when I wanted them to, I would keep the sexes apart for a couple of weeks before placing them in the breeding tank.

Some fish need soft water to spawn in. This is because they come from soft water areas and their eggs have adapted to this. In hard water they absorb calcium from the water which makes their shell become too tough for the baby to break through. A similar problem occurs with those fish which come from very acidic water. The shells of these eggs are particularly thick and tough when they are laid so the acid in the water will not eat through to the embryo. By the time the embryo is ready to hatch the shell is thin enough for the baby to break through. In neutral to alkaline water the shell is not eaten away and the baby cannot escape. So those aquarists who live in hard alkaline water areas (like me) have to collect rainwater or use chemicals to reduce the hardness and acidify the water when breeding these fish.

Once the eggs have hatched the fry take a day or two to absorb their yolk sac and then they will need feeding. This can be the most difficult stage at which to succeed because some babies are very tiny at birth and must have special foods. Certain species of Goby and many Marine fish have never been successfully bred in captivity because the fry are too small to eat anything aquarists have tried feeding them.

Fortunately the fry of most aquarium fish do not present such an impossible challenge but many do need infusoria as a first food. Infusoria is a general term for many different tiny organisms which live in water and feed on rotting plant matter. Their spores are airborne so you do not need a starter culture, just a container of water open to the air and a suitable food source. There are lots of different ideas on what is the best material to start an infusoria culture. Some people dry lettuce leaves in the oven and crush these into the water, others boil chopped hay and then strain the fluid produced, powdered milk has even been suggested but the best method I have found is to use a small piece of lightly boiled potato.

This is put in a jar of aquarium water and allowed to stand for about a week. You can see when the culture is ready because the water will be cloudy with infusoria. To feed just pour the cloudy water into the tank full of babies, making sure the potato does not fall in as well! Since a jam jar will only be enough to feed a brood of young for a day, you will need to start a new culture every day and have at least seven jars on the go. It is possible to buy various liquids and powders from retail outlets which encourage an infusorial bloom in the aquarium.

Great care needs to be taken with how much you feed, either with infusoria or one of the commercial alternatives because it is so easy to pollute the water and kill the fry, or not add enough and have the babies starve to death. This is the most tricky stage of rearing any brood of young but with practice success will come.

After a few days on this food I start to feed newly-hatched Brine Shrimp as well. This is fed very sparingly at first and in conjunction with Infusoria until I am sure the babies are eating it. Then the Infusoria is phased out. From here on the babies usually grow quickly and are soon large enough to eat normal foods. One word of warning when it comes to feeding flake food. Do not crush up staple flake food to feed your growing youngsters on. Buy a growth food to feed them. This will have the proper balance of nutrients needed for the fry to grow quickly and reach full size.

Apart from feeding the young in the early stages and preventing the eggs from being eaten, most egglayers are just as easy as the common livebearers to breed. Indeed in terms of numbers they can be far more prolific. A good pair of Emperor Tetras will produce 250 babies in one spawning and will be ready to breed again next week. The best you can hope for from a Swordtail is a brood of 80 young every month and the other common livebearers tend to produce even less. When compared to the monthly output of 1,000 or more young from a common egglayer, you can see that egglayers can be hugely productive.

Growing Tips

BY BARRY R JAMES

Deep Marginals

The most popular of the deep marginal plants are Water-lilies (Supplement, **A&P,** July 1996). These illustrate the habit of this group very well. They grow in water up to 4ft deep, some species even deeper, but are happier in shallower water. Most will grow well even when there is no water above the rootstocks at all, providing that the soil is saturated.

Characteristically their rootstocks are tuberous and the roots themselves very strong and vigorous. The leaves have long petioles which are very spongy for buoyancy. The leaves and flowers will lie flat on the surface when the water level is high, but will often stand erect when growing in shallow water. The flowers are often very showy and are pollinated by winged insects.

Seed often has short viability and should be sown as soon as it is ripe. In nature they are often somewhat buoyant, to aid distribution. The success rate of germination is increased if they are sown in shallow water. In their natural environment they grow in the mud overlying the normally clay subsoil and are not happy in soils with a high humus content, especially in acid peats. They are gross feeders and respond well to high levels of nutrients and should be fed regularly with slow-release fertiliser pellets.

Most species appreciate a sunny position but the *Nuphars* are more obliging and will succeed in shade. In general they appreciate stagnant water but the *Nuphars* will grow in fast running streams, provided that the water is not too cold in the growing season.

Whilst not as showy as the Water-lilies as far as flowers are concerned, *Nuphars* on account of the characteristics already mentioned will succeed in situations which no Water-lily could even contemplate. Closely related to the *Nymphaea*, these plants have similar floating leaves but will also grow completely submerged, where the almost translucent, pale-green foliage can be very effective. The comparatively small yellow flowers are followed by strangely shaped fruits which are descriptively called 'brandy bottles' in the vernacular.

Nuphar luteum — the Spatterdock — is a familiar native plant found in in a variety of habitats, frequenting ponds, streams and rivers. It can be found growing in water up to 10ft in depth and in fast flowing currents. The thick pale-green rootstock gives rise to rounded leaves which reach 8in or more in circumference. The yellow flowers produced in early summer have a strong smell of alcohol (which may well be another reason for its folk name!) There are many varieties none of which are commercially available.

Most *Nuphars* are found in North America, the most spectacular of which is *Nuphar advena*. This very large species does not produce submerged foliage but instead throws up leaves a foot long, often oval in shape, which stand proud of the water surface. There is a variegated form with purplish-yellow flowers from British Columbia which has become available in Britain in recent years.

My favourite *Nuphar*, however, is *N. japonicum* which as its name suggests hails from Japan. This beauty bears arrow-shaped leaves both submerged and floating. My next door neighbour has specimens with glossy leaves up to a foot long growing in shallow water. Although I supplied the plant, for some frustrating reason my specimens refuse to grow in a similar pool just over my side of the fence! There are several varieties of this species including one with variegated leaves in its home country.

Nuphar minimum has small leaves a few inches across and is suitable for small pools.

A to Z of plants

Crinum thaianum in flower.

PHOTO: BARRY JAMES

Crinum
Crinum is a large genus of bulbous plants whose headquarters lie in Africa and numbers some 110 species. The majority are normal garden plants, mostly needing moist or boggy soil for successful growth. Four species are aquatic, but reaching an average of 60cm in height, are only for those with really large aquaria. They are hardy plants which will put up with a good deal of harsh treatment.

Crinum calimistratum (Baker 1898)

Common Name: None.
Description: A recent introduction, this species has uniquely narrow, ribbonlike leaves reminiscent of *Cryptocoryne retrospiralis*. Like that plant, they are puckered and wavy-edged. Growing from a smallish bulb the leaves reach 70cm growing at the rate of one to two new leaves per month. The colour is a rich olive-green. In open topped aquaria this plant sometimes produces its white flowers.
Cultivation: Hailing from West Africa, water temperature should lie between 22-28°C. Requiring a rich, lateritic subsoil and clear water these plants are undemanding with regards to water chemistry.
Propagation: In older plants sprouts appear from the base of the bulb and these should be separated when about 30cm in height.

Crinum natans (Baker 1898)

Common Name: African Onion Plant.
Description: Somewhat similar to the last-named species and also from West Africa, the leaves are much broader reaching 3cm wide and growing to a length of 1m. The colour is a rich green. Flowers white.
Cultivation and Propagation: As per *C. calimistratum*.

Crinum thaianum (Schulze 1971)

Common Name: Giant Crinum.
Description: Frequently imported from Singaporean nurseries, this species was originally endemic to Indo-China where it grows in slow moving stream and rivers. The big bulbs can be nearly 3in in diameter. Quite different from the African species, the leaves are smooth, ribbonlike and pale green. In aquaria they float on the surface reaching lengths of over 1m. Flowering often occurs in open tanks, the delicate petals are glowing white.
Cultivation and Propagation: As per *C. calimistratum*.

WHERE THE RIVER MEETS THE SEA

PART TWO

ROY OSMINT SETS UP A BRACKISH WATER AQUARIUM AND SUGGESTS SUITABLE INMATES.

Unlike fishes that exist in the relative stability of a true freshwater or marine environment, those that spend most of their lives around coastal streams and river estuaries are subjected to an ever changing world of water conditions. In these regions salinity levels are constantly fluctuating as the sea water, influenced by the rise and fall of the tide, becomes variably diluted by freshwater outflowing from the rivers.

The life forms that inhabit brackish locations are consequently very well adapted to thrive in these indefinite circumstances. It is this adaptability that makes them worthy subjects for the fishkeeper who is looking for something a bit different, but which is not too critical in its application.

There are quite a number of fish species which can be successfully incorporated into a brackish system. Some may be offered by dealers as pure freshwater subjects, others correctly sold as brackish. There are even a few proffered as true tropical marines, but that in their natural habitat prefer a very much less saline environment. The Black Banded Sunfish (*Mesogenistias chaetodon*) is an example found in this latter category. But, as has been stressed previously, it is the way fish are adapted to different salinity levels that is important — gradual acclimatisation being paramount to good overall health. This fundamental truth applies just as much to the dealer as it does to the hobbyist; so only patronize those with a reputation for being knowledgeable and reliable.

FISH SPECIES

The following are some fish species suitable for a brackish system. As with any branch of fishkeeping attention must be given to compatibility if communities are to be established.

THE SAILFIN MOLLY (POECILIA LATIPINNA)

This is a lovely fish frequently seen and well adapted to freshwater, but responds wonderfully to a brackish environment where it will really sparkle. Distributed in the estuarial regions of Yucatan, the male has a large and most striking dorsal fin which is used with effect to deter rival males and to impress females.

THE MONO ANGEL (MONODACTYLUS ARGENTEUS)

Sometimes called Malayan Angel, Moonfish, Fingerfish. A silvery laterally-compressed fish from the seas and

PHOTO: GORDON WAKENS

estuaries of Africa and Southern Asia. Being a shoaling species by nature, four or five specimens should be considered the minimum to be kept. As the fish grows it benefits from increasing salinity which can eventually be raised to full sea water strength. If unhappy with its conditions the Mono Angel will often demonstrate the point by turning a very dark colour.

STRIPED FINGERFISH (MONODACTYLUS SEBAE)

Another variety of Fingerfish from West Africa but with a deeper more angel-like body shape than its cousin previously described (M. *argenteus*). This attractive species has a distinctive dark stripe which runs from the very tip of the dorsal fin to the tip of the anal fin immediately opposite. Requirements and general care are similar to that of the Mono Angel, but it tends to be rather less hardy.

GREEN PUFFER FISH (TETRAODON FLUVIATILIS)

This lovely fish from India and South-east Asia grows to around 15cm. It has an unusually small caudal fin which is used only for steering, propulsion being generated by the dorsal fin which is set well back on the body. The popular name of this fish is derived from its curious ability to inflate itself to almost double body size, a mechanism which is used when it feels agitated or threatened.

The species is not a particularly good all round community member as it has a habit of snapping with its powerful mouth. But it will often live quite harmoniously with fish like *Monodactylus argenteus*.

THE COLOMBIAN SHARK CATFISH (ARIUS SEEMANNI)

A lovely silver bodied fish with contrasting black fins that show white tips. It enjoys the company of its own kind and is best seen in a small shoal. Unfortunately it grows very large indeed, so a tank of suitably generous proportions is a must.

THE ARCHER FISH (TOXOTES JACULATOR) ▲

A fascinating and attractive fish from the coastal regions of India, Indonesia and the Malaysian Archipelago. So named because of its truly remarkable method of obtaining food. This it does by powerfully ejecting from the mouth droplets of water aimed at insects resting upon overhanging leaves or hovering above the surface. The droplets are fired singly or in rapid succession with uncanny accuracy over a distance of up to 150cm. The luckless insect is brought down onto the water from where it is swiftly consumed. When aiming, the Archer Fish cleverly compensates for the affects of light refraction upon its view through the water.

Some aquarists set up a tank especially for these fish which combines both water and land together with suitable overhanging vegetation. Flies can then be introduced, thus allowing the Archer Fish to exercise its marksmanship and capture some of its own food on the hoof. This is by far the most satisfactory and successful way of keeping this absorbing species.

SETTING UP THE TANK

(1) Decide on the species to be kept and try to establish from intended sources of supply if subjects are acclimatised to brackish conditions, and at what level. This will have a direct bearing on the setting-up procedure.

(2) If U/G filter is to be used, install in the base of the tank.

(3) Thoroughly wash all substrate. This is best achieved by using a plastic bucket with holes drilled in the bottom, or a large colander.

(4) Install other equipment and furnish as with any other aquarium.

(5) Calculate the water capacity of the tank, not forgetting to allow for displacement by rockwork and substrate.

(6) Depending upon water conditions required (see stage 1) make up sufficient quantity with salt mix, following manufacturer's instructions. Use hydrometer to obtain appropriate Specific Gravity reading at correct temperature.

(7) Add water to aquarium, switch on electrics and allow to settle down and stabilise for a few days. Make frequent checks on Specific Gravity as salt takes time to become fully absorbed. This process will be assisted by vigorous aeration.

(8) Make adjustments to salinity levels by adding more salt solution to increase Specific Gravity, or freshwater to reduce it.

(9) Introduce small number of fish and monitor closely until fully established.

(10) Maintain with frequent partial water changes ensuring that Specific Gravity of added water is similar to that in the aquarium. Small overall variations to water salinity within the tank is acceptable and, in fact, desirable.

TROPICAL
Where The River Meets The Sea

INDIAN GLASSFISH ▼
(CHANDA RANGA)

A small fish to 6cm with a body which is virtually transparent. It is a peaceful and rather timid species and should be kept With those of a similar temperament. Although lacking definite colour, when seen in reflected light the body displays a subtle greenish gold iridescence, which changes with the angle of view.

PHOTO: GORDON MAYNS

HALFBEAK
(DERMOGENYS PUSILLUS)

A very elongated livebearer with a protruding and unmovable lower jaw. The dorsal fin is situated well back just forward of the tail. This surface swimming species reaches a length of some 7cm and is best kept singly, and certainly not in the company of other males to which it often responds extremely aggressively.

THE BUMBLEBEE GOBY
(BRACHYGOBIUS DORIAE)

A cylindrical, rather chunky fish from Sumatra, Borneo and Java which grows to a length of about 5cm. It has an attractive yellow-orange body with dark bands from which it derives its popular name. In community aquaria it tends to become very shy and intimidated by other inhabitants. It is seen to best advantage in a small, well furnished single species tank.

MOSQUITO FISH
(GAMBUSIA AFFINIS)

This species is sometimes regarded as being the first livebearing fish to be introduced to the hobby. Although an interesting tank inhabitant, it is notorious for fin nipping and will menace fish both large and small. For this reason it cannot be considered as a community member.

These fish have an enormous capacity for consuming mosquito larvae, and have consequently been used to great effect in helping to control malaria-carrying mosquitoes in various parts of the world.

THE SCAT
(SCATOPHAGUS ARGUS)

Native to the tropical regions of the Indo-Pacific where it is found in estuaries and coastal waters. This is a deep bodied attractively shaped and variably marked species which will quickly become tame. Unfortunately it is a very messy creature and can grow to around 25cm, so a sizeable tank with powerful filtration is necessary together with frequent partial water changes. As the Scat gets older it requires increasing salinity levels.

PHOTO: MP & C. PIEDROIR

MUDSKIPPER ▲
(PERIOPHTHALMUS BARBARUS)

This fascinating creature with its curiously protruding eyes is not especially difficult to keep, but it does require a specifically designed aquarium which incorporates shallow water and large areas of dry land.

The Mudskipper spends a great deal of its time on terra firma, storing water in its gills to keep

them moist. For this reason scrupulous attention must be paid to water quality and frequent changes made, particularly after feeding.

ORANGE CHROMIDE (ETROPLUS MACULATUS)

This attractive member of the Cichlid family reaches a length of some 8cm. It is a comparatively peaceful species and does not normally molest plant life outside the breeding period. It has a golden-yellow colouring which is enhanced by three large black spots or blotches.

FIDDLER CRAB (UCA SPP)

This crab also requires large areas of land, which should consist of sand to facilitate its burrowing habits. The male has a large front claw which is predominantly used to gesticulate to others when staking territorial claims. Fiddler crabs make very suitable tank mates for Mudskippers as requirements regarding land and water ratios are similar. But it is generally considered unwise to introduce any other livestock to either species.

Planning and establishing a brackish aquarium can be an absorbing undertaking, offering a fascinating insight into a somewhat different aspect of the hobby. So, if you fancy a change, why not look to where the river meets the sea and try adding a pinch of salt!

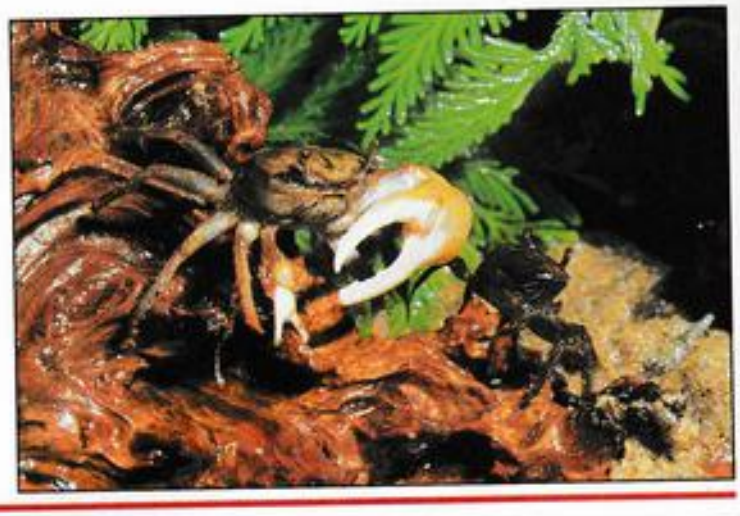


PHOTO: MR. A.C. PIZZEY

BREEDING DISCUS

How to achieve this mythical feat

BRIAN MIDDLETON GIVES YOU A LITTLE HELP TO GET YOU ON THE WAY AT LEAST.

Judging by the feedback I have been receiving the last few months, hobbyists keep Discus for a number of reasons, some for the sheer challenge of trying to maintain them in an upright position, others enjoy purchasing small fish and watching them progress to maturity. I must say, of all the aspects of Discus keeping, actually watching them develop and attain their potential colour is the most satisfying, for myself.

Different strains of Discus attain their full colour at different stages in their life, for instance genuine 'Blue Diamonds' are born yellow, but within a very few weeks they have turned completely blue. Solid fish, e.g. Solid Cobalts, Solid Metallic Greens, Solid Steel Blues, show the 'cobalt' colour within eight weeks and then at around 12 weeks they begin to become striated. It then takes them eight or nine months to begin to fill in and become solid, although there are always exceptions to the Rule, and some start to fill in at a much earlier stage (these are the ones to watch).

Red fish, and by red fish I mean the variants of the Brown (*Symphysodon aequifasciatus axelrodi*), are now known under various names usually related to the area in which the original wild fish was located, such as Alenquer, Rio Puru, Rio Ica, etc. Any domesticated fish which have been bred from these varieties tend to colour up much later in life, attaining about 80 per cent of their full colour potential in nine or 10 months.

It is a distinct advantage to know the hereditary details of your fish, but just because you do not, does not mean you cannot or should not breed them. What I am saying is this: if the male is large, and the female is large, you have a fair chance that the offspring will be equally large. Large is what you should be aiming for, as the female lays more eggs and the male produces more sperm to fertilise the eggs. If you use small Discus (under 5in from tip of nose to the base of the tail) as breeding stock, the chances are high that your fish will only produce slow-growing offspring that really won't grow into the magnificent fish which the should.

Wherever you obtain your fish, try and get them from completely different sources. The reason for this being, that there is far less chance of them being related and already 'inbred' as this is most undesirable. It is undesirable to breed closely-related stock, because there will be a percentage of the offspring (potentially 25 per cent), which will express the recessive characteristics of the gene, i.e., the weak half of the gene. If Discus from different sources breed, this recessive gene is usually overpowered by the strong dominant gene, and therefore a more powerful offspring is produced, and weaknesses are bred out. In nature, mutations occur when two usually recessive genes meet, a mutant (or runt) may then result, which will normally not survive in the wild.

Occasionally, however, a mutation may lead to an improvement in the species, and this specimen will be stronger than the rest. When this occurs, this stronger specimen will breed and and a gradual change in the species will then occur over many generations and a great deal of time. This is known to be the basis of the evolution of species, based on the assumption of 'Survival of the Fittest'. If it is at all possible, ask the dealer or breeder if he knows anything of the history of the fish in question; this can help you on your way.

