

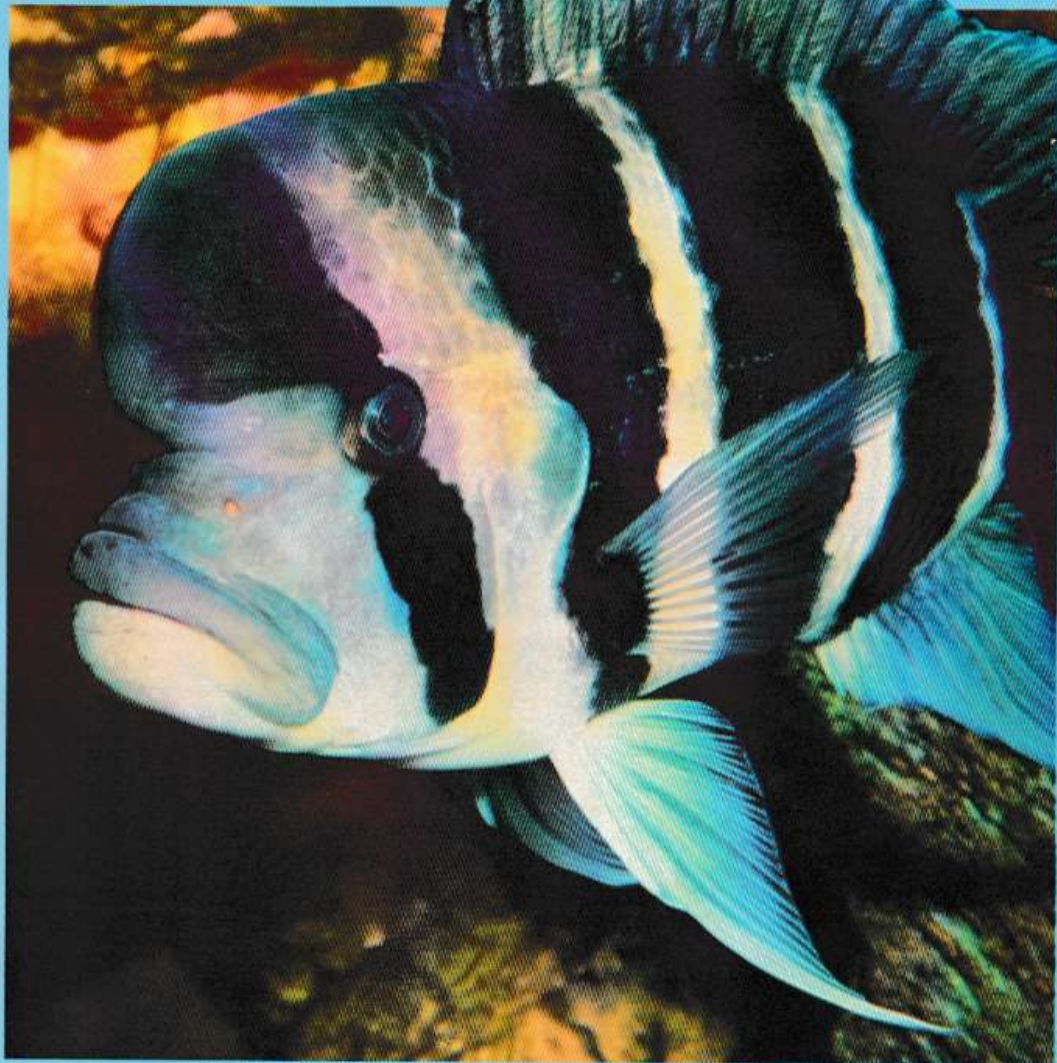
# AQUARIST & PONDKEEPER

75th  
Anniversary Year

Established 1924

AUGUST 1999 £2.25

The Better Fishkeeping Magazine



BEAUTIFUL BUSHFISH ● HOLIDAY HELP ● SHELL-DWELLERS  
MARINE INVERTEBRATES ● THE GOLDFISH SEASON  
**NEW SERIES** A-Z OF AMPHIBIANS & REPTILES  
**PLUS** KOI EXTRA

AUGUST 1999  
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## AQUARIST & PONDKEEPER

### EDITOR

Derek Lambert

### ART EDITOR

Mick Beeken

### ADVERTISEMENT MANAGER

Gwen McNeil  
Tel: 01233 500070

### PUBLISHER

Andrew Standing

### PUBLISHED BY

Inline Magazines Limited,  
Suite 4, Invicta Business  
Centre, Orbital Park, Ashford,  
Kent TN24 0HB

### CHIEF EXECUTIVE

Nick Richardson

### FINANCIAL DIRECTOR

Dave Wing

### MARKETING DIRECTOR

Alan Hulyer

### TELEPHONE: SUBSCRIPTIONS, ADVERTISING, PRODUCTION

01233 500070

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# CONTENTS

## FEATURES

### Beautiful Bushfish from Africa:

David Armitage takes a passionate  
look at some of his favourite fish

4

### Invertebrates Unveiled:

Nick Dakin  
looks at the long, the short and the  
tall of marine life

10

### Pond Watching:

Linda Lewis knows  
what she  
wants from a garden,  
however many times it takes

14

### Fashionable Plants on Bogwood:

Iggy Tavares finds plants which live away  
from the substrate

22

### Shell-dwelling Cichlids from Lake Tanganyika:

Peter A. Lewis  
is quite happy  
to be "shell-  
shocked" by  
the wide  
variety of  
species

