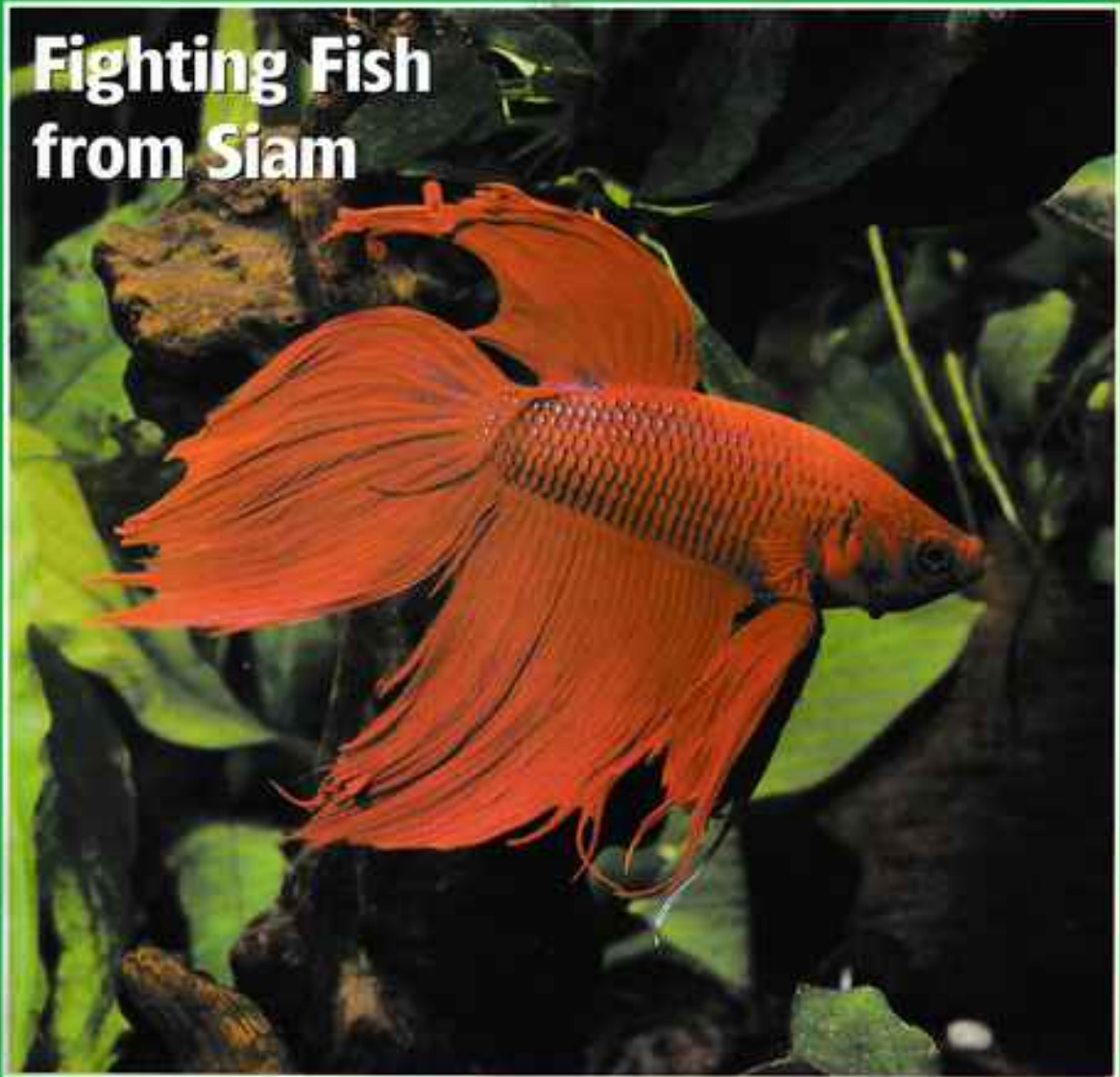


AQUARIST & PONDKEEPER

*Fishkeeping
at its best*

September/October 2000 £2.25

Fighting Fish from Siam



TROPICAL • PONDS • PLANTS • KOI • MARINE
DISCUS • COLDWATER • REPTILES • AMPHIBIANS



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HELLO, GOODBYE & WELCOME!

Looking at this month's A&P many of you will not have noticed one of the most significant changes to occur in A&P's 76-year history. We have passed to new publishers - TRMG Magazines Ltd. Nothing new in that, over the years many publishers have been involved with A&P; the last ones being Inline who published A&P for 15 months. Inline always hoped to continue in the long term, but they are involved with several other projects including Inline Marketing which has become tremendously successful over the last year. It eventually became obvious to everyone that A&P needed to find a new home with a professional publishing company who could devote sufficient time and resource to it.

So why would TRMG be interested in a fishkeeping title when much of its business is based around the motor industry and what is the connection with fishkeeping? All became clear when I met the new Group Advertising Manager, Catherine Chapman. Catherine is a keen fishkeeper of many years standing, loves A&P and has previously been involved with Koi Carp magazine. This was her opportunity to mix business with pleasure again and become involved with the world's oldest aquarium fish magazine.

Talking to our designer also turned up a another fishkeeper! Lisa has kept fish for a number of years, so between the three of us we make a very fishy team.

What does the future hold for A&P and our loyal band of readers? First of all a short delay in publishing our next issue. To allow things to be transferred over to TRMG smoothly we are publishing a joint September/October issue this month. In fact, you will only have to wait until 19th October for your next issue. From then on Aquarist and Pondkeeper will be on sale at your newsagents on the 3rd Thursday of each month.

Until 19th October,

Happy fishkeeping,

Derek Lambert.



Next Issue...

Tropicals Linda Lewis plays with delightful Danios and we go galloping through Gabon with Dave Armitage.

Marines Andrew Caine starts a new series to help everybody keep marines successfully.

Coldwater The Pondkeeper is back with jobs to be done in preparation for winter.

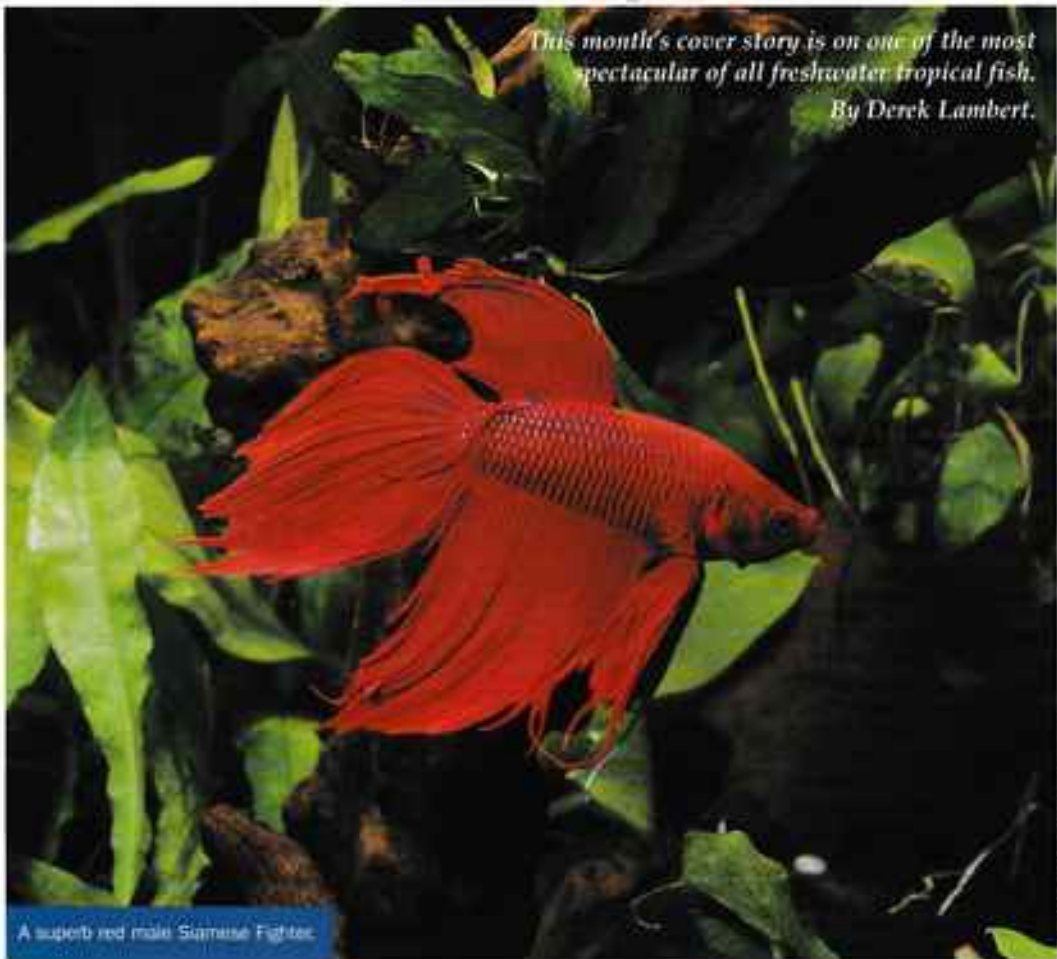
Plus... We introduce our new expert panel who will be on hand to answer any of your questions.

AQUARIST AND PONDKEEPER

The magazine for every fishkeeper ~ since 1924

In the August issue a printing error occurred in Ann Telford's article "Controlling green water & blanket weed". The very last sentence should read "There is insufficient to block pumps, filters or bottom drains, but enough to harbour the live food our Koi adore as a tasty snack." Our apologies to Ann for the error.

FIGHTING FISH FROM SIAM



This month's cover story is on one of the most spectacular of all freshwater tropical fish.
By Derek Lambert.

A superb red male Siamese Fighter.

Photos: Arnold Van Den Nieuwenhuis

This month's front cover is of a fish that has to be one of the most beautiful freshwater tropical fish in the world. It is not known just how long Siamese fighters (*Betta splendens*) have been kept in captivity as pets (600 years appears to be a reasonable estimate) but they certainly rank second only to Goldfish which go back over 1000 years.

Of course Siamese Fighters were not initially kept and bred for their gorgeous colours but as fighting fish. This is like certain varieties of chickens were kept not so much for their eggs and meat as for the fighting abilities of their cocks. Bets are placed on each animal with the fish which gives up first deemed to be the loser. It is a fallacy that these Fighting fish actually fight to the death. In fact very few fish die in the arena but many die shortly after through neglect of their injuries.

The winner, however, will be given the best of everything to help him recover from his injuries so he can fight again or be used to breed from. Over the years this

has led to the creation of a cultivated form of Siamese Fighter far removed from the native species. These fish are known as Plakat lukmoh in Thailand and are tough customers which don't know the meaning of the word defeat. They come in various varieties with each having a dominant colour - purple, green, and red are the most common.

The native fish can still be found in Thailand, although they are certainly nowhere near as common as they used to be. These are called Plakat pah (Plakat is the Thai name of fighting fish) and are smaller fish which are far less aggressive than their fighting cousins.

FANCY FIN FORMS

During all the selective breeding for Fighting fish a long finned form appeared as a sport. These long fin *Betta splendens* became known as "Plakat Cheen" which can be translated as "Chinese fighting fish" (Plakat = fighting fish, Cheen = China, Chinese).

It was at this stage that commercial fish breeders stepped in and started breeding these gorgeous fish for aquaria. They first made their way to the west in 1927 with a shipment imported to San Francisco by a Mr. Locke. They were a tremendous hit with aquarists and soon nobody wanted the short finned form any more. Eventually only the long finned variety was available to aquarists, although the wild type short finned fighters have reappeared in recent times.

Much more recently another fin mutation occurred which was totally unlike any other fancy finned Beta. This appeared in a strain used as fighting fish but they were soon bred into the many strains of fighter sold to aquarists. Originally called the Liberty Fighter they will also be found sold as Double-tailed or Split-tailed Fighters.

Right: A male displaying - note the flared gill plates.

Below: A beautiful predominantly blue male fighter. Red in the ventral fins is a common fault with many blue fighters, ideally they should be a solid blue throughout all their fins.



This mutation causes two distinct effects. Firstly the tail is split into two distinct lobes. Secondly, the dorsal fin is much broader based and has many more rays in it. Thus the dorsal fin is almost the mirror image of the anal fin.

TIMID FIGHTERS?

Siamese Fighters are not well suited to your average community aquarium. This is not because they are aggressive towards other fish but because they are rather timid. They are naturally found in weed filled ditches, streams, ponds and flooded paddy fields. All these places provide plenty of plant cover and it is this that many community aquaria lack. These aquaria often house fast moving Barbs and Danios as well as a host of other fish, all of which tend to frighten the more timid Bettas.

This, of course, is completely at odds with the "Fighting fish" label. So here, it is a good idea to look more closely at just who or what brings out the aggression in a male Siamese fighter. Other species of

fish generally don't. Occasionally you may see a Fighter chase after a male Gourami but usually this is a half hearted affair which lasts no more than a second or two. Female fighters will be displayed to and often chased around an aquarium. If not ready to spawn then there is a real danger they may be hurt by a randy male, so it is a good idea to include 2 or 3 females in a community aquarium to a single male.

Other males are what really bring out the aggression in a male Fighter. This is because in the wild male Fighters



stake out their own territory. This centres on his bubble nest which is a semi-permanent affair and will be used for multiple spawnings. A close examination of a nest in the wild will reveal newly hatched fry as well as eggs at different stages of development.

Obviously the last thing a male Siamese fighter wants to happen is for another male to muscle in on his patch. Hence his aggressive stance whenever another male approaches. This is normally exhibited by him flaring his gill plates and fins. If the other fish is a female or immature male then they will normally clamp their fins and swim off in the other direction. Females ready to spawn will react to him by displaying a vertical chevron pattern along their flanks and after some courtship will follow him back to the nest to spawn.

Other males wishing to set up their own territory may well stay and fight. Initially the challenger will spread his gill plates and flare his fins as well. Then they will start circling each other and try to hit. ➤

TROPICAL

chunks out of each other's fins. Usually in nature the strongest and fittest fish will win very quickly with only minimal damage to either fish. The winner taking possession of the breeding territory, whilst the vanquished male goes off to 'lick his wounds.'

IDEAL AQUARIUM CONDITIONS

Luckily Fighters are very hardy fish and can tolerate a wide range of water conditions. Ideally they should be kept in neutral to slightly acidic soft water, however, they



Above: Every weekend in Bangkok thousands of Fighters can be found for sale.

Right: A lovely red female. This fish looks ready for spawning and is showing the vertical chevron pattern. Ideally her mate should be a male similar to our cover picture fish – a good solid red throughout.

seem to do well enough in just about any normal aquarium conditions. The temperature should be maintained between 70-83°F, although if you want to breed them you should aim for the top end of this range (78-80°F).

Given that Fighters are in fact rather timid fish, you need to take this into account when thinking about the decor of their home. First of all you need to include some areas of thick plant growth. The back corners at each end of your aquarium are probably the best spots for this. However, these are also where filter uplifts and internal power filters are often positioned. Since these create a great deal of water movement you will need to find an alternative quiet spot for your Fighter's home base.

Apart from this quiet area you need to think carefully about tank mates. Most smaller community fish will be

fine but fast moving fish which are constantly on the move may well unsettle them. Any species prone to ripping fins (Tiger barbs, Serpae tetras etc) must be avoided at all costs. Brightly coloured Gouramis may also be a problem because they can trigger an aggressive response.

Finally other Betta species are not a good idea. Male Siamese fighters will attack them or may even try to breed with them. Hybrids have even been produced between Betta species.

FEEDING

Fighters eat a variety of foods in the wild but all are meat or fish based, vegetable matter plays almost no part in their diet. In captivity they will take all flake and granular foods but those designed for carnivores should preferably be fed. They also do best when some live food is added to



their diet. Once a week is enough normally but if you want to breed your Fighters then this needs to be stepped up to 3 or 4 times a week. Frozen blood worms etc. should also be fed at this time.

BREEDING

Breeding Siamese fighters is generally fairly easy. Use a 24" aquarium without substrate but with a number of pots and other caves straws around the bottom. Some surface plant cover can be included but no filtration or aeration at this time.

Now transfer a well conditioned male into your breeding tank and leave him to settle for a day. Next select a ripe female (they are rather plump with eggs and have a prominent white pimple at the vent) and float her in a glass jar or plastic breeding trap. Over 24 to 48 hours your male will construct a bubble nest near the confined female. Every so often he will break off and court his lady love. Watch this closely because, apart from displaying to her husband-to-be, your female will tell you when she is ready to mate. This happens when she tries to follow him back to the nest. Now is the time to release her and cross your fingers.

WATCH CLOSELY

Initially she may swim off in his direction. As soon as he notices her the pair will display to each other again. Mating may begin then and there, or it may take a little time for them to settle down to it. You must watch them at this stage. Generally there will be a little aggression if mating does not take place straight away. The male may bite or nip his prospective mate. Providing this does not get out of hand and serious harm occur, resist the temptation to interfere.

Once spawning does start, the pair will take up position directly under the nest and embrace in typical bubble-nester fashion. As they break apart white eggs will be seen floating towards the bottom. These are collected up by both fish and carefully placed in the nest. Another embrace occurs and more eggs are produced. A good spawning may consist of several hundred eggs and last well over an hour.



Photo: K.A. Walsh

Right: A gorgeous female green Double-tail fighter bred by R. Torres.

Above: Originally aquarists had only short finned fighters like this male bred by J. Arnette of France. Once the king finned types appeared these short finned fish all but disappeared in the hobby.

hatched Brine shrimp by the end of the second week.

Microworms will usually be taken a few days earlier and make a good second food for this fish.

Once onto larger foods the young grow quickly and can be sexed within 2 months. This is when you have real problems. You may have 50 male fighters growing up in a small aquarium and very soon they are going to hate each other. You need lots and lots of isolation units for all your young males. Some companies sell breeding traps which double as fighter tanks and these are ideal for this



Now is the danger period. You need to remove the female as soon as possible. In the wild she would just swim off before the male attacked her, but in an aquarium she may very well be killed. Once by himself the male will seriously start to build up his nest and care for the eggs. Any which fall out of their nest are caught up and carefully blown back into the bubbles. The eggs hatch in two to three days. At this time the fry can be seen hanging down out of their nest by the hundred. Those that fall are caught by their father and blown back amongst the bubbles. Another two days and they are free swimming and making a dash for freedom.