TROPICAL
Breeding Discus

There are numerous ways to obtain a breeding pair of fish and one of the most unreliable methods is to buy a Breeding Pair. The reason I say this is that it is extremely rare for a hobbyist to buy a good, steady pair that regularly raise their offspring. Anyone that earns their living by breeding Discus is not likely to sell you a pair of fish that are breeding regularly, as they are more valuable as a producer of his future stock. A Discus dealer would probably be able to offer you a 'Matched Pair' — this should be a male and a female that have started showing mating behaviour. The only problem with this method is that a pair of 10 month old fish may show mating behaviour, but the male may not be reliable for another year! So, at the end of the day I think the most reliable way of finding a breeding pair of Discus is to let them find themselves. The most efficient way of doing this is to purchase fish from different sources as youngsters, grow them on and feed them as they should be fed; water change regularly; and keep your eye open for any signs of ailments of any description. You should be rewarded with a group of Discus that will begin to find their own mates after 12 months or so.

This will happen in one of several ways. The advantage of keeping several fish together is that Discus do not become very territorial until they start thinking about pairing up. Often the first sign of a pair of Discus taking a fancy to each other is when the two fish in question claim an area of the aquarium as their own. It will be noticeable in the respect that all of the other inhabitants will be at the other end of the tank.

At this stage it is an advantage to have a spawning substrate in the aquarium. If it is a planted tank, Discus will quite happily utilise a broad-leaved plant or a piece of bogwood. Their favourite substrate is usually some surface that is nearly vertical, ideally at an angle of between 60 and 80°. Another favourite seems to be that they accept terracotta pots very easily; it does not matter if they are purpose-made spawning cones or a flowerpot. A little tip here about flowerpots: if you use an inverted flowerpot, seal the drain hole in the bottom with a glass marble siliconed in place. This stops any uneaten food or fish waste going into the hole unseen, and then going putrid and fouling the tank.

Scribbled Red with hatching fry.
PHOTO: BRIAN MIDDLETON

When a pair have decided to get it together they will tell you in several ways; often the first sign is that the two fish will swim towards one another and just before they pass each other they will make a very definite bowing motion to one another. This is often followed by a very intense, lateral shuddering motion which each fish will take turns at. This can be taken as a fairly definite clue that you have a pair. I say fairly definite because I am afraid that there are exceptions to every rule and Discus are no different. When a pair have chosen each other they will start preparing a spawning site. If you have a cone or a pot in the tank, hopefully this is what they will choose. Discus are also quite fond of laying eggs on heater tubes, filter inlet pipes, etc., which are, for obvious reasons quite undesirable.

The ritual of egg-laying is initiated when the male starts cleaning the chosen spot by a gentle 'pecking' at the spawning site. He is soon joined in this activity by the female and they will continue pecking with increasing intensity, and cleaning until they are content that the chosen spot is clean. This activity can take anything from a few hours to many weeks. I have one pair of fish that start cleaning the pot about an hour before they lay eggs. I have another pair that have been cleaning their pot for three months and are still not ready to lay their eggs!

When the female is at last happy that the site is suitably clean she will start preparing to lay her eggs. You can tell that egg-laying is imminent in two ways. Firstly, her ovipositor will protrude about 4-5mm. Then she will start doing 'practice egglaying runs' on the chosen substrate; this can continue for anything up to an hour. If you watch this process very carefully you will eventually be able to see her start depositing her eggs. She will do this in vertical lines starting at the bottom of the substrate and working her way up. The lines of eggs will be approximately 5-8mm in length.

What should happen next is that a good male will follow her up the egg-laying site and deposit his sperm on the lines of eggs. During this period it is a god idea to turn the filter and air supply down to a minimum (to allow the sperm maximum chance to fertilise the eggs). Unfortunately, what often happens in practice is that the female will start laying the eggs and, especially if the male is immature, he will take no notice whatsoever or will follow the female up the pot eating the eggs as fast as she can lay them! In my experience this is always a sign of the male being too young, it does not mean that he will always be an egg-eater. Another possible occurrence is that if the male does not fertilise the eggs efficiently the female will eat them within a few hours of them being laid; again this does not mean that she will

turn into a relentless egg eater, it generally means that something is amiss with the spawning procedure — again usually a sign of an immature male fish.

A good female can produce anything up to 200 eggs and a good male will usually fertilise that many without any problems. Young fish, however, will generally produce far less than this, and if the female produces less than 30 or 40 eggs she will usually eat them. All of this activity should be happening at 86°F (30°C). If your fish are showing mating behaviour but not doing much else try lowering the temperature a few degrees and allowing it to increase again. A large water change is the best way of doing this, and it often works.

Once the eggs are laid and fertilised both parents will take turns at looking after the spawn. They will do this by constantly fanning and blowing the eggs and removing small pieces of debris that may be in the vicinity. At this time the appetite of both parents tends to tail off. The eggs should then take around 60 hours to hatch. At 50 hours you will be able to see the developing embryos turning black. The white eggs will be the unfertilised ones and are usually removed by the parents. These unfertilised eggs are often mistaken for fungus. Eggs attacked by fungus can be identified easily as they are covered in white fur by the next day. This can be minimised by the addition of an anti-fungal agent a couple of hours after spawning takes place. If all goes well after 60 hours you will be able to see the hatching fry wriggling. This process will continue for about 10 hours during which time the fry are very often moved by the parents. For this reason, it is extremely important to cover any filter inlets, etc., as any fry deposited in such places will be lost.

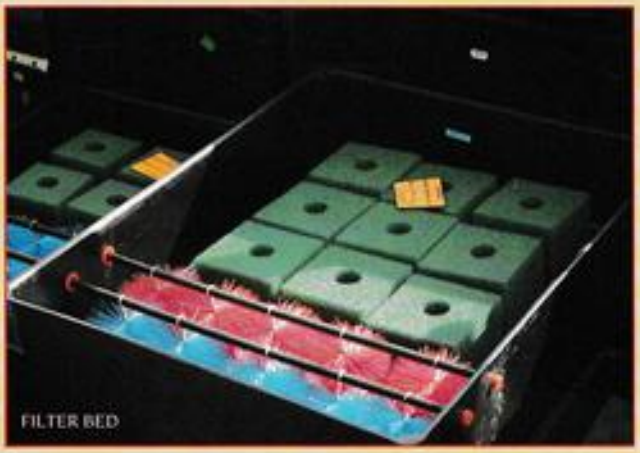
A perfect pair of Scribbled Reds.
PHOTO: BRIAN MIDDLETON

NEXT MONTH:

I will explain in more detail the procedure of raising the fry. It is not that difficult, but is a little labour intensive to say the least. I will give you the recipe for a fry-raising food and also explain the increase in popularity of 'Wild-caught fish' and many good reasons for keeping them.

FISHKEEPING'S HIDDEN AGENDAS

There is no denying that fishkeeping is, literally, a captive hobby — at least from the fishes' point of view. Accordingly, they are, in the close confines of whatever container we keep them in, at the mercy of whatever benevolence we extend to them; but, having said that there are also side-effects to every one of our treatments extended to them.


FILTER BED

THE EDITOR SAYS IF YOU LOOK HARD ENOUGH, EVERY SILVER LINING HAS ITS CLOUD!

• PHOTOGRAPH BY GORDON WIGENS •

You'd think that feeding fish would be all good news, wouldn't you? Kept within bounds it most certainly is but, overstep the mark and err on the side of over-generosity and the fish will be in trouble — and that's just overfeeding. The content of the food we use also has an effect on the water conditions too. Most people are certainly attracted to any new food and take note of its 'protein content'. Herein lies a potential problem as any excess of protein in the water (from milt of spawning fish to uneaten high-protein food) will soon produce a scum on the water!

By far the most problems come with water conditions, with any variation within them likely to send shivers down the caring fishkeeper's spine. The real aggravation comes from there being too many variables in any equation that might be applied to solving the problems. It must be appreciated that everything that comes in contact with the water acts for good or bad at one stage or another. (This article is not meant to be critical in any way of any particular type of filtration systems, past, present or future but merely to make you consider all the possibilities and not be over anxious to lay any blame at any one individual's door.)

Consider this vicious circle for starters: the pond goes green so you naturally lay out some money on an efficient UV clarifying system. Of course, it works wonders but after a time you get blanketweed which you hadn't had before! This setback is due to the improved filtration of the water — the sun can penetrate that much more easily and so the blanketweed flourishes. Another reason might be that, again, the filtration system converts the ammonia to nitrate so efficiently that there is an abundance of nutrient for the algae to feed upon; the remedy (apart from trying to fit trickle denitrifying filters) is to plant plenty of nitrate-absorbing plants either in the pond (Water-lilies) or in a cascade (Watercress).

Almost the opposite might happen in the aquarium — that new super filter could be stripping out all the nutrients needed by the plants for them to continue their previously-enjoyed rampant growth (including vital carbon dioxide) so now you're looking at plant fertiliser supplements and CO_2 injection!

Pond owners are constantly bombarded with advice on what's good for their ponds. 'Oxygenators' are a must and according to the purveyors of such plants you can't get enough of them. Having been woken up at 3am on an over-warm summer's night by 'bubble-wrap' popping sounds coming from the pond, there is another more sinister side-effect to be considered. The sounds were made by the fish gasping for breath at the surface: during the night the shoulder-to-shoulder oxygenators had been busily doing quite the reverse — using up oxygen and pouring out carbon dioxide!

Problems with 'air' can also arise from often unsuspected origins and manifest themselves in Koi ponds. It has been known for sand filters to cause problems. A leaking sand filter won't necessarily leak out water but may well suck in air which is passed through to the pond where supersaturation can occur leading to air embolism. Similarly, just any amount of air bubbles won't always bring benefits, the size of the bubbles can be important too, not just for maximum effect in the water but also it seems that too small a size of bubbles can also bring out problems within the fish.

When checking out filter media, whether for mechanical, chemical or biological usage, can you be sure that they will perform their necessary functions without any side-effects such as dumping any previously adsorbed materials back into the water? Are the materials used suitable for use in fishkeeping applications? Using inexpensive foam sheets normally used in furniture upholstery is not advised — all manner of toxins could be released (remember the warnings of danger from cyanide smoke if such materials caught fire?) We can all name wonderful metals that will devastate algae and blanketweed but certainly wouldn't knowingly use them because of their

FISHKEEPING'S HIDDEN AGENDAS

unsuitability where fish are present: you've only to look at copper-based remedies and their adverse effects on marine invertebrates for a typical example.

The treatment of disease is much more reliable these days thanks to careful research and excellent manufacturers' instructions for use. Every remedy will deal effectively with its designated 'disease target' if used correctly. However, us hobbyists often think we know better — either giving a little more 'just to make sure' or underdosing 'just to be on the safe side.' Either method is wrong — one kills the fish the other doesn't affect the disease! Before using a 'cocktail' of remedies on your fishes' ailments bear in mind two things: it is possible that mixing treatments could well produce a toxic mixture on one hand and, should you relentlessly pour in successive remedies and achieve a lucky result, how do you decide on which one worked?

The most common cause of problems in fishkeeping occurs, unfortunately, in well-meaning hobbyists (perhaps manufacturers, too) using the wrong materials either through ignorance or in the misguided approach that it will do the job and save, or make, them money in the process. Again, a well-known cost-cutting ploy by DIY hobbyists is making all-glass aquariums using bathroom sealant as the adhesive instead of proper aquarium-approved sealants; the fish could die because of built-in mould-inhibitors. Hands up all those who have used yacht-varnish to seal marine plywood for a wooden aquarium? If you've suffered losses then it may be because the varnish (designed for boat hulls remember) now contains anti-mollusc additives to prevent barnacles and other marine lifeforms attaching themselves to the boat.

One of the most used phrases in fishkeeping is 'More fish die from over-kindness than by direct abuse'. Just suppose you are a caring pondkeeper and wish to pamper your fish all year round. Naturally, a pond-heater would be the height of luxury and a gas-fired boiler can be fitted without too much trouble (by a qualified person please). Do make sure that the heat exchanger within the boiler is made of non-toxic stainless steel and that the water is fed through non-copper pipes wherever possible; old copper pipes coated with calcium deposits are only marginally safer than beand new pipes, and there could be instances (during disease treatment) where the medication could combine or react with the copper too with further adverse effects.

The lesson to be learned from all the foregoing is to try to think through all the implications of whatever action you're planning in and around the pond or aquarium before you embark on something that may well turn out to have far-reaching, unexpected results.

You Write ...

Dear Sir,

Reading your June issue we could well imagine how upset Bob and Val Davies must have been to find that a mother hedgehog and her babies had drowned in their beautiful pond. It is easy, though, to do what the Davies' have now done and make your pond animal-safe. All you need to do is place some large stones just below the surface of the water near one edge. If a hedgehog falls in it can easily swim to the shallow area created by the rocks and climb onto them and from there to the safety of dry land.

Many of your readers will know of the existence of the British Hedgehog Preservation Society and its aims:

(1) To encourage and give advice to the public about the care of Hedgehogs, particularly when injured, sick, orphaned, treated cruelly or in any danger.

(2) To encourage the younger generation to value and respect our natural wildlife and, by supplying information and giving lectures, to foster their interest in Hedgehogs.

(3) To fund serious research into the behavioural habits of Hedgehogs and to ascertain the best methods of assisting their survival.

Anyone wishing to learn more about the Society, its activities and the wide range of Hedgehog goods which are sold should send a stamped addressed envelope to: A. H. COLES, British Hedgehog Preservation Society, Knowbury House, Shropshire, SY8 3LQ.

Dear Sir,

When I rang Aqua Company a couple of weeks ago (to order some more O'Clear) I told them how pleased I was last year as O'Clear helped to keep my pond free from green water all summer.

My pond isn't very big — about 10x15x2ft deep so I suppose that makes it particularly hard to keep it free of algae. I would like to have more plants but had trouble getting them started, probably because of the green water, and so the algae could grow as much as it liked. Then I heard about O'Clear and decided to try it and it was brilliant!

The water became crystal clear and it was a pleasure to be able to see my fish without having to feed them in order for them come to the surface. I found the instructions easy to follow and it was a comfort to know that my fish were perfectly safe. The pack I ordered lasted the whole summer and it was the best investment I could have made to really enjoy my pond.

The other thing I appreciated was that Aqua Company was always on call to answer questions about my pond — so all in all it was a good deal.

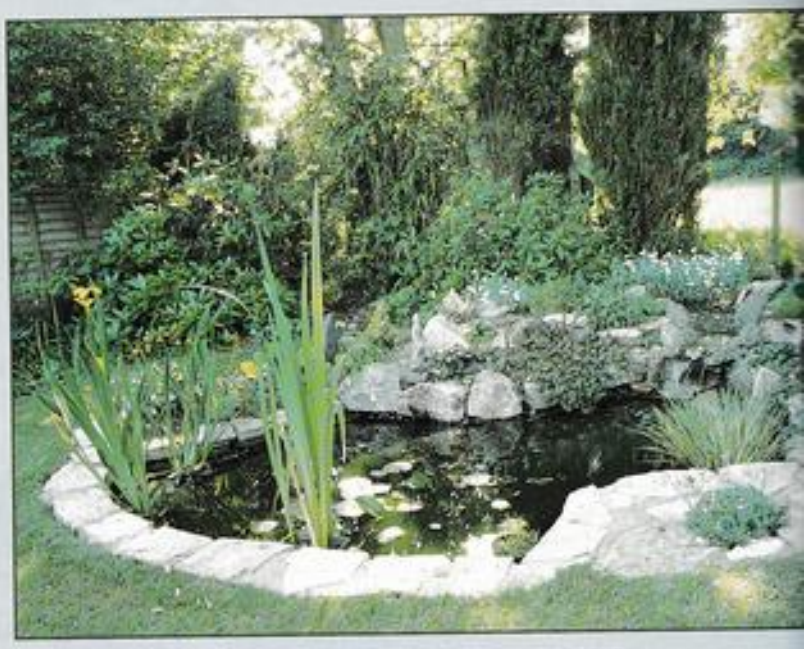
Mr J. R. Clayton,
Ilkley,
West Yorkshire.

Letters for publication should be sent to: THE EDITOR, MJ PUBLICATIONS LTD., CAXTON HOUSE, WELLESLEY ROAD, ASHFORD, KENT TN24 8ET.

SAFETY IN AQ

DEREK LAMBERT LOOKS AT THE HAZARDS IN FISHKEEPING.

• PHOTOGRAPHS BY GORDON WIGENS •



ABOVE
What dangers could be lurking in this picture of tranquillity?
BELOW
Adding extra water is fine but wet pond sides become slippery!
BELOW RIGHT
Raised ponds are safer, and also prevent back problems!

Such a simple subject you might think, but one which is so often ignored with disastrous results. What most people forget is that you are dealing with three very dangerous elements, two of which should never be mixed and the third is an accident just waiting to happen! I am of course talking about water, electricity and glass. Water and electricity are a lethal combination which any electrician will tell you should be avoided if at all possible. Aquarists, however, need to heat, light and filter their aquaria and ponds look better when they have a fountain or mini-stream flowing into them. All these pieces of equipment use electricity and have to be sited in or near water. It stands to reason that we should follow the manufacturer's instructions when wiring up a new piece of equipment and few mistakes occur at this stage. What does create a real problem for aquarists and can lead to a dangerous situation is the lack of available plug sockets. If you have a heater, light and filter in your aquarium you need three sockets, an airpump makes four. New homes are equipped with this number of sockets together so the temptation to wire two or more pieces of equipment into the same plug raises its ugly head. Resist it as all costs! Buy a proper extension lead with a four socket block on the end.

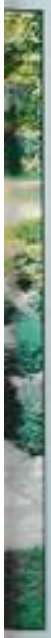
Another dangerous idea is to use plastic blocks to connect wires, especially if they are to be sited above the aquarium in the hood. It is so easy for them to fall into the water creating a short.

Airpumps and filters create a whole range of problems winch may not be lethal to aquarists in the same way but damage to the home can easily occur and fish lives are always on the line. The most common problem with airpumps is created when they don't work for a short time. Water is often sucked back down the airline and into the pump. From there it floods out over the floor and surprisingly quickly soaks the carpet and empties the aquarium. Ideally, site the pump above the aquarium or fit a little one-way valve into the airline to prevent this happening.

Outside power filters often have tubes going into the aquarium which are fixed in place with plastic suckers. For some reason every so often one of these will fail and the tube floats free. Unless it is wedged into place by the aquarium lid the tube can easily slip out of the tank onto the floor. Water will then flood out of it and empty the tank killing all the fish.

Another disaster which so nearly cost a friend of mine all his pond fish was caused by a new fountain. Their old water pump had given up the ghost so a new bigger model was installed and switched on up at the house. From a distance they could see the water shooting up into the air and assumed all was well without taking a closer look. Unfortunately what was happening was

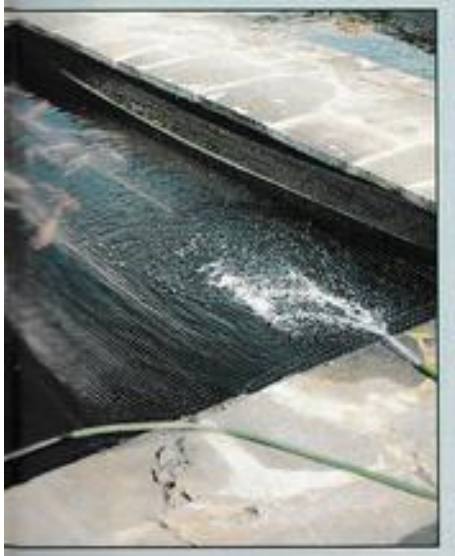
UATICS



the water was being pumped up at an angle and not landing back in the pond but on the rockery at the back of the pond. Within a few short hours the pond was almost emptied of water and the rockery flooded. Fortunately a neighbour saw what was happening and came round to warn them. The fish were saved but many of the rock plants never recovered from the flooding.

Whilst talking about ponds, one of the dangers which is a real worry to parents with small children is the risk of them falling in. This can be a real danger, so it is wise to fence off a pond when you have young children living in the house and when visitors bring children with them make sure they are supervised in the garden at all times.

Children present a set of problems all of their own. This is where the accident just waiting to happen comes in. A glass aquarium can present a real threat to youngsters. If you do have an aquarium in the house with small children, either buy a plastic one or site it high enough so there is no risk of a child tripping over and falling onto it. Adults are also at risk, so make sure you don't have anything you can trip over in front of the tank. In a fish room store a hose out of the way preferably wall mounted. Many's the time I have nearly tripped over in my own fish room because a hose has been left out. A friend of mine did trip over in his fish room and put his hand through the front of an aquarium. This obviously didn't do the fish in the tank much good but he nearly lost several fingers through it as well, so beware, glass is dangerous!