25

### KOI EXTRA

Koi Health; Koi Filtration

29/40



41

### The Goldfish Season:

Alex Stephenson charts the year's  
activities

41

### Discus, King of Aquarium Fishes:

Vernon Eydmann describes his  
experiences with this majestic  
fish

48

### Holiday Fish Care:

Roy Osmint takes  
a commonsense  
approach

55



48



55

## REGULARS

**Ask A&P ...** Your queries solved here ... **8 • Frogs & Friends ...** Bob & Val Davies with  
herpetile news ... **18 • A to Z of Reptiles & Amphibians ...** **20 • Koi Calendar ...**  
Liz Donlan reports on the Koi scene ... **35 • New Desk ...** Updated information from the  
aquatic scene ... **42 • Derek Lambert's Cutting Edge ...** **44 • Caught in the Net ...**  
Kathy Jinkings hauls in another batch of cyberfish ... **46 • Shore Watch ...**  
Andy Horton's native marine pages ... **58 • Fish Profiles ...** **60 • Society World ...**  
Events and news from the societies ... **62**

**PLUS: Tetra Competition ... 20 • Sinclair Koi Food Competition ... 34**

## COMMENT

This is a momentous year in *Aquarist & Pondkeeper's* 75 year history. Not only has the magazine changed ownership, but now it has a change of Editor as well. For nearly 30 years I have regularly bought my copy of *AdP* and avidly read it from cover to cover. Fifteen years ago I was cajoled by John Davies (the Technical Editor at the time) to write a piece for the magazine. Little did I suspect then that I would one day be its Editor.

One of my most important tasks at this stage is to thank Dick for all he has done for *Aquarist & Pondkeeper* over the years. I first met Dick over 20 years ago at an FBAS meeting when he was Editor of their journal (a post he held for 25 years or more). At the time he struck me as a real gentleman and genuinely nice person and nothing in the intervening years has made me change my mind. I know he is looking forward to retirement now and I am sure you will join me in wishing him all the best for the future.

Thinking of the future, what does it hold for *Aquarist & Pondkeeper*? Obviously every Editor makes his or her impression on a magazine and no doubt I shall do this too. I have already started a new regular feature, *The Cutting Edge*. In this column I shall be looking at new, rare or otherwise noteworthy introductions to the hobby. Whilst some of these fish will only be available through specialist societies many others may well turn up in your local aquatic outlets and are worth seeking out.

Until Next Month ...

  
EDITOR

E-mail Address:  
sandpeditor@btinternet.com

## COVER PICTURE



PHOTOGRAPH: MP. & C. PIEDNOIR

### Frontosa Cichlid (*Cyphotilapia frontosa*)

The Frontosa has been known to aquarists for over 40 years now and is just as popular today as it always has been. Part of the appeal this fish has for aquarists is due to the huge lump which forms on its head as it matures. The rest is due to its beautiful coloration.

This large Cichlid (35cm, 15 inches) comes from Lake Tanganyika where it is found at depths of 20 to 30m (65-100 feet). Here it tends to sit around and do nothing for much of the day and night. About 15 minutes before sunrise, however, when most of the other fish are still asleep, the Frontosa will wake up and cruise around gobbling up as many of the sleeping fish as it can find. The same thing happens just after sunset, when most of the other fish are settling down to a well earned rest.

In captivity this is a peaceful species which, although it needs a large aquarium, will live happily with other species of fish and its own kind. When kept in a group, the largest male will develop into the dominant fish but, unlike many other Cichlids, he will usually live happily with the other males and just remind them every so often that he is boss.

If they are to be kept in a community situation then it is essential that their tank mates are at least three quarters the body length of the Frontosa. Otherwise there is a grave risk that they will be hoovered up just before sunrise or after you have turned off the tank lights at night. It is amazing just how many people have lost fish this way, without ever realising who the culprit was!

Their aquarium needs to be set up with lots of rockwork and caves to hide in. The substrate can be gravel or sand which they rarely dig up. Some plants can be safely grown with them. The water should be hard and alkaline with the temperature kept between 25-28°C.

Breeding is relatively easy, provided you can accommodate the adults. Spawning usually takes place in a cave with up to 50 eggs being deposited. Directly after spawning, the female picks up her eggs and broods them in her mouth until the fry are free swimming. At this stage she will release them so they can forage for food. If other fish are in the aquarium at this time, they will almost certainly be eaten almost as soon as they are released. For the next five or so weeks mum will look after her babies as best she can, taking them back into her mouth as soon as danger threatens or at night. During this time they will need regular feeds of newly hatched Brine Shrimp and other small live foods. Fry foods can also be fed and they will forage in the gravel or sand for anything edible.

DAVID ARMITAGE of the Anabantid Association takes a passionate look at some of his favourite fish: PHOTOGRAPHS: DAVID ARMITAGE UNLESS OTHERWISE STATED

# Beautiful Bushf



For the last 15 years or so, I have concentrated most of my endeavours as an aquarist on Bushfish, having kept and bred all of the bubble-nesting species. In 1990 I fulfilled my ambition of catching *Microctenopoma nanum* in its natural habitat of Gabon, Central Africa. This was one of the most exciting moments of my life!

In this article I hope to show you how to keep these fish and recount some of their fascinating natural history. *Sandelia*, the Kurpers and Rockys from South Africa, *Anabas*, the Climbing Perch, from south-east Asia, together with *Ctenopoma*, from central Africa, known as Bushfish, make up the family Anabantidae.

There are two distinct groups of Bushfish. The most primitive resemble *Anabas*, in which males and females are similar and scatter eggs without caring for their young. The other group, however, show differences between the sexes, build bubble-nests, guard territories, and look after their young, just like the Asian Gouramis, *Trichogaster* and *Colisa*. To aquarists, the differences between the groups has always been evident. It is only recently that taxonomists have analysed the differences sufficiently to separate the free-spawners from the bubble-nesters, and have finally given the bubble-nesters their own (genus) name: *Microctenopoma*.

## The species of *Microctenopoma*

The most widespread of the bubble-nesting Bushfish is the 7cm *Microctenopoma nanum*, the Dwarf Bushfish. This is not so much a species as a species complex, comprising a number of different species, found from Cameroons, throughout Zaire (*M. milleri*, *M. uelense*, *M. nigricans*, *M. ocellifer*) and as far south as Natal in South Africa, where the species is known as *M. intermedium*.