The male plays no further part in their development and should be removed. The fry can now be fed on a liquid fry food or infusoria and will be able to progress to newly

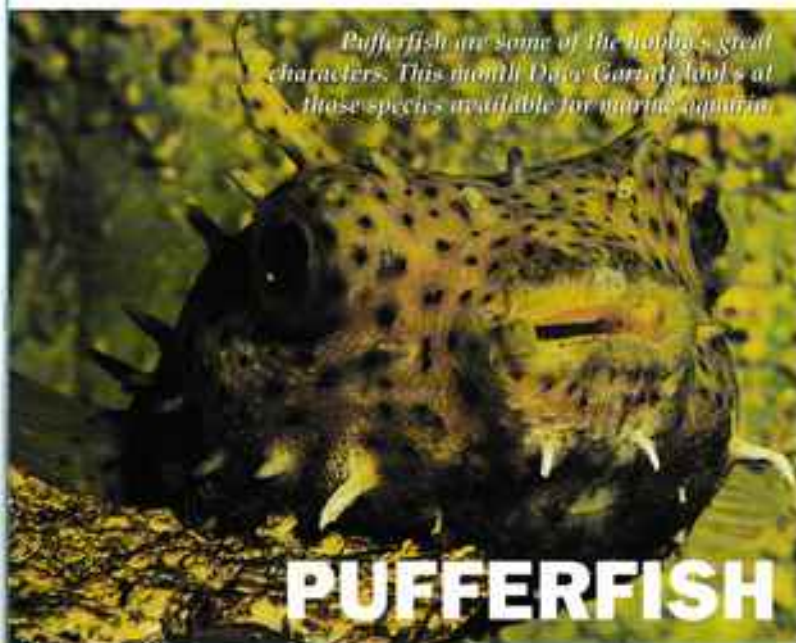
situation - the only problem is buying a large enough quantity and having enough tanks to fit them all in.

Alternatively you can use large jam jars to rear them in for the last couple of months before they are big enough to be sold on. Luckily the females will live happily together without too many problems.

By 6 months of age your youngsters will be reaching their prime. Each one a unique and stunning beauty in its own right. This is one fish you will have no problems finding a home for. Most shopkeepers are happy to buy your surplus stock and fishkeeping friends will line up to pick out their own particular favourite.

Siamese Fighting Fish, *Betta splendens* or Plakat Cheen - whatever you call them, they are a truly gorgeous gem of the aquarium world and only 600 years in the making! ■

Pufferfish are some of the hobby's great characters. This month Dave Garratt looks at those species available for marine aquarists.



PUFFERFISH

Commonly available species of Porcupine fish include the Beaked Hammerhead (Chilomycterus reticulatus). This is a small species rarely exceeding 6" in captivity.

Two closely related families, the Tetradontidae and the Diodontidae, contain the fish that are known collectively in the hobby as Pufferfish. The members of these two families have a defence mechanism that sees them inflate themselves to a much larger size. As an added deterrent all species possess spines, in some species these are very tiny whilst in others (Porcupine Puffers) they are a further formidable obstacle against being swallowed by a predator.

For the sake of the hobbyist the Pufferfish can be conveniently split into three groups. The smaller species of the genus *Canthigaster*, Dog Face Puffers of the Genus *Arothron* and the Porcupine Puffers (Genera *Diodon* and *Chilomycterus*). The *Canthigaster*s and the DogFace Puffers have smooth scale-less skins (the spines are not noticeable), whilst in the Porcupine group the scales are adapted into spines that face outwards in the event of inflation.

The Dog Face and the Porcupine Puffers have become firm favourites within the hobby. They grow to a large captive size and develop into active and appealing fish that can become very tame, more in the manner of a pet than a fish. The *Canthigaster*s are more colourful than their larger cousins but do not have the same popularity or appeal, however as they only reach 3" in captivity they are ideally suited to smaller tanks.

INFLATION

Puffers take their common name from their ability to inflate themselves with water, greatly increasing their size and thus deterring predators. A fully inflated Porcupine Puffer is quite an imposing sight, certainly one that would

make anything think twice about launching an attack or, worse still, trying to swallow it. The inflation is a defence mechanism adopted at times of perceived threat and must not be precipitated by the aquarist merely for its curiosity value.

Should you need to catch a Pufferfish you will need to take great care. Use a puncture proof container big enough to cope should it inflate. Do not lift the fish out of the water as it may then inflate with air and experience great difficulty in deflating. If this happens the fish will float on the surface and suffocate, hence you will need to gently push the fish under the water surface to enable it to deflate.

FUGU

The Dog Face and Porcupine Puffers are known to have internal organs that contain one of the deadliest poisons known to man, the powerful toxin, Tetraodon. Tetraodon poisoning is the deadliest form of fish associated toxic poisoning, being reported in the 1960s as having a fatality rate of over 60% with



Photo: M.F. & C. Pendervert

death occurring between 6 and 24 hours after ingestion. Despite this fact Pufferfish are considered a delicacy in Japan and in spite of the well known risks, these poisonous fish are used by experienced chefs to make the sometimes deadly delicacy known as Fugu.

DENTAL PROBLEMS

The puffers all possess teeth that are fused into a hard bony palate giving rise to beak-like jaws capable of biting and chewing hard coral. Their teeth grow constantly and in the natural course of events they are kept worn down by a diet of crustaceans and by gnawing on hard corals. In captivity hard-shelled food must be made available and fed to the Puffers with the shell intact e.g. mussels and clams. Bear in mind that although many Puffers become tame enough to hand feed they are also quite capable of removing the end of your finger, prompting the question as to whether hand feeding is such a good idea?



Above: American texts list other species such as this *Canthigaster marginatus*, but they are seldom seen in the U.K. hobby.

Below: An awesome sight - a Porcupine Puffer fully inflated. This is *Diodon stramonium*.



POISONOUS EMISSIONS

In addition to their poisonous internal organs Puffers can emit a deadly toxin from their skin. In their natural environment the fish would emit its toxin allowing it to make its escape by swimming away from the shell shocked predator. In the closed confines of an aquarium escape is not possible, either for the aggressor or the Puffer.

Should the Puffer have cause to emit its toxin into your tank you will suffer a complete fish wipe out. The Puffer will not be immune to its own toxin and will also succumb. Keep the aquarium well maintained, provide excellent water quality, and most importantly choose the tank-mates for your Puffer very carefully. Generally cater for your Puffers every need so as not to cause them any stress, thus avoiding the deadly outcome of a toxin release.

THE GENUS CANTHIGASTER

The Canthigasters, also known as Tobies and sometimes Sharp-Nosed Puffers, are much smaller than the Dog Face or Porcupines, reaching 2 to 4 inches in captivity (double this in the wild). They have a widespread distribution, although there are a number of exclusively Hawaiian species. They may be seen in pairs on the reef and tiny translucent juveniles have been found in planktonic larvae but I can find no records of spawning in captivity.

Although generally peaceful to fish other than their own kind some of them have acquired reputations as fin nippers. Despite their small size their crushing teeth means they must not be trusted with invertebrates. They are omnivorous feeders that will adapt to an aquarium diet and generally do well in captivity but are not as hardy as the larger Puffers. I have come across reports of them being involved in toxin emission and subsequent tank wipe-outs.

Two Indo-Pacific species are the most colourful species found in dealers tanks i.e. Valentia Puffer (*C. valentis*) and the Sharp Nose Puffer (*C. solandri*). A much drabber species is *C. crocota* from the Caribbean and American texts list other species such as *C. marginatus*, *C. cinctus*, *C. henrichi* and *C. caudatus*, but they are seldom seen in the UK hobby.

DOG FACE PUFFERS

The long snouts of these fish give rise to a puppy dog look and hence their common name. They will grow rapidly and may easily achieve a size of 10-12 inches in an aquarium. Despite having no pelvic fins they are active swimmers and must have plenty of uncluttered swimming room. Although rock work must not restrict the free swimming space required by Puffers you will need to create a couple of large caves as resting places.

They possess formidable fused teeth and are voracious feeders, getting particularly worked up at feeding time, often exhibiting a feeding frenzy. Puffers are not generally aggressive towards other fish but they must not be kept with small fish, as any such fish would be in mortal danger if they accidentally got in the way during a feeding frenzy. Unfortunately I have lost a fish myself in this manner. Puffers will also create havoc with crustaceans or sessile tubeworms or corals; they cannot be trusted with any invertebrates.



Above: Common Dog Face Puffers include species like this Blowfish (*Arothron hispidus*) which was photographed near Elat.

Left: One of the two Indo-Pacific Puffers which are the most successful species found in display tanks is Valentine Puffer (*Cyclopterus labridae*).

➤ Most literature suggests two Puffers of similar size will fight but I have friends who have kept adult Dog Face and Porcupine Puffers together in an eight feet long 200 gallon tank successfully for many years. I am not recommending you try this, I use the case to illustrate that given enough space, starting with small juvenile fish and selecting suitably sized fish as tank mates, they achieved a harmonious community of large fish. However, I have to advise caution as I have knowledge of tank wipe-outs involving Dog Face Puffers.

Common species available are usually Indo-Pacific in origin. Some of them may reach up to twenty inches in length on the reef but a maximum aquarium size is usually ten inches or less. The species most commonly seen for sale are from the *Arothron* genus, namely the Common Dog Face Puffer (*A. nigropunctatus*), Blowfish (*A. hispidus*), Reticulated Puffer (*A. reticularis*) and Spotted Puffer (*A. melanurus*).

PORCUPINE PUFFERS

The Porcupine Puffers are distinguished from the Dog Face Puffers by their elongated spines. These spines are normally kept flat against the body of the fish until it inflates, whereby they stand at right angles to the body. In its inflated state the fish is an awesome sight, as anyone who has seen a large fully inflated Porcupine Puffer will doubtless agree. However, on no account should the fish be provoked into this reaction, no matter how well meaning the intention.

Amongst the Porcupine Puffers rare captive spawnings have been reported concerning *Diodon holocanthus* in large public aquarium. Colourless floating eggs are produced that hatch in 4 days producing 2mm larvae

that spend three months in the planktonic layers.

The Porcupines are the same as the Dog Face Puffers in all aspects of: aquarium size, tank requirements, toxin emission, diet, feeding frenzy, requirement of hard shelled food, growth potential, unsuitability with invertebrates etc. The Porcupine Puffers, like the Dog Face Puffers, adapt well to captivity and are hardy fish well within the means of someone who has progressed a little beyond the beginner stage.

Feeding hard shelled food is a must to keep those formidable teeth worn down, choose tank mates carefully, leave plenty of free swimming space and a nice large cave as a retreat. Commonly available species include: Common Porcupinefish (*Diodon hystrix*), Long Spined Porcupine Fish (*D. holocanthus*), Bridled Burrfish (*Chilomycterus antennatus*) a small species rarely exceeding 6", and the Spiny Boxfish or Burrfish (*C. schlegelii*).

POLLUTERS OF THEIR ENVIRONMENT

There is one vital aspect of the large puffers that I have not yet covered and I would like to do so by way of a conclusion. It concerns the somewhat messy habits of the larger Porcupine and DogFace Puffers.

These fish do not just achieve a good length but also a formidable girth. Fish of such size are obviously going to need large amounts of food to keep them healthy. High input will be balanced by high output i.e. waste products.

Coupled to the high waste production is their extremely messy feeding habit. They will take large chunks of food into their mouths, chew on it, then spit it back out and proceed to eat the smaller bits. As most of their food, once the shell has been cracked, will be soft-bodied molluscs you can imagine the cloud of minute food particles that is produced.

All this food, waste and appalling table manners are going to place an enormously high load on whatever type of biological filter is employed. To stand any chance of coping you will need excellent biological filtration, a well-maintained power skimmer and a very efficient and regularly cleaned out mechanical filter. Even with all this in place you will need large and regular water changes to maintain water quality, in particular to maintain a reasonable pH level.

Puffers make endearing pets and reward their owners by being relatively hardy, disease free and being easy enough to keep, even for a beginner. You must however pay attention to the various points mentioned, in particular those relating to diet, tank-mates and aquarium management. ■

Sadly two very well known and loved characters in the fishworld have recently died.

OBITUARY FOR PHIL SWALLOW

Many people will mourn for Phil who died on Thursday 22 June.

Phil was one of the great characters in the fish world who always had a ready joke and being the Barnsley lad he was, didn't hesitate to tell anyone if he was unhappy with something.

He drove tanks in the forces for six years (and continued to drive his car the same way!). He was also a cross-country runner. Once out of the forces he became a plant operator driving large earth movers and in his spare time ran a Sunday League football team, taking the position of 'goalie'.

During this time he fell in love with fish and kept tropicals for many years.

Phil obviously didn't think he had enough to do so he took up horse riding. The instructor couldn't have been too bad because he volunteered to mend her back door. She made him fix afterwards and he was so smitten he proposed then and there. Phil married his Ginny the same year in September 1984.

They took up angling and then decided to build their first pond in 1989. The net started when they discovered Koi!

They joined the Yorkshire Section of the BKKS. Phil became PRO, then Show Chairman and he ran the section's shows successfully for four years. In the meantime Ginny

started working at Quality Koi and Phil gave her support on many show stands. So he understood both the amateur and the trade side of Koi shows.

Because of his skills he was approached in autumn 1997 to run the BKKS National Koi Show. Phil was always to regret that illness prevented him from doing so. In August '97 he had a virus which attacked his heart muscles and Phil was never able to work again.

But Phil refused to give into his illness and lived life to the full. He continued with his Koi and his 5 tanks of Rift Lake Cichlids (Phil was also a member of the Yorkshire Cichlid Group). Phil loved all livestock, he added two love birds and two celestial parakeets to their collection of fish and three dogs. Phil took up amateur art and discovered a hidden talent.

He still helped people whenever he could, be it solving pond problems or undertaking ornamental stone work, for which he was renowned.

Phil will be sadly missed by: his wife Ginny, his mother Annie, his daughter Andy, his sons Lee and Sean, his grand sons Leon and Chad, his special mate 'Caspar' (his Staffordshire bull terrier) and all his many, many friends.

A few words from just one of Phil's friends: ■



OBITUARY FOR BARRY GOODWIN

Barry Goodwin died suddenly in August aged 61. As anyone in the Koi world would know Barry was a very active Koi enthusiast, originally joining the Mid-Lincs BKKS section but who then formed Witham Valley Koi club. He wrote for several aquatic publications, but primarily Koi Carp, and lectured widely. His own book 'The Enigma of Koi' is still respected as a standard work.

Apart from his activities in the Koi world, Barry's other passion was caravanning, and he was an active member of the Caravan Club and a former editor of their magazine. Having served for 20 years in the RAF as a technician, including service with the UN Forces in Cyprus he became fully conversant with Vulcans (V-bombers) and had just completed a book on these aircraft,

due out next year. In the week before his death, the Lincolnshire Echo carried a major feature on Barry and his book.

At the funeral, Barry's immediate family (wife Brenda, son Ralph, daughter Sonia), were joined by friends from Mid-Lincs, Witham Valley, BKKS (chairman Phil Davis), and representatives of the Koi trade, notably Steve Hicking (World of Koi), Adrian Barnes (Crown Park Koi), Paula and Vic Reynolds (Lincs Fish Health/Lincolnshire Koi) and Andy Dixon (Discount Koi Supplies), who donated a floral tribute in the shape of a Kohaku.

Barry will always be remembered for his great sense of humour as well as his thorough technical grasp of Koi and passion for the Koi world. ■

AQUARIUM PHARMACEUTICALS WINS BEST AQUATIC PRODUCT AWARD FOR MELAFIX



The prestigious award for "Best Aquatic Product" was presented by Water Garden magazine to Aquarium Pharmaceuticals at Pet Index 2000 for Melafix, its remarkable new antibacterial remedy for fish. There to receive the award was Patrick Durkin, UK Sales Manager for Aquarium Pharmaceuticals. Melafix had previously been honoured in the United States as "Best New Aquarium Product for 1999" by the Pet Industry Distributors Association.

Aquarium Pharmaceuticals was especially proud to receive the "Best Aquatic Product" award because Melafix was the result of a six-year effort on the part of its research team to solve a problem that tropical and cold water fishkeepers were finding increasingly difficult to control. All were aware that a more effective antibacterial was needed to safely control topical infections caused by

bacteria and fungus invading damaged fins and tissue. Tissue abrasions occur due to common everyday activities such as netting, handling, transport, and fish interaction.

After more than six years of research in the company's in-house laboratory, the Aquarium Pharmaceuticals' research team finally found the answer in the botanical extract of the leaves of a Tea Tree, *Melaleuca*. The healing properties of the Tea Tree for humans have been known for centuries. Australian aborigines have long crushed Tea Tree leaves and rubbed them directly on cuts, wounds, and burns with rapid beneficial results. The breakthrough came when Aquarium Pharmaceuticals' scientists were able at last to incorporate the essence of *Melaleuca* leaves into an antibacterial formula that could be used to treat aquarium and pond fish.

Melafix is so effective that it not only heals open wounds and abrasions, but promotes the regrowth of damaged fin rays and tissue, restoring torn and damaged tail, dorsal, and pectoral fins. Melafix users have been astounded to see severely damaged fins begin to regrow after only four days of treatment, an unusually short period of time for any kind of remedy. Consequently, the response from pondkeepers, fresh and saltwater hobbyists, and professionals in all areas of the industry has been overwhelming, once they see how quickly and effectively Melafix works.

Melafix is recommended for use whenever fish are diseased or wounded or when new fish are being added to the aquarium or pond. It is so effective that it has been granted a United States patent and three foreign patents, while 15 additional foreign patents are pending.

Melafix is available in 240ml, 480ml, and 1.9-litre bottles.

FOR MORE INFORMATION

Aquarium Pharmaceuticals E.G., Inc. Post Office Box 987,
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EHEIM AIM TO BRING THEIR PRODUCTS TO WIDER PUBLIC

Eheim has announced a restructuring of its distribution throughout the UK. Henceforth the distribution of EHEIM's range of aquatic and garden pond equipment will be available through three UK distributors, who will be purchasing direct from EHEIM headquarters in Germany.

The three appointed direct distributors are John Allan Ltd., J & K Aquatics Ltd. and Norwood Aquarium Ltd. all of whom will carry a full range of EHEIM stock. John Allan has been appointed EHEIM service centre for the

U.K. and will continue to supply the range of EHEIM professional aquariums together with a range of high quality aquariums and matching aquarium furniture from Müller and Pflöger, another company in the EHEIM group.

EHEIM believe that this simplifying of the structure will lead to better customer service and an improvement of its competitive position, bringing EHEIM's leading range of products to a wider public.

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DISCUS POOL



Photo: M.P.A.C. Pohlman

Tony Sault draws attention to early warning signs of Discus problems.

DISCUS: THE EARLY INDICATORS OF PROBLEMS

On a number of occasions customers have asked me how they can spot early warning signs of something wrong with their Discus, so I will try and cover early indicators of problems and their possible causes.