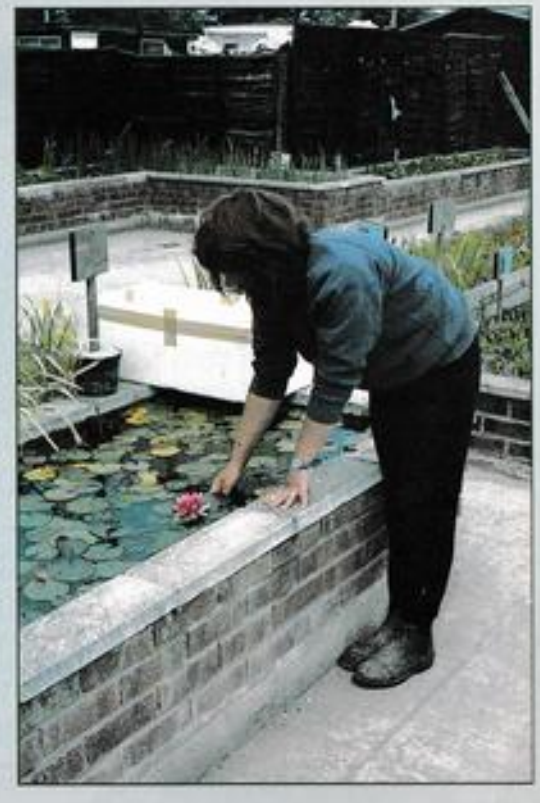


Another safety matter to think about when designing a fish room or even just thinking about the siting of an aquarium is weight. Water weighs 62.5lb per cubic foot, therefore, a 36x12x12in aquarium will weigh about 188lb. The floor in most normal houses can easily cope with such a weight but most stands have a place for a second tank under the first. For some strange reason tanks seem to breed faster than guppies in the early days of fish keeping and soon a room may be given over totally to fish tanks. If this is a downstairs room with a concrete floor then you are laughing but the floor of an upstairs room may not be strong enough to take the weight. I know one aquarist who went out to work with an upstairs fish room, to find the remains of it on the ground floor when he arrived home. Personally I built a wooden stand made with wood which was too thin and had the whole thing collapse a few weeks after.

Another aspect of the weight of water is the strain you put on your body when carrying buckets of it about. This actually twists the spine in a most unnatural way and over a long period of time will cause damage. What I do now is use a small water pump which fits on the end of a hose and pump the water out of the aquarium with that. When filling up I connect the hose directly to the mixer tap and adjust the water to the correct temperature before filling the tank. This way I do not lift a single bucket of water whilst doing my aquarium maintenance, and with 200 tanks to look after this is a great relief.

From time to time you will see advertisements in shops offering second hand tanks but some of these seem to be constantly on display. These are often not an old aquarium someone is selling off because they have lost interest in the hobby, but in fact these 'second hand' tanks have actually been glued together by amateurs who may use second hand glass or glass which is too thin. With these you may think you are getting a bargain but a few weeks or months down the way when you hear a crack in the middle of the night followed by the sound of running water, you will find out it was not such a bargain after all.

Moving on to a few other risks associated with aquarium keeping, there are a few diseases which aquarists have to be aware of. If you keep Terrapins make sure you thoroughly wash your



SAFETY IN AQUATICS

hands after handling them. The bug which causes Salmonella food poisoning is often harboured in the shells of these animals and can very easily be transferred to your food if common sense precautions are not taken. Another disease which has become a real menace in recent years is fish TB. This bug enters the skin through a cut or open wound and causes red lumps, etc., to form near the site of infection. Apparently it is difficult to cure and often leaves scar tissue, so never put your hands in an aquarium when you have an open cut on them. Use rubber gloves or better still wait until it heals.

BELOW
This safety fence around the pond doesn't look too obtrusive.

Now you may be forgiven for thinking being an aquarist is a dangerous occupation, but the fact is few accidents happen and most of those that do can be avoided. With care and common sense this can be a wonderful, rewarding hobby which we can all enjoy into our old age.

frogs & friends

By BOB and VAL DAVIES

Breeding

One problem with breeding reptiles is knowing whether or not they have mated. With species where the sexes are kept separately mating may be observed when they are placed together if the timing is right. There may be an element of risk involved as courtship can be a rather violent affair in certain species and often causes damage — we heard recently of an attempted mating with Reticulated Pythons (*Python reticulatus*), where the male attacked the female so badly that she needed extensive veterinary treatment and will not be used for breeding again.

Panther Chameleons mating — the female shows her receptiveness by the salmon colouration. PHOTO: BOB & VAL DAVIES

In many lizard species the male seizes the female by the neck and damage may occur. Male Plumed Basilisks (*Basiliscus plumifrons*) and Giant Day Geckos (*Phelsuma grandis*) frequently inflict severe bites when mating but they usually heal without trouble. Extensive wounds can be produced by male Blue-tongued skinks (*Tiliqua s. scincoides* and *T. gigas*, especially the latter). The male will grab the female's flank and work his way up to the nape with a series of powerful bites. The damage is not always one-sided. Unreceptive female Blue-tongues may turn on the male and damage him. Other cases include a female Giant Day Gecko which killed an over-amorous male and two female Chinese Crocodile Lizards which turned on the male who persisted with his intentions after mating had occurred. When pairing up Desert Kingsnakes (*Lampropeltis getulus splendida*) the female seized the male's head and would have attempted to swallow him if we had not intervened — two days later they mated successfully.

Female reptiles obviously signal their receptiveness by some means — with snakes scent is used and Tiliqua males will examine the cloacal region briefly before proceeding. Unreceptive female Chameleons use colour change, body flattening and swaying, open jaws and extended gular pouch to deter a would-be suitor. Such display is often sufficient although some males will persist further — the female may submit or will try to move on, often keeping her body close to a branch and even descending on to the floor to make mating difficult. An unwilling female Senegal Chameleon (*Chamaeleo senegalensis*) delivered a series of raking bites causing scarring on the male's side — he eventually gave up!

From these observations it seems that there are critical periods when mating will occur — often they may be of a few days duration only — outside these periods attempted mating can be traumatic for both animals and keeper. With some species pairs or groups can be kept together permanently but obviously mating may not be observed. Our trio of Green Lizards (*Lacerta viridis*) are not separated and they breed without problems. Similarly with our Desert Collared Lizards (*Crotaphytus collaris*) — a useful characteristic of this species is that females, after mating, develop bright orange flecks which seems to deter further attempts by the male. The hatchlings also sport this colouration, possibly to prevent aggression from males. Leopard Lizard females (*Gambelia wislizenii*) use the same method. This trait is useful as the owner can keep watch for oviposition (usually some 30 days after mating).

Staggered hatching

Readers who have bred reptiles may well be aware that the hatching of eggs from one clutch can be staggered but for the first-time breeder it is useful to know that this sometimes occurs. Unhatched eggs should not be discarded too soon — it is also tempting to slit them, thinking that the young creature cannot, for some reason, manage to break out. It is possible that the late eggs may contain weaklings but this is not necessarily so. A few examples of staggered hatching which we have experienced are as follows:

Desert Dragons (*Laudakia stellio brachydactylus*) — eight days from first to eighth egg.

Giant Day Gecko (*Phelsuma grandis*) — 10 days (despite the two eggs being stuck together.

Plumed Basilisk (*Basiliscus plumifrons*) — 14 days between the first and sixth egg.

Chameleo calyptratus — 20 days between first and 14th egg.

Chameleo pardalis — TEN WEEKS between first and last egg!

Chameleo verrucosus — 30 days between first and 19th egg.

In the above examples the eggs in each clutch were incubated in the same container and therefore subjected to the same temperature and humidity requirements for that species. As a contrast, Leopard Geckos (*Eublephorus maculatus*) have usually hatched within 36 hours (at the most) of each other. Large clutches of snake eggs tended to hatch over a period of four days.

Once the egg has been slit the baby may take some time to emerge — again it is tempting to interfere, but not always wise. Disturbance may cause it to move out of the egg prematurely with yolk still attached. The yolk tends to be torn off as the creature moves around the hatching box thus depriving it of valuable nourishment. Some hatchlings will voluntarily emerge with some yolk but others remain in the egg until it is all absorbed. Hatchlings with remnants of yolk are left in the hatching box so that the yolk might be absorbed before it becomes detached.

It is difficult to know when assistance is needed. Hatchlings which need help are usually weaklings and may not thrive. Two *C. calyptratus* babies seemed to have difficulty in emerging — the slit appeared tight around the neck. One was left alone, the slit was enlarged on the other and although it emerged it was

A Baby Desert Dragon making an appearance eight days before some of the other eggs in the clutch. PHOTO: BOB & VAL DAVIES

undersized — neither of the two survived. Emergence from the egg (after the slits appear) can be anything up to two or three days. A Sinaloan Milk Snake (*Lampropeltis triangulum sinaloae*) emerged only to return to the egg several times before finally leaving it after two days. Several Chameleon species have averaged 24 hours. In some cases the eggs which have hatched later than others have contained larger young.

Conservation

The Declining Amphibian Populations Task Force (DAPTF) has been mentioned previously. Established in 1991 to organise the study of declining amphibian populations it operates through a network of some 80 Working Groups. At the moment there is no Working Group in the UK as two existing organisations are already concerned in this work. If you wish to become involved in amphibian conservation and monitoring contact either :

The British Herpetological Society, Zoological Society of London, Regent's Park, London. NW1, or Jim Foster, Common Species Officer, HCIL, Triton House, Bramfield, Halesworth, Suffolk IP19 9AE.

Herpetafauna Conservation International Ltd. (HCIL) is a non-profit making company concerned with the conservation of reptiles and amphibians. The company issues a number of useful Advice Sheets on various topics. Particularly useful is Advice Sheet No. 7 on 'Unusual Frog Mortality' which provides information on the causes of death in amphibians. One common cause of Frog mortality is often called 'red-leg' — the leaflet shows a colour photograph of this condition which will help you to recognise it. Any one observing unusual mortality in amphibians, in your garden pond or in the countryside, is asked to report it to Frog Mortality Project (01986 784518) or FMP, PO Box 1, Halesworth, Suffolk IP19 9AE. The Frog Mortality Project is a partnership between HCIL and the Institute of Zoology, London. It is part-funded by the RSPCA. To date over 1,500 incidents of unusual mortality have been reported by pond owners.

© *Continued on page 36*

Nile Monitor, one of a few live specimens still imported. This specimen is very young but possesses a powerful bite.
PHOTO: BOB & VAL DAVIES

CITES News

The demand for reptile skins seems to continue unabated. The latest CITES release gives details of import quotas agreed by the EU member states for 1996. Of particular note was the quota for Nile Monitors (*Varanus niloticus*); Benin-8000 'ranched' (not stated whether skins or live), Cameroon — 70,000 skins, Chad — 80,000 skins. Relatively few live Monitors are imported — their eventual large size and uncertain temperament make them unsuitable subjects for life in a vivarium, although people do buy them as babies and they are relatively easy to feed. What to do with them as they grow is a problem.

CLUBS

LIVE IN ESSEX and interested in reptiles/amphibians? E.R.A.S. meet in Witham on the second Thursday of each month. Contact 01621 819675 for further information.

◀ Continued from page 34

London Zoo

Way back in October we visited London Zoo for the first time in several years. It was an interesting day. The zoo has over 600 reptiles and amphibians although not every species is on display. Particularly pleasing was the way the vivaria were furnished, not an easy task bearing in mind the animals must be as visible as possible for the public yet need adequate cover — looking at a permanently empty cage is disappointing but reptiles and amphibians do need to hide at various times.

Of special interest to us were Werner's Chameleon (*Chamaeleo werneri*) and the Arrow-poison Frogs (*Dendrobates tinctorius* and *D. auratus*). Like many zoos, London has now become concerned with the captive-breeding of rare and endangered species rather than simply presenting a varied collection of animals for public entertainment. We were informed that a project to breed Britain's rare Smooth Snake (*Coronella austriaca*) is under way. Other rare herps include the Mexican Boxturtle (*Terrapene coahuila*) and the Egyptian Tortoise (*Testudo kleinmanni*) both classed as vulnerable. Certainly worth a visit — an enjoyable way to pass the day.

Native species

Some years ago books on keeping reptiles usually had a section dealing with the Slowworm (*Anguis fragilis*). This harmless lizard was, for many people, their introduction to the hobby. It was often for sale in pet shops or could be obtained from the wild in many areas. Possibly less popular today — maybe keepers are reluctant to take it from the wild or maybe they just prefer the more exotic species which are available and which may be more active, as the Slowworm tends to be rather secretive, spending much of its time in a warm hiding place. Many accounts describe their food as slugs, worms and insects but we have never known them eat crickets or mealworms. The two former items are taken readily but not all types of slugs are accepted — some slugs may be distasteful or even toxic. Those preferred are the greyish-white (*Agrolinox*) and a similar light brown, soft-bodied species (as yet unidentified). Brandling Worms likewise must be avoided. In hot, dry weather when the above items were scarce, they have accepted Waxmoth larvae.

A vivarium for Slowworms needs to be slightly humid (SLIGHTLY - NOT SODDEN). Leaf litter, loam or moss can be used as a substrate and a piece of cork bark makes a suitable hiding place. An occasional light spray will maintain the necessary humidity. Mixed groups can be kept together without problems — they make suitable inhabitants for an outdoor enclosure although precautions may be needed against predation by cats, birds, etc.

Although not classed as endangered, Slowworms are protected against deliberate killing or injuring and cannot be sold. Being livebearers Slowworms are not difficult to breed and in these days of habitat destruction, pollution, etc., interested parties could consider breeding them for release into the wild. Before doing this it is advisable to consult your local Wildlife Trust, Herpetological Society, or the BHS Conservation Officer to find a suitable site — they will not survive just anywhere.

DAVID TWIGG'S

KOI CALENDAR

August, the height of the summer, brings the top Koi Show in the country, if not the world (outside of Japan). The British Koi Keepers Society Annual Open Show KOI '96 takes place again at Billing Aquadrome near Northampton over the weekend of 10/11 August. This Show attracts both visitors and exhibitors from all over the world, particularly from mainland Europe where the Koi hobby has taken off over the last few years. The new and enlarged showground, first used last year, houses dealers not only of Koi but all sorts of associated products from bottom drains to Bonsai and pipework to pictures of Koi. A large Craft Tent as well as plenty of children's entertainment help add to the family atmosphere of the event.

If there is a Show in the UK that you should do your best to attend, this is it. The quality of the Koi on display is always extremely high and this year will, I'm sure, be no exception. Whether you attend with the intention of purchasing or just viewing Koi then your requirements should surely be met but that is not the only reason for the Show. It is an opportunity to further one's interest and knowledge of these wonderful fish and we do that by meeting and talking to Koi keepers of like mind whilst, maybe, standing over a Vat containing Koi or indeed partaking of a cup that cheers! I look forward to meeting you there.

The Cleanwater Koi Direct staff at work in a packed dealer tent at last year's show.

PHOTO: DAVID TWIGG

If you are one of those taking your Koi to any Show, not just KOI '96, then it would be wise not to feed them for at least three and preferably five days beforehand. It is better that the consumed food is turned to waste and deposited in your pond where it can be dealt with efficiently by the filter, rather than in the Show vat where it could cause water quality to fall rapidly. I know that Show organisers work very hard to maintain high quality water throughout the time your fish are with them. By not feeding for those days you will be helping them greatly in achieving their aim.

Even if not showing Koi then this really is the month when our Koi are at the peak of health. Water temperature should be at its highest and the fish will be eating us out of house and home, growing like mad and producing lots of waste. It is therefore imperative that we keep on top of the housekeeping tasks. Pull bottom drains and backflush vortex and other filter chambers regularly to ensure minimal build up of waste and thereby minimise water pollution from that source.

Aeration of the water at the elevated temperatures during the summer months is very important particularly in planted ponds where the plants take oxygen from the water by photosynthesis thus reducing the amount available for the Koi. If a summer thunderstorm is added to this situation the problem becomes doubly dangerous. Air pumps, e.g. HiBlow, are now in regular use by Koi keepers and are used not only in the pond itself but also, perhaps more importantly, in the filtration system, particularly under the filter media to give extra oxygen to the nitrifying bacteria. Use of a venturi is another way to aerate the pond water. These devices also provide a movement of water around the pond. So if you have poor circulation in your pond, a venturi may solve two problems at once.

Show results.

My thanks to George Rooney for sending me the results of the South Hants Show that took place over the weekend of 26/27 May. Val Frost and her team of Judges came up with the following winners:

CHAMPIONS: Grand, Size 4 Kohaku, Dennis Brown. Mature, Size 5 Sanke, Dave Wooldridge. Adult, Size 4 Kohaku, Terry Bee. Baby, Size 2 Sanke, Eddie Aiston. Tateigoi, Size 3 Sanke, G. and K. Rooney. Jumbo, Size 6 Hikarimuji, Keith Rose. Junior Challenge Shield, Size 3 Hikarimoyo, Andrew Rose. Crystal Challenge Trophy, Size 5 Sanke, Dave Wooldridge.

Best in Size: 1, D. Wooldridge. 2, E. Aiston. 3, T. Bee. 4, T. Bee. 5, D. Wooldridge. 6, K. Rose.

Best in Class: Kohaku Size 1, D. Wooldridge. Size 2, M. Friday. Size 3, D. and P. Carter. Size 4, T. Bee. Size 5, K. Rose. Sanke Size 1, M. Friday. Size 2, E. Aiston. Size 3, A. Purnell. Size 4, K. Rose. Size 5, D. Wooldridge. Showa Size 1, M. Friday. Size 2, I. Froome. Size 3, T. Bee. Size 4, E. Ruddick. Size 5, T. Bee. KinGinRin Size 1, D. Wooldridge. Size 2, D. and P. Carter. Size 4, A. Purnell. Tancho Size 1, D. Brown. Size 2, I. Froome. Size 3, L. Picot. Size 5, K. Rose. Asagi/Shusui Size 2, I. Froome. Size 3, I. Froome. Size 4, R. Bryan. Size 5, T. Hill. Utsuri Mono Size 1, J. Brennan. Size 2, D. Brown. Size 3, D. and P. Carter. Size 4, T. Bee. Bekko Size 2, T. Hill. Size 3, D. Wooldridge. Size 4, G. Mortimer. Hikari Utsuri Size 3, T. Hill. Size 4, I. Froome. Hikari Muji Size 1, E. Aiston. Size 2, A. Purnell. Size 3, R. Bryan. Size 4, T. Bee. Size 5, D. and P. Carter. Size 6, K. Rose. Koromo Size 2, D. Brown. Size 3, D. and P. Carter. Hikari Moyo Size 1, T. Hill. Size 2, K. and D. Harrison. Size 3, G. and K. Rooney. Size 4, T. Hill. Kawarimono Size 1, L. Ayre. Size 2, L. Picot. Size 3, K. and D. Harrison. Size 4, D. and P. Carter. Size 5, D. and P. Carter.

KOI MEETINGS IN AUGUST

1 Suffolk & North Essex Section BKKS. Monthly meeting. Contact Mavis Carter, 01206 866011
1 North of England Koi Chapter of Zen Nippon Airinkai. Monthly meeting. Contact John Timmis on 01226 289507
1 Middlesex & Surrey Borders Section BKKS. Speaking on 'Bonsai' is John Southworth. Contact Sharon Peacock on 01252 719478
7 Leicestershire Koi Section BKKS. Monthly meeting. Contact Mick Reffin, 0116 2712517
12 North Lincs Koi Society. Open meeting. 8pm, Brackenborough Arms Hotel, Nr. Fotherby, Lincs. Contact Secretary on 01472 826605
12 Northampton Section BKKS. Monthly meeting. Contact Albert Day, 01604 407361
13 Nottingham & District Section BKKS. Speaker is Adrian Barnes of Pisces Aquatics. Contact Shirley Hind on 0115 981 0923
14 Merseyside Section BKKS. Speaker is Dave Wiggley. Contact Phil Adamson, 0151 220 2970
18 Scottish Section BKKS. Summer pond visit. Contact Archie Dick on 01786 832073
18 Northern Koi Club. Open day for club ponds in Wigan, Preston & Skelmersdale areas. Contact Tony McCann on 0161 794 1958
18 Crouch Valley Section BKKS members open ponds and BBQ around Laindon, Essex. Contact Ron Parlour, 01277 840863
20 Northern Koi Club. Beginners Seminar Part 2. Contact Tony McCann on 0161 794 1958
21 Crouch Valley Section BKKS. Koi Quiz in Laindon, Essex. Contact Ron Parlour, 01277 840863
28 Ireland Section BKKS. Meet 8pm at the Cregagh Cricket Club, Cregagh Road, Belfast. Contact Secretary on 01247 467171
29 Oxfordshire Section BKKS. Monthly meeting at 'The New Club', Wheatley. Contact Kevin Newton on 01865 874008

My thanks go to all Koi club Secretaries or PROs' and others who send me their latest calendar for inclusion in this column. Although I do my best to ensure all events are mentioned it may be that some information, which arrives a little late, misses my deadline. Ideally I need to have information at least 10 weeks before the date of the event to guarantee publication. You may of course ring me direct on 01926 495213 or fax on 01926 403500, which will allow a little leeway. This request also applies to dealers with special events, auctions, etc. I look forward to hearing from you. All Koi keepers are welcomed to the events mentioned in this calendar (an entry fee may be payable). Further details can be obtained from the contact telephone number quoted alongside the diary entry. Please write to me at your earliest convenience via the Editor at MJ Publications Ltd, Caxton House, Wellesley Road, Ashford, Kent, TN24 8ET. Thank you.