The species which gives the group its name is *Microctenopoma congicum*, this group includes the very recognisable species, *Microctenopoma fasciolatum*, the 9cm Banded Bushfish from Congo and Zaire, as well as *Microctenopoma pekkolai* from Ethiopia. *Microctenopoma damasi*, the 7cm Pearl Bushfish, has the most limited range, only coming from around Lake Edward in Uganda. Arguably, the most magnificent and sought-after species in the genus is *Microctenopoma ansorgei*, the 8cm Ornate or Orange Bushfish from Zaire and Cameroons.

The habitats, behaviour and aquarium care of all these fish are similar. I shall explain the maintenance of *Microctenopoma ansorgei*, giving details of how the other species differ if necessary.

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# ish from Africa

## Habitats

When setting up an aquarium for these species, it is quite important to know something of their natural habitat.

*Microctenopoma ansorgei* is generally known from the rainforests of the Congo and Zaire. However, verified collections have also been made in southern Cameroons. The fish are generally found erratically in widely separated localities, and never in very large quantities. This is because the great central African rainforests have expanded and contracted over the years, leaving remnant populations of the true forest species in isolated pockets.

The forest habitats are very similar to those of *M. nanum* — small, slowly flowing streams of negligible hardness and pH of 6-7, although some habitats can have almost brown water with a pH as low as 5. Here the fish are usually found singly, in vegetation that overhangs the stream edges, between roots or in holes in the banks. These are the same forests that house the biggest populations of forest elephants, chimpanzees and lowland gorillas. By day, the air is full of the calls of monkeys, birds and various grasshoppers. At night, this chorus is replaced by the song of countless toads and frogs!

Because Africa is in the tropics, and these habitats are close to the equator, it is often imagined that their water must be very warm. In fact, the streams are usually heavily shaded and often no more than 22°C. From my first hand knowledge of *M. nanum* habitats, I can say that these streams also shelter a variety of *Aphyosemion* Killifish species, Barbs, Characins and, occasionally, Elephant-nose fish, West African *Hemichromis* and *Pelmatochromis* cichlids. *M. fasciolatum* also appears to be a rainforest species while *M. damasi* and *M. intermedium* have both been captured from papyrus marshes,

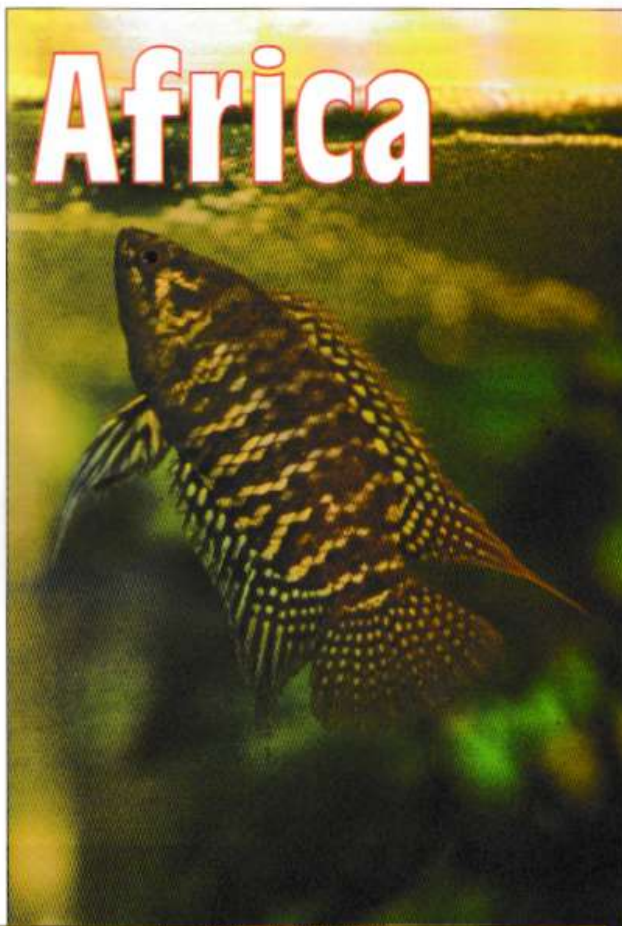
### above left

*Microctenopoma damasi*.  
PHOTOGRAPH: K. WEBB

### above right

*Microctenopoma fasciolatum*,  
building a bubble  
nest.  
PHOTOGRAPH: K. WEBB

**right** A pair of  
*Microctenopoma fasciolatum*  
spawning.  
PHOTOGRAPH: K. WEBB



## BEAUTIFUL BUSHFISH FROM AFRICA ... Fulfilling an ambition

(favourite habitats of Hippos!).

*M. damasi* was found near the Kazinga channel which joins lakes Edward and George in Uganda. *M. intermedium* has been found in the Okavango in Botswana. Here, the fish are caught by trampling down the papyrus to form a shallow puddle and scooping them up as the water flows into the newly-formed depressions. These marsh habitats are exposed to the sun and the water here must climb to temperatures of nearly 35°C.

### The *Microctenopoma* aquarium

Building on this information, we can set up our aquarium for *M. ansorgei* and other bubble-nesting Bushfish. The water should be of pH 5 (which is the value of my rainwater) to pH 7 and as soft as possible, although they will tolerate quite a range of pH and hardness. They will all live and breed at 20-24°C, although the temperature will get unavoidably higher in the summer, even in northern Europe. I regularly breed pairs of *M. ansorgei*, *M. damasi* and,

less often, *M. nanum* in spaces no bigger than 0.3x0.3x0.3 metres. I would, however, recommend an aquarium length of at least 0.6m for the bigger *M. fasciolatum*. The surface of the water should be covered with floating plant, I use *Ceratopteris*, to cut down the light and also give shelter to the fish. This really does give the fish confidence — my first *M. damasi* were so shy I hardly ever saw them until I used this plant and then they spawned immediately and swam freely around the aquarium.