For many years I have often likened the Discus to an 18th and 19th century miners' canary, one whiff of gas and it fell off its perch, but recovered again when taken into fresh air. In many ways the Discus is an early warning system in the tank of impending disaster and they even have their own built in indicators.

THE APPEARANCE OF STRESS BANDS

The five vertical black bands on all Discus (except on some of the Far Eastern fish, where unfortunately they have been bred out) are commonly known as stress bands. These can appear for a number of reasons. Even standing in front of the tank to photograph a subject is enough to produce the stress bands. In this instance they are being used as an indicator to say, "I don't like what you are doing, please stop it."

Stress bands will appear for a variety of reasons, someone moving rapidly in front of the tank, vibration, or simply a sub-dominant fish on the receiving end of a threatening glance or peck from the tank's dominant fish. In more sinister circumstances they are the first indication of things to come, and Discus continually showing their stress bands should be investigated further, ignore them at your peril. Common causes of stress are over-crowding the aquarium, and extreme variations in the parameters and quality of the water (e.g. pH, temperature, Oxygen level, Carbon Dioxide level, Nitrite and Nitrate levels). In a well established and sensibly stocked aquarium all the above can be virtually eliminated.

ABNORMAL BREATHING PATTERN

Rapid breathing, or a significant increase in the respiration rate, can have a number of causes, but first of all check how many fish are affected as this can also be a valuable pointer to the cause. Some of the common causes are too high a temperature, oxygen deficiency in the water and poor water quality that will damage the gill filaments.

Never forget, whatever you put into the tank will ultimately pass through the gills of the fish. With gill flukes or gill worms you will always get other symptoms as well, such as rubbing the gill covers against objects and hanging just under the surface of the water.

LOSS OR DARKENING OF COLOUR

Loss of colour or fish turning dark can be caused by abnormal conditions developing in the water such as a rise in the nitrite level, so always make sure your parameters have not altered first. Another cause can be external or internal parasites. The fish can be seen rubbing against objects in the tank indicating external parasites. The faeces of the fish changing from a normal brown/black to white could indicate internal parasites.

Fin flicking can be caused by an element in the water usually introduced with a water change or external parasites. Fins clamped and the fish turning dark usually indicates external parasites. When the fish get to this stage they are usually infested with parasites, but you should have noticed all the preceding signs first such as rubbing against objects etc.

CLOUDY EYES

I had a case recently where a lady did a water change and she added a dechlorinator and blinded all her Discus. On that particular day her local water board were putting

seven times the amount of Chlorine through the system. All the fish recovered because, luckily, there was no permanent damage to the eyes.

CHANGE IN COLOUR OF THE FAECES:

White faeces is commonly symptomatic of intestinal parasites but in the past I have seen bullied fish excrete a white faeces. Drastic change in water conditions (when a fish has been transported) can also result in white faeces. White faeces should be examined for indications of parasites, eggs etc. before any treatment is given.

HEADSTANDING

The fish swimming with its head pointing downwards indicates a swim bladder problem. This can happen when the fish swims through cooler water at water change time. In this case, the damage is not permanent and will usually correct itself in a short period of time. A week with the temperature raised to 30°C also helps. It can also be caused by a growth pressing on the swim bladder so look for any

swellings on either or both sides of the Discus around the mid region.

JUMPING AND DARTING AROUND THE TANK

This is a sure sign that there is a toxin in the water which must be removed if the fish are to recover. If this is not done the fish usually dies of exhaustion. Nervousness can be caused by any one of a number of things – too small a shoal of fish, the position of the tank – too low or too near the floor, or a change in water conditions.

LOOK FOR ABNORMAL BEHAVIOUR PATTERNS

From noticing the first abnormal behaviour or problem indicator to losing the fish is usually a fair period of time, often days, sometimes weeks, but if the signs are seen early enough the majority of problems can be cured. If you know the normal behaviour of your Discus then the abnormal, when it does occur, stands out like the proverbial sore thumb.

DISCUS DIRECTORY

DISCUS: Red Rubys, Snakeskins, Blue Diamonds, Golden, Red Royal Blues, Pigeon Bloods. Starting from £6 per fish. Delivery £15. Tel: 0191-422 3579, Tel/Fax: 0191-456 8648. Mobile: 07712 273362.

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BREEDING MY FIRST CENTRAL

Hypsophrys nicaraguensis (The Nicaragua Cichlid)



Left: This is an adult male Nicaragua Cichlid.

Below: Female Nicaragua Cichlid.

We hoped this species would be our first Central American success.

Sonia Guimne of the British Cichlid Association writes about her first experiences with Central American Cichlids.

All photos: M.T. & C. Pughmore



I am certain that Cichlid keeping is addictive! Following the purchase of our first tropical tank, within a time span of less than one year, Dave and I had increased our tank capacity considerably.

Our large living room now housed two 4' tanks containing Malawi Mbuna cichlids, four 2' tanks for growing on fry, four little "maternity" tanks for the continually mouthbrooding Malawi females, as well as our original 30" tank. Comments from various friends suggesting that perhaps we should open a public aquarium were completely ignored. When we told these obviously well meaning people that we had decided to buy a 6' tank, it confirmed their worst fears that Dave and I were already completely beyond help!

MORE FISH OR SPACE TO SIT?

Much as I enjoyed the diversity and challenge of the Malawi fishes, I was also very interested in the Central American Cichlid species that were featured in several of

our growing number of fishy reference books. Unfortunately, most of those fishes that I particularly liked had the potential to grow too large for a 4' foot tank, and both of our tanks of that size already contained our Malawian Mbuna. Several long discussions between Dave and I now ensued! If, we decided to buy some larger tanks, would there really be enough space for both of us and all "our" furniture in the room, (it was only a small house!), or were we being a little unrealistic? Out came the tape-measure and after much measuring some very good news, there was enough room for a 6' tank, as well as some more 4' tanks. As an added bonus, there was still enough room for Dave and I, a three-piece suite and the television, so at least we would be able to sit down!

We made a monumental decision, (I should add that we were completely sober at the time!) and decided to go for a 6' x 18" x 18" tank. There was a suitable location alongside one wall of the room, where the floorboards were reinforced, so now it was all systems go! The following day, we ordered the tank from a local "fishy" store, which thankfully, they offered to deliver. I had been having horrible nightmares about the prospect of driving through the middle of Brighton in my Ford Escort, with a 6' tank sticking out of the back! Once again, Dave decided to use undergravel filtration, with powerheads situated at both ends of the tank, as well as a gravel tidy in anticipation of any future digging by the Central American Cichlids.

HOME MADE STAND

It soon became obvious that it was going to be very difficult to obtain a suitable stand for this new tank, as one would have to be specially made at considerable expense. As Dave had done carpentry at school, he thought he should be able to build his own stand. It only took him two days to complete the "masterpiece" and I was really impressed by his talent. The same stand is still in use eight years later as well as another he made for an even larger tank at a later date.

DISCUSSION ON SELECTION OF FISH

Now came the selection of suitable inhabitants for this Central American set-up!

As usual, I had made a list of my favourite species, while Dave, quite rightly, was more sensible and carefully

CENTRAL AMERICAN CICHLID



This river in Costa Rica was teeming with Cichlids including *Hypseorhynchus nicaraguensis* (Nicaragua).



Photo above: David Leadbet

calculated how many fishes the tank could eventually accommodate. One of our books told us that many of the Cichlid species grow large, requiring a large breeding territory, and most are naturally very aggressive towards their tank mates, even when not breeding. It had the signs of being quite a challenge.

Dave suggested it might be a good idea to buy various single specimens and perhaps several juveniles of one larger, not too aggressive species. We were guided by our books, but have since discovered that most Cichlids do not read these publications on how they are supposed to behave in an aquarium and, more than often, do the complete opposite! We decided that once the tank was set up and mature, we would go to an aquatic store in South London that specialised in Central American Cichlids and, using our reference book, we could see what was available.

A QUICK METHOD OF MATURING YOUR FILTERS

The new tank matured quite quickly as Dave had used some mature water from some of the other tanks. He also took a few sections of the already established undergravel filter plates from another tank to try to speed up the process, which certainly seemed to work. We had read in our main Central American reference book that the fishes

Female Nicaraguan Cichlid displaying. This threat behaviour is designed to frighten off other fish from her territory.

from this part of the world, like their cousins in the African Rift Lakes, require clean, well filtered, alkaline water, with a pH higher than 7.5. Luckily, the water conditions in the Brighton area, where we live, are ideal, with the pH being 7.2 - 7.8, KH - 8dH and GH - 15dH. Following the advice of our books, the temperature in the tank was maintained at 25°C (77°F).

The tank decor consisted of several large rocks, bogwood and ceramic tubes to provide as many "caves" and hiding places as possible, which is a necessity in most Cichlid set-ups! The 6" tank looked great and seemed so large and empty.

OUR SELECTION

When Dave and I, armed with our book, arrived at the aquatic store, there seemed to be Cichlids from all parts of the world in the aquariums. There were many rows of tanks, many of which contained several different species of Central American Cichlids, which were mainly juveniles. We finally reached a decision about which species to purchase: one *Pithichromis managuense*, one *Amphilophus labialis*, one *Parachanna friedrichshohli*, one *Vieja* >

➤ *maculicauda*, one *Herichthys carpinifis*, one adult *Aythya nigrofasciatus* (Convict Cichlid) and finally six *Hypophrys nicaraguensis* (Nicaragua Cichlid).

Both Dave and I felt a little apprehensive as we left the store with our new fishes, as to whether we had chosen species that would live together in a Central American community set-up. We realised that perhaps the choice of

line, which is retained by the adult female, is not usually visible in the adult male, who tends to show the spot as a faint mark in the middle of his body. Adult coloration starts to develop at about 8cm and the difference between the sexes becomes apparent. The females have a mainly orange coloration on their bodies, with a distinctive red area on the abdomen and metallic blue/green on the cheek and operculum. Male *Hypophrys nicaraguensis* have an overall yellow/gold coloration, with dark spots visible in the fins and tail, which are absent in those of the female.

SETTLING INTO THEIR NEW HOME

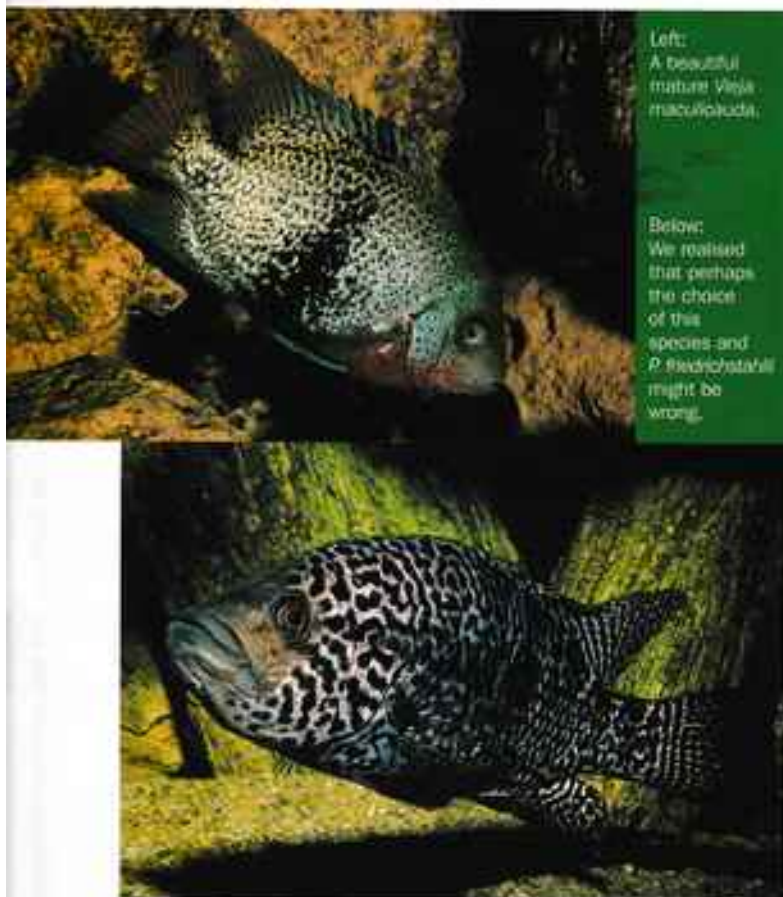
Most of the Central American juveniles and the adult "Convict" soon settled into their new home and really seemed to be enjoying their spacious surroundings. The only exception was the *P. friedrichsthalii* who completely disappeared for several days and I began to get very worried about the fish. Eventually, he did come out to feed and gradually his confidence increased to such an extent that he eventually became hand-tame.

The six "Nicas", as Dave and I had started to call them, were the complete opposite and were out and about browsing on the substrate for most of the time. All the different species seemed to tolerate each other, but this was still early days and it could so easily change, when they became adults. They were fed good quality flake, Cichlid pellets, as well as live food, when available, and frozen blood worm, Brine shrimp, Mysis shrimp and Daphnia. We had read that "Nicas" eat insects, snails and other crustaceans in their natural habitat, as well as some vegetation. One book advised feeding cyclops to help to enhance the red coloration of the female, which we also

did. Like all Cichlids, the Central American fishes really enjoyed earthworms.

SLOW GROWING "NICAS"

Compared to their tank mates, the six "Nicas" seemed to be very slow growing, but eventually the largest began to show a hint of adult coloration. This same fish also had dark spots clearly visible in his tail and fins. He was very much the boss of the group and took great delight in chasing the other five. Generally, there was peace and harmony in the tank, apart from the odd scrap between the *P. managuense* and the *A. labiatus*. The female Managuense was not aggressive with any of the other fishes, which was quite a surprise to us, as most of the books we had read, said otherwise. She was the largest fish in the tank at this time and the other fishes, apart from the *A. labiatus* kept a respectful distance from her, especially the group of



Left:
A beautiful
mature *Vieja
maculicauda*.

Below:
We realised
that perhaps
the choice
of this
species and
P. friedrichsthalii
might be
wrong.

P. managuense and *P. friedrichsthalii* might be wrong, as there is some similarity between the species, but we really hoped that with these juvenile fishes growing up together, it might just work. Although we had done some "homework" on Central American Cichlids, we were now entering unknown territory.

HYPSONPHYS NICARAGUENSIS (NICARAGUA CICHLID)

The ultimate aim was to try to breed the *Hypophrys nicaraguensis*, which might just be possible! This attractive, elongate species is endemic to Costa Rica and Nicaragua and is found in lakes, including Lake Nicaragua, as well as slow moving rivers. Males can reach 25cm TL, whereas the females remain slightly smaller at approximately 20cm TL. Juveniles have a large mid-body spot and a lateral line that extends from the operculum to the caudal peduncle. This

"Nicas". As it was a large tank, with plenty of hiding places, there was very little trouble in these early days.

A few months later, Dave realised that two of the *H. nigricaudus* were exploring several of the rocky areas at one end of the tank. The male was now about 12cm TL, with the female slightly smaller and their colour had intensified considerably. I was really hopeful that our first Central American spawning might actually happen. The pair started to dig the substrate in several locations, but seemed unable to decide which area they liked best. Finally a site, in between some of the large rocks was being seriously defended by both the male and female.

THE FIRST SPAWNING

It was apparent that the female was becoming much fatter in her abdomen area, so Dave and I were confident that it would not be much longer before the pair spawned. Early one morning, about three or four days later, we were delighted to see a clump of eggs, numbering about 200, in the bottom of the pit, which the female was fanning with her large pectoral fins. The non-adhesive eggs of this species are thought to be unique amongst Central American cichlids. Occasionally, some of the eggs floated from the site, but they were soon collected and returned to the pit, by both parents.

Both fish were excellent parents and managed to keep all the other tank residents away from their eggs. Dave and I, however, were becoming concerned as to how the pair would manage once the eggs hatched and the wrigglers became free swimming. After four days, the larvae were chewed from the egg shells by both parents, who continued to guard them with great determination whenever any of their tank mates made the mistake of straying too near to the spawning pit. The wrigglers seemed to take forever to become free swimming, but, finally, after 10 or 11 days they were mobile! The other fish in the tank, especially the *Amphilophus labiatus* and the *Archocentrus nigrofasciatus* kept making sudden surprise attacks on the cloud of fry, which their parents seemed unable to prevent. If this was allowed to continue, all the fry would soon disappear.

SAVING THE FRY

Dave decided to siphon off some of them into a spare rearing tank, filtered by two small sponge filters, which had been up and running for a while for just such an occasion. Before he did this, he removed most of the water in the little rearing tank and replaced it with water from the parents' tank. The temperature in both tanks was maintained at 25°C (77°F) and there was some décor in the little tank, a sandy substrate and just a few small rocks for cover.

Apart from the parents, with their diminishing mass of fry, all the other tank inhabitants immediately disappeared when Dave put the siphon tube in to the tank. The male bravely attacked the tube and Dave's hand and we were

both really impressed with the aggression and protection shown by both parents. Dave succeeded in siphoning about half of the remaining fry, which totalled about 30 in number, into a bucket. They were then carefully tipped into the rearing tank. The parents were very annoyed, but within minutes the other fishes in the tank reappeared and caused a distraction, by once again attacking the remaining



Above: One adult Convict Cichlid, *Archocentrus nigrofasciatus* was included in the set-up.

fry. A few days later, all of the fry in the main tank had disappeared and the parents, having lost their attractive breeding coloration, were completely ignoring each other. Their fry in the rearing tank were flourishing and feeding well on various powdered baby fish food and baby Brine shrimp and they were also growing at quite a rate. Twenty-five of the *H. nigricaudus* juveniles continued to do well and homes were found for all of them, amongst our ever-growing number of aquatic friends.

A HOME OF THEIR OWN

It became obvious that if we wanted the pair to continue to breed, they would need a tank of their own as soon as possible. So we decided to buy three more tanks, a five foot for their exclusive use and also two more four foot tanks. The pair lived happily together for a further two years, confirming what had been correctly written about this species in one of our reference books. *H. nigricaudus* is one of the few Central American Cichlid species that will usually live together peacefully as a pair, once a bond has been formed.

This fact, combined with their gorgeous coloration, makes them one of the slightly easier Cichlid species to maintain, and when adult and breeding they can usually cope well with other larger Central American Cichlids. Dave and I would have no hesitation in thoroughly recommending this fish to anyone wanting to keep larger Central American Cichlids for the first time. ■

Bob and Val continue with their A-Z with the letter M.