1996 SHOW CALENDAR

AUGUST
10/11 BKKS National Show. Billing Aquadrome, Northampton. Contact Lou Jackson on 01322 463669
25/26 South East Section BKKS Open Show at Ravenswood School, Oakley. Contact Alan Maskell on 0181 6985779
31/1 Mid Somerset Section BKKS Closed Show as part of the Countryside Cavalcade at the Royal Bath and West Showground. Contact Colin Baker on 01935 840389

SEPTEMBER
8 Avon Section BKKS. Closed show at The Grange School, Warmley, Bristol. Contact Show Secretary on 0117 949 1061
8 Leicestershire Section BKKS. Annual Show at Stoughton Farm Park. Contact Mick Reffin, 0116 2712517
21/22 ZNA North of England Chapter. 1st Annual Open Show (Japanese Style) at the Avesta Sports Club, Bawtry Road, Sheffield. Contact John Timmis on 01226 289507
29 Northern Koi Club 4th Annual Open Show (Japanese Style). Cascade Water Gardens, Radcliffe, Manchester. Preceding this Sunday show on the Saturday afternoon, 3-5pm, is a celebrity speaker. Further details from Tony McCann on 0161 794 1958

Supplement

PHOTO: GORDON WIGENS

CHOOSING & TRANSPORTING KOI

An AQUARIST & PONDKEEPER Publication

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CHOOSING & TRANSPORTING KOI

PHOTO: GORDON WILKINS

The King of the pond (and Queen, too, if we're being politically correct) must be Koi and, like royalty, they have just as many devoted admirers. Sometimes, again like royalty, there is a mystical barrier erected by those 'on the inside' which almost denies entry to those not 'in the know' but desperate to join in this most attractive aspect of the hobby.

Of course, with such marvellous fish there is much to learn about their finer points (of which their admirers will claim there are many) but where to start? What should we be looking for? Is it merely a question of just having enough room in your pond and money in your wallet? How to choose the right fish (in any area of fishkeeping) is usually fraught with potential risks but we've got David Twigg, our resident Koi columnist, to set you off on the right road.

Having obtained our chosen fish the first thing to do is get it home safely. Subsequently, when you've grown accustomed to its face, grown it up a bit so that all its finer points have become accentuated, there's a fair chance you'll want to show it off a bit here and thee. Both these two travelling occasions will present extra stress-inducing opportunities from which your pride and joy may not survive unaffected. Barry Goodwin's item in this Supplement might well have been retitled 'Have Koi Will Travel' for he has applied his mind to making Koi journeys as uneventful as possible.

Just when you thought your fish were safe, along comes Mother Nature (or maybe Man's negligence) to upset things. Overcoming a major disaster can only be done with help and that's when you find out who your friends are — just ask David and Debby Hester.

Returning to the opening premise, one of the first 'barriers' encountered by would-be Koi owners are 'those names'. We have selected a few of the most commonly encountered and provide translations for you, together with some pictures of some varieties that may be unfamiliar to you but which are just as breathtakingly beautiful — the camera certainly doesn't lie on this occasion.

Contents

Scaled and Deutz Hariwake. The scaled Hari on the right shows uneven yellow colouration along its back. In this case on a 24in fish it has deteriorated with time as the Koi grew. When bought at 17in it was even all over.

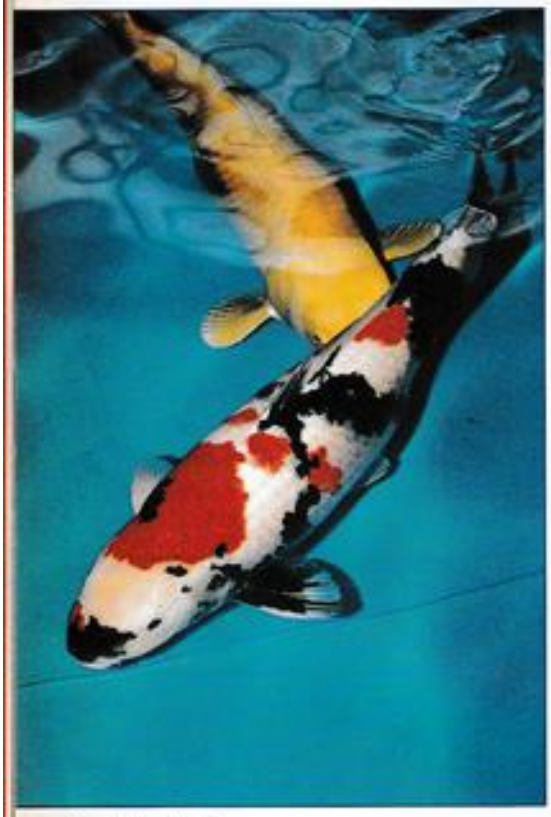
SELECTING KOI FOR SHOWING OR PLEASURE

DAVID TWIGG IS POSITIVE THE TWO CATEGORIES ARE COMPATIBLE.

• PHOTOGRAPHS BY THE AUTHOR •

CHOOSING & TRANSPORTING KOI

Selecting Koi



Very high quality Showa.

August is the month of the Koi in the UK. It is the month when they will almost certainly put on most growth and certainly be admired by all one's friends and relatives who pay the Koi keeper a visit. It is also the month of the largest Koi show in the UK, Koi '96.

Probably the visitors will look at the vats (plastic containers generally between 4 and 8ft (1.2 to 2.4m in diameter) full of fish with an inexperienced eye and be overwhelmed by their sheer size and beauty. On the other hand, it may be that the vats will be given the once-over by experienced members of the Koi fraternity and they will be much more critical of the vats' contents.

Why should this be? What will the 'knowledgeable' Koi keeper see in these fish that the non Koi keeper doesn't? These are the points to be considered in this article.

When my family became hooked on the Koi bug it was through buying from our local aquatic centre a shiny gold fish, now known to us as an Ogon, as an addition to our small collection of coldwater fish in our, at best I guess, 200 gallon pre-formed fibreglass pond.

That first Koi was bought because we were attracted to its bright, shiny scalation and fins that made it stand out amongst the other Koi in the dealer's tank. This is the way that the majority of people select their stock even when they have been in the hobby for many years. Appreciation, developed over time with observation and discussion, makes choosing a new pet more difficult as time goes by. The fish meeting the most recently acquired criteria become less and less available and respectively more expensive. Unless the local aquatic centre has a specialist Koi section then it is probably necessary to visit a dealer who trades in nothing but Koi in order to find a fish that is of the quality required.

Our Editor asked me to write about Koi from two angles, namely purchasing Koi for pleasure and buying with the idea of entering the Koi into shows. As you can see from the above these two aspects merge into one with time; hence the title 'for showing and pleasure'. It is almost certain that early fish purchased for pleasure, unless from a specialist dealer with his/her guidance, will not be of show quality. This latter option is available to anyone, regardless of knowledge of the hobby and basically their only guide will be price, i.e. the higher the price, the better the Koi.

This is, however, only one aspect of Koi keeping. There are others, not least of those is that of looking after them as 'pets'. They are extremely friendly beings that become as important in their keeper's life as the pet dog or cat. Many owners give them names and treat them like children! It is often those early purchases, likely of lesser 'quality', that are the favourites of the family even when knowledge of the hobby has improved. One of those early Ogons that I purchased had a personality all of her own and, until she sadly passed on a short while ago, would not only come to the hand for food (she was invariably first there if any was on offer) but would allow me and my family to lift her out of the water without any fear. Bought at about 4in (10cm) 15 years ago, she was 22in (55cm) when she died and even though she didn't have a clear head and good quality metallic skin (prime requirements for an Ogon) she was still our favourite Koi in the pond.

Koi are produced in a variety of colours and combinations of colours all aimed at a particular set of criteria. Because the Ogon is a single coloured Koi it is most important to have not only a clear head (close inspection will often reveal marks on the surface or 'thinning' of the colour) and highly lustrous shiny skin quality but most importantly a good body shape and that includes the head. Well proportioned finnage, size and position of mouth and properly seated eyes are other appreciation points to be looked for when purchasing a show quality fish.

These points and others in multi-coloured varieties, such as clarity and balance of pattern, depth and evenness of colour and scale shape and alignment all go to make a 'perfect' Koi. In recent years some famous people and their collections of Koi have made the headlines and people have become more aware of the high prices commanded by some Koi. These fish are of course the exception rather than the rule and most Koi keepers, although admiring such fish for their almost total collection of high quality points, have more modest collections of dearly loved Koi in their ponds at home.

So then, which pond do you fall into? Are you new to the hobby or about to join it or are you improving you knowledge at such a rate that you wish to try your hand on the show scene? I guess that there are two rules of thumb (Koi keeping is full of them) that should be considered. If you are in the former group then it is probably better to choose healthy Koi that are attractive to

▶ *Continued on page 49*

◀ Continued from page 46

ABOVE
Excellent example of Kohaku with well shaped and coloured fins and well balanced and pleasing pattern.

RIGHT
The really shiny metallic skin quality of this Kujaku is shown in this picture.

you, at a price you can afford, such that you will have a pond full of fish that you like, will be proud to show to your friends and will be happy to spend time on in order to keep them healthy. If you fall into the latter group then you have two choices: (a) pick fish on your own judgement; or (b) spend time with other knowledgeable Koi keepers discussing the merits of any particular Koi before making your purchase based upon those deliberations.

So, I shall try now to summarise the things to look out for when selecting a beautiful Koi for the pond. These apply whether they are intended for showing or not but will obviously become more important if the show scene is the chosen route. Remember that beauty is in the eye of the beholder and before we part with our money we have to be sure that we select a fish that is not only beautiful but also healthy.

The longer we keep Koi the more critical our appreciation becomes of the fish we wish to add to our collections. Some of the points considered are listed below and it is not intended to be an exhaustive list as we each have our own view through our own eyes. They are however probably considered the most important general points that hold good for most, if not all varieties of Koi. I will look at each of these in turn.

1. COLORATION

The Kohaku (white fish with red pattern) is a good example. Firstly the Hi (red) must be a good red (although the orangy reds are acceptable in certain circumstances) and the white must be a good white. Secondly, the Hi must be even in coloration. Sometimes you will see that it fades (or thins) in places.

2. PATTERN

Using the Kohaku again as the example you will know from reading books that there are one step, two step, three step, inazuma (lightning) etc., patterns. Yes these fish do exist but more important is the overall effect of the pattern. Is it balanced? Is it pleasing to the eye? Another point to be considered here is the 'Kiwa' or edging

CHOOSING & TRANSPORTING KOI
Selecting Koi

to the pattern. A clean line on the trailing edge of the Hi pattern is much preferred: difficult to obtain on the leading edge due to overlapping white scales that can cause a 'bleeding' effect to be seen. If buying a small fish then the pattern should be 'heavy', i.e., a larger proportion of red than white. This is because the pattern on a white based Koi never seems to grow at the same rate as the base colour.

3. BODY SHAPE

It should be a full well rounded appearance and either cigar or airship shaped. Generally the body widens just behind the gill covers and then starts to taper in towards the tail. The head shape also falls into this category; it too should be seen to be well rounded and certainly not described as 'pointed'. The most highly valued fish are generally female and they can be seen to have a long deep 'tummy'.

4. SKIN QUALITY

This is more difficult to define, but the easiest way to check it out, if in doubt, is to look at the fish in a basket or bowl and observe the skin when the back of the Koi comes out of the water. It really should lustrous shine, have a 'depth' and glisten.

5. EYES

These are often overlooked! The most obvious to look for here is how they are seated. If by your judgement they look either too sunken or protruding then it would be wise to reconsider that choice. Compare the eyes with other Koi of similar size in the same vat for confirmation. Eyes should also be bright and shiny and show no sign of cloudiness.

6. FINS

These should obviously be all there. Yes, I did buy a Koi from a well known outlet that was missing a ventral fin; observation was not my strong point at that time! In the GoSanke varieties (Kohaku, Sanke and Showa) fins are usually white at the muscle and become increasingly translucent as they extend to the edge. Often the edge is almost transparent. Other varieties can be a solid colour throughout but whatever the variety there should be no obvious colour or shape defects.

Kikisui — a Deutz Metallic Koi. Long slender body suggests male gender.

7. HEALTH

Things to look for are obvious signs of damage (liable to bacterial infection), mis-shapen body or damaged fins. Signs of possible illness are raised scales, sunken or protruding eyes, or large heads and thin bodies. Some parasites are visible to the naked eye; the two most obvious to look for are Argulus (Fish Louse) and Anchor Worm.

So, having picked the best fish in the vat what comes next? Well, before taking it home you must assure yourself to the best of your ability that the fish is, as mentioned above, healthy. It doesn't matter if you spend £5 or £500 on the Koi of your dreams, if it dies the next day your dream is shattered. Give the Koi of your choice a good long hard look before making the final decision. Watch the fish for as long as possible and take particular note of the way it swims (not laboured or jerky motion), breathes (gill covers not opening and closing too widely or rapidly), eats and most of all how it mixes with the other fish in the pond. Inactivity is a possible sign of a problem although fish are just as in need of rest (as we all are!) and do take 'time out' to relax. This time spent watching the Koi of your choice pays dividends because you will be more able to differentiate between rest and illness.

Run your eyes along the body below the lateral line on both sides and then along the underside from mouth to tail checking for soreness or ulceration; pay particular attention to the anal vent and fin. This check can often be made when observing feeding but most dealers will be happy for that final check to be done in a polythene bag if this really is the fish you desire.

It is probable that there are other points that the knowledgeable Koi keeper will look for to satisfy his/herself as to the quality of a particular fish but the above will give the person selecting, beginner or otherwise, a good start. The finer points really have to be discussed variety by variety as, for instance, one does not find a Kage Ogon; Kage being a feature of the scalation, but is that the equivalent of Matsuba in the metallic varieties? There are many debating points when it comes to the finer aspects of Koi appreciation and even judges find themselves differing in opinion from time to time. Where would any hobby be without discussion and difference of opinion? Boring! Koi keeping is certainly not that!

Finally, please remember not to let your enthusiasm for the beauty of the fish over-ride your need to be critical of health as it is very difficult to be objective when its 'love at first sight'. Happy hunting.

A CHILLING TALE ...

(or you get out what you put in)

David and Debby Hester relate a chilling tale with a heart-warming conclusion.

At first as you read this article you may think the title a bit strange. Please read on and it will soon become clear to you. As members of Mid Atlantic Koi Club, Debby and I have never shied away from the call to help at club events. We enjoy it, and have made many new friends in doing so. Being a volunteer with any organisation requires that you give some of your time and energies for a worthy and or enjoyable cause without being paid.

One Saturday in February after the 'Blizzard of '96 Part 2' I loaded our snow blower in the trailer and Debby and I headed for the in-laws. Never miss a chance for the son or daughter-in-law-of-the-year-award. We spent about four hours clearing snow at both parents' houses and then headed home.

On the way we talked of stopping for dinner but decided to go straight home since we had our four-legged son with us. Once home Debby went to check the answering machine and I went to check the pond. It was almost dark and 6in of snow on the cover made it even darker. I turned on the floodlights and looked over the edge.

I have no idea how long I stood there frozen in place with my mouth open and heart stopped. What I saw was 10,000 gallons of water gone, and all of our fish (70) lying on the bottom. I believe that one of the fish flapping around snapped me out of it.

I soon noticed that a few of the fish were still breathing. I screamed for Debby and while she stood there in pretty much the same pose as I had, I did the first stupid thing that came to mind — jumped into the pond. Never jump into an empty slime-coated pond. I think I deserved a 9.9 for freestyle creativity!

Now both of us in a panic resembled the proverbial chickens with their heads cut off. I told Debby to get some old towels, not knowing what caused the water to drain. I stuffed the towels into the bottom drains. Debby passed me the hose and I began spraying the fish and refilling the pond. Our water supply is a well — the upside to this being no chlorine, the downside being low oxygen. Our well water stays around 45-50°F year round. The pond water temperature was around 41°F before it disappeared. The air temperature was expected to be about 5°F that night. As the pond filled I instructed Debby to fill the bathtub and set up the hospital tank. Then I changed my mind and said no, get our 8ft show tank and set it up instead; no do the tub, no do this, do that. In spite of my babbling, Debby got the tub filled.

I started handing her our favourites first. Trying to decide who to save first was very disheartening, so I did the logical man thing and went by the price! After about ten fish we realised that we could not do this alone. While Debby fumbled with the show tank I jumped out of the pond and grabbed the phone and called Dick and Betty Roemer. 'Short and sweet, this is David, our pond is empty, the fish are still alive, we need help!' I was not quite sure what she said, but I knew help was on the way. She later confirmed that she said, 'Dick will be right there.'

Soon Dick Roemer showed up with a 'Brute' tank and set it up on the deck. I handed fish to Dick and he placed them in the tank. This tank now full, Dick went downstairs to help Debby with the show tank. Larry and Laura Lunsford arrived with pumps and airstones. Larry went downstairs and set up an air pump with the show tank and Debby and Laura shuttled fish from the pond to the tank.

By now there was about 6in of water in the pond and the little guys that were left were now swimming. Dick suggested that the fish rescue was under control and we should try to find the cause of the water loss. With flashlights in hand Dick, Larry and I trudged through the snow around the filters under the deck. Both pumps were stopped, but there was no immediate sign of how the water escaped. We soon noticed that both filters, pumps and the side of the house were covered in a sheet of ice. Tracing the pipes we found the cause. A rubber fitting with two clamps that I used had popped loose and the pump had pumped the pond dry, giving the second pump a wash down in the process.

We fixed the problem with the connector, then discovered the valves that control water from the bottom drains and the valves on the two bubble bead filters were frozen but not broken. The concern now was the filters, pipes and UVs freezing up and being destroyed. Dick suggested that we get the filters running again as soon as possible. Larry and Laura went home to get a portable heater while Dick and I built a plastic tent around the filters. Wayne Orchard showed up and helped us finish the tent, and when Larry and Laura got back he helped Larry lug the heater around back. This heater looks like a jet-engine, sounds like one, too.

In no time the heater got it nice and toasty under there and I was able to shut the valves from the pond The drain valves on the filters were still frozen so we decided to go in the house for a while and let the heater do its thing. When I got in the house I discovered to my surprise that Larry and Laura had stopped at Taco Bell on the way back and brought food and drink for everyone. I don't remember telling them that we had not eaten, but sometimes friends just know things. So we sat in our dining room and did what comes naturally when Koi people get together — eat and discuss Koi stuff! While we were sitting there Betty called to see how things were going, then Charles Walker called and offered to take some of the fish to his indoor tank. Next Susan Boland, Debby Bocnek, and Wendy Marris called all offering more help. Now well fed, it was back to work; we got one filter started and the other one drained. The pump that got the 10,000 gallon bath was DOA.

With the pond about 12 in full now we decided that the fish would be better off back in. I wish I had thought to take a picture of the eight 20in+ fish in the bathtub, it was a sight. So back in the pond I went and Wayne, Larry, Laura, Dick and Debby shuttled fish. As of this writing we lost one 6in fish; only time and spring will tell what effect the stress will have. Dr Johnson gave me a list of preventive steps to take. I had a spare pump and got the other filter running. I took the other pump in for a repair estimate.

The people mentioned above stayed until midnight They and many others called over the next few days, checking up or offering help. Two dealers called and offered free loan of a pump and other equipment. Remember the title of this article? As far as Debby and I are concerned, we're convinced we got back double what we put in. That's one of the things MAKC and all Koi clubs are really all about.

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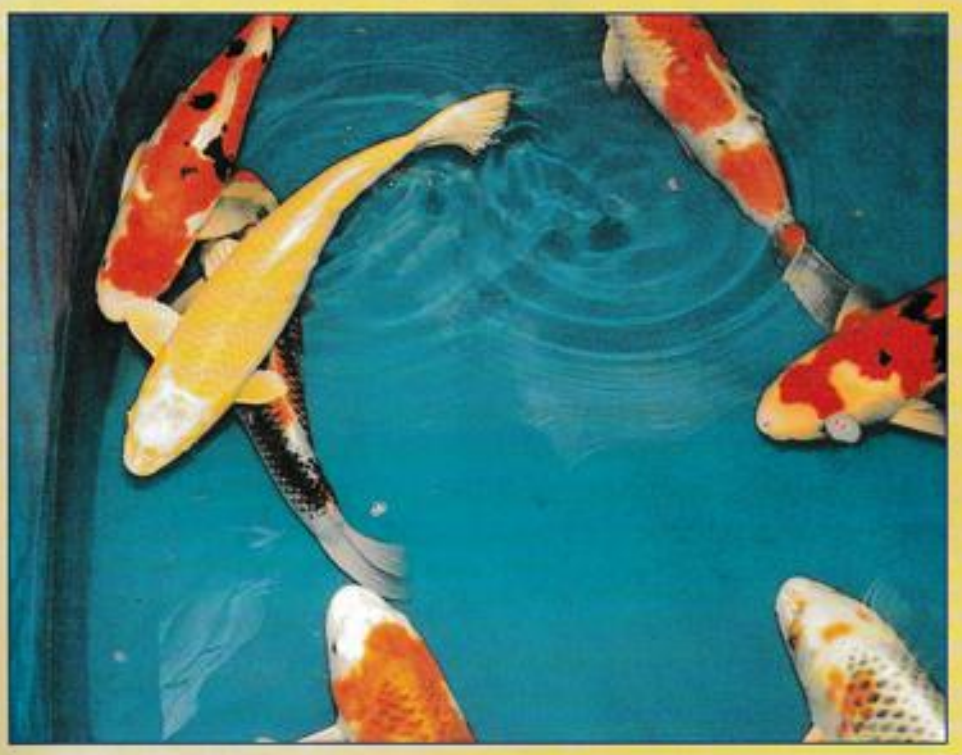
IT'S IN THE BAG!