My tanks have no gravel, only Java Fern or Anubias in pots on the bare base because

I find gravel hard to clean and it adds to the water hardness.

Pieces of bogwood, or flower-pots on their sides are useful to give females

somewhere to shelter because males of all species can be very aggressive and persistent in their attentions.

In *M. nanum*, this aggression can be life-threatening and it is necessary to keep a

close eye on them and remove weaker fish before they are killed. I find filtration is

unnecessary — the water movement disturbs the plant cover and disrupts bubble-nests and a monthly 25 per cent water change is just as good.



above *Microctenopoma nanum*.

below *Microctenopoma ansorgei*.





## Breeding

Wild caught, fully grown *M. ansorgei* can be very delicate and few survive to reach the tanks of European retailers. Fortunately, like all these species, they are almost as easy to breed as Gouramis. Most fish are, in fact, captive bred and these are very hardy and present no special problems. You may read that males and females are easy to distinguish — males have longer extensions to their fins and are 1 cm larger. This is true of adult fish, but sexing youngsters is more tricky. Most young *M. ansorgei* and *M. fasciolatum* look like males and most young *M. damasi* look like females. The best thing to look for are the extended pelvics of the males.

The choice of food is a little restricted. I have found that only *M. fasciolatum* will ALWAYS take flake, whereas *M. ansorgei*, *M. nanum* and *M. damasi* will require frozen (or live) Bloodworm, Glassworm or Black Mosquito larvae. On this diet, they will condition very quickly, display their courtship colours and will soon be ready to breed.

The courtship colours of all the males is splendid but pride of place must go to *Microctenopoma ansorgei*. Normally it is quite attractive, with an orange-brown base colour and six light stripes but, in display, the stripes become jet black, the fins unfold to emphasise their white edges, a beautiful green sheen covers the body, the dorsal and anal fins are almost red, while the caudal fin is jet black. When you see the male in this condition, often patrolling the front of the tank, it is a clue that breeding has, or is about to take place. The bubble-nest can usually be found hidden among floating plants.

In *Microctenopoma nanum*, the 7-10 body stripes also become black and the fins become really blue, but when he embraces, he is almost black! In *Microctenopoma fasciolatum*, the 8-10, broad zig-zag stripes become almost jet black and the fins show a beautiful blue, while male *M. damasi* become a dark blue-black with tiny iridescent flecks on the body. In aggressive display, all the females may show weak imitations of the males' courtship colours but when they spawn, they all show a pale, stripe along the length of their bodies.

There is a hint of seasonality to the spawning of these fish. Obviously there are exceptions, but I find that they usually spawn most often at the beginning and end of winter and can be triggered to do so by a 50 per cent water change. I have found that *M. ansorgei*, *M. damasi* and *M. nanum* build domed nests but *M. fasciolatum* usually only builds a scattered bubble nest. Friends have informed me, however, that theirs also built a dome which is often the size of a dinner plate! You can often

see this sticking up above the water but frequently the cunning fish will build under floating plants and you will fail to notice it. In my thickly planted tanks, *M. ansorgei* is particularly good at doing this and the first sign I have of spawning is the sighting of month old fry emerging from the vegetation!

After the nest has been built, the male displays in front of the female and, if she is ready, she will follow him to the nest. They will then circle beneath it while she mouths the male's caudal fin. They then spiral upward until the female lies in the curve in the male's body but she remains upright with her head in the nest, not inverted as occurs with Asian Anabantoids. In test (false) embraces, they lie like that for only 1-6 seconds but, when the eggs are released and fertilised, the embrace lasts 30-60 seconds.

These notes are based on my observations with *M. damasi* but I have observed little variation among other species. I have seen two embraces in every spawning bout and once I even saw two females circling with the male below a *M. damasi* nest! I have watched all the other species breeding in the afternoon. However, I had been producing young *M. ansorgei* for some time before I actually saw them embracing late at night. From 200 to 1,000 eggs will be produced, depending on the size of fish but it is usually difficult to raise all of these to maturity.

The male maintains the nest for a further two days or so by sucking in air at the surface, a little way from the nest and then blowing out mucus-covered bubbles while he hangs beneath. After this time, the larvae have hatched and for another day or so, they hang by their heads from the nest, making little spiralling dashes back when they fall out. After three days, they are free-swimming and have used up their egg sac. The next week is the most difficult time in their development because they are very small and require the smallest living pond life, infusoria (*Paramecium*) for a week before they will take micro-worm and brine shrimp (*Artemia*) larvae.

You will have to decide whether to leave them with their parents, remove the nest (and enough of their original tank water), or remove the parents and leave the fry in the breeding tank. I would recommend the first or last options. In my tanks, the fry usually find enough food between the leaves of the floating plant and I will find 10-30 young with their parents after a month or two. *M. ansorgei* are particularly good with their young and I never seem to be able to take all the young fish out of the tank. It is, however, really necessary to remove them, or they will eat the smallest fry from later spawnings. A tankful of eight-week-old *M. ansorgei* fry, constantly displaying to each other is a wonderful sight!

These beautiful African fish have everything going for them — good looks, hardiness, ease of breeding and interesting behaviour. They deserve to be as popular as the Asian Gouramis and, with care, should live for at least three years in captivity with the larger *Microctenopoma fasciolatum* living for nearer to five years.

**left** *Microctenopoma intermedium*.



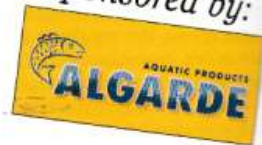
For further information on Labyrinthfish contact: Anabantoid Association of Great Britain, c/o 19 Chiltern Crescent, Spotbrough, Doncaster DN5 7PE.