A - Z OF REPTILES AND AMPHIBIANS

M - MANTELLAS

Several species of these small, mainly colourful frogs from Madagascar have been popular among hobbyists since exports increased in the late 1980s. Their taxonomy has been confused for some years: eight species were recognised in the early 1990s – a recent revision defines 17. Taxonomy was largely based on colour and pattern but many intermediate colour morphs have been discovered causing some confusion. Mantellas are small (18-31 mm) and live mainly in moist forests, although three or four species inhabit arid areas depending on finding moist refuge and spasmodic rainfall.

All species are basically similar in morphology; they lack nuptial pads and webbing. The toes are only slightly enlarged at the tips apart from *M. larvigata*, the only arboreal species, which has wider adhesive toe pads. The skin is generally smooth or slightly granular. The gular vocal sac is single - the characteristic call is a series of clicks. Certain species have glands on the underside of the thigh, close to the vent. Where present these are more prominent in males. A few species do not possess these and in some they are barely visible. Where present they can be useful in identification or sexing. The exact function of these glands is unknown – they are thought to play some part in mating.

A degree of convergence exists between Mantellas and the poison-dart frogs (*Dendrobatidae*). Both groups possess skin toxins (although these may be absent in some species of both groups). Aposematic (warning) and cryptic coloration occurs in both groups; feeding habits (mainly termites, ants, small beetles) are similar and eggs are laid in moist sites on land. Dart frogs are more arboreal and use larval transport to move tadpoles to water. *M. larvigata* is the only Mantella known to transport tadpoles to water-filled receptacles such as bamboo or tree holes. Breeding habits are not known for all Mantellas but many spawn in small burrows in the mossy or leafy substrate relying on rising water to wash the developed tadpoles into ponds or streams. For this reason they are never found far from water.

The golden mantella (*M. aureivittata*) is possibly the best known of the genus.

TEMPERATURE FLUCTUATIONS AND CAREFUL LIGHTING ARE NEEDED

In the vivarium most species do well at temperatures between 20-23°C (68-73°F) with a drop overnight to around 15°C (60°F). Dusted crickets are readily accepted. Since these frogs are mainly active in the day, low-percentage (2%) fluorescent light is advisable particularly for growing juveniles. A moist substrate, with moss and

hiding places is needed. Good ventilation is essential to avoid stagnant conditions and possible disease. In the four species that have been bred regularly a slight cooling over winter, with reduced humidity and photoperiod seems to have been successful. Rising temperatures, increased photoperiod and heavy spraying provided the stimulus for spawning.

Their colourful appearance made Mantellas popular when they became more widely available but the explosion in numbers being exported caused concern among conservationists. One report mentions a recorded 230 amphibians being exported in 1988 but this escalated to more than 20,000 in 1990 – many of these, possibly the majority were Mantellas. Certain species are very rare and in some cases reduced to extremely restricted areas due to habitat destruction. In April 2000 a ban on the import of all but one species, *M. betsileo*, into Europe came into force. (see *Frogs and Friends* August). Apart from this the only possibility of obtaining others is if captive-bred specimens are offered for sale. ■



M. larvigata is the only arboreal mantella with habits similar to poison-dart frogs.

ME, DIG A POND?

Dick Mills digs up the dirt on pond installation the hard way.



For a number of reasons, I decided to install a new pond. Recent building work had meant the removal of my previous existing rigid 100 gallon 'basin', and the resulting area of debris, brickbats and soil outside our new conservatory needed sorting out. So, once I'd relinquished the editorship of A & P what else was there to do?

I chose to fit a pre-formed rigid glass-fibre pond rather than a liner. This turned out to be a wise choice eventually, but the prime reason was one of self-discipline. Unless I'd set myself a target-size hole to dig, I knew that as soon as I got fed up with digging I would just put a butyl pond liner into whatever size hole I had reached - which, with my non-propensity for digging, would not have been quite what my Grand Plan had envisaged. Other than that,

Tracing out the hole - using sand or aquarium gravel is best - our first tracing was done using flour and I had to cover it up to prevent it from washing away in the aforementioned rain storm!



Always keep checking 'The Level' throughout the excavations.

2



the design and installation followed the familiar train of events of using the spoil from the hole to make a pondside 'filter-hiding' rockery with a cascade to return the water to the pond.

I sat down to make both a sketch plan of the site and also to make a 'step by step' list to remind myself of things to do as I went along. This latter 'foresightedness' stood me in good stead as work progressed as, each evening, I would stagger indoors to cross off whatever stage I'd completed and to update the 'to do' list in the light of



3

The hole is ready for its first total fitting. Note the white plastic pipe (for the pump cable) and the black pipe to carry the pumped water up to the filter. The piled up spoil has been cut back to allow a retaining rock wall to be built around the pond edge.

I devised this home-made gauge for approximating the overall depth of soft sand to cover the pond base.



5

6

At last! No more 'trying and fitting,' the pond in position ready for back filling. Add at least 10cms of water depth to give the shell stability as you back-fill; increase the water depth progressively.

Snag! Such was the accuracy of our excavators it was nigh on impossible to backfill beneath the shelves. I had to dig down several 'chutes' at a 45° angle at regular intervals around the pond to be able to insert the pea-gravel infilling material.

A wide shallow trench has been dug out to take the concrete base for the crazy paving pond surround. You WILL drop mortar into the pond, no matter how hard you try not to, but pumping out water to just below shelf depth will make its removal easier.



4

When fitting the pond look for bulges inside which show 'high spots' in the excavation that require removing.



➤ things I'd come across that needed modifying.

Credit where it's due, however, I am only too happy to say that I was not alone in my endeavours as my wife took a very keen interest in things. At first, I thought her enthusiasm was in order to keep me up to schedule (or at least make sure I tidied up each day) but no, once the hole had become big enough for two to swing a spade, she joined me at the face and probably dug out more than I did! By the time the hole was dug, and the numerous barrow-loads of spoil distributed in unlikely piles around the garden, not only had she memorised my checklist (and

knew more about what I was going to do next than I did) but also read up all the pond books in my collection and thoroughly got a grasp of water filtration systems.

By shopping around, I managed to get the 700 gallon pre-formed pond together with a complete external filter system (including UV, magnetic, mechanical and biological sections) and dedicated pump at a 'Special Offer' price from a well-known chain of aquatic outlets.

IN THE BEGINNING

One word of warning – don't stand the pond the right way



With the rock wall in place, the spoil is transferred and contoured to take the rockery and filter unit. Make sure the soil bank is consolidated thoroughly as rocks and cascade units will tend to 'settle' further if not.



Three 'off the shelf' units suited my cascade needs almost as if they had been planned for. Build up from the bottom, checking each unit for 'leviness' and stability.



A firm level platform is required for the filter unit – a couple of paving slabs are ideal. The brick box conceals the unit but allow enough clearance inside for removal or maintenance purposes!



Pull through any cables and connect units up to weather-proof switching boxes. One switch controls pump, another the UV and the third is spare in case any pond lighting is fitted in the future. Connect hose ends to pump and filter/UV units.

up on the lawn whilst you get digging. It only took the usual English day of torrential rain to half fill the pond so that had to be emptied out before we could even move it! On the other hand, with an irregularly-shaped pond you have to stand it the right way up on the proposed site to trace out its outline for excavation as, doing it the other way up will produce a mirror-image hole, the wrong way round!

It's also vital to plan the 'cable-runs' and bury them in protective plastic conduits to their intended destinations before progressing on with the main dig; similarly,



11

Test the system (not the UV) for several days and check for water losses before making any final 'cementations' of external rocks to integrate the cascade into the rockery.

Well, we're pleased with it so far. All we need now is for things to get fully established.



12

pipework for the filtration system must also be laid out (and pipes for any drains have to be planned well in advance too). Either thread through the electricity supply cable as you go or make sure you can pull them through easily once buried, as you'll want to avoid any re-excavation work at a later date. Fortunately, just in time, I discovered that the 1.5" hose from the pump wouldn't go around an obtuse (135°) bend.

Without any more boring narrative follow the pictures to see how things progress - I'll pop back from time to time with any explanatory notes where necessary.

AFTERTHOUGHTS

Be prepared for hard work - both physically and mentally. It certainly pays off to plan well ahead and also to modify plans as you progress. By far, the best thing we did (apart from deciding to do it in the first place) was to make a list of things to do, write it down and refer to it constantly - otherwise would I have had those Jubilee Clips just when I needed them, or installed the switches whilst I still had access to their position?

I have not intended to make it all sound too easy; like most people, to me extended periods of physical labour can come as a bit of a shock, so don't overdo things in your initial enthusiasm. Hiring suitable equipment is not that expensive and the small cement mixers available from your local Hire Shop not only go around the side of the house easily but they process just about the right amount of material you want to use at any one time. I had sand, ballast and pea-gravel delivered a ton (1 cubic yard) at a time - a bag of cement is even manageable now they pack it in smaller bags!

Once you start mixing concrete and/or mortar, things have reached a point of no return: I found it well worthwhile laying rocks, bricks and paving slabs out 'dry' to make sure they were in the right position, and that I liked the look of them, before the 'muck' set.

Fortunately we were blessed with excellent weather (sometimes too hot for comfort) and whilst this meant we had an excellent period for installation the lateness of the season - September to /October - meant we will have to wait until the following Spring before the fruits of our labours begin to make themselves apparent. However, the omens look good as the minute we finished filling the pond following the backfilling, there was a 'plop' and our first Water Boatman had arrived; not long afterwards, a Hawker Dragonfly cruised around and I know we've got two Frogs hiding in a pile of bricks just waiting for us to furnish their new home.

Fish? Oh yes, I put my two surviving Shubunkins in the pond swiftly followed by another dozen or so Common Goldfish; some kindly donated Water Lilies and Water Hawthorn which are now laying dormant in the crystal clear water waiting to beat greenwater algae to next year's sunshine. ■

This month Andrew Caine BSc of Aqua-World, continues his look at invertebrate life in the oceans with the final part of Molluscs including some of the most spectacular Invertebrates.

LIFE IN THE OCEANS

THE CEPHALOPODS

These are commonly known as the shell-less molluscs, with over 600 species. However, this is not completely true as the most primitive do have an external shell, one stage up the evolutionary tree, and the shell is reduced in size and density and is located internally, the most advanced have completely lost the shell. The average size range is between five and sixty-five centimetres. If we disregard jellyfish tentacles the largest invertebrates belong to this group.

NAUTILUS

These are the most primitive of the living cephalopods, with a fossil record going back over 250 million years and which has four species existing today. It is a relatively clumsy animal with limited powers of locomotion, equipped with 32 tentacles for feeding and mating. This animal is probably near the end of its species lifetime, as it is a very rare and ancient beast found only in a few places

in the tropical Indo Pacific. The two other remaining groups are very successful indeed, being squid/cuttlefish and the octopods commonly known as octopuses. They have many similarities so shall be discussed together.

GIANTS OF THE DEEP

THE SQUIDS, CUTTLEFISH AND OCTOPUSES

The largest known invertebrates are present here, often known to exist only by remains washing ashore or found in guts of other animals, but never being observed alive. Some species have been observed but never caught for study as they are just too fast. So we have the exciting situation that many species must exist which remain unknown. These are most likely the source of many old

tales of sea monsters. Given the size, if you came face to face with a giant squid, believe you me, it would be a monster to anyone!

The giant squid was thought to exist on account of enormous beaks found in the stomachs of sperm whales in the great whaling days of the 19th century. This was responsible for the re-emergence of tales of great monsters taking ships and eating all aboard, as the beaks found

Molluscs: part 3



Nautilus are the most primitive of the living cephalopods, with a fossil record going back over 250 million years.

Photo: M.F. & C. P. P. P.

Osipenko Cnidarian (class) often uses jets of propulsion which is produced by forcing water through a large opening, and then forcing the water through a much smaller orifice, thus producing a jet flow propelling the animal.

might have been from a 'baby' for all they knew. There may be animals of that size existing in the deep but the giant squids that we know are not one of them. No live beasts of this size has ever been observed as they would have detected our presence and 'done a runner' long before we could detect them, although a few dead ones have been washed ashore and studied, one such event occurring on the coast of Norway in 1954 when a beast with a total length of sixteen metres and a body circumference of nearly four metres was washed ashore.

This giant size is not restricted to squids for following closely are the octopuses, with the most familiar and studied species living in the Pacific, the largest actual recording being ten metres. Science recognises this as the largest species as it has been caught and studied. However, in the Japanese Sea lives a bigger beast which has eluded capture to this day. Observations have estimated a total length of up to fifteen metres, just one metre behind the giant squid in Norway. Which is the largest the squid or octopus? Only time and good fortune will tell and I only hope I never come across one in the wild! These animals have developed two specialised cell types, the light producing chromatophores and ink glands which are used in social behaviour, reproduction and

predator escape. The chromatophore is filled with a species of bacteria which exists in a symbiotic relationship and is the source of this 'cold light'. Unlike a light bulb no heat is produced and the colour is always blue. The light emission is controlled by oxygen supplied to the bacteria, thus the blood capillaries which are connected to the chromatophore are switched 'on' and 'off' when required. When blood flows, light is produced and passes through a lens to increase the brightness, and then through a filter allowing different displays of colour to be seen. Research is currently being employed to understand these displays with the belief that it reflects the 'mood' of an individual thus assisting reproduction and social behaviour. When approached by a predator the animal in a split second turns from a dull to a bright colour thus distracting the predator and allowing a quick retreat to safety.

Predator avoidance is also facilitated by the ink gland. This produces an alkaline black substance which ➤

Osipenko like this *Eudora zornica* feed on worms etc. Capture and death are swift, then the animal returns to its life.





Clemon Atlantic GRILLS (Octopus vulgaris) have developed a highly complex eye which allows a very high standard of vision in the aquatic environment.

➤ performs a dual role. On discharge it firstly impairs the vision of the hungry beast whilst the animal makes a quick retreat. The alkaline substance then acts on chemosensory glands further "blinding" the attacker, and a gob full of ink is not what it expected!

LOCOMOTION

They swim by jet propulsion which is produced by inhaling water through a large opening, and then forcing the water through a much smaller orifice, thus producing a jet force propelling the animal. The exhalant siphon is highly manoeuvrable and, with the aid of fins, it can act as a sort of rudder in directing the water outflow and thus the direction of an individual. Speed of the animal is controlled by the water throughput rate which is normally set at cruising, but when alarmed reaction is instant in that one minute it's there, the next it's gone. This is not used continuously as it incurs a high energy cost so they supplement this with fins running down the sides of the body in squids and cuttlefish, while octopods crawl over the bottom.

FEEDING

These animals have a distinct feature that is unique among invertebrates, in that they have developed a highly complex eye. This allows a very high standard of vision in the aquatic environment and is used to find prey. Also the

development of chromatophores goes hand in hand as they need good vision to see the colour changes, thus the mood of an animal. Prey capture is by tentacles and arms.

Squids have eight short arms which are covered in suckers, and one pair of long tentacles which have suckers only on the flattened ends. These shoot out and attach to a prey item, which is now doomed. Octopuses have only arms, eight of them, which are all the same size and covered in suckers which are all independently controlled. Once caught the prey is enveloped in the arms and a powerful beak soon finishes off the helpless animal, which is why I do not want to ever see a giant squid face to face! To add to the action, poison glands are often present, most of which do not affect man but soon finish off any prey. The Indo Pacific blue ringed octopus can cause an agonising death to humans in under two hours. The type of prey depends on the habitat of the animal, fish being the main diet of pelagic species (oceanic swimmers) and crustaceans being consumed by benthic (bottom) inhabitants.

Squid can take a fish and finish it off by severing the head. All the meat is stripped, leaving the tail and guts which are dropped. Octopods search out crabs etc. Capture and death are swift, then the animal returns to its lair (either a hole or mound of rocks) to consume its meal in peace. The inedible parts are discharged leaving a pile of body bits outside. This is how an octopus lair is found by divers and spear fishermen, and so the octopus is caught. It's the octopus's meal that leads to the octopus becoming a meal!

REPRODUCTION

All the cephalopods have variations on the same feature, where the male performs a mating dance often above the female. A vivid light display is also common and acts to warn off potential competition from other males. Then the two animals entwine at the head region with the male delivering sperm via a specialised portion of an arm. This has smaller suckers which hold the bundles of sperm to be delivered into the female. Once fertilised the eggs are laid in bundles on the sea bed, often in small crevices where the arms can reach but animals looking for an easy meal cannot.

Other species which perform mass matings lay a mass of capsules covering the sea bed. The eggs are protected by a case which is not eaten by other beasts as they either do not recognise this highly nutritional mass as a meal, or chemicals deter them from taking a bite. Species that are pelagic lay planktonic eggs often with specialised features to protect them. One such species secretes a calcareous bivalved shell in which the eggs are brooded. Many species of squid and octopus have short lives and die after the first spawning or, in brooding species, after the eggs hatch.

The mating cycle is controlled by hormones which, when active, cause the animal to stop feeding. Thus, after the job is done they die from starvation. One experiment involved a brooding octopus, which had laid its eggs and was waiting for them to hatch. The animal had the hormone-producing gland removed and started feeding again so that its life span was increased. ■

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Organised by the Federation of Northern Aquarium Societies in collaboration with The Aquarist and Pondkeeper Magazine.

MONTH PLANNER

Since A&P will not be back until mid-October we have included dates in this month's planner for the next two months.