To ensure that your Koi arrive safely at a show you must plan your every move carefully. The importance of water quality will ensure less cumulative stress for your fish.

BARRY GOODWIN
SHOWS HOW TO SAFELY CATCH, PACK AND TRANSPORT KOI.
• PHOTOGRAPHS BY THE AUTHOR •

Transporting your Koi from one place to another, even if it is done correctly, is still a very traumatic experience for the Koi that can lead to all sorts of complications. If it is done incorrectly, using the incorrect design of net to catch the Koi, or the wrong size bag, or without oxygen, or without a polystyrene box to correctly insulate the Koi for its journey, then you have a recipe for disaster on your hands. In the case of those Koi keepers who show fish, they should be past masters of this art, and if you are not sure how to go about it, then you should seek out a hobbyist who shows his fish and get him to teach you the finer points. If you are considering transporting your Koi to a show, then be careful to obey the number one commandment . . . starve your Koi for about four days prior to packing and transportation. This will lower the solid waste matter

CHOOSING & TRANSPORTING KOI

It's In The Bag!

ABOVE
A Koi sock.

BELOW
A floating net of the type discussed in the text.

from the Koi, and also lower the excretion of ammonia slightly.

We should begin at the beginning really, and that is with the Koi net. It is surprising how few Koi keepers have the correct net available, and when it comes to catching their Koi, it cannot be done without causing a lot stress and possibly physical damage to the Koi.

The size of net is important, and this will be determined by the size of fish that you have in your pond. A good all round size of net would be 20in diameter (not less, even for smaller Koi) and round in shape. Very large Koi may need a net of 26in or even 30in, but these are very difficult to manoeuvre with any effect. A good sturdy handle is also very necessary. The net should be of the 'pan' type, with not very much depth or volume to it at all. The reason for this is that it is too easy to get a Koi entangled by its fins in a net of any volume and as this usually involves a dorsal or anal fin which sticks through the mesh of the net, a lot of damage can result. It happens that the leading ray of the fin goes through the mesh of the net, stripping the membrane of the fin, and locking itself to the net fabric by seeming 'barbs' on the torn edge. This is very hard to remove without further damage to the Koi, and is usually only possible by cutting the net. It follows that a Koi should never be lifted out of the water in a net, but merely guided towards a suitable bowl, where it can be lifted clear of the pond or vat, together with a quantity of water, to be packed for transit.

If you have large Koi, then the procedure is the same, and it does not really matter that the Koi is bigger than the net, as you only seek to guide it towards the bowl. If it turns out that the weight of the water in the bowl is greater than you can lift from the pond, because of the size of the Koi, then you can, if you are expert enough, bag it directly from the bowl or net, or use a Koi sock to transport it to another bowl which has been prepared with water outside of the pond. You can, in this instance, use a floating net in the pond to hold your Koi whilst preparing to move it with a Koi sock.

For a larger Koi the size of bag must then be carefully chosen, so that when the Koi is in it, it will about three-quarters fill the bag when held lengthways, and enough water should be included so that when the the bag is flat in its transportation box, the dorsal area should just be covered with water. This should make the bag about one-third full, and the other two-thirds should be filled with oxygen.

It is usual for Koi to be transported 'double bagged' and this is quite simple to do. You place a small amount of water into one bag, and then slide it down inside another bag of the same size, the weight of water ensuring that one is completely inside the other and expelling the air between the two. The necks of the bags are then rolled down as one, and the Koi is bagged. This is accomplished by putting some more water into the bag, and then sliding it under the chin of the Koi, and then further over the body of the Koi. It should then be held up in the bag, in the manner it will lie during transportation, and it can then be seen if more water is required, and this should be added as necessary.

▶ *Continued on page 59*

◀ Continued from page 56

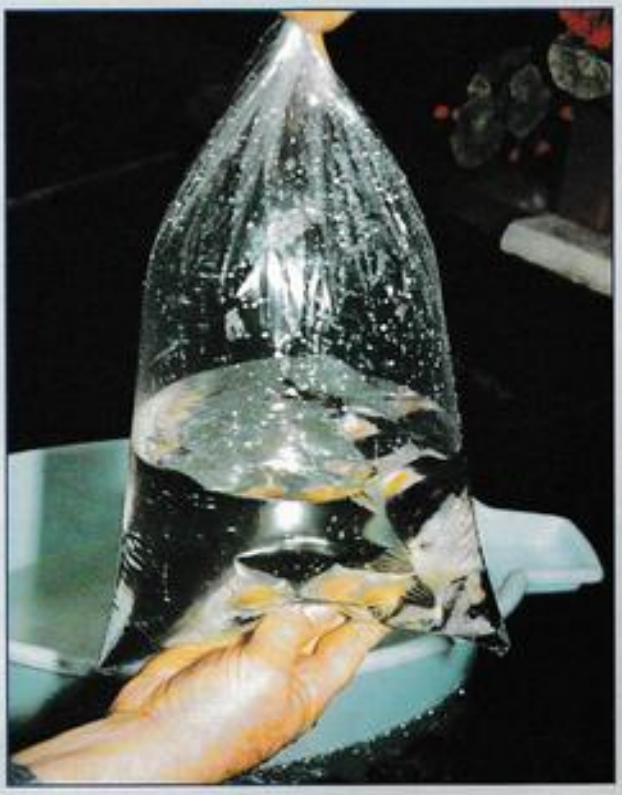
When the Koi is in the bag, oxygen is put in by depressing the bag down to its water level, so that all the air is expelled, an oxygen hose is inserted, and the bag inflated. The inner bag is then secured by rubber banding at the neck, and the outer one is further secured over it. It will be a good idea also to slip the transportation bag into a black plastic bin liner before it goes into its box, as this will exclude any light and keep the Koi calm during the journey. The bagged Koi is then placed in a polystyrene fish transportation box with a lid, which is then secured. Some hobbyists and dealers like to transport their Koi in an 'elbagin' solution, and the elbagin crystals are put into the water in the bag before it is inflated and secured. The box should then be placed into the boot of your car in a position where it cannot tumble about during braking, acceleration, or manoeuvring, and for a larger Koi (over 12in) it should be placed across the direction of travel to prevent injury to the nose and other extremities taking place, under braking in particular. This is sometimes referred to as 'bag injury', and can be very difficult to treat.

You should obviously remember at all times that you are transporting Koi, and adjust your driving habits as necessary. Avoid heavy braking and acceleration at all costs, and take bumps such as sleeping policemen very carefully indeed. It may be a good idea in these days of 'road rage' to carry a back window notice explaining 'Live fish in transit — please take care', and this may save you from an embarrassing situation with other road users! When you get to the other end of your journey, make sure that the Koi is uncovered slowly to prevent visual stimulus of its alarm reaction which will increase any stress it is under.

There are no guarantees that your Koi will survive any journey completely without injury, but by observing all of the above precautions, it stands a better chance than a Koi being transported by someone who does not know how to do it properly.

On arrival at your destination, the problems are not yet over, as if you are going to a Show, it is not always the case that your Koi are immediately 'benched'. This can cause further problems if you remove the Koi from its box and black polybag before it is necessary, as not only will you be inducing a level of stress, but you will be doing this to a Koi that is already stressed from its journey, and the by now deteriorating water conditions in its bag. You should leave it fully packed, and in your vehicle until it is time for processing for Show entry.

If you are simply transporting the Koi to another environment, or to your quarantine system after purchase, then



LEFT
Inserting one bag inside the other for a 'double bagging' procedure.

BELOW
Holding up the bagged Koi, before banding, to assess the eventual water to oxygen volume.

CHOOSING & TRANSPORTING KOI

It's In The Bag!

ABOVE
The inner bag is banded, now the outer one will be likewise secured.

BELOW
The bagged Koi is placed in its box, this time a cardboard one, but for larger Koi, and for long distance travelling, a proper polystyrene fish transportation box is essential.

you should still observe a few sensible precautions.

Remove the Koi from the polystyrene box, and remove the bin liner, and put the Koi, still in its transportation bag into your quarantine system to 'float' for about an hour. This will equalise any temperature difference between the vat and the bag. At the start of the 'float' period, the banding should be released from the necks of the bags, and small amounts of vat water introduced to the bag from time to time. This will help to prevent a large pH or water chemistry shock when the Koi is eventually released.

When it is time to release the Koi, then release the Koi only, and not the water from the transportation bag. This you can do by lifting the Koi out, or netting it out.

The amount of stress that your Koi will have suffered will depend on a lot of things, as both environmental stress and external stimuli will have taken their toll of your fish.

If you have merely travelled from your local dealer to home with your Koi, then the hazards will not be great, but if you have travelled from a dealer further afield, then the stress may be greater, as the journey was longer, and there may be a substantial water chemistry difference for your Koi to undergo.

On the other hand, if your Koi has been to a Show, then the stress will be enormous, for it will have been caught and packed for transportation to the Show. It will have undergone the 'benching' procedure, and then a couple of days in a Show vat where it will have been subjected to possible temperature variation, and almost certainly lessening water quality. It will then have been caught and bagged again for the transport home. This is to say nothing of the visual stress stimuli of actually being on display, where the vat is sometimes subjected to kicking by unruly children (yes, I have seen that) or even ice cream dripped into it, and a continual train of faces staring in for two days or more. You will have to exercise all of your skills to ease the burden on your Koi when you get it home again ... but that is another story.

Aeration Without Agitation

Bio 2000 Range of Bio-Bubblers

Oxygen is the very fabric of life in a Koi pond. Ensuring levels of dissolved oxygen are adequate is one of the most important challenges faced by all Koi keepers and, although Koi of course need oxygen, filtration system bacteria are also prodigious users. The importance of adequate levels of O_2 in Koi ponds cannot be over emphasised and while waterfalls, watercourses and venturis are important prudent Koi enthusiasts don't leave the maintenance of sufficient O_2 to chance; they ensure they have supplementary aeration equipment such as air pumps available and ready for action. This is especially important for as water temperatures increase, the ability of water to absorb and retain oxygen decreases. In thundery weather which often occurs in the summer, crashing atmospheric pressure (which result in clammy oppressive summer nights) can compound the problem and result in oxygen depletion in ponds which normally function quite happily. Unwary Koi keepers can fall victim to serious O_2 depletion and every summer hundreds of Koi die needlessly, simply because Koi keepers are not aware of this problem

Although air pumps are of course important, the mechanisms to deliver this vital payload of air into the water is equally important. Conventional air stones have traditionally been used to undertake this duty but not only do airstones often turn the areas they are situated in into a jacuzzi, more importantly the size of the bubbles they produce is too big to effectively transfer the air into the water: In short, lots of agitation but not enough aeration!

It is well understood in industrial aeration applications that maximum O_2 transfer is achieved when bubbles sizes are between 0.5mm and 1mm with a theoretical optimum bubble size of 0.9mm. The new Bio 2000 range of Bio-Bubblers are high quality, high performance air diffusers designed specifically to meet this key bubble size criteria. Bio-Bubblers provide bubbles designed to offer maximum O_2 transfer but their gentle effective action gets the job done without turning pond or filter into a jacuzzi! In addition to meeting the challenge to ensure O_2 levels are adequate, appropriate location of aeration sources is also necessary, especially in filters where gentle highly-efficient aeration is even more important.

Bio-Bubblers not only offer optimised bubbles sizes but, as they are available in a range of sizes and configurations, there is a Bio-Bubbler to suit all aeration applications from pond and filter aerators to diffusers — ideal for isolation and quarantine systems and show vats.

The unique Bio-Bubbler design also means they extract the very most out of any air pump and will operate happily with those with relatively low output. Finally, as Bio-Bubblers are manufactured out of high

Continued overleaf

KOI VARIETIES

WE GIVE A FEW POINTERS TO IDENTIFICATION OF VARIETIES.

• PHOTOGRAPHS BY DAVID TWIGG •

Every branch of fishkeeping has its aficionados who eat, sleep and drink everything to do with their chosen subject matter. These fortunate people have simply no problems with the most tongue-twisting of names, merely taking for granted that what the fish is called and acting on the principal that if you've got to learn a name then you might as well learn the correct one to begin with. With the majority of fishes, a combination of Latin and Greek together with generic and specific names is sufficient but Koi (being of one genus and species — *Cyprinus carpio*) have taken things a step further with the 'common names' having oriental roots based both in historical chronology and in visual appearances. Names take into account colours, patterning, lustre and scalation — no wonder beginners are somewhat at a loss! A further confusion is encountered when multi-colour-combinations occur, novices have a hard time to decide what are black and red markings on a white fish or red and white markings on a black fish! For the purposes of this introductory article, certain liberties may be taken which may very well depart from official Koi classifications but we've all got to start from somewhere and over-technicalities, whilst probably strictly correct, may well deter newcomers from taking further interest. Let's take colours first.

Matsuba, showing pine-cone effect of dark-centred scales

Just to confirm nothing is simple, the word red can be offered (as are other colours) in two guises — as a background colour or as highlights or markings.

Ai — Blue
Aka — Red (background
Beni — Orange-red (back-ground)
Cha — Brown

CHOOSING & TRANSPORTING KOI

Koi Varieties

A superbly-marked Sanke.

Gin — Silver
Hi — Red (markings)
Karasu — Black (background)
Ki — Yellow
Kin Gold
Midori — Green
Nezu — Grey
Orenji — Orange
Shiro — White
Sumi — Black (markings)

Patterning names show subtle descriptions. Perhaps the most obviously recognised for beginners is the Tancho — a distinctive single red marking on the head, the more perfectly-circular in shape the better. Very recognisable too is Matsuba — a pine-cone patterning of dark-centred scales which is startlingly effective on single-colour, metallic silver or gold fishes. The dramatic Inazuma pattern reflects the 'Z' in the name and likens the patterning on the body as a continuous lightning streak from nose to tail.

Needless to say, the patterning in all cases should be well defined with little spillage into other areas (although there are exceptions where some shadowy blurring may be permitted).

Separate scalation characteristics may also be recognised reasonably easily. Kinginrin scales are sparklingly reflective (literally gold and silver scales) and of course when applied to fishes with certain colours the result can be extremely effective: when seen over red the effect is a golden metallic shine, over white the effect is silver. Partial scalation is referred to as Doitsu (the Japanese equivalent name for German). Fucarin scalation gives the Koi a lustrous, rather than a hard metallic, gleam. Speaking of lustre, the word Hikari (usually used as a prefix) a metallic finish, whereas Kawari (another prefix) means non-metallic.

POPULAR VARIETIES

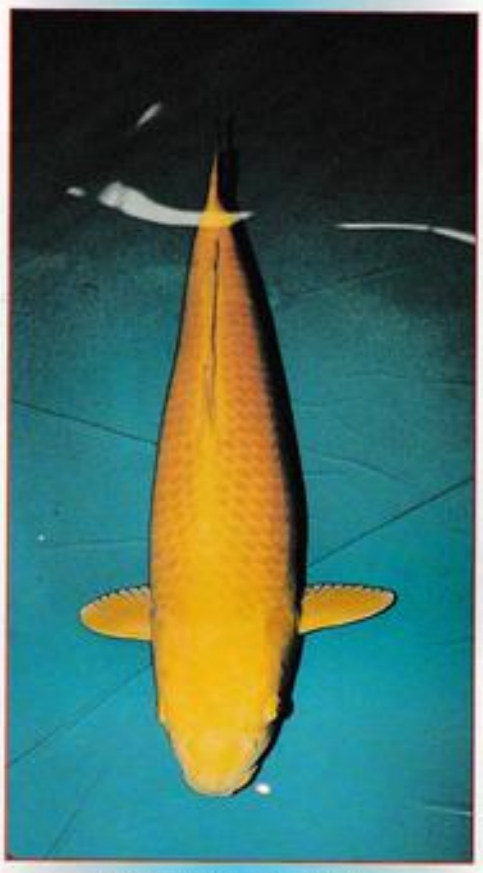
With all due deference (and apologies) to those who know much better, and for the sake of space-saving some white-bodied varieties would include the following:

Kohaku, the beautiful white Koi with plain red markings; fishes with a single red marking on the head would be our previous definition thus become Tancho Kohaku. Further discrimination in amounts of patterning, especially in definite steps, attract the names Nidan, Sandan and Yondan — two, three and four steps respectively. Add some darker patterning over the red areas of the Kohaku and the variety becomes known as Koromo.

Now we step into possible confusion with Bekko and Utsuri. The former are fish with a white, red or yellow background colour that have black markings superimposed on them — Shiro Bekko, Aka Bekko and Ki Bekko respectively. Utsuri are (guess what?) fish with a black background with white, red or yellow markings, hence Shiro

▶ Continued on page 73

Ki Utsuri.



The classic plain-coloured Ogon.

◀ Continued from page 70

Utsuri, Hi Utsuri (notice the change from Aka, 'background' red to Hi, 'marking' red in the description) and Ki Utsuri.

Still with white Koi, the Taisho Sanka (after the Emperor Taisho era) is white with red and black markings. Sanke (often read as Sanshoku) means three-coloured. Two typical variations are Aka Sanke where the red marking extends continuously all along the body and Maruten Sanke with a separated Hi marking on the head. Like the apparent colour-reversal patterns of Bekko and Utsuri, the Showa Sanke is still a three-coloured fish but this time with a black background with white and red markings. Again, a variation with continuous red markings along the body would be called a Hi Showa whilst one with a single red patch on the head would be a Tancho Showa.

The colour blue may be fairly common in cultivated coldwater fishes (notice this predominant colour in Bristol Shubunkins, for example) and it is also found to striking effect in Koi. Looking very much like being decorated in an airline's colours the Asagi has a red belly with the colour spreading up to the lateral line (gills, jawline and bases of fins too) above which is a blue dorsal surface area formed by dark-centred, lighter-edged scales. Another spectacular development of this fish results in the Shusui, a

Magnificent Sanke.

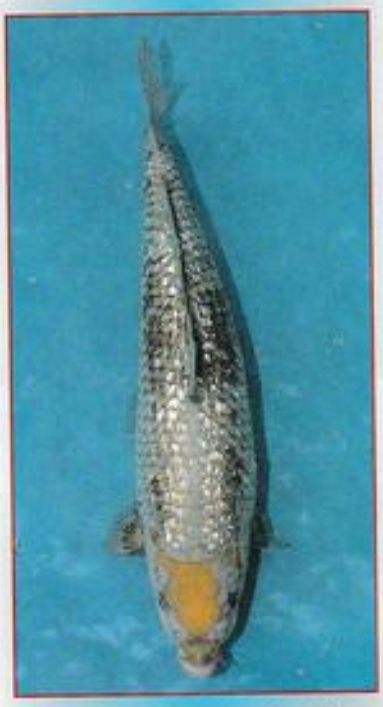
Ai Goromo showing patterning over the red.

CHOOSING & TRANSPORTING KOI

Koi Varieties

Doitsu Asagi, with scalation limited to along the dorsal ridge and lateral line as previously described. There is a Hi Shusui variant too with continuous red on the flanks above the lateral line.

The highly-popular metallic Koi are contained in the classification Hikari Muji Mono and one of the most popular (and recognisable) fishes is the Ogon, which may be plain silver or plain gold. The scales are generally only just visible but there are Kin Matsuba and Gin Matsuba, gold and silver variants with the black-centred scales giving the pine-cone effect described earlier. Metallic varieties can include our Utsuri and Showa fishes which now become Hikari-Utsurimono fishes and called Kin Ki Utsuri and Kin Showa for example.



GinRin Ochiba Shigure — far better than a floating dead leaf!

Count the five colours on this Goshiki.

Finally, one would expect with all the possible descriptive words that some amazing combinations would be possible and here are two examples of Koi which may not be so familiar to you.

Go is the Japanese word for five, and Goshiki means five colours (the actual colours may be composed by combinations of overlapping traditional colours). However, for a wonderful description, how about GinRin Ochiba Shigure? Shigure means 'Autumn, or falling leaves floating on the water' with the familiar prefix GinRin referring to the silver reflective scales.

Now you can see how logical and simple the names can be; it's all a question of treating them like building blocks to construct the exact name to suit the fish precisely — it's no more than it deserves.