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# Ask A&P

Your queries solved here ... with the featured  
 problem winning a prize from ALGARDE

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I seem to be having a problem with my water in my tropical fish tank. It is constantly green and all of the plastic plants and rocks being covered in algae. I can cure the green water with doses of an algacide, but I need to do this at least twice a week to keep the water crystal clear. Surely, I don't need to do this constantly to achieve clear water?  
 My tank is 2ft long, 18 months old, filtered originally by a Fluval 2 internal but I recently added an air-driven undergravel, three months ago, to try to achieve good water quality after high test results of Ammonia, Nitrite and Nitrate were beginning to appear. The extra filter also achieved clear water after an early problem with cloudy water. The tank contains three Golden Gouramis, one Dwarf Gourami, four Zebra Danios, assorted Guppies and Mollies and one Sucking Loach of which all seem contented and healthy. The water is kept at a constant 25°C and water changes of 15-20 per cent every 10 days, at which I take the

## Prize Winning Problem

opportunity to clean the gravel and the filter foam. Recently it was necessary to replace the fluorescent tube, which I did with an Aquaglow. It was after the replacement bulb was fitted that the green water appeared — could this just be a coincidence? What advice would you give?

Graham Worrall, Warrington

As you don't mention live plants, your problem appears to be an excess of nutrients in the water. Nitrate is not removed by the undergravel filter (in fact, it is produced by it) and this, coupled with a lamp whose spectrum is eminently suitable for plant growth all add up to a paradise for algae-culture. Another contributor to algae-favourable conditions is overfeeding. This may inadvertently be the cause, as your tank is not exactly overstocked with fish and it is all too easy to overfeed. Newcomers to the hobby often make this mistake. Make sure you feed only enough flake food that the fish can eat in five

minutes and feed only twice a day. If you introduce a good quantity of live plants, they will out compete the algae for nutrients in the water. As the plants grow, they will also add shade which will help reduce this problem as well. With only plastic plants, you really only need light over the tank when you are looking at your fish, not all day long. When using remedies to combat algae, always follow the instructions; it is important to remove any dead algae as their subsequent decomposition will use up oxygen in the water. Regular removal of dirt and debris from the gravel is especially necessary when undergravel filtration is used as it helps to keep the water flowing freely through the gravel. You should only wash out the filter foam with old aquarium water (never tap water). This avoids killing off beneficial bacteria which may have developed on it. If possible, wash the foam in sections on a rotational basis as well, this too will preserve bacterial life (no one says you can't cut existing foam blocks in two!).

## General

**Q** My letter concerns Guppies, or rather Livebearers in general. I have been keeping tropicals for 30 years but in the last few years any livebearers, especially Guppies (my favourites), seem to develop a hollow belly. They go all thin, their fins fold flat, and they shimmy for a few days before dying. They are fed live food etc. What am I doing wrong?  
 Also can you tell me where I might get hold of some wild Guppies as I think they are too inbred?

W. L. Thomas, Birmingham

**A** The problems you are describing are symptomatic of a number of different causes. Several different diseases, a parasitic infestation or poor water conditions can all affect livebearers in this way. The first thing to check is your water quality. Do you have a high nitrate reading? This can easily build up in an aquarium over a period of time and will stress any new fish you introduce, whilst those that are already established seem to be able to cope with this pollutant. You should also check for ammonia and nitrite as well. Assuming everything is fine with the water, you now need to take a close look at all the fish in your aquarium. Look at their anus and check to see if

there are any small brown worms hanging out. These are nematode worms which feed on your fishes gut wall. Once established in an aquarium they will infest all your fish. Eventually they cause weight loss and general weakness which will lead to death if not treated. Livebearers are particularly prone to this infestation and are usually the first to die from it. Effective treatments are only available from your vet. Another possibility is that the fish were diseased when you purchased them. You should quarantine all new fish for two weeks before you introduce them to your aquarium. This will give you a chance to see if there is any sign of disease and treat it before they reach your main tank. Obviously you should only purchase healthy stock not showing any of the symptoms you describe. Your final question about Guppies being weakened by inbreeding is one which comes up from time to time. In fact cultivated Guppies often prove much harder than their wild counterparts. The reason for this is that they have adapted to aquarium conditions over the 100 or so years they have been kept in captivity. I don't think you would be too impressed by the wild animals either. The wild Guppy has small fins, little colour and males only grow to 2cm with females reaching 3.5cm. Certainly nothing like the beautiful pedigree Guppies which adorn our tanks today.



PICTURED Wild Guppies look nothing like those we see in the shops today.  
 PHOTOGRAPH: DEREK LAMBERT



This page is generously supported by Algarde who are offering a Midi Therm Electronic Thermostat suitable for aquarium or vivarium use as a prize for the featured problem. The unit, with a 300 watt handling capacity, has two heater connections and a fully waterproof probe which senses water (or air) temperature and easy-to-follow instructions.

NICK DAKIN looks at the long, the short and the tall of marine life:

PHOTOGRAPHS: NICK DAKIN UNLESS OTHERWISE STATED

# Invertebrates Unveiled

**W**hat is an invertebrate? Perhaps you are wondering whether this is a trick question, for surely there must be a long and complicated answer, full of technical jargon that academics love to bandy about. But you would be quite wrong. Invertebrates are simply animals without a backbone — or vertebral column if you really want to get technical — and an internal skeleton. Albeit quite a loose term, “invertebrates” nevertheless encompass the overwhelming majority of animals on this planet.

It is estimated that there are at least two million species of animal sharing our world and of those, a staggering 97 per cent are invertebrates. A significant proportion of this figure is made up of terrestrial insects, worms and spiders, but it is thought that sea-dwelling invertebrates could account for nearly half of all species. Much of this total is made up of

microscopic plankton but let us not forget that the giant-squid is also an invertebrate, and at 66 feet (20m) surely the largest living independent species known to man!

Owing to their mainly non-restrictive form, saltwater invertebrates have developed over time to take on a multitude of fascinating forms and sizes. For example, Sea-anemones are little more than a bag of skin but when inflated with water, they become delightful flower-like creatures with deadly, protective tentacles. Instead of an internal skeleton, crustaceans wear their skeleton on the outside, which they can shed from time to time enabling growth to take place.