September 2000

Fri	1st	
Sat	2nd	
Sun	3rd	Cramlington A.S. Open Show (FBAS). Contact 01670 817158
Mon	4th	
Tues	5th	Southend & Leigh Club meeting. Contact 01702 305740 Gloucester F.C. Club meeting. Contact 01453 824810
Wed	6th	Corby & DAS. Club meeting. Contact 01536 761736
Thurs	7th	
Fri	8th	
Sat	9th	
Sun	10th	Alden Aquarist Show Team (F.N.A.S.) Open Show and Auction. Contact 01535 610494 Viviparous Livebearer Auction, Pontefract, Yorkshire. Contact 01977 709790
Mon	11th	Iford & D A&P Society meeting. Contact 020 8550 7329
Tues	12th	
Wed	13th	
Thurs	14th	Bristol Tropical Fish Club meeting. Contact 0117 9732145 Telford & DAS Club meeting. Contact 01902 372945
Fri	15th	
Sat	16th	Hounslow & DAS Open Show (FBAS). Contact 01784 259230
Sun	17th	Mid-Sussex A.S. Open Show (FBAS). Contact 01273 602407 Otley Open Show & Auction (YAAS). Contact 01274 531418
Mon	18th	Thorpe & D.A.S. Club meeting. Contact 01953 605394
Tues	19th	Southend & Leigh Club meeting. Contact 01702 305740
Wed	20th	
Thurs	21th	
Fri	22nd	
Sat	23rd	
Sun	24th	Darwin A.S. Open Show & Auction (FNAS). Contact 01254 701925 Washington AS & R Open show & Auction (FBAS). Contact 0191 416 7292
Mon	25th	
Tues	26th	Lincoln DAS Club meeting. Contact 01522 703620
Wed	27th	Hounslow Club meeting. Contact 01784 259230
Thurs	28th	
Fri	29th	
Sat	30th	NGPS (Goldfish) Open show & Auction (NGS rules). Contact 01282 420097

October 2000

Sun	1st	Halifax A.S. (FNAS) Open Show & Auction. Contact 01422 257739
Mon	2nd	
Tues	3rd	Southend & Leigh Club meeting. Contact 01702 305740 Gloucester F.C. Club meeting. Contact 01453 824810
Wed	4th	Corby & DAS. Club meeting. Contact 01536 761736
Thurs	5th	
Fri	6th	
Sat	7th	
Sun	8th	
Mon	9th	Iford & D A&P Society meeting. Contact 020 8550 7329
Tues	10th	
Wed	11th	Hounslow Club meeting. Contact 01784 259230
Thurs	12th	Bristol Tropical Fish Club meeting. Contact 0117 9732145 Telford & DAS Club meeting. Contact 01902 372945
Fri	13th	
Sat	14th	
Sun	15th	Hounslow Closed Show. Contact 01784 259230 Scottish International Open Show (FSAS) Contact 01475 704219
Mon	16th	Thorpe & D.A.S. Club meeting. Contact 01953 605394
Tues	17th	Southend & Leigh Club meeting. Contact 01702 305740
Wed	18th	
Thurs	19th	
Fri	20th	Supreme Festival of Fishkeeping. (FBAS)
Sat	21st	Supreme Festival of Fishkeeping. (FBAS)
Sun	22nd	Supreme Festival of Fishkeeping. (FBAS) Darwin A.S. Open Show & Auction (FNAS). Contact 01254 701925 Washington AS & R Open show & Auction (FBAS) Contact 0191 416 7292 Instant Ocean Seminar 2000. Contact 01924 420101
Mon	23rd	
Tues	24th	
Wed	25th	Hounslow Club meeting. Contact 01784 259230
Thurs	26th	
Fri	27th	
Sat	28th	British Aquarist Festival, (FNAS) Contact 0161 652 6207
Sun	29th	British Aquarist Festival, (FNAS) Contact 0161 652 6207
Mon	30th	
Tues	31st	Lincoln DAS Club meeting. Contact 01522 703620

Fact File

Common Name	Rosy Barb
Scientific Name	<i>Barbus conchonus</i> (HAMILTON, 1822)
Family	Cyprinidae
Origins	Northern India & Bengal
Size	7cm in captivity, however, wild fish are said to reach 15cm
Diet	Eats all foods (Omnivorous). Does really well on a good quality flake food combined with some live feeds. While they initially dash to the surface to feed they also grub through the substrate looking for any missed morsels to eat.
Temperature	One of the Barbs which can tolerate a wide range of temperature, 18-25°C (64-77°F).
Aquarium Type	This is a lively, boisterous fish which likes lots of room to swim. Whilst some plant cover is appreciated they usually spend almost all their time charging around right out in the open. Best kept as a group of four or more with other lively, energetic fish which will not be disturbed by their constant movement.
Reproduction	Typical egg scatterer which spawns into plant thickets. The adults will hunt out any eggs laid once they have finished spawning so must be removed and the eggs left to hatch by themselves. This takes about 30 hours, and the fry hang on for a further couple of days before they are free swimming. Infusoria or a liquid fry food is needed as a first food. Once feeding on baby brine shrimp they grow very quickly.

Major Dates
in 2000**15th October**

Scottish International Open Show (FSAS), New Toun Hall, Bronway, Cumbernauld, North Carbrain, Scotland.

20th - 22nd October

Supreme Festival of Fishkeeping, (FBAS) New Horizons, South Downs Holiday Village, Bracklesham Bay, Near the Wittering's & Chichester.

28th & 29th October

British Aquarist Festival, (FNAS) George Carrall Leisure

Centre, Kingway Park, Urmston, Manchester.



Photo: Arnold Van Den Nieuwenhuizen

Federation Contacts

AofA	Ian & Rhona Walker, 01252 668747
FBAS	Paul Corbett, 01983 721246
FNAS	Amy Chadwick, 0161 652 6207
FSAS	James Sheekey, 01475 704219
USA	John Reid, 01738 634689
YAAS	Terry Nelson, 01724 289736

KOI CALENDAR

KOI

Our monthly
look at the
Koi World.

Sometimes Koi seem to be better than we did. This one is showing a very nice black of points.

Show dates

- September 2/3** BKHS Isle of Wight Section Show, Contact M. Giddens 01983 527520
September 3 BKHS Leicestershire Section Open Show at Farm World, Gortree Road, Gadsby, Leicestershire, Contact Nigel & Pip Deibel on 0116 220 1522.

Copy for Koi Calendar

Copy for Koi Calendar should be sent to Aquarist & Pondkeeper, Winchester Court, 1 Forum Place, Hatfield, Hertfordshire, AL10 0RN Telephone 01673 885352 or fax 01233 500021. Copy deadline 4 weeks before publication date.

KOI SOCIETY MEETINGS AND EVENTS

There are numerous Koi clubs/societies throughout the UK and we will publish details of their meetings, each month as and when we receive details. However, don't forget to include a contact name and number.

The British Koi-Keepers' Society Sections

- Birmingham and West Midlands** - Alan Smith - 01214 223886
Central - Christine Green - 0111 266 6021
Devonshire & District - Keith Grogan - 01182 772892
Chilvers - Ed Wood - 01582 841158
Orwell Valley - James Scott - 02375 642321
East Pennine - Garry Kester - 0114 234 1111
Essex - Margaret Soun - 01702 292796
Ireland - Trevor Geary - 01247 468882
Isle of Wight - Mike Giddens - 01983 527520
Kennet Valley - Terry Spryng - 01488 682294
Lea Valley & Harlow - Michael Nunn - 0208 534 3691
Leicestershire Koi - Les Hatfield - 0116 223 7670
London - J. Caray - 0201 657 9036
Lower Thames Side - Ian Radley - 01702 529675
Manchester & District - Sue Enns - 0201 480 5821
Midlands & Surrey Border - Jill Freeman - 0201 641 2886
Mid Uxes - Val Green - 01673 898354
Mid Staffs - Val Stokes - 01543 278398
Northants - S. Day - 01904 407961
North Herts & District - S. Bova - 01767 261135
North Wales - E. Parry - 01492 360302
Plymouth & District - Sandra Crocker - 01752210118
Potters & District - Rita Burgess - 01763 617026
Scottish - J. McCarty - 01259 750484
South East - Mox Wright - 02034 718943
South Hants - T. Clark - 01489 513374
South Wales - Christine Northcott - 01443 267279
Suffolk & North Essex - Alan Carter - 02036 969031
West Wales - Neil Evans - 01354 771190
Worthing & District - K. Merrin - 01323 220838
Yorkshire Section - Andrea Thomson - 01904 273748

Independent Koi Clubs

- Birmingham & West Midlands Koi Club** - Alan Smith - 0121 422 3886
Black Country Koi Society - Toly Biscoe - 01284 205299
Bristol & West Koi Club - Gary Lewis - 02454 898207
Cambridgeshire Koi Club - Graham Hagger - 01487 111129
Dorset Koi Keepers - Alan Allen - 01202 875457
East Coast Koi Club - Alan Wright - 01502 567115
East Wiltshire Koi Club - Richard Jones - 01283 224878
Eastbourne & District Pondkeeping Club - Brian Cole - 01323 731369
East Yorkshire Koi Society - Steve Matbrown - 01484 527963 or Dave Wile - 01482 388777
Fyfe & District Koi Club - Chris Ingleson - 01772 625281
Heart of England Koi Society - Rita Shuck - 02093 674821
Marleyvale - Sue Bennett - 01942 204948
Midland Koi Association - Fethi Saman - 01527 545288
Nahikogal Association - Neil Peart - 01202 713000
North East Koi Club - Jean Hoak - 0191 415 5794
North Uxes Koi Club - Ken Bush - 05472 883377
North of England DNA Chapter - Yvonne Mose - 0124 288 5437
North Wales Koi Society - Fethi Saman - 01482 583383 or Fethi Williams (Secretary) - 01407 711848

Well what lovely weather we had for this year's International Koi Show at Billing Aquadrome. The organisers John & Beverley Woodfall of DJ's Koi did an excellent job of putting on the show and, judging by the many happy faces I saw, people thoroughly enjoyed themselves and lots of fish swam off to new homes over the weekend.

Just as A&P will be hitting the newsstands this month BKKS West Wales Section will be holding their Koi Show (Sun 27th/Mon 28th August) at Margam Country Park. This venue looks a really good one with something for all the family. Hopefully we will see you there.

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Q How many fish can I keep?

A **Freshwater** For freshwater aquaria it is safest to work on surface area rather than volume. We recommend 12 sq. inches of surface area per 1" of adult fish. This means you must take into account how big your fish will grow to, not just how big they are when you buy them.

Marines Marines require a different method of working out the number of fish you can house in an aquarium. You need to work on volume here and 1 inch of fish to every 6 gallons of water is a safe stocking level for a reef style aquarium. Fish only tanks can house more fish, but the exact level will depend on how good your filtration system is. Again you need to find out how big your fish grow to rather than just measure how big they are now.

Ponds Ponds are usually calculated on volume and for a filtered pond you can house an absolute maximum of 100 inches of fish per 1000 gallons. It is vital to remember this only works when you calculate it on the final size of your fish – not the current size. A 6" koi will grow to 24" long and increase its weight 50-fold. This can happen very quickly and often leads to ponds becoming over stocked with fatal results.

Q What is the correct temperature for my fish?

A

Freshwater tropicals	70-80°F
Coldwater	55-70°F
Marines	75-79°F

Some delicate species have very specific requirements, so read up on them before you purchase.

Q Water changes – how much & how often?

A **Freshwater** In freshwater aquaria you should change 10 to 20% of the water weekly. If you live in a water area where chloramine is added to your tap water it is essential to add a water conditioner to the fresh water before use.

Marines The ideal here is 20% every two weeks. This will reduce nitrates to a safe level and replenish the vital minerals and trace elements. Never change larger volumes of water than this, however, as large water changes in a marine aquarium may cause osmotic shock or other problems which will harm fish or invertebrates.

Ponds Pond fish also benefit from regular water changes but here it is rarely practical to change large volumes on a regular basis. Even so regular water changes should be carried out and ammonia, nitrite and nitrate levels monitored regularly or whenever the fish look in distress. With enough growing plants in the pond nitrate should be reduced naturally and providing your pond is not overstocked or over fed, ammonia and nitrite should always read zero in a mature setup.

Q How should I light my aquarium?

A Correct lighting is vital for plants, corals and other invertebrates. All too often beginners buy set-ups which are not designed to do what they want to. Make sure you have lighting designed for plant growing and ask your local aquarium shop for advice on marines.

Q Are live plants essential in a freshwater aquarium?

A The simple answer is no, but they are beneficial and we strongly recommend you grow some in all but exceptional circumstances. The reason for this is that they remove nitrate from the water. This pollutant is the end product of normal aerobic filtration and whilst at low levels it is unlikely to kill your fish, it will still stress them which can lead to health problems.

Two other important aspects to consider are:

1. That they provide cover for your fish and create a more natural environment.
2. Reduce the likelihood of algae becoming a problem.

Q Why can't I add fish directly to a new aquarium?

A When a new aquarium or pond is set up you should test for Ammonia and Nitrite every day. Initially you will see ammonia levels rise and then start to fall. Then nitrite levels will rise and fall. After this you can be sure your biological filters have developed a healthy colony of bacteria which will break down fish wastes.

During this initial period the aquarium or pond should not house any fish. Once these two poisons have peaked and dropped back to safe levels again you can start putting a few fish into your aquarium or pond. No more than 4 to start with followed by a slow build up in numbers over a period of months. This way you will avoid sudden spikes in ammonia or nitrite levels which will harm your fish.

Once your aquarium has become established it is still important to check for ammonia and nitrite every 2 weeks or whenever the fish look ill. Most health problems can be traced back to poor water quality so it makes sense to look at this first.

Ammonia will build up over a period of time and will kill your fish. Nitrite will build up over a period of time and will kill your fish.

Q What is the correct pH range for my fish?

A

Freshwater	pH6.5 – pH8
Marine	pH8.2 – pH8.4
Ponds	pH6.5 – pH8

However, certain delicate fish and invertebrates have specific requirements, so check before you buy any animal.

GOOD COMMUNITY MEMBERS

Richard Friend has an initial shopping list of compatible species for that new tropical aquarium.

You've set up the aquarium, the filters are up and running, the plants are in place, you have created a great little home from home for a lucky bunch of fish, but which fish?

Return from your aquatic centre with any old collection of fish and mayhem could prevail. Some fish will accept all others, except those of their own kind, or any that look even similar. Others prefer to live in shoals of their own kind and will mope, sulk, or even waste away if kept singly.

This list gives you some idea of the sort of fish that can be picked. Remember that once you have made your choice, stocking should be a gradual process, over several weeks, giving the filter system a chance to catch up each time.

PLATIES

A first choice with many hobbyists old and new. Available in a wide range of colours. They are easy, hardy, have strong colours and breed easily. They will give birth in the community tank to broods of live young. You could even find yourself looking for new homes for the offspring. Pick a shoal of six – preferably three pairs.

GUPPIES

Again a firm favourite, and rightly so. The males have exaggerated fins in a wide range of brilliant colours. The females are less attractive, after one happy moment

with a male, she can then produce several broods of live young, storing the sperm she has received until needed. The large fins of the males can make these little fish susceptible to fin nipping from other fish.

CLOWN LOACH

This fish has a behaviour pattern unlike other Loaches that tend to be missing for long periods, disrupt decor and plants. These beautifully coloured Loaches live up to their names by playing dead, getting into the most impossible cracks and crevices, and are generally entertaining. Must be purchased at least in pairs, they are one of the more expensive community fish, but worth every inch.

ANGELFISH

The shape of these spectacular fish is synonymous with the aquarium itself, seeming to be every non-fishkeeper's idea of a tropical fish. The body with extended fins and bold colouring makes for a brilliant sight. Being one of the few members of the Cichlid family that are suitable for the community tank, it is a welcome addition. Likes to make a



NEON AND CARDINAL TETRAS

In all ways, origin, size, behaviour and colour there is very little between these two species. The Cardinal is perhaps lighter. A shoal of either creates a pleasing sight in the aquarium as they dart about, their bright colours catching the light. Be careful of adding small quantities of these fish to an established tank, some of the present occupants might just think it is feeding time.

There are several other tetras that can be included such as the Emperor Tetra with a hint of purple on the flanks and turquoise eyes. Theummy nosed tetra is worth adding for the name. Its quiet addition to the community tank is rather bland in body colour but with a slight red head. Will stay under two inches, which is just as well as it needs to be kept in a shoal of six or more.

Emperor tetras are an excellent fish for your first community aquarium.

Photo: Derek Lambert

meal of any livebearer fry, will lay eggs but hatchings are less reliable.

BARBS

There are many species of Barbs available in the aquatic shops, Rosy, Checker, Black Ruby and Cherry. They all live well in a community tank in a confident shoal. They will readily spawn in the well planted tank. Individual fish may become fin nippers.

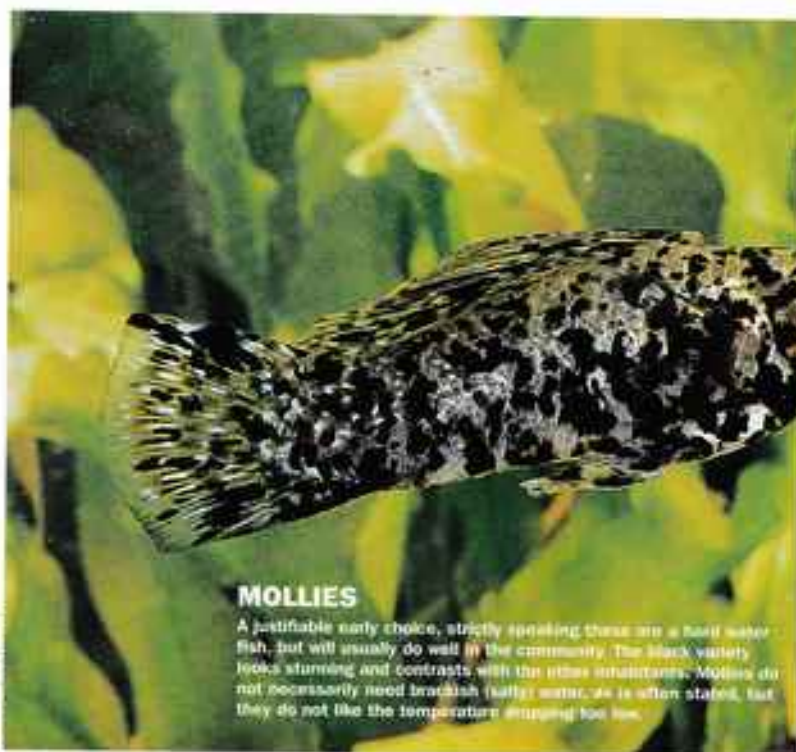


Photo: Derek Lambert

MOLLIES

A justifiable early choice, strictly speaking these are a hard water fish, but will usually do well in the community. The black variety looks stunning and contrasts with the other inhabitants. Mollies do not necessarily need brackish (salty) water, as is often stated, but they do not like the temperature dropping too low.

Mostly black Mollies make a good addition to a medium sized community aquarium.

food that you drop in. Best in a shoal, the name stems from their native home, although you do not need to provide them with caves.

SWORDTAIL

A Platy with a tail? Well they are of the same genus, but it is only the male that has the tail. Commercial breeding has provided us with plenty of colour choice. A common community fish but they can be rather aggressive and renowned fin nippers. However if kept in a shoal they are much less trouble. The problems arise when lone males get bored and set about other tank mates to

SIAMESE FIGHTER

Not a name that lends itself to the community aquarium. Purchase two of these exotic males, with their flowing fins vividly coloured, and you will find out the reason for the name. They will, without doubt fight to the death. Set up two females with one male, however, and all is sweet and honey. The splendour of the male, really is not to be missed, but beware of other tank mates who are fin nippers, as the superb 'plumage' of these proud fish is often too big a temptation.

BLIND CAVE TETRA

This rather sad little fish has a beauty despite its plain pink body colour. Born with eyes, the distressing fact is that they then grow a skin over them, and become totally blind. This fact will concern you more than it will the fish, as other senses allow them to live a normal life, and they will always be first to the

vent their frustration. Like their Platy relations they are livebearers and prolific breeders.