Thanks go to davidtwigg-san, which means 'he who takes excellent photos' without whose talents this article would be reduced to mere colourless prose.

Jackie's Juniors

Hi, Junior Fishkeepers! It's time for your page of fun again. It is nice to hear from so many young fishkeepers; please keep your jokes, letters and drawings coming in. This month we have more from the two Schools with aquariums featured previously.

Firstly, Katie Shallow, a pupil from Holtsmere End Junior School, Hemel Hempstead, was so inspired by the School aquarium that she pestered her parents for a tank of her own! She writes:

"Last year, with the help of our local Aquarist Society, a community aquarium was set up in our School. I enjoyed watching the fish swim around, my favourites were the Neon Tetras. A year later, I was intrigued by the idea of setting up my own tank. I bought a hexagon tank and put two red and black Fantails in it. After three weeks they both died. Four weeks later I bought an orange and white Oranda — that died from high ammonia levels and lack of oxygen after a week.

"We then sought advice from our local Society who advised us either to get a bigger tank (with better filtration for Goldfish and Orandas) or to set the tank up as a temperate tank with a small number of White Cloud Mountain Minnows and maybe a few Danios. I am saving up for a larger tank but for the time being I have restarted the hexagon tank and have four White Clouds and three Danios living quite happily. They are lots of fun to watch, always moving.

"I learnt a lot from my mistakes and now ask for help from the local fish Society whenever I am not sure. I love my fish and am very happy that the School had a tank to encourage me into getting one."

Some of the 'Fish Monitors' from Woodside Middle School in Amersham (pictured left) have written in with their thoughts on their old tank and the lovely new one they are having installed:

"The old fish tank was getting greener and dirtier every day and I thought it must have been horrible to live in. Often, after School I used to watch the Goldfish. The new tank is so different, we are going to keep tropical fish and we have a board up to protect the tank from the light coming in through the window. It looks great." *Christine Oxberry.*

"I think our new fish tank is better than our old one because in our old fish tank there were few plants, rocks and wood for the fish which we have in the new one, as the fish like to have somewhere to hide in. We have made a bridge by putting two big stones in with a piece of slate on the top as a roof." *Wendy Hood.*

"Hi, I am *Kimberley Louise Brown*. I'm nine years old and go to gymnastics. I just love being a Fish Monitor because it is great fun. We have just got a new fish tank which is looking super. I can't wait to get some fish in there , but there will be some in a couple of days. The other little fish tank wasn't any good; in it there were some Goldfish called Casper, Stretch, Fatso and Stinky. They were cute but the water had to be changed every other day because the filter was not strong enough for them."

"In our new fish tank we have two Leopard Danios, two Pearl Danios and two Zebra Danios. They are helping to start the tank off and giving us fun fish to watch whilst waiting for it to mature. We feed them brown, green, yellow and red flakes so that they get a balanced diet. The fish really enjoy their food and really like the tank. You can tell which fish is the Leopard Danio because they have spots on them. The Zebra Danios have black stripes on them and the Pearl Danio are plain but they shine at you. The six Fish Monitors are Kimberley Brown, Kay Ball, Lorraine Comper, Wendy Hood, Christine Oxberry and Daniel West." *Lorraine and Kay.*

JOKER TIME

Thank you for sending in your jokes, here is a selection of those that made me laugh:

Q. Where do frogs hang their coats?
A. In the Croak Room

Q. When is a fish pond like a bird cage?
A. When there's a perch in it.

Boy: Mum, there's a fish at the door.
Mum: Oh, that must be the Piano Tuna

Q. Did you hear about the Jellyfish?
A. Yes, it set.
Q. Where do find the most fish?
A. Between the head and the tail!

Q. What is a Mermaid?
A. A deep she fish.

Write in with your fun experiences with fishkeeping and tell us all about your fun days out and about too. Don't forget your name, age, address and if you belong to a Society. Remember, those lovely people at John Allan Aquariums are giving a prize for the best received — SO DON'T DELAY — DO IT TODAY!
Write to: Jackie's Juniors, c/o A&P, MJ Publications Ltd., Caxton House, Wellesley Road, Ashford, Kent TN24 8ET.

VIVA VACATIO

SUSAN BREWER SAYS GIVE YOUR

Every year we pack our bags, hop into a car or plane, and disappear for a couple of weeks, returning blissfully suntanned, and raring to return to work (or more likely, wondering if we could possibly fiddle a couple more days leave!) Sometimes we take the dog, or else we put him into kennels, the cat is sent to the cattery, and the budgie goes to Gran, or to Mrs Smith at number 44. So, in various ways, our pets get holidays too. But what about our Newts, Frogs, Toads, Terrapins, Lizards and the like? Why can't they have a holiday?

Now, I'm not advocating that you take your favourite Toad along with you to the beach. For a start, he probably wouldn't enjoy getting covered in gritty sand, salt water would be bad for his skin, and he'd loathe the sun, even if you did manage to knot a hanky on his head. But there's no reason why you couldn't let him holiday in your garden for a while.

Outdoor vivaria can be as simple or as complex as you like, ranging from basic tanks in the garden, to huge stone-walled enclosures complete with ponds, shrubs, caves, plants and fountains. The most important thing is that they are escape-proof, and that they are sensibly sited.

In the broadest sense, a garden completely surrounded by a brick wall, or a fence with no gaps, could be considered a large vivarium. After all, any Newt or Frog inhabitants would be contained within the garden, and, assuming it contained a pond, would probably breed quite happily. However, in practice, most gardens have gaps under gates, knot-holes in fences, or walls low enough for Frogs to scramble over. In any case, the whole point of a vivarium is to make it easy to observe the occupants — and unless the garden was tiny, there would be no guarantee that the amphibians would be constantly on view.

Recently, I decided to build a small outdoor 'Newtery' to act as a safe nursery for a batch of young Smooth Newts, which I'd bred and hibernated. I was loathe to release them freely into the garden where they'd be at the tender mercies of all creatures great and small, reasoning that if I could confine them outside until they were almost adult-sized, they'd have a better chance of survival, yet would be in their natural environment. At least they'd get used to temperature extremes and British summer weather of rain, wind and (sometimes) sun.

I wanted to get the enclosure 'up and running' immediately, and as it was intended to be a temporary feature, didn't want to spend too much. So, how to go about it? Unfortunately, my garden is small, which meant I was hampered with regard to position and size of the vivarium. I chose a shady damp spot near the wild-life pond, which just received dappled sunlight in the early morning and late evening and was sheltered by a pierced brick wall.

An outside vivarium for terrapins.

Then I had to decide which was the best material to use for the vivarium. As this was a short-term project, I didn't want to use bricks and mortar. Obviously it was important to make sure the sides were Newt-proof, so after much thought, I purchased a large sheet of clear perspex and some ¾in angle plastic strip from a DIY store, with the intention of making a bottomless tank.

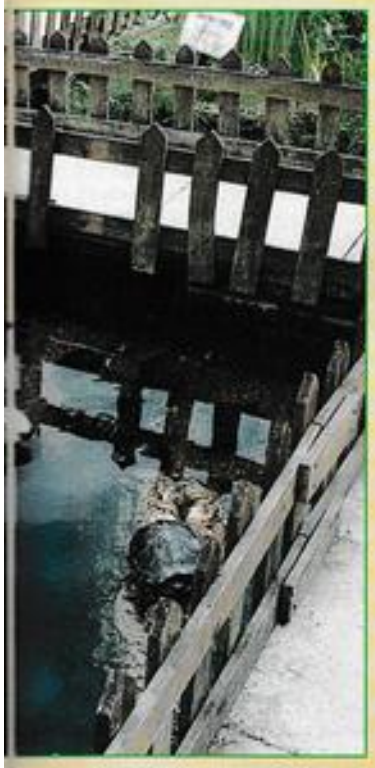
Four pieces of perspex were cut, two of 36x18in and two of 18x18in. I discovered that the best way to do this was to score along it with a craft knife guided against a steel rule, and then to snap the perspex along the cut. The next job was to cut four 18in lengths and four 36in lengths of the angle plastic strip, and rivet the perspex pieces to them to form an oblong-shaped tank. (Aquarium sealant could have been used, but as this enclosure was to be outside, it wasn't considered essential to be a thing of beauty.)

Next, four strips of perspex, two measuring 36x4in and two measuring 18x4in were cut and rivetted to the top of the angle strip to produce an escape-

NAL VIVARIA!

PS A BREAK FROM THEIR INDOOR QUARTERS.

BY THE AUTHOR ●



proof overhang. The whole bottomless tank was embedded into the ground about 3in deep. I used a roll of log fencing to surround the outside, so that it merged reasonably harmoniously into the garden. There were several other options which I considered, including smearing a concrete-cum-small-stones mixture over the perspex, facing it with slate tiles, or using pre-formed polystyrene moulded 'bricks'. I decide that the fencing was quickest and easiest!

A hole was dug inside the enclosure for a large dish to serve as a pond (with plenty of slate to provide easy access ramps) and two short lengths of 1½in piping were partly buried to serve as hiding places, taking care to slant them so that they couldn't fill with rainwater. Various plants were added — including some Dwarf Nasturtiums which are practically guaranteed to attract Blackfly — and pieces of bark, slate, and branches arranged to provide more cover for the inhabitants. The whole thing was liberally soaked with a hose, to make sure that the ground was really moist. Finally, a lid was constructed from squared mesh and wooden battens, to ensure that cats, frogs, birds and hedgehogs couldn't climb into the vivarium.

When the Newts were introduced, they settled down immediately. Since then, it has proved a safe home for other small amphibians, including Yellow-bellied Toads and the like. Remember, though, that some creatures, slow-worms for instance, like to burrow, as do certain toads and snakes, so it's important to embed the walls of the container at least 3in deep, and possibly a little more to be on the safe side. Naturally, with a vivarium of this size, it is still essential to regularly feed the inhabitants, even though a certain amount of their diet does find its own way into the enclosure.

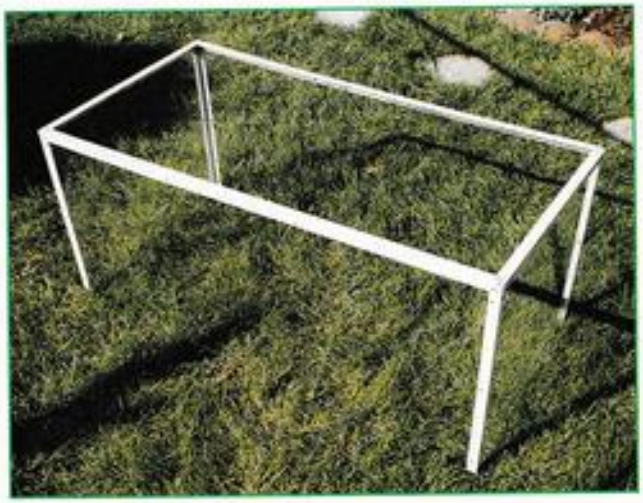
As I've said, this is a small enclosure for a small garden. Ideally, it would be at least twice as large, and have a permanent filtered water supply. Perspex would not really be economical for a larger set up, and brick, breeze block or stone walling needs to be used. A height of 30in should ensure most of your specimens stay put. As a rough surface provides a much easier grip for the inhabitants, especially lizards and frogs, it might be worth considering lining the inner walls with smooth tiles, which can often be bought cheaply from DIY stores if you're not too fussy about the colour. Cream, beige or green would be ideal.

The all-important overhang, of approximately 4in is best constructed from wood or tiles cemented into place, and the pond made from a piece of butyl liner in the usual way, making sure that there are gentle slopes for access and a choice of water depths. A small pump could be used, although it has to be said that many Frogs and Newts seem to prefer still, almost stagnant water, and what might appear pea soup to us is apparently Froggy Utopia.

Naturally, the furnishings, and the siting of the vivarium depend on the type of creatures you plan to keep. Lizards will need a much drier environment than Newts, and will need stones placed to catch as much sun as possible, so that they can bask to their heart's content. Of course, they will still need shelter — even sun-worshippers can have too much of a good thing — and so caves must be constructed from

Yellow-Bellied Toads make excellent inhabitants for an outdoor vivarium.

HERPETOLOGY
Viva Vacational Vivaria!



ABOVE
The basic vivarium — like a bottomless tank.

BELOW
The completed vivarium.

rocks or slate, with some leafy plants dotted around to provide extra shade. Remember to keep an eye on plant growth; a long-leafed plant too near the vivarium wall will provide an ideal escape ladder.

European Salamanders are suitable for outdoor vivaria, if you can find a really shady, ferny corner which will still be cool even on a hot summer's day. As they're not particularly disposed to climb, the wall needn't be as high as for some species. Admittedly they're nocturnal creatures, which might mean you'll have to seek them out with a torch, but usually a shower of rain, or a quick sprinkle from the watering can, will bring them lumbering from their shelters.

Perhaps the most successful creatures to keep outside in the summer are Terrapins. Sunlight is important for their proper shell formation, and as they don't climb, a pond with an island, surrounded by a strip of grass and a low wall (and pretty plants for aesthetic purposes), is ideal. Some people use wire mesh, but this can prove a problem as Terrapins occasionally get their heads stuck, or develop sore noses by pushing against the mesh.

If you intend to leave some of your hardier species out all year, it will be necessary to make proper provision for hibernation. Earlier, I mentioned using drainpipes as shelters; by expanding on this idea, it's possible to make proper hibernation chambers. The pipes will need to be filled with moss and buried at least 6in deep, in a hillock of earth, with the entrance holes pointing slightly downwards, to stop any build-up of rain water. A heap of bark pieces, moss or bracken should be built over the site, to protect the occupants from frost.

Personally I would hesitate to leave any creature outside which isn't native to Britain, although I know that many people do keep, for example, Midwife, Fire-bellied and Yellow-bellied Toads outside all year round, and maintain that it encourages breeding. I've even heard of African Clawed Frogs being left in ponds all year, hibernating in the mud at the bottom.

Why not think about building an outdoor vivarium to give your herptiles a holiday? After all, you have a break each year — why shouldn't they?!

HINTS & TIPS

1. Unless the outdoor vivarium is enormous, you'll still have to feed the inmates regularly.
2. Check often, especially on hot summer days, to make sure that the substrate is still damp and the pool hasn't evaporated.
3. Don't forget the overhang — at least 4in is needed to stop escapes.
4. If a snake can get its head to the top of the wall, its body will soon follow!
5. Many species can burrow, so embed the vivarium wall at least 3in below the ground.
6. Nasturtiums, Nicotiana, Lupins and Petunias are all great plants for attracting aphids.
7. Every outdoor vivarium must have an area of shade — even lizards need it — and water should always be available too.
8. The outdoor enclosure must be totally escape-proof; not only is it disappointing when you lose creatures, it's illegal to release non-native amphibians and reptiles into the wild.

BUY LINES

Barry James'

round-up of latest innovations for your pond and aquarium

Interpet

Interpet has launched a new-look range of neat, user-friendly aquarium powerheads. They are designed to provide a quiet, powerful filtration and aeration package. Intended for use in conjunction with undergravel filters in marine and freshwater aquaria, there are four models to cater for aquaria from 18in (450mm) to 60in (1,800mm. For even larger aquaria multiple powerhead set-ups are used). The features of the powerheads include: venturi aeration system with inbuilt noise suppression, multi-directional flow control with adjuster, includes an adjustable airlift stabiliser with suction cup and a 'Z' spacer pipe to enable the powerhead to be used.in close proximity to the aquarium wall. The prices range from £20.99 for the PHI rising to £32.99 for the PH4 unit.

Interpet has also launched a new lighting display unit for their range of fluorescent tubes (pictured right). Accompanying the stand is a new customer information unit called 'Guide for Lighting'. The leaflet clearly explains the aquarium application recommended for each type of lamp.

The Interpet Triton Light has been incorporated into a new purpose-built aquarium complex at A&D Aquatics in Oldbury in the Midlands. The lamps were chosen by A&D to enhance the appeal of the tanks by showing off both fish and plants to the best advantage.

Details on all the above from: Adrian Exell, Interpet, Vincent Lane, Dorking, Surrey RH4 3YX. Tel: 01306 881033. Fax: 01306 885009.

SICCE

SICCE, the well known aquarium appliance manufacturer, presented many new lines at the Interzoo 1996 Exhibition at Nurenburg the most important and innovative of which was GENIO, a new external filter. Amongst the host of new features are the following: Self Priming. Fast-fitting and secure couplings for connection to aquaria, Basket modules for filter media, which can be superimposed on each other, to add greater filtering capacity, three models delivering 99, 154 and 212gph respectively. All come complete with tubing, spraybar, sponge filter medium and grill deflector unit.

The established range of Micron and Shark internal filters have been revamped and now come complete with a new range of filter cartridges with various components including carbon and zeolite modules.The Shark range with the PH POWER HEAD and PF POWER FILTER versions has been expanded to include two new higher performance models. The PH/PF 4 delivers 1,000 litres per hour and the PH/PF 5 1,200 litres per hour. Both models also come with a new accessory which enables the water to be ducted and directed in any direction. Sicce are also well known for their heating systems and have introduced a new family of PER (Precise Electronic Regulation) Electronic Heater/Thermostats. Features as follows: exclusive design of sensor, which is in direct contact with the water which ensures perfect temperature control and maximum reliability, compact design, supplied with suction clips for attachment to the wall of the aquarium, six models from 50-300 watts.

Further information from: Sicce S.p.a Marketing Services, Via Mazzini, 64 35010 San Pietro in Gu (Padova), Italy.

Norfolk Lavender

Yes, I was taken aback a little too! However, according to Henry Head, MD of Norfolk Lavender, who spoke to our Editor at the recent Gardeners' World Live! Exhibition at the NEC, tests have shown that the efficiency of Barley Straw in clearing blanketweed and algae has been considerably enhanced by the addition of ... lavender stalks. The company has therefore produced Pond Pads for use in blanketweed-stricken ponds; the three-pad pack costs £5.95 plus £1.75 p&p and can be ordered direct from the company. Use is fairly straightforward, one pad is hung in the pond, preferably in the water flow, and left to rot away; further pads are added at four month intervals thus giving a full season's treatment.

Details from: Norfolk Lavender Ltd., Caley Mill, Heacham, Norfolk PE31 7JE. Tel: 01485 570384. Fax: 01485 571176.

W. J. Furse

W. J. Furse are the marketing agents for the distributorship of the pioneering range of Sequence 1000 low-energy, high-performance pumps for Koi systems.The manufacturers claim the following advantages for their new Sequence 1000 1/8th horsepower pump:

External pump delivering 2,450gph at just 185 watts. The operating wattage actually reduces when the pump load increases! Noryl chemically resistant and durable construction. Back pull-out design for ease of servicing.

Further details from: Mr Chris Dolman, W. J. Furse & Co Ltd, Wilford Road, Nottingham NG2 1EB. Tel: 0115 986 3471. Fax: 0115 986 0538.

Tetra

The TetraPond Koi Analyset is a complete series of water test kits housed in a convenient, compact plastic briefcase. It contains tests for Ammonia, Nitrate, Nitrite, pH, Oxygen, and KH.

The kit contains colour charts and syringes together with complete easy to follow instructions, advice and guidelines on the actions to take in response to the test results. Designed specifically for Koi keepers the kit retails at £49.75.

Further enquiries to: Sally Windsor, Aylesworth Fleming PR, Fleming House, Poole Hill, Bournemouth, Dorset BH2 5PS. Tel: 01202 295723. Fax: 01202 290643.

Sales success for Tetra

Since Tetra introduced their new range of aquarium Tetratec Heaters onto the market last January sales have rocketed. Tetra have succeeded in selling a whole year's supply in just five months! "The demand for the new heater has been incredible," comments Dr David Pool, Advertising & Promotions Manager of Tetra, "and because of this we have had to up production in order to satisfy this requirement."

The Tetratec Heater is designed to Tetra's high specification and conforms to new European CE regulations. It features an advanced nichrome heating element for a longer life and an even distribution of heat throughout.

With five models available, (75-300 watts) these high quality aquarium heaters perform brilliantly, satisfying all fish's needs whatever the size and recommended temperature of the aquarium. The heaters have a clearly visible and easily-adjustable temperature setting, with a safety 'click' control switch that prevents overwind. However, what makes this heater clearly stand out against the rest is the Borosilicate heat and shock-resistant glass making it that much tougher.

With prices starting at £21.99 you'll start to see immediately why the Tetratec heaters are so popular. Just set it and forget it!

Press enquiries to: Sally Windsor or Steve Bendell, Aylesworth Fleming PR, Fleming House, Poole Hill, Bournemouth. Tel: (01202) 295723. Fax: (01202) 290643.

BioLife

The world's most advanced filtration system of all comes in one easy internal unit!

Biolife is a compact filtration system which fits inside your aquarium just like an internal filter – *but the comparison ends right there!* With 7 stages of mechanical and biological filtration, including a 'dry' trickle chamber for highly effective oxygenation and a carbon impregnated pad for final water polishing, Biolife is a power pack of purifying activity giving outstanding performance, without inconvenience.