Whilst it may seem that Sea Fans and Sea Whips possess an internal backbone of sorts, this is no more than a flexible

**below** *Anemonia viridis*, PHOTOGRAPH: MP. & C. PIEDNOIR



right Blue Sponge. below Red Sea Fan.

support structure that carries no nervous system and only acts as a convenient attachment point for the multitude of polyps surrounding it. Cephalopods such as Octopuses and Cuttlefish, on the other hand, are free-swimming invertebrates of great intelligence and formidable predatory skills.

And so the list goes on, including such intriguing creatures as Starfish, Sea Urchins, Nudibranchs, Clams, Tubeworms, Jellyfish, Sponges, Leather Corals, Soft Corals, Polyp colonies, Hard Corals; could we imagine a more diverse range of animals from outer space, let alone our own seas and oceans?

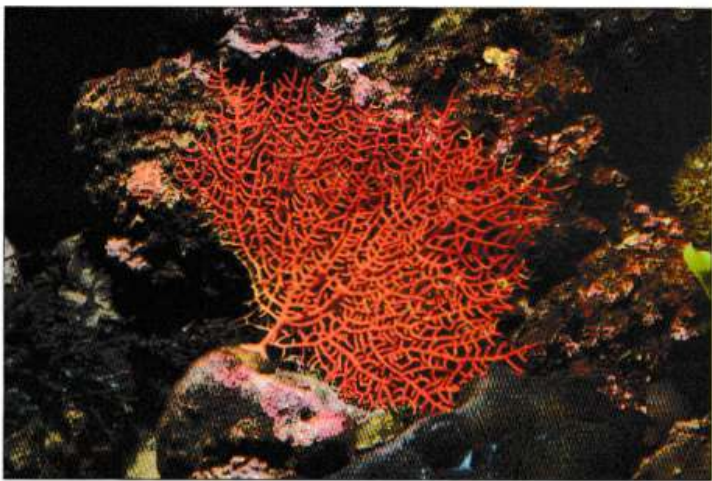
Marine aquarists are, of course, mostly concerned with those invertebrates that inhabit the shallow, tropical waters of the world, but species are represented in all oceans and seas from the tropical equatorial regions to the freezing waters of the Poles. Indeed, and to the surprise of many people, polar regions possess an amazing diversity of Sea-anemones, Sponges, Tubeworms and Shrimps, etc., owing to the richness of microscopic food in those areas.

The adaptability of invertebrates has been a never-ending source of wonder, even to the point of overturning a previously unassailable major scientific precept; that being that all life on Earth is primarily dependent upon the energy of the Sun (the usual analogy quoted in this respect describes how the Cabbage captures light energy from the Sun through photosynthesis which is then eaten by the Rabbit, which is in turn a meal for the Fox).

For, in 1977, scientists discovered thriving colonies of Crabs, Shrimps, Sponges, Giant Tubeworms, Molluscs and other animals living at formally impenetrable ocean depths (1.5 miles beneath the surface!). Far beyond the rays of the Sun, this ecosystem is nourished in a totally unexpected way, through a synthesis of chemicals utilised by bacteria, upon which most organisms feed. The primary source of energy was identified quite readily as a chain of volcanic vents in the ocean floor, providing heat and chemicals vital for life at these incredible sun-less depths.

## Coral reefs as history

Marine aquarists will no doubt be familiar with at least some of the many hundreds of species of coral to be found world-wide, if only by noticing those selected specimens available at their local retailer, but it



may be of interest to note something of their history.

The first corals appeared around 500 million years ago and can now be identified as fossilised examples inland, well away from today's coastlines. In fact, modern reef growth is estimated to have begun only very recently, around 5,000 years ago. This is because sea levels are dramatically higher now and have drowned previous structures. As recently — in geologic terms — as 7,000 years ago, sea levels were 20 metres lower than they are today; 15,000 years ago the difference was even more dramatic at 120 metres lower! The reason being that much of the water was locked up in the giant ice sheets of the last ice age.

As we can see, even relatively slow-growing invertebrates such as

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## INVERTEBRATES UNVEILED ... The long, short and tall of marine life

corals are capable of adapting to change and most people will be surprised to learn that marine structures such as the modern Great Barrier Reef have been less than 5,000 years in the making.

### The missing link

The difference between vertebrates and invertebrates is not as clearly defined as black and white, for there are animals which possess the attributes of both at some time during their life cycles. One example particularly familiar to the marine aquarist is the Sea Squirt which, as a sessile adult, can be regarded as a true invertebrate but as a free-swimming larvae must be included in the phylum chordata — animals with backbones. For the tadpole-like larval form has a stiff rod, not unlike a backbone, and a single hollow nerve cord. Falling into both camps, animals such as these are referred to as protochordates and form the missing link (obviously now found!) between the aforementioned groups.

### Invertebrates and the marinist

How does all this affect the marine fishkeeper? Well, there are several areas of discussion that the marinist will want to address. Firstly, the ethical dilemma of collecting and keeping invertebrates. Are we endangering the coral reefs by gathering invertebrates for our own pleasure?

It is now generally believed that if collectors stopped their activities tomorrow it would make little or no difference as they remove such an insignificant amount. Much more damage is done to reefs by other agencies, such as dynamiting for hard-core, sewerage outfalls from tourist hotels, dragging anchors, oil tankers flushing their tanks, deforestation, storms and a host of other sources. Certainly if

I thought marine fishkeeping was a threat in any way to the reefs of the world, I would quit now!

Many newcomers to the hobby are worried that invertebrates will be too difficult to maintain, and there is a great deal of truth in this. Personally, I would not recommend that any newcomers begin with invertebrates. On the whole, they are far more sensitive creatures than fish and require a good understanding of the basic aquarium water chemistry, filtration and lighting. By keeping fish only for at least 6-12 months, the novice will be able to get a good grounding in these areas with animals that are generally far more forgiving of mistakes.