These are just a few of the easier fish for your first community aquarium. Correctly set up this is surely one of the most pleasing sights in the hobby. ■



Photo: Honey gourami in full breeding colour

GOURAMIS

Best to leave most Gouramis in the dealer's tank when stocking a small community aquarium, as they can be large, are territorial and very boisterous. There are exceptions. Honey Gouramis, Sparkling Gouramis and Dwarf Gouramis are quieter and quite shy. They will settle in well, although the male can turn nasty when breeding - and not just to other species of fish. There are several commercially developed colour versions of Dwarf Gourami although the original is beautifully striped orange and blue, the female is less colourful.

Photo: Derek Lambert

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LET'S GET FISICAL...



Photo: M.P. & C. Poshov

Lance Jepson MA VetMB CBiol MIBiol MRCVS of the Small Animal Veterinary Teaching Hospital, University of Liverpool, continues his series on fish health. This month he focuses on Ulcer Disease.

WHAT CAUSES ULCER DISEASE

Classically this is a bacterial infection, which can be initiated by known fish pathogens such as *Aeromonas salmonicida* achromogens and *Pseudomonas*, but can also be due to opportunist bad guys such as *Aeromonas hydrophila*, *Citrobacter* and *Edwardsiella*. Most of these bacteria are present naturally in the aquatic environment and so they are a constant potential menace. Occasionally mixed infections of these bacteria may occur. It is thought that in some cases *A. s. achromogens* causes an initial lesion, but is then swamped out by secondary invasion with these other species.

by large parasites, for example the fish louse *Argulus*. Poor nutrition also plays a part. High protein levels help to produce high antibody levels, essential fatty acids aid in antibody and white cell production, and vitamins A and C are also significant.

DIAGNOSIS

Species susceptibility This disease can potentially affect any fish. However those most commonly affected are Koi and goldfish. This may mean that they have an increased species susceptibility, or it may be that they are usually transported and kept in more crowded conditions than other fish.

If inspecting your fish for ulceration, always net and bowl them to inspect underneath as ulcers can be found lurking here, invisible from above.

PREDISPOSING FACTORS

Anything that stresses the fish or otherwise compromises its immune system may leave them open to infection. So water quality, low or rapidly fluctuating temperatures and overcrowding can all trigger an outbreak of ulcer disease. Trauma to the skin, which breaches the protective mucus layer and outer barriers of the skin, may allow these bacteria to attach and establish themselves on the damaged tissue. Such traumas may be physical, for instance scale loss during spawning or scratching, or they may be caused

Recognisable signs of disease One normally thinks of ulceration as being the classic sign. Small to large erosions in the skin and body wall are typical. However, early signs include areas of scale protrusion where fluid accumulates in the scale pockets, causing patches of scales to stand out. Other signs include reddening of the skin and fins, with areas of "bruising" or haemorrhage. The fish may be off its food and separate itself from the main shoal. In some cases the fish may just be found dead with no obvious signs, a victim of a massive,

Recently a corona-like virus has been isolated in Japan that produces a condition in fish very similar to bacterial ulcer disease. It has not, as yet, been diagnosed in the UK, but this virus may explain why some outbreaks fail to respond well to antibiotic medications. This virus has no connection with SVC.

overwhelming spread of infection and toxins throughout its system.

Laboratory investigation Taking a sterile swab and submitting it for bacterial culture not only allows one to know which species of bacteria are causing the problem, but also to have it tested against appropriate antibiotics.

TREATMENT

Individual fish may need injecting with an appropriate antibiotic, whilst groups or those which are still feeding may be given food impregnated or coated with antibiotic. Before offering medicated food, starve the fish for 24 hours to make them hungry! A recipe for antibiotic coated food is:

- If the antibiotic is available only as a tablet you will need to crush the required amount until a powder is formed. Always wear gloves whilst doing this.
- Mix the antibiotic with a small amount of vegetable oil until it forms a thick paste.
- Mix this paste with an appropriate amount of pelleted food. Allow to air dry before feeding.
- Feed to 1% body weight.
- Avoid dosing the entire pond with antibiotics – they are liable to ruin biological filtration as well as being prohibitively expensive!
- Ulcers may require treatment. With the fish anaesthetised, gently remove any revitalised tissue and then apply a proprietary iodine compound such as

Tamedine (Vetark) making sure to follow any diluting instructions. Then gROUT in a layer of Orabase to act as an osmotic barrier whilst the ulcer heals.

- In all cases, especially if one is using proprietary off-the-shelf antibacterial preparations, speed is the essence. Your best chance of a successful outcome is to treat or seek assistance as soon as you realise there is a problem.

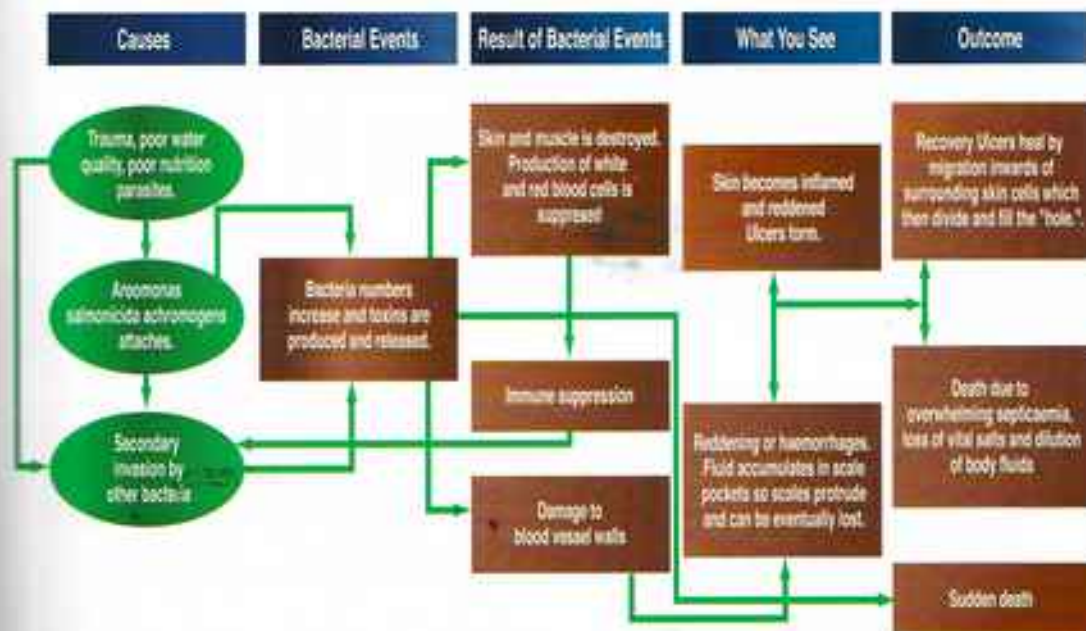
DISEASE LOOKALIKES

Diseases which may be mistaken for bacterial ulcer disease are fish tuberculosis (mycobacteriosis), sunburn, trauma, trichodiniasis and hypersensitivity (allergic) reactions at attachment sites of parasites such as Argulus and Lerneae (Anchor worms). Spring Viraemia of Carp (SVC) can mimic the haemorrhagic condition.

PREVENTION

Consult the section on predisposing factors, and avoid or correct them! Water quality, as ever, is of critical importance. Recently there have become available probiotic compounds. These are preparations of beneficial bacteria that, once established in the pond or aquarium, reduce the incidence of pathogenic bacteria by a combination of competitive inhibition (these bacteria occupy environmental space that the disease-causing microbes would normally inhabit) and the production of natural bacteriostats (bactocillins). ■

Ulcer Disease of Coldwater Fish



KING OF THE KILLIS

Mike Edwards Blue Gularis



Photo: M.P. & C. Robinson

Mike Edwards gets excited about the Blue Gularis.

I've been keeping fish for more than 35 years (I started young!) and in that time, I've kept almost everything, freshwater, marines and inverts. However, a couple of years ago, I encountered a new disease which I had never experienced before. It's called killi fever. This disease does not affect fish or plants and there is no medication which can eradicate it. The only way to control the illness is by ensuring that you maintain an optimum aquatic environment in your tanks – get some killis!

Although I'm an experienced fishkeeper, where Killis are concerned, I could never understand this fever. I knew that they were some of the most brilliantly coloured of all fish, that they had a wide range of fascinating spawning behaviour, and that most species were small enough to be maintained in even the smallest tanks. What held me back was the false belief that they were also incredibly picky as to water conditions and would only live in very soft water, would only eat live food and were very prone to disease (velvet). While those "facts" might be true for a few of the many hundreds of species of Killifish, for most of the commonly encountered species in the hobby, they are misleading in the extreme.

However, "commonly encountered" is a relative term – you won't find Killis very often in most aquarium shops (unless the owner is a fellow sufferer from Killi fever). There are several reasons for this. One is the prejudice about the difficulty of maintaining Killis and another is the belief that all Killis are annuals which drop dead after a

year. However, the most important reason is that Killis don't lend themselves to commercial scale spawning operations in the same way that fish like Barbs, Tetras and Cichlids do – they don't represent a good investment for fish farms. This does not mean Killis are hard to breed, just that the end result of a spawn, often after months of waiting, tends to be dozens of fish rather than hundreds and this is not commercially viable.

These days it's difficult for me to get as excited about fishkeeping as I once did. Every few years however, I read about or see a fish that is new to me and which reminds me of the way I used to feel about fishkeeping when I was a kid. That's exactly what happened a couple of years ago when I first heard about the Blue Gularis – the king of the Killis.

KILLIFISH GENERA/ SPAWNING GROUPS

Top (plant) spawners
Aphanius, Aplocheilichthys,
Aphyosemion (most),
Epiplatis,
Fundulus (most),
Pachypanchax,
Rivulus (most)

Bottom spawners
Soil spawners:
Aphyosemion (some),
Austrofundulus, Fundulia
(some), Fundulopanchax,
Fundulosoma,
Nethobianchias,
Pachonia, Pleuro (some)
Peat stream: Oryziatilis,
Pimelodus

Young Blue Gularis



Photo: M.P. & C. Pedersen

BLUE GULARIS

Killifish are oviparous (egg-laying) members of the order Cyprinodontiforms. The word Killi is a Dutch word meaning small ponds, which is the Killifish's natural habitat. The Blue Gularis was first collected by a Swede, Professor Yngve Sjosted, in 1890-1892 from a small tributary of the river Njlan in West Cameroon. Its current scientific name is *Fundulopichax sjostedii* (Fund-you-low-pan'chacks shuss'ted-eye - "bottom-dwelling panchas (a native Indian name) named after Sjosted"). Previously, it was known as *Aphyosemion sjostedii* or *Aphyosemion caeruleum* ("small blue fish with a colourful tail" - a pretty good description, except for the small part). *F. sjostedii* is unusual among Killis in that it has a common name, although I've never figured out what "Gularis" refers to.

MAINTENANCE

It's true that some Killis are fussier than others when it comes to water conditions, disease resistance and

feeding. However, others are quite tolerant and really quite good beginners species. Along with that old time favourite the Lyretail (*Aphyosemion australe*), aquarium strains of *F. sjostedii* are pretty tough, adapting to a range of water conditions. In its natural habitat (the west coast of Central Africa, from southern Nigeria to West Cameroon).

F. sjostedii inhabits small, overgrown, slowly flowing streams and tributaries in the rain forest. The water is soft, somewhat acid and rich in organic material. In the aquarium, *F. sjostedii* is happy in ➤

The Blue Gularis is a hardy fish that can tolerate a wide range of water conditions. It is a good choice for a beginner's aquarium.



Photo: David J. Amador



Photo: Mike Edwards

tolerant of a range of water conditions, but the water should not be too hard or alkaline (e.g. 10° dH/175ppm, pH 7.5 maximum). The average number of eggs obtained using this method is around 50. If you need more fry than that, condition two or three females and place them in the spawning tank with the male sequentially. If you really want to go into production, condition a number of pairs and rotate them through the spawning tank, but remember that the local market for any Killifish is likely to be limited.

The adults do not eat the eggs, mostly because they cannot find them in the peat. The eggs are quite safe in the breeding tank for several days, but as soon as spawning is over, remove the peat using a fine net and squeeze it gently to get rid of excess water. Spread the peat out in an inch thick layer on newspaper and allow it to dry for a few hours, then place in a suitably-sized plastic container or plastic bag. For incubation, the peat should be damp but not wet, i.e. it should not be easily possible to squeeze out any water. Excess moisture encourages the development of mould during incubation, although the great advantage of incubating the eggs in peat is its anti-fungal effect. It is possible to allow the eggs to develop in water, but even with the use of acriflavine or methylene blue, many eggs are lost to fungus using this method. At 70°F/21°C the optimum incubation time is 10 weeks, at 80°F/27°C, 8-9 weeks. As noted above, lower temperatures are preferred for this species. It is not advisable to try to short-cut these incubation times since this results in immature fry and lower hatch rates.

At the end of the incubation period, place the peat back into a tank containing water as similar as possible to that in which the eggs were laid. What happens next is perhaps the most remarkable thing which any fishkeeper is likely to witness - the first time my father saw this he refused to believe it and thought that I was playing a trick on him.

After many weeks incubation on "dry land", fry start to wriggle their way out of the peat within one hour. Another great advantage of peat incubation is the synchronisation of hatching, which is usually complete within a day. This results in a batch of fry all of the same size and at the same stage of development and therefore easy to raise.

I start feeding after a few hours. The fry are relatively large, ravenous and easily fed on Micro worms and/or newly hatched brine shrimp - infusoria is not necessary. As a compensation for the weeks of waiting during incubation, with a relatively large adult size and big appetites, they grow quickly. On a good diet, the fry take Grindal worms and sifted Daphnia and after 10-14 days can be weaned onto brine shrimp. After 3-4 weeks they can be sexed and placed on the adult diet.

I hope that this article has convinced you that not all Killifish are difficult and temperamental. It's very few people who don't have space for a few pairs. The art of enjoying fishkeeping over a lifetime is to keep trying something new. Go on - give 'em a try. ■

MORE INFORMATION

- Mike Edwards Tropicals: <http://143.210.172.28/>
Edwards
- British Killifish Association, B.K.A., Registrar, Cliff Griffiths, 8 Croftmore Close, Woodrow North, Redditch, Worcestershire, UK. <http://www.bka.org>
- American Killifish Association: Daniel Ulesco, ARA Membership Committee, 3085 East Erskin Ave, Benton Harbor, MI 49022, USA <http://www.aka.org>



➤ most conditions from very soft to moderately hard water of pH 6.0 to 7.5.

Because its native habitat is heavily shaded by vegetation, temperatures should be moderate, e.g. 70-75°F, although the fish will tolerate summer temperatures of 80°F. Under these conditions, they tend to become sluggish and do not display frequently. Their life expectancy is also considerably shortened. Although not as long lived as, for example, Cichlids, under ideal aquarium conditions non-annual killifish such as *F. sjostedti* can easily live 3-4 years.

It is beneficial to include a thick layer of floating plants in tanks containing *F. sjostedti*. One thing which everyone who keeps these fish finds out (usually sooner rather than later) is that these fish are jumpers. William T. Innes in his classic book *Exotic Aquarium Fishes* describes receiving an imported shipment of 20 *F. sjostedti* which were placed overnight in a large covered trough, the lid of which was half an inch short of complete coverage. By morning, every fish had leaped out and dried out. I make no claim to be considered as eminent an aquarist as Innes, but it is comforting to know that I found out the same way as he did that a complete cover with no gaps is essential when keeping these fish. Floating plant cover reduces, but can never eliminate the tendency to jump, gives some shade in a brightly lighted tank which the fish appreciate and provides a refuge for females in case the males become too amorous. I keep African fern (*Ceratopteris*) in all my Killi tanks and removing several handfuls every week helps to maintain good water quality in conjunction with light filtration (an air-driven sponge or box filter) and regular weekly 20-30% water changes.

F. sjostedti is large for a killifish, and reputed to reach a length of 6 inches. However, I have never seen fish even when reared in large tanks reach much more than 4 inches.

It would appear that the aquarium strains of this species have lost some of the genetic potential of the original stock. Unlike many Killis, 10 gallons is really the minimum size tank in which this fish should be kept, and 15 gallons or larger

is better, especially for growing on. Although beautifully coloured, the initial appearance of *F. sjostedti* can be off-putting. Their jutting lower lip, size and no-nonsense attitude suggests a fish capable of considerable domestic violence. However, they are actually surprisingly mild-mannered. Males may exhaust a female by their constant drive to spawn, but rarely if ever resort to physical attacks. I have never known well fed adult *F. sjostedti* eat a fish larger than a newborn guppy, even though they are quite capable of swallowing fish of neon tetra size.

In captivity, all except newly-imported specimens readily take flake food and prepared foods such as discus beefheart-spinach mix, grated shrimp, etc. However, for optimum growth, size and colour, the diet should contain a fair proportion of live or frozen foods such as bloodworms, daphnia, mosquito larvae, whiteworms and small or chopped earthworms. This is particularly important when conditioning for spawning.

BREEDING THE BLUE GULARIS

F. sjostedti is a "switch spawner", that is a species which will lay eggs either on plants ("top spawner") OR in the substrate, e.g. peat or sand ("bottom spawner"). In its natural environment, the eggs of *F. sjostedti* do not undergo a drying out period and develop naturally in water. For captive spawning, it is most convenient to allow the eggs to develop on wet peat moss. My setup consists of a bare five gallon tank with a half-inch layer of bodied peat on the bottom. Some breeders prefer to add a couple of floating spawning mops, but this is usually not necessary.

Separate male and female for a week to prevent premature spawning and condition them well with as much live food as possible. When placed together in the spawning tank, properly conditioned mature pairs usually start to mate within minutes and are usually spawned out within 12 hours. Don't feed the breeders in the spawning tank to avoid fouling the peat. Captive-bred specimens are

ASK A&P

aquarist pondkeeper

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STAR LETTER

Slow growers

Q I have had great success at breeding several *Brachyrhaphis* species over the last year. The problem now is some batches of fry are growing much more slowly than the older broods did. Originally my females were only giving birth to about 15 fry per brood, but now they are having anything up to 40 youngsters. These later broods are housed in larger aquaria so they are not over-crowded, and fed lots more food but they are not growing so quickly. Why?