And the neat, sleek Biolife unit also comes with a built-in heater and pump so you don't need to buy any extras either. Look out for Biolife, it's the future of filtration that's available now.

HAGEN ...For Pets

UK
USA
CANADA

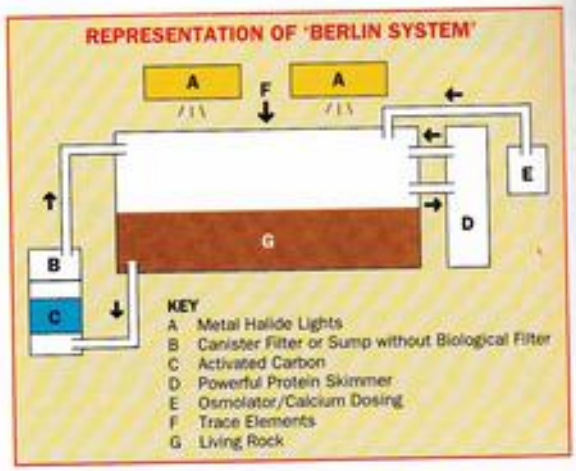
EXPLORING NEW FRONTIERS

NICK DAKIN DISCUSSES ADVANCED METHODS OF BIOLOGICAL FILTRATION FOR THE TROPICAL MARINE AQUARIUM.

• PHOTOGRAPH BY THE AUTHOR •

As we have seen in my previous articles during this series, marine fishkeeping is far from a stagnant hobby. There are always a few talented individuals willing to push back the bounds of possibilities by experimentation with new techniques in an effort to make the hobby easier, more effective, or both. Of course, not all are successful and many ideas sink without trace; however, within the last few years the marinist has been spoilt for choice by a series of fresh approaches. The major 'advances' and most publicised are the Berlin System, the Jaubert System and the fluidised bed filter. The first two incorporate a whole new approach to reef systems in particular, whilst the latter is type of biological filter, new to most hobbyists, for use with any set-up. All have been the subject of much keen discussion and debate in various journals on both sides of the Atlantic and will no doubt continue to spark comments for the foreseeable future. Having said that, these are are not particularly expensive systems that are going to be placed beyond the average hobbyist on a reasonable budget. The decisive factor is certainly going to depend to a greater degree on the competency of the individual marinist. For example, the fluidised bed filter can be understood, installed and maintained by any conscientious newcomer, whereas success with the Jaubert project will certainly call upon a number of years experience and a great deal of familiarity with biological processes.

Berlin Protein Skimmer.

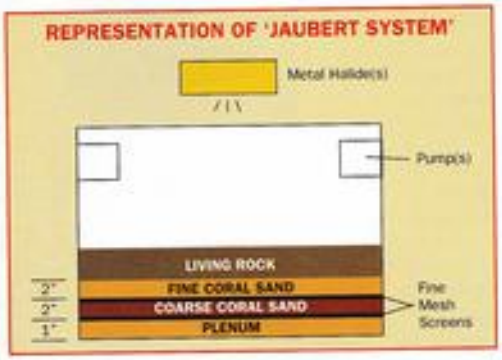


THE BERLIN SYSTEM

So named owing to its development by a group of experienced reef-keeping hobbyists in Berlin, it is a straightforward, some would even say 'back to basics' approach. At the heart of the system is a huge amount of living rock (approximately 2lb per gallon) and a large, efficient, power protein skimmer. It will be clear to those that have followed this series that biological filtration occurs, not only in the 'proper' places, i.e. trickle filters, but also on any suitable surface within the aquarium or its equipment. This may include glass, rocks, sand, gravel, plastic — in fact any location where nitrifying and denitrifying bacteria can gain a foothold. In the case of the Berlin System, the living rock is utilised as home for vast colonies of *Nitrosomonas* and *Nitrobacter sp.* bacteria which provide the only biological filtration. Complementing and supporting the system is a large and extremely efficient protein skimmer designed to remove much of dissolved organic waste before it overloads the bacteria present on, and in, the living rock. In using such an effectual skimmer, many of the useful trace elements are deemed to be quickly lost and most authorities advise replenishment on a constant basis. Only the addition of calcium by means of a calcium reactor or

dosing system and the incorporation of activated carbon is required to complete the Berlin System as envisaged and adopted by its creators. Intense metal-halide lighting has always been advocated, rather than fluorescent, although I'm sure that could be the subject of some debate! One thing is for sure, a great number of enthusiasts worldwide have already tried the Berlin System with much success and converts are being made all the time.

THE JAUBERT SYSTEM



Dr Jean M. Jaubert, working at the University of Nice, France, made a series of simple yet rather unique discoveries in the late 1980's after experimenting with a number of what would be regarded as rather unusual systems. At first glance, one would almost believe you were looking at a familiar undergravel filter without uplifts (and for that matter, without a protein skimmer or activated carbon either!). However, so unique is this particular method of biological filtration that it has been patented in France and the United States.

In essence, a thick layer of coral sand separates a low oxygen environment below (in a space called the plenum) from a high oxygen environment above (the main showtank). Aerobic bacteria occupy the upper layers of the sand while the lower layers provide a home for anaerobic bacteria. Ammonia, nitrite, nitrate, nitrogen, carbon dioxide and oxygen migrate through the substrate by a process referred to by Jaubert as diffusion. Essential to its successful performance is a healthy population of burrowing animals (worms, molluscs, crustacea, etc.) within the sand itself. Not only do they help consume and break down larger particles of organic detritus that can be utilised by the surrounding bacteria but in disturbing the sand, vital oxygen is allowed to penetrate the top layers and support the aerobic bacteria. A fine screen is positioned about midway between the top and bottom of the 4in thick sand bed. Only the top layer is allowed to become home to the various useful burrowing creatures and is commonly termed 'living sand'. In this way, ammonia and nitrite are neutralised in the top layers and nitrates are converted into free nitrogen gas in the deeper layers; the plenum also remains clear of trapped animals and their detritus. As an added bonus, the acidic secretions of the various bacteria and other organisms cause calcium to dissolve from the sand and enter into solution, thus enabling hard corals to be maintained with ease at levels rarely dropping below 450 ppm.

Now, if this all sounds too good to be true — a cheap and seemingly almost perfect method of biological filtration that requires little more than coral sand, a few gravel tidies and no water changes — then you may join the others that have joined the furious discussion over this particular subject area! The mistake made by most people is to look at the relatively simple arrangement and assume that it mirrors the level of competency required by the aquarist; in fact, the total opposite would be nearer the truth! For the marinist trying to emulate Dr Jaubert's system will need a total understanding of all the biological processes taking place and how these interact with the livestock kept. Failure to recognise areas of potential difficulty will easily result in a quick and massive decline.

Over the last few years the Jaubert and Berlin methods have been mixed and matched in a seemingly endless combination by numerous authorities, all claiming to have perfected the complete system. Meanwhile, another biological filter has been quietly making inroads into the hobby ...

FLUIDISED BED FILTERS

Nothing new to commercial water treatment plants, nor commercial aquaculture companies, fluidised bed filter technology specifically designed for the domestic aquarium is a fresh approach.

Tankwater is pumped at a carefully controlled rate through a container housing a very fine granular media which is kept in constant suspension. The unique motion and massive surface area available to colonising aerobic bacteria leads to a highly efficient biological filter arrangement. Unfortunately, absence of any denitrification facility means that other methods of eliminating nitrate build-up will have to be employed.

Unlike the Berlin and Jaubert systems, fluidised bed filtration does not approach a complete strategy for the aquarium, merely an extremely efficient aerobic filter; but it is commercially available in units that may be added to practically any aquarium.

THE FUTURE?

The cutting edge of marine aquarium filter technology and 'anorak-land' is a distinction that is becoming harder and harder to define these days as media such as the Internet become choked with information and misinformation alike. Anyone with a computer, a modem, a tupperware box full of sandwiches and a weak lemon drink to hand can claim themselves 'an expert!' Plagiarism is rife and goes unregulated, leading to bad feeling and confusion of ideas from the originator. Many 'articles' are no more than advertising pieces submitted by manufacturers under a different name. In short, you need to be an expert to sift through the mass of confusion now being circulated and identify the truly genuine and exciting work! To make matters worse, there is now a definite tendency for a group of certain experts to insist that they are the 'top' marine aquarists in the world (of which I am not one, I hasten to add)! For whatever reason, this is a pathetic and childish state of affairs that serves only to confuse the hobby even further as they vie for a place that means little to anybody except themselves!. If this is the future of the hobby, as so many insist it is, then the outlook is as bleak as it is sad. (All letters addressed to Dick Mills, Editor of this magazine, etc., etc.!)

SHORE WATCH

An ABC of Rockpooling

BY ANDY HORTON

Shore Watch is a two-way process where readers can send in reports of what they find on their visits to the shore. With the summer holidays upon us more people take the opportunity to visit the coast at low tide. It is usually the best month because most of the rock pool fish and crabs will have bred and their young feed in the shore pools. Prawns move inshore during this month and they will release their fry to join the plankton. The tides will go out further than in July uncovering the richer pools near the low water mark. Be careful not to get cut off by the incoming tide.

O

OCEANOGRAPHY is the science of the oceans.

OCELLUS means a spot of colour ringed by another colour, or an eye-spot, a false eye designed to fool predators. Many small fish possess ocellated spots including the rarest of the British Blennies: the Butterfly Blenny, *Blennius ocellaris*.

OCTOPUSES are represented by two species of these eight armed cephalopods that inhabit the seas around Britain. The Common Octopus, *Octopus vulgaris*, is a southern species and although common on the south coast of the English Channel during summer it is not found nearly so often on the British side.

The Lesser Octopus, *Eledone cirrhos*, enjoys years of glut when it is regarded as a pest that pinches lobsters from fishermen's pots. It inhabits the colder more northerly seas.

OMNIVORE is a devourer of both animal and vegetable matter.

OPERCULUM means a cover and is used both for the gill cover on bony fishes and of the horny transparent plate that is seen on marine shells like the Winkles that inhabit the shore zone. Winkles close up the operculum to retain sea water when the tide goes out.

ORDER is the unit (taxa) of taxonomic classification between the Class and the Family.

OSMOREGULATION is the control by an organism of its composition of body fluids. This is very important for a fish or crabs ability to adjust to varying salinities. Sea water contains more salts than the body fluids of fish so the fish has to excrete salt. Most fish can only tolerate a small range of salinity, and many of the simple invertebrates are even less tolerant of unusual conditions.

OSTEICHTHYES are the Class of fishes known as the bony fishes with the sub-Class called the Teleostei which is a more familiar name.

OVIGEROUS means with eggs.

OXYGEN is extracted by the fish in the sea by breathing through gills and by invertebrates in similar ways. The important point for rockpoolers and fishkeepers is the small amounts of dissolved oxygen that are present in water compared to air. Oxygen enters enters the water at the surface and dissolves slowly. This process can be speeded up by by the use of airstones and aerators on powerheads to increase the turbulence.

THE OYSTER is a bivalve mollusc that was formerly abundant, cemented to hard surfaces on the sea floor around Britain.

The Candy-striped Flatworm is a free swimming species found below low water mark.
PHOTO: PETER GLANVILL

The Plumose Anemone is known as the White-plumed Anemone on the west coast of America.

PHOTO: ANDY HORTON

p

PALEONTOLOGY is the study of fossils.

PARASITES are organisms that are dependent on their host species for part of their life cycle and are detrimental to it.

PATHOGENESIS is the development of an individual organism from an egg without fertilisation.

PATHOGEN is an organism or agent that causes disease in its host.

PELAGIC pertains to the open waters. It is used of fish and other animals that inhabit this area.

pH is the acid-alkaline scale from 0-14 with 7 as neutral. Sea water is alkaline with a pH of 8.3. Biological filtration and respiration of all the organisms in aquaria tends to make the water more acidic falling to 7.5. Marine fish are able to adjust to more acid conditions in the short term, but will not thrive in the long term. Crabs and other invertebrates may actually die if the water become too acid. The remedy is monthly 20 per cent water changes.

PHYCOLOGY is study of algae including seaweeds.

PHYLUM is the name given to the principal category of animals divided into at least 35 groups. Important Phyla include Annelids (Segmented Worms), Mollusca (Snails, Mussels etc.), Arthropods (Insects, Crustaceans), Echinodermata (Starfish etc.), and Chordata (Vertebrates).

PIPEFISH form the Family called the *Syngnathidae* with the Seahorses. The male fish incubates the eggs in a pouch on its belly.

PLAICE, *Pleuronectes platessa*, is the most numerous of the flatfish in the north-eastern Atlantic and is an important food fish. Young fish are occasionally found inshore pools.

PLANARIANS are flatworms of the phylum *Platyhelminthes*. Most are small and many are parasitic, although a few attractive larger species inhabit the seas around Britain.

PLANKTON means wandering and is a name given to the billions of microscopic organisms called plankton that drift passively with the currents and tides.

PLEUSTONIC refers to the water/air boundary and is used of animals that are buoyant in the water and include the Jellyfish-like hydrozoan called By-the-Wind Sailor that has a sail-like float called a Pneumatophore that catches the wind and blows it across the sea.

PLUMOSE means feathery and is the apt name given to the widespread Sea-anemone, Metridium senile. Porcelain Crabs resemble true brachyuran crabs until you examine these small crabs closely when you can discover they have only eight visible legs. They are anomurans in same infraorder as the Hermit Crabs.

POLYCHAETES are Segmented Worms which include the Lugworm, Ragworm and the Earthworm.

POLYP is an individual soft cylindrical body with tentacles (looks like a miniature Sea-anemone) that is part of a colonial true coral, soft coral or hydroid. The sedentary scyphistoma stage of a Jellyfish is also known as a polyp.

PORIFERA are the phylum of invertebrates known as sponges.

THE PRAWN is a common name for a natant (swimming) decapod crustacean which are transparent, although they are often lined with colour. The names Shrimp and Prawn are often used for the same species.

PROSOBRANCHIA are the subclass of Coiled Marine Snails to which the common shore species like the Winkles and Topshells belong.

PROTANDRY is a term given to protandrous hermaphrodites of a species with males that turn into females later in life.

PROTOGYNY is a term given to protogynous hermaphrodites of a species with females that turn into males later in life.

PROTOZOA are single-celled organisms.

PYCONOGONIDA are a class of small marine Chelicerates that have eight legs. The species, *Pycnogonum littorale*, is found in conjunction with Sea-anemones around the British coast.

Reports of visits to the shore and rock pool fish, crabs and other creatures found between the tides, should be sent to: Andy Horton, British Marine Life Study Society, Glaucus House, 14 Corbyn Crescent, Shoreham-by-Sea, Sussex BN43 6PQ. If you are unable to identify the animals it is better to say so than make a wild guess. If you are able to provide a full description, or even a photograph, I may be able to help. All letters will receive a reply.

Protogyny is common amongst tropical reef fish, notably the wrasses. The Cuckoo Wrasse, Labrus bimaculatus, found in the seas around the British Isles starts life as an orange or red female and later changes sex and acquires a blue head. The larger males selects a nest and attracts the females to lay their eggs.

PHOTO: ANDY HORTON

POND LIFE

FOLLOWING ON AFTER HER INVASION OF THE FROGS, **LYNDA OSBORNE** KEPT A CLOSE EYE ON SUBSEQUENT DEVELOPMENTS IN HER POND.

• PHOTOGRAPH BY THE AUTHOR •

The pond was deserted and lifeless. Throughout the summer we had raised thousands of tadpoles in our small garden pond, which we had put in for the frogs. We had then watched the little froglet offspring gradually leave home. What had once been buzzing with life was now just a container of water and we were suffering from the 'empty nest' syndrome.

In September, we gave in to our daughter's plea for goldfish and bought her two for her birthday. One was pure gold and the other had a small black mark, so that she could tell which was which. They seemed happy in the pond but darted away and hid every time we went near it. When winter came they kept a low profile and wanted very little food. Sometimes the pond would be covered with an inch or two of ice and I'd gaze at the frozen surface and wonder if they were surviving underneath it (I created an air hole with a floating ball which I took out during the day). However, as soon as the weather turned milder and the ice had melted, they would be foraging around again as if nothing had happened.

SPRING AGAIN

When the warmer spring weather came, the fish became more active and their appetites increased. We didn't get quite as many frogs as the previous year, but enough to give us a good supply of spawn. We looked forward to having tadpoles and froglets again, but the fish were probably looking forward to having some fresh tasty food. The plants I had put in the pond, in September, were not growing yet, and the pond had a green tinge, becoming more like a pea soup as the days passed. The fish didn't seem to mind the green water, but we could not see much in the pond and so I emptied a little water out occasionally and replaced it. I often seemed to be changing the water during the year, and so it was a good thing that the pond was small, but I sometimes thought that a bigger pond would probably be better able to take care of itself.

TAMING THE FISH

To help us see the fish more we started feeding them with floating pellets. The fish quickly learned to come up to the top of the water for their food and there seemed to be a competition between them to see who could gulp down the most pellets the fastest. They soon realised our presence by the pond meant dinner was being served and lost their shyness. Later on, they even took pellets from our fingers.

CUTE NEWTS

As I was sitting on the paving slabs by the pond one day, watching the fish, I suddenly saw a creature that looked like a miniature alligator, with its rounded snout, long body and four little legs. It was a Newt. I watched as it gently crawled amongst the weed, and then it swam by tucking back its legs and wiggling its tail. We decided to clean out the whole pond, as it was still very green, so that we could see what was going on under the surface. To our surprise we found not one newt, but five, at the bottom. We also found two strange insects which we identified as dragonfly nymphs and although they are another predator of tadpoles, they would be an attractive addition later on. A few frogs were rather indignant about the pond water disappearing above their heads and hopped away into the garden. After the pond was refilled, the water was crystal clear, and it was now even more tempting to spend time watching the pond life. Unfortunately, the newts, goldfish, and even the snails, had large appetites for the tadpoles developing in the spawn. It was sad to see the tadpoles being devoured before they'd had much chance of life, and we could see why each frog needs to lay so much spawn in order to produce a few frogs, they are a tasty morsel for much wildlife.

SWOLLEN BELLIES

The fish didn't seem to mind the newts even when they brushed past each other. One of the newts had a swollen abdomen and we wondered if we were going to have some newt spawn. Then we noticed that one of the fish looked much fatter than the other one, were we lucky enough to have a male and a female? The fish often seemed to be chasing each other, as if mating, and this is usually the best sign you can have to prove that everything in the pond is in tip-top condition. I was very pleased to see that they were happy, but I didn't think they would breed in our small pond.

POND LIFE

By May the pond was teeming with life and certainly full of interest again. the plants were growing, the fish came up for food and chased each other, the newts surfaced for air and then dived down, the diving beetles zoomed about in the water, and the snails bred rather too abundantly. Tadpoles came out to eat the fish food, but mostly hid in the weed, as there were too many open mouths out there waiting to consume them. Dragonflies and many other insects came, attracted to this mini-oasis in an area which had seen the gradual filling in of ponds. It became a very hot summer, and in the evening frogs would gather round the edge of the pond and some would take a cool dip. The pond needed topping up regularly and the fish enjoyed swimming under the surface when water was being sprinkled from a watering can. The cat's favourite spot was a flat ledge on the rockery behind the pond, where she could lie in the sun and watch the golden fish at her leisure. She did not attempt any fishing, perhaps she did not want to get her paws wet.

FRUITFUL AUTUMN

In September, we noticed that the fish often seemed to be wriggling along the top of the weed, half out of the water. We realised that the pond plants had at last grown, and rather too much, there was very little swimming space left. I pulled some of the weed out and decided to change some of the water, thinking that the tadpoles must have left home by now. I threw the pond water onto the garden. Suddenly I saw something

writhing on the mud, and as I went to pick it up, I saw that instead of it being a black blob of a tadpole, it was silvery and shiny. To my surprise it was a little fish! 'Well,' I thought 'There are only two ways that could have got here. Either it fell from heaven, or it is a baby from the two goldfish.' Since the latter seemed more likely, I put it into a container of water and rushed indoors to show my daughter. 'Congratulations! Your fish have become parents' I told her. She was thrilled and went to show everyone else in the family. We marvelled at this tiny replica fish, so perfectly-formed, looking brown from the top and pale gold on its sides. It takes a year for fry to turn the adult, bright orange colour.

FISH NURSERY

We decided to empty most of the water out of the pond to see if there were any more baby fish. As we got near to the bottom, we found another, and another, until we had 14 which we put in a tank indoors, so that they would not be eaten by predators. The thick pond plants must have helped them survive so far. We put oxygenating weed in the fish tank and a few snails to keep the water clean. A couple of weeks later, we found a snail eating one of the fry, so we removed all the snails and were left with 13 little fish. At first the water became cloudy but then we found a flake food that did not have this effect. The fry were very active at feeding time, gulping and splashing, and they did not lose their appetites in the winter because they were being kept indoors where the water was relatively warm. They grew half an inch bigger in the first three months.