Having said that, marinists do progress and we must consider the best conditions under which to keep invertebrates in captivity. Preferably a minimum tank size of 48x15x18 inches (around 40 gallons net), trickle filtration, adequate protein skimming and activated carbon filtration. Good quality water changes using de-ionised or reverse osmosis water at intervals of 10-20 per cent every fortnight: pH 8.1-8.3; temperature 77-79°F; SG 1.021-1.024; Ammonia and nitrite — zero at all times; copper — zero; nitrate — less than 10 ppm (zero, if at all possible); phosphates — zero; carbonate hardness 7-90 dKH (natural levels, not artificially-buffered); dissolved oxygen 5-7 ppm; Redox 350-450 mv.

A final point for the budding reef-keeper to bear in mind is that all copper-based medications are fatal to invertebrates. To complicate matters still further, any calcareous materials such as Tufa rock, coral sand and gravel absorb copper, releasing it at a later date. Therefore, it would be very unwise to house invertebrates in tanks that have been previously treated with copper.

**below** The Cleaner Shrimp, *Lysemata amboinensis*.  
PHOTOGRAPH: MP. & C. PIEDNOIR



right Blue Sponge. below Red Sea Fan.

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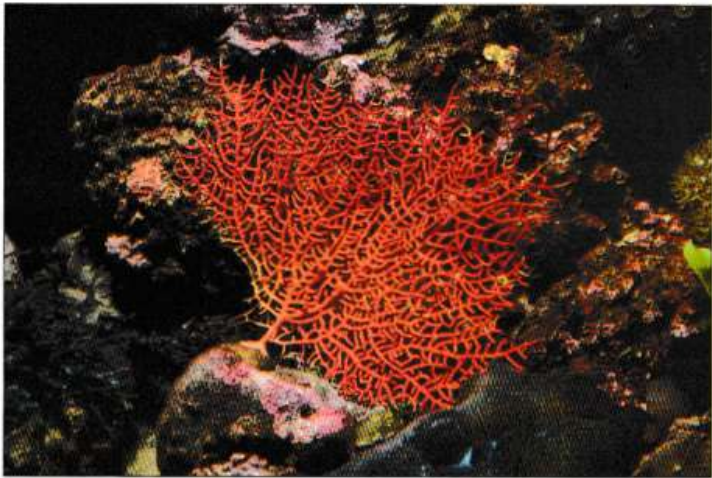
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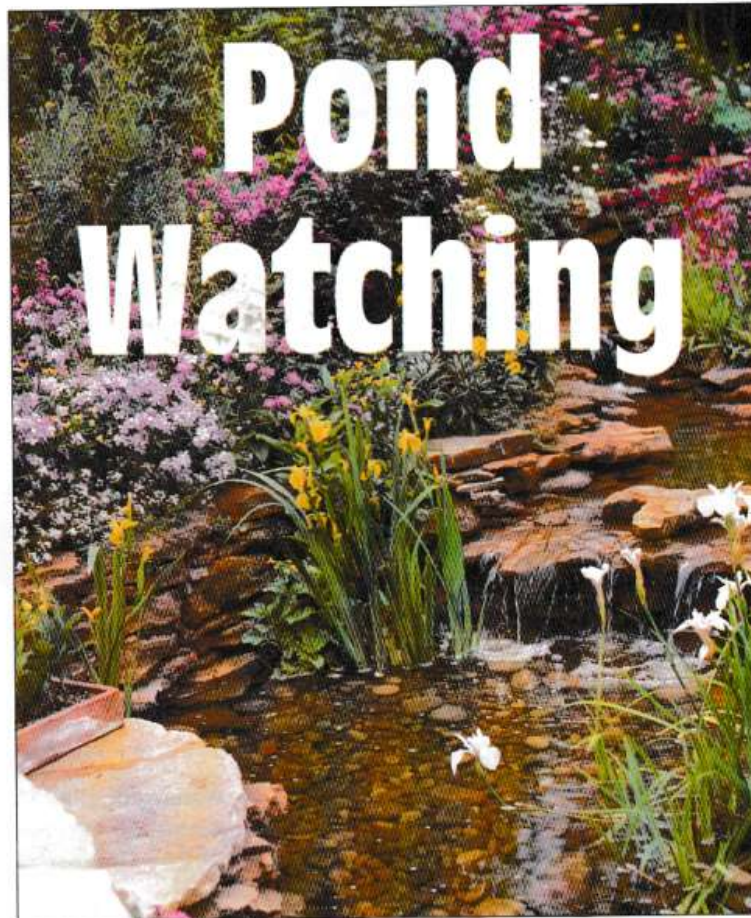
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PHOTOGRAPH: MP. & C. PIEDNOIR



**LINDA LEWIS** knows what she wants from a garden, however many times it takes: PHOTOGRAPHS: LINDA LEWIS UNLESS OTHERWISE STATED



**above** Growing plants which attract Butterflies and other insects to feed on them will soon bring life to your pond area. This Butterfly Conservation Garden was displayed at Chelsea Flower Show in 1998 and has been designed with this specifically in mind. PHOTOGRAPH: DAVE BEVAN

**T**he first thing I do whenever I move house is to make a pond. Second on my list of hobbies, after fishkeeping, is gardening, and for me, a garden without a pond is incomplete. Of course, there are many different kinds of garden, but each can be complemented by a water feature of some kind. A formal, rectangular pond will blend perfectly with an organised, symmetrical garden and even a small plot can incorporate a miniature water feature.

I have recently moved, so am busy turning a bare patch of concrete and grass into a garden. As usual this means digging ponds. As I now have a decent sized front garden, this means I can have a pond in both the front and back gardens.

My previous garden was not to everyone's taste. Planting was random, often verging on the overgrown. The bottom end was dominated by brambles and nettles and, at peak growing season, was virtually impenetrable. This type of setting would not have suited a geometric pond with a neatly defined border and crystal clear water. I have never been very comfortable with mechanical objects, so there were no fountains, no filters and — no Koi! I let nature sort out the water quality, and welcomed all the wildlife that is attracted.