J. Garner-Jones, Lincoln

A This is a problem which has taken years of record keeping for me to unravel. What



seems to be happening is that the early broods any female livebearer gives birth to are usually smaller in number. This means there is more food available when the eggs are being formed, so early broods will have a head start in life anyway. With Guppies and many other livebearers that would be the end of the story, but with some Poeciliids and many other groups of livebearers additional nourishment is passed on from the mother to her babies during their development. If there are more fry then once again there is less to go around, so when the female releases her youngsters they are significantly smaller than her first few broods.

With this poorer start in life it can be very difficult to make up lost ground, and it may not be until they are fully grown adults that they catch up their older 'siblings'. This is one reason why I try to save most fry from my livebearers when they are producing their second or third broods rather than wait until they are older fish. Admittedly, you will obtain lots more babies but none will be so strong and robust as those early broods.

Photo: Derek Lambert

Which family?

Q Can you settle an argument for me? My friend, who is a Koi keeper says that there is no way the Neon Tetras are in the same family as Piranhas. I say they belong in the family Characidae. Who is right?

Brian Bates, Wimbledon.

A You are Brian! Despite the fact they are such different looking fish and have very different habits, they still belong to the same family. Scientists have broken Characidae down into subfamilies of more closely related species which is a closer reflection of the inter-relationships between them but at the moment Characins come in a huge range of sizes, body forms, feeding and even breeding habits. They are a wonderfully diverse group and could keep an aquarist interested for many years. Indeed some people work with almost nothing else.



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Your Coldwater queries
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Killing Koi

Q I have a small garden pond measuring 8'x 6' and 2' deep. It currently houses six Goldfish but I would like to add six small Koi to it as well. Would they live happily together?

Pat Sims, Woking.

A Under no circumstances should you put 6 Koi into your pond. It is far too small to house Koi even with good filtration. This having been said, Koi and Goldfish can live happily side by side but only if you have a pond large enough to cope with fish which grow to 2' plus.



Photo: David Stewart

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Rampant pond weed

Q I have a problem with my pond being taken over with pond weed. I purchased a few bunches early this year and now the pond seems full of it. The proper name for it is Elodea. What can I do to control it?

M. Hastings, Walthamstow.

A *Elodea canadensis* is a very useful and commonly found oxygenator. It is normally sold in bunches bound together by pieces of lead or a rubber band. Many people just throw these plants in the pond and expect them to grow - which they do, usually very rapidly. The problem with this broadcast method is that the bunches soon become separated into individual pieces which settle all over the place. Each piece then grows into a branching mat, and soon your whole pond becomes more pond weed than water.

The best way of dealing with this plant is to confine its growth to one large area. Separate each strand and plant them into a large tub. These will root into the substrate (aquatic soil covered with 2cm of gravel is best). As this reaches the surface chop it back to half its original size and throw the surplus away.

FURNISHED AQUARIA



Photo: Arnold Van Den Nieuwenhof

In this regular feature we hope to inspire you to do more with your aquarium than you might think possible!

This month A&P has another Dutch 'aquatic garden' for you. This one is 200cm x 50cm x 50cm which is big enough to be the main feature in a large room without it being overpowering. Scale is something you have to remember in any home furnishing and fish tanks are just as much a piece of the furniture as they are places for fish to live.

Compared with the July inspirational aquarium this one is longer and shallower, but bogwood has still been used to provide the main structure. A tiered effect has been created by careful use of taller plants at the rear and low growing plants at the front, however, spot planting of several specimen plants at the front adds more interest than bland tiers of plants would.

DRIFTS OF PLANTS TO CREATE A PATCHWORK

Once again this aquarist has used large drifts of plants to create a patchwork quilt effect similar to the way plants grow in the wild. This time the foreground plants are Pygmy chain swords – *Echinodorus tenellus*. Large Amazon swords have been used in the rear corners and Tiger Lotus has again been used to create a focal point, but this time it is the green form.

Another focal point has been created by planting a single stem of Blue Water Hyacinth – *Eichhornia azarovii*. This has long (10-20cm), thin (5-7mm) leaves under water, but as soon as they reach the surface emerse leaves develop which have a different shape. At this point the plant needs to be cut back and the cutting planted. In this way a clump can be built up over a period of time. It dislikes hard alkaline water and will only be seen at its best when grown in soft slightly acidic water conditions with good lighting.

USE JAVA MOSS FOR A MORE MATURE LOOK

Looking right at the back just under the surface you can see fronds of Java Moss growing. This is a very useful plant in many different situations. You can buy it already attached to pieces of bogwood which, when added to a

- 1 Pygmy chain swords
- 2 Amazon swords
- 3 Tiger Lotus
- 4 Blue Water Hyacinth
- 5 Java Moss

new set-up, gives it a more 'mature' look. Here though, it has been attached to the backing sheet. Most of these sheets can be pierced with a pin and, with patience (a lot of patience!) it is possible to seed them with pieces of Java Moss. All you do is prick a hole with a pin and then push a piece of plant stem into it with the blunt end. By carefully working over as much of the back as possible you have an instant wall of greenery. Make sure the plants are not allowed to dry out when you do this, and keep your newly seeded backing sheet under water in good light until you are ready to set up your planted tank.

With Blue Water Hyacinth and other acid loving plants in the aquarium the fish will have to be able to adapt to soft water. So this aquarist's use of small Tetras is completely in keeping with the water conditions. Corydoras would also do well, but they would need an area of substrate left open to forage in. Other fish you could include are many of the small Barbs or Suckermouth Catfish. For something a little more exotic you could add some Killifish (*Aphyosemion* species would be a good choice). Almost any of the Gouramis would be at home in this aquarium as well.

CORRECT LIGHTING ESSENTIAL

As already mentioned in previous inspirations, correct lighting is vital for this type of aquarium. Many complete set-ups have rather basic lighting in them which will not be of the correct spectrum for your plants to grow properly. Even those which have reflectors to direct as much of the light downwards as possible are still unlikely to produce good growth with more demanding plants. For this reason, before you even buy a plant, replace the tubes with some designed to grow freshwater aquarium plants. ■

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THE CLEAN CLEAN GLASS OF HOME

Koy Osmit explains how Suckermouth catfish are a vital part of keeping your aquarium clear of algae.



Photo: M.D.A.C. Padova

There are probably well over one hundred species in the Plecostomus genus alone.

Picture the scene: two aquariums standing alongside each other of identical dimensions. Each similarly stocked with a selection of popular tropical community fishes utilising the same biological filtration systems. Both containing artificial plants and illuminated to corresponding duration and intensity. Why then does one appear sparkling clean with virtually no green algae present on the rocks, plants and glass, while the other has a totally different appearance with all surfaces liberally coated with algal growth, yet both tanks are maintained with the same frequency?

This was the question recently put to me by a fishkeeping acquaintance who could not understand why, given the similarity of circumstance, there should be such a noticeable contrast between the two aquariums. I agreed to take a look!

The following day I visited his home and was eagerly escorted into a large well appointed lounge where the brightly-illuminated tanks created an impressive feature against the opposite wall. Even from a distance it quickly became evident that everything previously described was entirely accurate, they were indeed markedly different in overall appearance. Each, to my way of thinking, aesthetically appealing in its own way, but nevertheless different.

Moving across the room to examine things more closely I peered in turn into each tank. Platies, Swordtails, small Barbs, Danios, Neons, Glowlights and Corydoras Cats among others variously swam and foraged contentedly through well designed and furnished aquascapes. All in all apparently healthy, properly maintained and nicely-balanced aquariums.

Even before arriving I had a pretty good idea as to what the answer was likely to be, although as I gazed in at the cleaner of the two tanks for a while I could not see what I was looking for. Suddenly my attention was drawn to a movement from behind a rock situated towards the rear of the aquarium. 'There we are,' I announced pointing towards the filter airlift pipe in the corner 'that's your answer!' A small Plecostomus Catfish had swiftly emerged from the shadow of the rock to reposition itself vertically on the back of the airlift. 'The filter!' My friend queried unenthusiastically. 'No,' I replied - 'the Plec!'

My conclusion was received with more than a little surprise for, although my host was well aware of the Plecostomus' algae-eating prowess, he certainly did not appreciate just how efficient and effective this sucker-mouth catfish could actually be at cleaning up. His tanks really did provide a superb and memorable contrast.

Some weeks later I happened upon this chap again when he ardently informed me that my diagnosis had indeed turned out to be correct. To prove the point he had transferred the Plec to the other aquarium soon after I had left and within a very short period witnessed the start of a reversal of conditions in the two tanks. As the Plec got down to cleaning the algae in one, so the other developed a build-up. He had, he told me, subsequently acquired another Plec and now housed one in each aquarium.

CHEAP AND EASILY AVAILABLE

My friend's original decision to obtain a Plecostomus is certainly not surprising. These fishes are extremely efficient cleaners as we have seen, relatively inexpensive to purchase, attractive in their own way and universally available. It is little wonder that for many tropical aquarists they will be the almost natural choice when it comes to algae-eating catfish. But are they the best choice? Let's take a look.

Hypostomus plecostomus is a member of the family Loricariidae, a group of dwarf to large, sucker-mouthed catfishes with a South and Central American distribution range from Nicaragua to La Plata. In terms of shape and size they really are a pretty disparate lot and undoubtedly include some of the most bizarre representatives of the Catfish world, fittingly portrayed by popular names such as 'Bristlenose', 'Twig' and 'Whiptail'. Despite this considerable diversity all members of the family display certain uniformity of characteristics that render them readily recognisable. Most striking of these are the impressive protective body armour and the curiously designed mouth section.

During the early fry stage, small folds of skin gradually develop into bony plates which eventually cover the entire upper head and body areas providing an effective defence against injury and predatory attack from above. The underbody, with some exceptions, remains generally either

insects and dried foods, to remain in good health they must have access to copious quantities of vegetable matter. In their natural environment they can be found endlessly grazing on almost inexhaustible supplies of green algae and other plant material, but within the confines of the average aquarium there is unlikely to be sufficient algal build-up to continually sustain this demand. Consequently it is up to the aquarist to supplement this deficiency.

STARVED THROUGH IGNORANCE

It is on this question of feeding that things often go wrong, particularly for the relative newcomer to the hobby. There frequently exists a preconceived idea that all Catfishes are scavengers and as such will live healthy and contented



Big Catfish like this require particular species care which is not always given to any aquarist.

Identification of many Plecostomus species is difficult, but when it comes to aquarium care the scientific name really matters!



naked or has a covering of granular scales. The mouth section of all Loricariids is located on the underside of the head and it has expanded lips that form a powerful sucker. This perfectly designed organ allows the fish to rasp away at the algal growth on a wide range of surfaces, and enables it to firmly anchor itself to any solid object and thus prevents it being swept away in the currents of the fast flowing streams that are its natural home.

The majority of Loricariids are herbivores and although most will relish a wide range of edibles including worms,

lives feeding on decaying organic matter and the leftovers of other aquatic creatures. Although this notion is in many ways understandable and not entirely inaccurate in its widest natural context, it does present a potentially dangerous misconception when applied too liberally to captive aquarium subjects.

The truth of the matter is that all fishes, no matter what their form or habit, must be individually catered for if they are to remain in good health and condition. In the case of Loricariids

vegetable matter is the principal requirement. Once this need is fully recognised and understood it is a quite simple matter to provide a suitable diet. There are various commercially produced vegetable based foods widely available specifically manufactured for this group of fishes, but much the best way is to offer household vegetables such as lettuce, peas, potato, courgette and cucumber all of which will normally be enthusiastically received.

Lettuce leaves should be well-washed and gently crushed in order to break down the cellulose before

➤ being placed into the aquarium and weighed down on the bottom by a rock or other heavy object. Peas should be squeezed between the fingers to separate the nutritious inner halves from the outer husk which can be discarded. Frozen peas are particularly convenient and just need to be placed in hot water for a few moments. Something of a delicacy, peas will often be relished by various other species. I have a Tinoid Harb that cannot get enough! For this reason some carry tactics might be called for to ensure the Suckermouths get a share. I usually place the peas in the same inaccessible corner around dusk – the cats know where to find them!



Feasting on an algae covered rock.

Bristlenose Catfish remain one of the most popular Loricariids in the hobby.



It is of course important to remember that vegetable material will quickly start to decompose in the warm tropical conditions of the aquarium with consequent pollution risks. Always ensure, therefore, that any uneaten food is swiftly removed.

Provided that adequate supplies of vegetable matter are always available Loricariids will in the main leave aquarium plants generally unmolested, although they will of course frequently graze on the algae growing upon them. This normally in moderation does no direct harm in itself to the plant, though in excess the constant action of the rasping teeth inside the sucker-mouth lips can sometimes damage the structure of delicate leaves. Provision of plenty of lettuce and the like creates an excellent distraction from this activity.

BOGWOOD AN ESSENTIAL INGREDIENT

There is, to my way of thinking, something especially aesthetically pleasing and naturally correct about suckermouth catfishes in an aquarium aquascape containing a bogwood feature. To see them resting upon or chomping their way across an interestingly shaped piece against a backdrop of contrasting plant life is a sheer delight! In fact the inclusion of wood is highly beneficial and in some cases essential to the fishes themselves. Some varieties will often be seen rasping away at a particular

section eventually creating a purpose-built depression into which they then retreat. Evidence of this activity can sometimes be found in the form of sawdust accumulations around the excavation site. For this reason the wood used must not be varnished as this can prove toxic to the fishes.

HUNDREDS TO CHOOSE FROM

The ubiquitous *Plecostomus* (there are probably well over 100 species in this genus alone) despite having all the

previously described qualities has one major disadvantage for the average aquarium – its size. Though ideal when small it quickly grows, becoming generally too large, boisterous and cumbersome for most planted community aquaria. It is far better suited to the larger tank as a companion to more robust subjects like Cichlids.

Fortunately there are among Loricariids a good number of interesting and attractive alternatives that are equally enthusiastic and efficient algae-eaters but which do not grow into monsters and are thus better suited to the average aquarium. Let's take a look at some of the best of them!

TWIGS

The beautifully graceful and appealingly elegant Twig Catfishes (*Epiplatys*) of which there are almost sixty species, are a group of justifiably popular suckermouth subjects that will add interest and charm to any well furnished aquarium. These ultra-slim cats (hence the popular name) have unusually elongated bodies which taper from the dorsal region backwards to a greatly expanded caudal peduncle and forwards to a lengthy snout. They display attractive colouring and patterning and love to rest and graze on bogwood at mid-water level where they look quite superb. The wood in fact is an aid to diet and digestion so its inclusion should be considered a necessity.

WHIPS

The Whiptailed Cats (*Rineloricaria*) so named for the whip-like prolongation to the upper lobe of the tail fin are another group of firm favourites. They reach various sizes according to species (there are some fifty in total) and generally make ideal subjects for the community aquarium. These slim bodied fishes are in many cases not too difficult to breed and can be sexed by virtue of the male's noticeably thicker pectoral fin spines. They are also well adapted to bright illumination due to a moveable lobe that protects the eye by controlling the amount of light entering.

BRISTLES

Another collection of highly efficient algae-eating sucker-mouths can be found among the aptly named Bristlenosed Catfishes (*Ancistrus*). Adult males exhibit an array of strange tentacle-like growths on and around the snout which make them easily identifiable. Females may also display some of these bristles but in very much less developed form.

As with the previously-described species, bogwood should be regarded as an essential part of the aquarium decor for not only does it provide an excellent grazing ground and retreat, but also has important implications on diet and thus overall health. These fishes are placid and peaceful except when two males are kept together in relatively close proximity under which circumstances considerable aggression can occur.

LITTLE SUCKERS

Some Loricariids ideally suited to the smaller community aquarium can be found among the genera *Otocinclus* and *Parotocinclus* of which there are some twenty species of the former and fourteen the latter. These are peaceful,

industrious cats seldom exceeding 3.5cm in length which enjoy a good lifespan when given proper conditions and diet. The species *Otocinclus vittatus* is probably one of the most commonly seen representatives of the genus. These lovely little fishes have an attractive olive/grey body decorated with darker markings on the head, back and sides. The belly is whitish and protected by three series of plates. As with all *Otocinclus* no adipose fin is present.

Parotocinclus cats are in many respects similar to *Otocinclus*, the principal obvious differences being the presence of an adipose fin and a covering of large plates on the underbelly. There are some lovely fishes in this group with one of the most desirable being *P. maculimanda* which will grace any aquarium.

IDEAL CONDITIONS

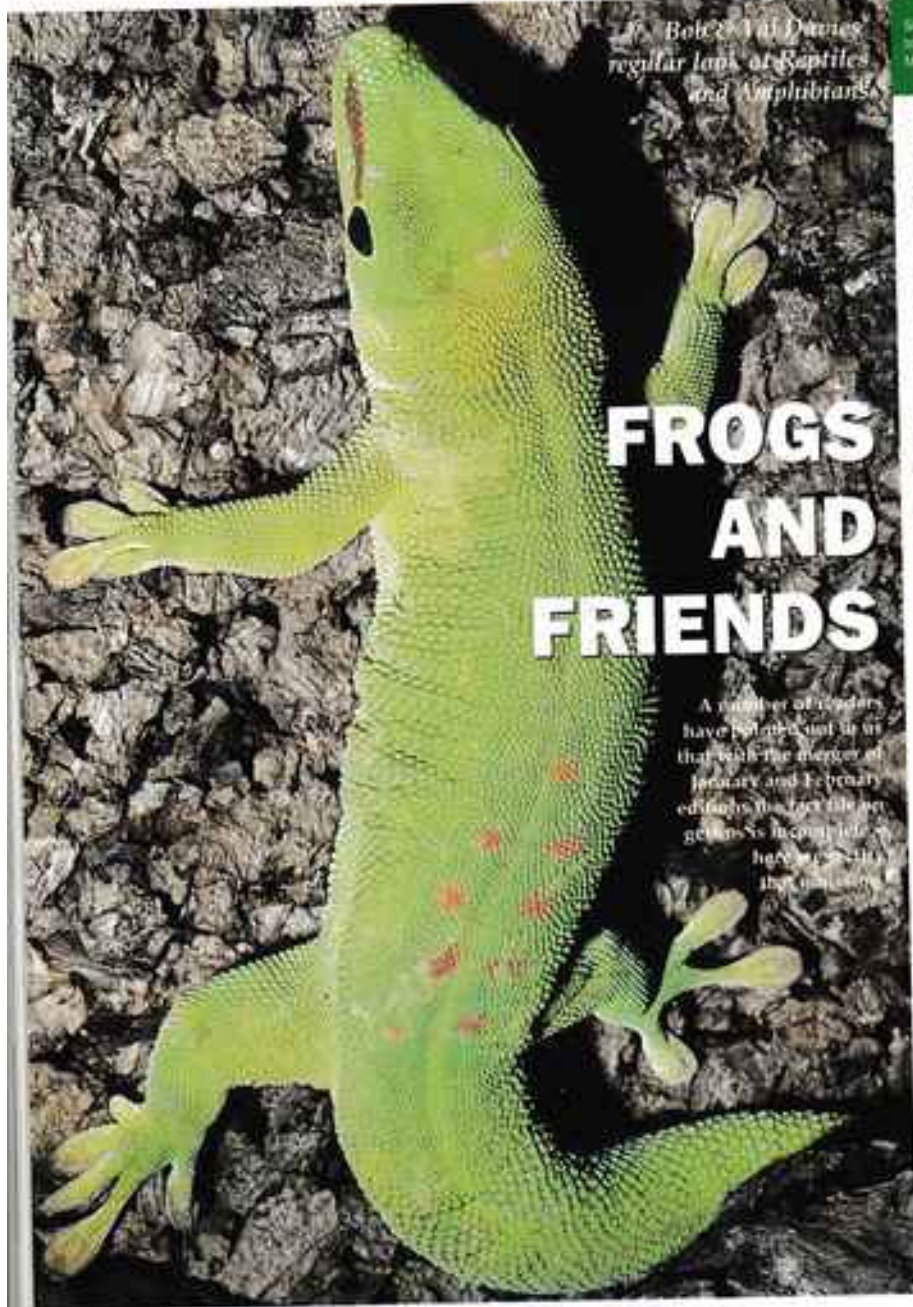
Always ensure that a tank containing Loricariids is well filtered, richly oxygenated, preferably with a good current flow, and regularly refreshed by partial water changes. Overstocking must be avoided. Plants, ideally, should be selected to cover a wide spectrum of growing habit, with some reaching the water surface and others lower at differing depths.