POPULATION EXPLOSION

During the autumn, the adult fish ate plenty to stock up for the winter and they carried on chasing each other; we couldn't help thinking 'Oh no!' every time we saw them still keen on reproducing more of themselves. Where were we going to put them all? They looked very attached to each other, sometimes just lying still side by side. What if all their offspring decide to breed? Also all those froglets we raised last year may have grown up and be coming back soon. What had started out as a small project to give the frogs somewhere to lay their spawn, had turned into something that was multiplying. The demands of the fish and wildlife suggest that we really must put a bigger pond in the garden — my husband is quite keen on the idea, he says it will be less grass to cut!

Beware, pondkeeping can really get a hold on you! It is a fascinating hobby and a valuable contribution to the conservation of garden wildlife.

.. News Desk ... News Desk ..

INTERZOO 1996

These pendant lamps certainly appear to encourage plant growth! PHOTO: PETER MOON

Peter Moon visited Nuremburg for the 1996 Pet Marketing Event

Possibly the largest pet-orientated exhibition in the world? Well, with six halls and an attendance of over 23,000 Trade people from all parts of the globe and some 700 or so exhibitors, who am I to argue?

For me it was my first time at the Show, which by the way is every two years and is held in Nuremburg, Germany, and runs for four days in May. I was invited over by our American colleagues to assist on the Stand organised by their German distributor, which gave me the opportunity to meet members of the exhibiting Trade from the UK.

The aquatic companies were distributed throughout all of the six halls, with areas designated, for example, UK pet companies located in a particular block, so armed with the Show Guide you can easily select the area you need. It was nice to see so many English companies exhibiting products that are, perhaps to us, well known and very popular with aquarists, but on the other hand some new products were being displayed that will inevitably be advertised in our aquatic press shortly.

Most of the filtration systems were of German origin with a wide and varied range of Trickle Filters and Skimmers on show; naturally these units were of high quality with a suitably high price to match, nonetheless extreme interest from overseas buyers was apparent. Firms such as Tunze, Aqualine Buschke and Dupla were kept busy.

Systemised aquaria, also, seem to be in vogue (especially black finished!) again most coming from the host country.

Hi-tech lighting seems another growth area, especially in Metal-Halide/Actinic combinations which give ideal spectrums for Marine invertebrate aquaria.

Expertly-planted freshwater aquariums using CO_2 units and under-substrate heating cables coupled with high output Mercury-Vapour Lamps also, seem popular with companies such as Dennerle, Dupla, JBL and Bio-Plast, etc. leading the way. Perhaps one of the most striking exhibits was that of Tetra's magnificent marine tank containing Sharks and other striking fish.

There seemed to be an endless supply of Heater and Pump manufacturers around and all of the well-known companies were on view and all had a plentiful supply of customers. Our own stand was kept busy throughout the four days, so everyone went home pleased, but tired! Never mind, we do have another two years in which to recover.

Pet Gala Day

Harlington Nurseries, the large Pet and Garden Centre in Harlington (at 100 Doncaster Road), are holding a Pet Gala Day on August Bank Holiday Sunday (25 August).

The Centre has a large aquatic section where the day will include a visit by the Aquarian Advisory Service, with free help and advice by Dr David Ford. Aquarian will also be making special offers on their fish foods, plus raffles and promotions.

Worth a visit, especially by pet-owning aquarists.

ESPA (UK) Ltd

ESPA (UK) Ltd are pleased to announce their collaboration with the German manufacturer Messner Gmbh.

Messner have, for many years, supplied renowned pump manufacturers and aquatic companies with its water garden products, on an international scale. Today Messner have an export rate of 70 per cent to 40 countries worldwide. Their highly-advanced aquatic products, manufactured according to the latest technical knowledge, are the perfect partner for the ESPA/JARDINO range of Surface Pumps.

Together ESPA and Messner bring a depth of experience, and a product range, previously unavailable in the UK. For further information on the ESPA and Messner systems contact: ESPA (UK) Ltd., 15 Riverside Avenue West, Lawford, Manningtree, Essex CO11 1UN. Tel: 01206 391291. Fax: 01206 391239.

COLDWATER JOTTINGS

BY STEPHEN J. SMITH

Keep it simple

No garden is complete without a water feature — whether your 'little piece of paradise' is fully-landscaped, a small town back garden, a patio or balcony, there is room for a water-feature of some sort to bring life and colour to an area which, no matter how many plants you put there, will be devoid of magic without a water feature.

Your water feature can be as large as a lake or a small as a wooden water barrel but, and this is the whole point of this 'jotting', construct it so that it is easy to enjoy. In other words: 'keep it simple'. These three words form one of my personal favourite 'golden rules' of fishkeeping. After all, this IS a hobby, and a hobby is to be enjoyed. So, do not bite off more than you can chew by constructing a pond or water feature which will require a lot of work in order to keep it in good condition. Keep it simple and you will be able to sit back, relax, and enjoy it to the full.

Garden pond

Building your pond need not be a civil engineering job and it need not cost the earth, nor take forever. My first ever pond was built in a day and, by the time it had been stocked and planted out, you would have thought it had always been there.

So where should the pond be sited? Every garden has a messy corner which will never get tidied up and where nothing else can be done. Or, maybe, the lawn is just too large to cut, or could do with a focus of attention. Choose a corner of the lawn, in part shade from trees.

Reclaimed roofing joists are ideal for the 'walls' of your pond, but make sure you strip out any bolts, nails, screws, and so on, as these will puncture the liner. My first pond needed just four lengths: two at 10ft long and two at 5ft long and my local timber yard supplied them cut to size — and very cheaply. Stand these four lengths of timber along their edges to make a rectangle on the patch of lawn you have levelled out, with the 5ft lengths in between each end of the 10ft lengths. Check again that the top edges of these timbers are level, and use slate or stones for packing to fine-tune the levelling process. To pin the timbers together, I used short battens and plenty of nails.

Ensure that the rectangle is 'square' by tapping in a nail at each corner and, using lengths of string strung diagonally, check that each diagonal is the same length. When you are satisfied remove the string and the nails holding it. This will create the basis of a rectangular pond 10ft long, 5ft wide, and 9in deep. To make the pond a little deeper, mark out a rough rectangle approximately 18in inside the 'walls' of your construction (to form a 'shelf' for plants) and dig that out, giving a slight slope to the sides, and going down approximately 18in if you can. The soil you remove can be packed around one end or one side of your construction, perhaps for a rock-garden, but be sure to save the topsoil in a separate pile to put on top of your intended 'rockery' feature.

Before lining the pond, some form of underlay should be put down to protect the liner from sharp stones, twigs, and other sharp objects. Proprietary pond underlay is designed specifically for this purpose — I have also put old carpet to similar use! To establish the dimensions of liner you will need, the formula is relatively easy: Length plus twice the Depth BY Width plus twice the Depth. So, if our pond is 2ft deep at its deepest, 10ft long and 5ft wide, then its Length (10ft) plus twice Depth (4ft) BY Width (5ft) plus twice Depth (4ft). Therefore you will need a liner with minimum dimensions of 14ftx9ft.

Traditionally one of the favourite flexible liners to use has been butyl rubber, which is hard-wearing, but very expensive. My own preference is for black polyethylene sheet, often used for reservoirs, and which is very durable. I have had the same liner in my pond for over ten years and it is still surviving. Also, with this type of construction it may well be that you will wish to enlarge or develop your pond and you would then need to buy a new liner anyway.

After checking the timbers again to make sure that there are no nails or screws or other protruding objects, lay the polythene out over the framework so that it is roughly even all round, and sagging in the middle; and hold down the sides and corners using large stones or rocks. Now simply drop the hose into the 'sag' and turn it on. As the water flows in, its weight will 'form' the liner into the inner hollow while you carefully tease the sheet to ensure that it is captured evenly within the pond as the weight, and volume, of water increases.

Once the pond is filled, turn off the hose and tidy up the corners. A sharp knife and a staple gun is called for here — but don't go too mad with the knife! Starting with the ends, staple the liner down onto the top edges of the timber 'walls' (if you intend to build a rockery, then the liner at that edge can be folded all the way down, to protect the timbers) then carefully trim the surplus liner away.

Next month: Finishing the pond, stocking and planting.

FEEDBACK

Do drop us a line about your first simple pond and your enjoyment of coldwater fishkeeping by writing to me at Coldwater Jottings, A&P, MJ Publications Ltd, Caxton House, Wellesley Road, Ashford, Kent TN24 8ET. If you have e-mail you can contact me direct at: jottings@sjspr.demon.co.uk.

SOCIETY WORLD

Tim Smethurst reports on a Grand Day Out

30 June 1996 saw Seascale Junior Fishkeeping Society's First Open Show.

For those of you who don't know, this is not a junior section within an adult Society but a Junior Society run for juniors by juniors, all conducted under the guidance of Chris and Helen Steele. The children in the Society range from seven to 11 years of age, and every one of them can be very proud of the way they organised the Show.

Judges came from the FBAS Tyne Tees Area Association and the Show was run under FBAS Rules. The Championship Trophy Class R (Platies) was won by Gavin Cowan (Solway A.S.) with a *Xiphophorus variatus*; the *Apistogramma vijeta* owned by Geoff and Jane Bell claimed Best in Show. Entries for the Show came from as far afield as Yorkshire, Scotland and Tyne/Tees and around 350 fish were benched.

Geoff Capes was the celebrity guest attending; whilst many people recognise Geoff as a Champion Strong Man and Champion Budgerigar Breeder, not many know of his appreciation of fish — or that he is currently building a 12,000 gallon pond to house his favourite Koi, along with some specially selected specimens being flown over from Japan. He happily chatted to the Border Koi Keepers' Society for well over an hour. Geoff was also made an Honorary Member of the Seascale Junior Fishkeeping Society (only he could lie about his age and get away with it!)

At the end of the day the Show was run by the children of the Society and they did a fantastic job. I know that Chris and Helen Steele were immensely proud of 'their kids'.

The Seascale Junior Fishkeeping Society will again be attending the Supreme Festival of Fishkeeping this year at Weston. One of the things they will be doing will be giving a fishkeeping lecture that they have prepared themselves. I have nothing but admiration for these kids and will be there at the lecture — how about you?

Win free Weston Weekends!

There will be several opportunities to win a FREE WEEKEND FOR TWO at this year's Supreme Festival of Fishkeeping to be held at Pontins' Sand Bay Holiday Chalet Centre during 1-3 November.

The first will be a Lucky Society Draw which will be held at the September General Assembly Meeting of the Federation of British Aquatic Societies. Each year, upon affiliation, every FBAS-Affiliated Society is given a registration number and all these numbers will go into the hat for the Draw. The Society whose Affiliation Number is drawn out will receive a weekend ticket for two for the event.

The Draw will be open to all Societies affiliated to the FBAS at the time of the Draw.

This means that late-affiliations for the rest of 1996 (and there's still a month left to join!) not only will receive benefits of FBAS membership for the remainder of 1996 but also stand a good chance of winning a great free weekend for two for their members.

If your Society wishes to affiliate, please send £12 (cheques made payable to FBAS), together with details of your Society's meeting place, time and frequency of meetings, name and address of Secretary and Chairman, to the FBAS Treasurer, 9 Edwin Road, Hastings, East Sussex TN35 5JT.

Another, continuing, opportunity to win, open to individuals, comes via three monthly **A&P** Competitions. All you have to do is answer the following three questions correctly for your name to be entered into the Draw of all correctly-answered entries.

Q1. Name the notifiable disease which attacks pond fish in the early part of the year.

Q2. A Mermaid's Purse contains what?

Q3. **A&P** was founded in: (a) 1924; (b) 1934; (c) 1947?

Send your answers, together with your name address and telephone number, on a postcard or sealed down envelope, to: Supreme Festival Competition (AP1), 8 Acacia Avenue, Brentford, Middlesex TW8 8NR, to arrive no later than Friday, 27 September 1996. The winner will be notified as soon as possible after this date.

Consolation prize vouchers for £30, £20 and £10 worth of Hage products (retail values) will be awarded to runners-up.

PLUS: Bring along this copy of **A&P** to Weston and obtain FREE ADMISSION to the Supreme Festival of Fishkeeping as a Day Visitor.

Alex Stephenson says: "Good Show, Midland!"

Once again, the Association of Midland Goldfish Keepers have presented one of the best Goldfish events of the year. 'The Midland', as it is generally known, took place at the usual venue, Foleshill Community Centre, Foleshill, Coventry on 30 June 1996. It isn't the largest show in the Goldfish calendar but the relaxed and friendly atmosphere make it top of my popularity poll. Add to this, easy access, adequate car parking, good 'all day' refreshments, and you have a very worthwhile gathering.

Competition was keen, as always, and this year produced a record number of entries. Sometimes quantity does not always produce quality, standards however, were high and most exhibits excellent specimens.

Goldfish Societies' Shows differ from the more usual tropical or mixed shows in as much as the tanks and water are already provided. All the competitor has to supply are the fish. Judging is carried out by an invited group of experienced practitioners, chosen for their knowledge and bravery. Current guidelines for competition are the relatively new 'Nationwide Goldfish Standards of Great Britain'. Previously, Goldfish Societies each had slightly differing ideas of excellence, a situation which was at best unhelpful. Getting enthusiasts to agree about Goldfish must be almost as hard as getting the EC to agree about anything so, these latest show standards are seen as a great step forward.

For those of you who enjoy Goldfish, joining one of the six major Societies could do a lot to increase that enjoyment. All organizations welcome new members and, whatever your level of expertise, you would be sure to gain by joining one of them.

Cats and Coelacanths

Thames Valley Catfish Group had its highest attendance this year with over 40 enthusiasts present at its summer meeting at Amersham, on Sunday, 23 June. The Group laid on their normal format of two speakers (Alan Sykes, well-known Corydoras breeder, who gave an illustrated talk on his fish house and the experiences he had gained over many years of fishkeeping, and Gina Sandford, **A&P** columnist, with a superb talk on furnished aquaria, Dutch style), a Members' Auction and a plentiful supply of refreshments.

At the Group's next meeting on Sunday, 1 September at 2.00pm, the main speaker will be Mike Shadrack, from Ilford A.S., talking on what the Natural History Museum regard as a fossil fish — *Latimeria chalumnae*. The Coelacanth, once thought to be extinct, was rediscovered some years ago off the coast of Madagascar and Mike will be discussing the rival claims made by both the English and the French in this unique discovery.

For next meetings or membership details please contact Steven Halliwell on 01869 248340 after 6pm or

1996 OPEN SHOW DATES

(Rule Codes: A = A of A; FB = FBAS; FN = FNAS; FS = FSAS; I = International Goldfish Standards; N = NEFAS; U = USofA; Y = YAAS)

3 August Gloucestershire A.S. (FB)
4 August Peterhead A.S. (FS)
10/11 August Koi '96 BKKS National Show
11August Dunfermline A.S. (FS)
11 August Grimsby & Cleethorpes A.S. (prov.) (Y)
11 August Salisbury A.S. (FB)
18 August Perth A.S. (FS)
25 August Glenrothes A.S. (FS)

write to Membership Secretary, TV CATS, 14 Constables Croft, Arncott, Bicester, Oxon OX6 OPG.

More Cats!

The Northern Area Catfish Group has 65 members (including some in America) and holds regular Sunday afternoon monthly meetings. Its yearly activities includes two Auctions plus their Catfish Only Open Show which attracts 'cats' from miles around. The highlight of the year is the Convention held at Wigan Pier and amongst the things you missed this year were 'Fishes of Borneo,' 'Breeding Synodontis' and Corydoras and their behaviour.' Next year's Convention date is 16 February 1997.

Details of meetings can be obtained from the group's PR Secretary, Giles Barlow 01706 210709.

Ryedale members active

Members of Ryedale Aquarist Society have been active in the past months. In March the Society put on a promotional stand at the Malton and Norton Hobbies Exhibition to alert the public to the need for aquatic habitat conservation and, of course, to advertise the Society's existence. As no water or living fish were allowed, three aquarium scenes (representing coldwater, tropical freshwater and tropical marine systems) were created using potato crisp boxes and cardboard cut out fish! To highlight aquatic conservation a map of the world was specially made showing many fish species in danger of extinction.

More recently the Society launched its new quarterly newsletter. The meetings of Ryedale Aquarist Society are held on the first Wednesday (when possible) of the month at the Bay Horse Hotel, Market Place, Pickering. If you are in the Ryedale area on holiday/business at this time please call in and say 'hello'. Contact the Secretary, David Marshall, 16 Potter Hill, Pickering, North Yorkshire YO18 8AA, for more details.

Can you qualify for the Interpet Fishkeeping Challenge?

You too can be in the Final of the Interpet Fishkeeping Challenge at the Supreme Festival of Fishkeeping this year. We have a pair of tickets to give away to the successful entrant. Just answer the following 10 questions (and Tie-Breaker) correctly and you'll be in the 'hot seat' in no time at all. The Questions are:

1. What is another common name for the Red-cap Oranda?
2. *Cephalopholis miniatus* has three common names. Red grouper and Coral Rock Cod are two, what is the third?
3. What colour is the eye of *Priapella compressa*?
4. What body of water is the main natural habitat of *Synodontis brichardi*?
5. What is the scientific name of the 'Dwarf Golden-eye?'
6. To what Family do Danios belong?
7. What do demersal eggs do?
8. What is the main ingredient of mercurochrome?
9. What is the first thing you should do to newly-purchased fish?
10. *Barclaya longifolia* is better known as what?

Tie Break Question

How many people attended the Second Supreme Festival of Fishkeeping at Weston?

The Tie Break Answer will only be taken into account in the event of a tie.

Send your answers, together with your name address and telephone number, on a postcard or sealed down envelope, to: Interpet Fishkeeping Challenge (AP), The Orchard, Gatcombe, Isle of Wight PO30 3EF, to arrive no later than 14 September 1996. The winner will be advised as soon as possible after this date and will receive a pair of tickets for the event.

DIARY DATES

AUGUST

3 Gloucestershire A.S. First Open Show. St Marks Community Centre, Brooklyn Road, St Marks, Cheltenham. Benching from 9am; public access to Show area on completion of judging (approx. 3.30pm). Profits to Pied Piper Appeal (Reg. Charity 1011611). More information from Stuart Brown, 01242 513928.

6 Gloucestershire A.S. Review of 1st Open Show. QUIZ. Bell & Gavel, Cattle Market, St Oswalds Road, Gloucester. Contact Andy, 01452 372948 or Christina, 01242 520428.

18 Association of Aquarists. Chilterns Superbowl Open Show. Community Centre, Amersham, Bucks. Contact Adrian Aylmer, 01256 53793.

18 Clwyd Aquatic Show Team '88. Aquatic Auction, Boys Brigade Hall, Castle Street, Caergwrle, nr Wrexham. Booking in of lots (limited to 25) from 10.30-11.45am on the day or in advance by contacting Peter Jones, 01978 761829.

18 Perth A.S. Open Show and Fish Auction (no reserve prices!). City Hall, Perth. Contact Tom Young, 01738 621704.

18 Portsmouth A.S. Annual Convention. Portsmouth Community Centre, Mallins Road, Portsmouth. Speakers Dr Peter Burgess and Brian Walsh. Tickets £5, including buffet. Contact J. Stilwell, 01705 691030.

25 Tyne Tees Area Association. Aquatic Festival '96. 10am-5pm. Park Hotel, Tynemouth. Open Show, Lectures, Competitions, Trade Stands, Society and Specialist Stands. Sale of Fish by Hobbyists. Space available for non-affiliated aquarists to sell fish at £5 per space. Heat of AquaChamp. Further information Colin on 0191 2533452 or Jane on 01325 466630.

SEPTEMBER

1 Union Scottish Aquarists. Open Show and Auction. Tulloch Institute, Perth. Entries and benching 10am-1pm. Contact John Reid, Show Manager, 21 Cumbrae Place, Perth. 01738 634689.

1 T.V. Cats. Community Centre, Amersham, Bucks. 2pm. Mike Shadrack on Coelacanths. Contact Steve Hallivell on 01869 248340 after 6pm.

Society World is provided to help all Societies to promote themselves and their activities. One of the most difficult tasks within any Society is that of Programme Secretary, who is expected to fill every meeting with something of interest. These columns are a source for all manner of ideas for Societies' entertainment, and could lead to many a Speaker finding fame (if not fortune!)

So do your bit to let readers know of your good fortune, whether you have found an excellent Speaker or have come up with good ideas which have helped to entertain your Club's membership.

We can help you only if you provide the information. Depending upon availability of space, we are also pleased to incorporate highlights of Show results (major prizewinners only, please, and DO please include first names) together with photographs if they are suitable.

And, of course, ensure that as many people as possible have advanced warning of your Meetings, Shows, and other events, by sending us details for our comprehensive '**Diary Dates**' column in good time.

Send your information to: '**Society World**' ***Aquarist & Pondkeeper*, Caxton House, Wellesley Road, Ashford, Kent TN24 8ET;** or you can e-mail direct to: **societyw@sjspr.demon.co.uk** (please let us have your information at least six weeks prior to publication).