From among the Loricariid ranks will be found something to suit almost every aquarium application and interest and provided that favourable conditions are maintained, and dietary needs properly catered for, they should remain healthy, trouble free subjects.

In some circumstances the reliable 'Plec' will be an appropriate choice, for it is an old favourite that has much to commend it, but it is not the 'be all and end all' of the Sucker-mouth world. As we have seen, there are many attractive algae eating alternatives which may well in the long term be far more suitable for your particular aquarium set-up. So check out the Sucker-mouth scene - you will be glad you did! ■

One of the commonest Whipl Catfishes.





Bob & Val Davies
regular fans of Reptiles
and Amphibians

Some of the most attractive species belong to the genus *Hemidactylus* from Madagascar

FROGS AND FRIENDS

A number of geckos have been introduced to the UK with the merger of January and February editions to attract the attention of geckos's in captivity. However, all the geckos that are introduced to the UK are illegal.

Herp Fact File – Geckos (part 3)

THERMOREGULATION

Like other reptiles geckos need to raise their body temperature to levels which enable normal activities such as feeding and breeding. They are thus dependent upon climatic conditions. Some species hibernate or at least turn sluggish during cooler weather others may remain inactive during hot, dry seasons. Diurnal species raise body

temperature through basking – nocturnal species may sometimes bask during the day or emerge in the early evening to absorb residual warmth from rocks. Nocturnal activity is often punctuated with 'warming spells' on rocks. Coloration can change to varying degrees; darkening to absorb heat, and many species can flatten the body to provide a broader heat absorption surface. As temperatures rise a cooler spot is sought – some species hide away, others dig down to find a cooler, moister refuge.

SOCIAL INTERACTION

The behaviour of many geckos, particularly nocturnal species provides much scope for study although normal behaviour may be altered in the confines of a vivarium as available space and possibly numbers will be artificial. All geckos are territorial to varying degrees – in some species this may only occur in the breeding season. Females can also be antagonistic towards other females and even towards males. Certain species tend to be solitary, coming together only for mating. A few others are said to pair for life and should they be separated will not accept a 'stranger' once that bond has been formed. Others tend to live in larger groups – in some cases a hierarchical system is apparent among females – the dominant female retains the best feeding area and is the first to mate with the male.

Territorial disputes are usually based on space –

according to species there tends to be a certain minimum distance which must be maintained. Invasion of that space provokes threat behaviour – usually based on body movements and colour in diurnal geckos, vocalisation in nocturnal species. In some of the latter tail movements may also play a part in communicating a threat. In the wild territorial disputes may be settled simply by threats such as



Red-leg - highly infectious, difficult to cure and can quickly wipe out a whole collection.

➤ So much for the disadvantages; on the plus side newts have always been relatively cheap; they need no extra heat and are generally hardy - hibernation over winter gives the keeper a rest when livefoods can be in short supply. Some species are very attractive especially in spring when they enter the water and assume their breeding livery. Two particularly colourful species are the Alpine newt (*Triturus alpestris*) and the marbled newt (*T. marmoratus*). Alpine we have kept for some twenty-odd years (some newts can be long-lived) and we recently obtained some baby marbles having been tempted to keep this species again after a gap of several years. Other fascinating aspects are morphological changes which some species undergo; the development of crests or webbing, a tail spine in the palmate newt (*T. helveticus*) and in some cases change in skin texture which is thought to aid sex recognition. Courtship rituals are the highlight of newt behaviour. *Taricha* and *Notophthalmus* actually use amplexus (i.e. the male grabs the female) but *Triturus* species perform a peculiar 'dance' in which the male curls his tail and vibrates it to

waft his scent towards the female. He then deposits a sperm package which is picked up by the female in her cloaca. Fertilised eggs are folded in leaves - fascinating to observe!

In spite of the absence of many species some others have been advertised as captive-bred over the last year or so. These include: Ribbed newts (*Pleurodeles multif.*), Marbled, Alpine, Italian, Groat-crested and Banded newts (*T. cristatus*). Breeding males of the latter are impressive creatures possessing a large 'Sailfin' crest in spring. Dwarf firebellies (*Cynops orientalis*), Hong Kong newts (*Panorhynchus hongkongensis*) and Paddletails (*Pachytriton brevipes*) are regularly on sale (often in tropical fish outlets). The latter two are largely aquatic and present no feeding problems. Our Hong Kong newts readily take crickets, snatching them from the water surface. Along with other amphibians newts are threatened with habitat destruction and pollution - good reasons for captive-breeding.

AMPHIBIAN DISEASES - 'RED-LEG'

Many amphibian keepers will be familiar with 'red-leg' disease which appears as a reddish suffusion under the skin usually on the underside of thighs, advancing along and onto the belly. As it progresses the inflammation breaks through the skin to produce ulceration. One of the most common organisms found in cultures from swabs is the bacterium *Aeromonas* (often several species) but numerous other species may also occur - some of them possibly being opportunists that invade an already infected area. The disease is caused mainly by filthy conditions. Overcrowded amphibians will usually huddle together in moist hiding places - a build-up of waste matter produces ammonia and the bacteria have an ideal breeding ground.

Red-leg (and other diseases) may have already taken hold when the animals are imported if they have been overcrowded during transit and whilst in the dealer's premises. Infection may not be limited to the area mentioned but can occur on other parts of the body. Sub-acute forms are sometimes referred to as ulcerative dermatitis and may initially show simply as lesions followed by ulceration and weeping patches. The condition can be troublesome to clear up and is fatal if not treated. Sometimes a bath in a 1% solution of chelated copper sulphate (used by aquarists) will clear it up in the initial stages but it is more likely that antibiotic treatment from a vet will be needed. Leftover human antibiotics may not necessarily be effective against the organisms involved - fungal organisms may also have invaded.

Once apparent the disease progresses very rapidly - delay in treatment can be fatal. First-aid treatment involves placing the patient in a quarantine tank on clean, wet paper towel - give it a spray with tepid water and change the paper towel. Red-leg is highly infectious - removal of affected frogs is essential to prevent further outbreaks. Sterilisation and refurbishment of the vivarium will be necessary. Ideally the animal(s) should have been quarantined in the first place before going into permanent, furnished quarters.

Red-leg must not be confused with natural red pigmentation - certain frogs have red coloration in the groin or along the thighs as 'flash colours'. ■

THE BLUE GOURAMI (*Trichogaster trichopterus*)

By Iggy Tavares Ph.D

The Three-spot or Blue gourami, *Trichogaster trichopterus* (Peters, 1777) has many cultivated varieties, including a golden strain and even a silver strain. A very popular variety is the Opaline gourami, also called the "Cloudy" gourami. The Three-spot gourami has a pale metallic blue body with a hint of a darker blue showing through, and only two spots, one mid body and the other on the caudal peduncle, with the eye forming the third spot. In the Opaline gourami, this pale blue metallic sheen is reduced allowing the darker blue to show.

Males have longer dorsal fins. The wild-type Three-spot gourami has a widespread distribution in Asia from the Malay Peninsula, Thailand and Vietnam to Indonesia, where they inhabit all sorts of habitats in the wild, from ponds and submerged growth beds to small rivers where they feed on crustaceans including insects on the water surface.

Blue Gouramis can grow to 12.5cm and need to be housed in an aquarium at least 90cm long, which they can share with other medium sized Asian tropical fish such as Giant Danios and Ruby Danios among others. Only one male Blue Gourami with one or more females should be housed in this set up, as males are aggressive towards each other. A well-planted tank with an open swimming area in the front is best. Water chemistry is not critical and can be from soft to medium hard, provided it is well aerated and filtered and maintained around 25°C. The gourami will eat all commercial foods offered, although it also enjoys live and frozen foods.

For these medium sized Gouramis, one should use a 90cm long tank for breeding, as they tend to lay a large number of



eggs. A mature pair, where the female is obviously gravid can be moved into the breeding tank, which should contain some plant cover for the female to hide in if necessary. Spawning is an interesting affair and well worth photographing if the opportunity arises. Blue gourami eggs, which are

lighter than water, are placed in the nest by the male, who also tends the nest. The female, who plays no further part, should be removed. The fry hatch at least to three days

and are free swimming in another three days at which time the male can be removed. The hundreds of fry need to be fed tiny foods such as rotifers and other infusoria and after a few days moved on to larger foods.

Blue Gouramis are handsome, hardy fish that are relatively easy to spawn. Their blue color and various varieties to choose from keep the Blue Gourami ever popular.

Blue Gourami CV
FAMILY: Belontiidae
NAME: *Trichogaster trichopterus*
ORIGINS: SE Asia
AQUARIUM TYPE: 120cm community tank
FEEDING POSITION: Top and mid-water
SIZE: 12.5cm
TEMPERATURE: 75 to 80°
DIET: Flake, live food, frozen foods

CONGO TETRA (*Phenacogrammus interruptus*)

By Iggy Tavares Ph.D

Phenacogrammus interruptus (Boulenger, 1895), the Congo Tetra is sometimes called the Central African Tetra. Males grow to 8cm with the female remaining a little smaller. These wide bodied Tetras have large opalescent scales, a golden band running above the midline of the fish, with an olive brown back and a golden green belly. Adult males are larger and more colorful but also have larger dorsal and anal fins as well as streamers in the caudal fin. The Congo Tetra comes from the country now once again called the Congo in Central Africa.

This is a peaceful species that can be easily frightened by aggressive fish. Hence it is best housed with other similar sized African Characins such as the Red-eyed Characin and the Long-finned Characin, which also come from Africa. A 48-inch long aquarium provides the room that a school of these medium sized tetra require. At least half a dozen Congo Tetras are required to give this fish some sort of security. A dark tank bottom and low light help to show the beautiful colors of this Tetra at their best. For normal husbandry, the aquarium can contain moderately hard water maintained at 25-28°C by a Heater thermostat. Larger tanks with medium sized fish do best with an outside cooler filter, which does not interfere with the root systems of plants in the aquarium. Congo Tetras will usually eat flake foods - but this should be supplemented with live or frozen foods at least once a week.

Like most Tetras, the Congo Tetra does need soft, slightly



acidic water for breeding success. Live food and separation of the sexes are needed to allow the female to fill up with eggs. Apparently, courtship can often be initiated by changing the subdued lighting to very bright lighting, perhaps to imitate summer. For the sake of the fish, one might expect more than

the 300 rounded or so non-adhesive eggs that are scattered over live rooted plants. Congo Tetra eggs do take a long time to hatch, up to six days, during which time water conditions have to remain pristine. Free swimming by one another five days to appear, at which time feeding can commence. Following their long development, the fry are large enough to take Brine shrimp and are fast growing.

A school of Congo Tetra are well worth the extra cost and are bound to delight you with their good looks and exemplary behaviour in the community tank.

Congo Tetra CV
FAMILY: Characidae
NAME: *Phenacogrammus interruptus*
ORIGINS: Congo, Central Africa
AQUARIUM TYPE: 48" community tank
FEEDING POSITION: Top and mid-water
SIZE: 8.5cm
TEMPERATURE: 75 to 80°
DIET: Flake, live food, frozen foods

THE WOLF CICHLID

Cichlasoma (Nandopsis) dovii

Cichlasoma (Nandopsis) dovii, the Wolf Cichlid, is also called the Rainbow Bass and reflects the garb of mature males. This tends to be pale purple in colour overlaid with horizontal rows of black spots. In younger males, a broad, black, horizontal band runs along the mid-line from behind the gills to the caudal peduncle. His fins are green with darker spots. Females tend to be yellowish in colour and also have the black, horizontal band. Her fins are a plain pale yellow-green in colour.

The Wolf Cichlid is found across Nicaragua and parts of Honduras and Costa Rica in Central America where it inhabits rivers, but is also found in Lakes Managua and Nicaragua where the water is hard and alkaline. In the wild, where it can reach 2 feet in length and 12 pounds in weight, the Wolf Cichlid hunts and feeds on other fish.

START WITH SIX YOUNGSTERS

One would usually start with six juveniles of these fast growing Cichlids from which a pair should form naturally within a year. A pair of large Wolf Cichlids need a minimum sized tank that is 4'x2'x2' fitted with an outside, large canister type filter. Plenty of long narrow branching bogwood, arranged so that the fish can swim under it, provides very effective yet natural looking cover for the female when she needs it. Alternatively, cover could be provided by large clay flower pots and ceramic pipes. Large flat boulders provide these Cichlids with a suitable site to spawn on. Wolf Cichlids need hard water maintained by an outside, large canister type filter and kept at a temperature of 75 to 80°F. Pellets could form the staple diet of the big eating Wolf Cichlid. They will of course wolf down

Guppies and small feeder Goldfish, or other live food such as earthworms and freshwater shrimps. They should not be overfed, two feeds a day being sufficient to keep them in good health.

VIOLENT COURTSHIP

Pre-spawning behaviour can be violent and may require the use of a divider to separate a mis-treated female. Once spawning has taken place, the pair tend to be very good parents, with the female usually providing most of the egg care. The eggs usually hatch in three days and the fry are free-swimming in another four days. The fry will take newly hatched Brine shrimp but also do well when fed on crushed flake.

In the wild, Wolf Cichlids are a fearsome piscivore but a pair can be successfully maintained in a properly furnished large aquarium. If kept with a community of other large Central American Cichlids, special precautions will be needed if breeding takes place, since other fish will be attacked, damaged and even killed. The Wolf Cichlid is not for the faint-hearted beginner, but is a splendid fish for the Cichlid specialist with a large aquarium. ■

WOLF CICHLID CV

FAMILY: Cichlidae
 NAME: *Cichlasoma (Nandopsis) dovii*
 ORIGINS: Nicaragua and parts of Honduras and Costa Rica
 AQUARIUM TYPE: 4 ft. Preferably separate tank
 FEEDING POSITION: Bottom and mid-water
 SIZE: Up to 24 inches
 TEMPERATURE: 75 to 80°F
 DIET: Pellets, frozen Cichlid foods, live feeder fish occasionally.

Art and photo: Tony Davison PhD



This month Pat moves on to the next stage of being a real aquarist rather than just a fishkeeper.

THE YOUNG AQUARIST

After a year of running this column I think we are now ready to move on to the next stage. You have been keeping fish for a while now - it's not just a passing fancy but a real interest.

You know about setting up an aquarium, choosing and purchasing stock, foods and feeding, water quality and changes, acclimating your fish, the importance of a quarantine tank and the key to it all, daily observation. We've even talked a little about breeding fish. In fact we've covered all the important factors in caring for your fish properly.

Where do you go from here? Well, I can tell you where we went from here. We acquired more tanks and we joined a fish club. We were very lucky in our choice because we were surrounded by people who were very knowledgeable in their particular group of fish. We visited their set-ups and ponds and were taken to fish shows in the London area. We went on pond hunts and shop tours, ever widening our horizons and deepening our interest.

RESCUED FISH

We rescued fish that were being battered in the tanks of uncaring shopkeepers. (This is no reflection on the hundreds of aquarium shops that are well-run by caring aquarists). One of our rescued fish was a Chola Barb, an 8" African Barb which was having all its scales ripped off by a Jack Dempsey Cichlid sharing the same tank. When we took it home it was housed in an aquarium in one of the bedrooms, and my son said that he would get the club Show Secretary to look at it and identify it for us, which he did. I was horrified at the state of the poor creature, but we nursed him back to health. He lived for a further ten years in a 6' long tank that became our "Big Barb tank".

Another special fish in that 6' tank was a *Leptobotus horvathi*. This is a beautiful Barb-like species which grows to 18" (and it did!) We bought it as a 2" Barb and it just grew and grew. Remember what I told you about how careful you must be when purchasing stock. Try to identify whatever species you want to buy, if you cannot it is best left in the shop. A full grown *L. horvathi* just will not fit into a 24" tank will it!



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SPECIALIST SOCIETIES

Many of the young people we met through the club seem to have developed interests in the different groups of fish such as Catfish, Cichlids and Livebearers. We had several members who belonged to a Characin study group within Kingston & D.A.S. Characins are a fascinating group of fish which includes Piranha and Neon Tetras.

There are specialist societies for Anabantoids, Catfish, Cichlids, Goldfish, Killifish, Livebearers, Rainbows and Gobies, and you will find many experts in them. They also hold auctions and conventions and produce interesting magazines. Through these societies you can obtain many species of fish that you will be unable to find in the shops, and advice is readily available on how to keep and breed them. Many of their leading members write articles for this magazine. Meetings, however, may be too far away from your home, although some of their members may live near you. There will probably be a specialist society member in your local fish club who may be prepared to take you along to the Nationals if you are interested.

So far I have told you of our experiences in the early days. Next month I want to introduce you to a young person who, at fifteen, has recently built his own fishroom in which to house his collection of Characins.

Until next month

Pat

JOIN A CLUB

If you are interested in joining a fish club, look up the Federation in your area on the calendar page. There is a contact number and they should be able to tell you if there is a club that meets near your home.

CONTACT PAT

You can contact Pat either by writing to her at TFMG or by sending an e-mail to whys@shanksthem.com

Photo: Derek Lambert