### Ease of access in mind

That pond was designed with ease of access in mind — not for me, but for other creatures. At one end, the water was very shallow, just a couple of inches, with several stones breaking the surface. This means that any animal that falls in can easily clamber out. The edges of the pond quickly became impossible to distinguish. Grass grew down into the water, and water plants crept out on to the land. On one side the water overflows after heavy rain creating a boggy patch.

Many people lose fish to cats, but because the edges of the pond were indistinct, cats feel uncomfortable there and (touch wood) I kept all my fish. My fish are mainly Shubunkin and Common Goldfish. I did have Golden Orfe but lost them in a heatwave. I'd had them for several years and they were about 11 inches in length. They need more oxygen than other fish and succumbed thanks to the reduced oxygen levels caused by heat and the abundance of plant life produced in the summer. I will not keep them again unless I have a huge pond to house them in.

My old pond was made in the spring, and by June had already started to fill with life. To get things going quickly, I transferred some water and mud, plus various plants, and of



course the fish, from my previous pond. Within days, pond skaters appeared and after just one month I found a Common Newt basking on a stone. I am looking forward to watching this minor miracle be repeated in my latest pond.

As far as possible, I do not use chemicals in the garden, instead I do all I can to encourage natural predators to deal with pests. A pond is a tremendous help. It attracts so many different pond insects. Native plants are incorporated into all my designs, such as Water Forget Me Not (*Myosotis* sp.), Yellow Iris (*Iris pseudacorus*) and most importantly of all, Water Mint (*Mentha aquatica*) which grows at a phenomenal rate and it is a constant battle to keep it from taking over the pond. It will also grow in damp ground as well as in water and is therefore perfect for disguising boundaries. As it is easy to pull up, I consider the constant thinning a small price to pay, for its benefits are considerable.

Water Mint is in flower for weeks. Not only are the flowers pretty to look at, they are also highly attractive to all manner of insects. The blooms are covered in Bees, Hoverflies, Moths, Butterflies and Damselflies. This abundance of insect life attracts predatory insects such as Dragonflies of which I have identified six different species, and seen others which I could not get close enough to — they move so very fast!

The insects I have been most thrilled to see were Beautiful Demoiselles (*Calopteryx vergo*), and the Jersey Tiger Moth (*Euplagia quadripunctaria*). The latter is mostly found in the Channel Islands, but sometimes appears in southern areas of England. At rest, the moth shows a zebra like pattern of black and white markings — striking, but not especially beautiful. The story is very different as soon as the insect takes flight. As the wings spread, a bright red or orange patch is revealed — a truly lovely sight.

Just as delightful are the Beautiful Demoiselles, which are aptly named. Midway in size between Damselflies and Dragonflies, the males have a jewel like sheen to their bodies and the most glorious dusky black wings. I could sit and watch them for ages. In fact I do.

### Other things grab your attention

The problem is that once you sit down by the pond to watch a Demoiselle you soon find other things grabbing your attention. I must have spent hours watching Common Newts courting. They choose the shallow water at the edge of the pond for their courting activities. The male displays to the female by fluttering and waving his tail in front of her, occasionally stopping to chase away rivals. The female may take a long while to respond to his advances. Only when she is ready will she follow him, touching the tip of his tail with her head. This signals the male to deposit a packet of spores which the female then collects. Although I've seen the entire process in detail on television, the pleasure gained from actually witnessing the event was far greater.

Having a pond allows me to relax, to take pleasure from simple

**right** Jersey Tiger Moth (*Euplagia quadripunctaria*) is a rare, but striking, insect which visited Linda's old pond.

**below** Blue Tailed Damselflies (*Ischnura elegans*) mating on Water Mint (*Mentha aquatica*).



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## POND WATCHING ... The requirements of a garden

things, things which you might think would lose their appeal. It is many years since the first Frog spawned in one of my ponds, yet I still delight in watching them. In the height of summer, when the baby Frogs have just left the pond, the garden literally becomes alive with them and almost everywhere you look, you can find a Frog.

When it gets very hot dozens and dozens of adults return to the waters. Then, in the evening it is possible to waste more hours just watching, as one by one they emerge to feed. Some just leap out of the pond, others are more cautious spending ages with just their heads above water, before finally making a move.



Frogs come in all kinds of sizes and colours too, not just green. There are yellow ones, red ones, brown ones, plain and speckled ones. Some are huge, particularly females at breeding time, when they are swollen with eggs, whilst others are small and lean.

To see a Toad is more difficult. They visit the pond to spawn, and announce their arrival with deep mellow croaks, but once the breeding season is over they rarely return to the water and spend the daylight hours hidden, under stones or in crevices. Dusk is the best time to look for them.

### Not quite so appealing

Other life which appears in a pond is not quite so appealing. Water Lice scurry through the mud looking much like their dry land cousins the woodlice. Larvae of all kinds of creatures abound. Most fearsome of these is the Dragonfly larva. Like the adults, these are highly predatory. Equipped with jaws (and fangs) that can be shot out to spear prey they can kill small fish. Beware if taking pondweed to decorate indoor aquaria. Very well camouflaged, the larvae are hard to see until they move, so meticulous washing of plants is essential.

A little less dangerous as they are smaller, and much more plentiful are Damselfly larvae. As an experiment I once took a two gallon bucket full of plants from the pond and counted the larvae it contained — there were 97. You may also find Leeches. Fortunately, most are harmless to fish and feed on water snails and other invertebrates.

Skating on the pond surface live the aptly-named Pond Skaters, often the first insects to appear at a new pond. They walk on the water supported by pads of hair on the ends of their legs which trap air, so do not become wet, allowing the insect to move over the water without breaking the surface film. Attracted by ripples, they feed on insects that fall into the pond, impaling their bodies with their proboscis to suck out the body fluids.

Like a mirror image of Pond Skaters, Backswimmers (often called Water Boatmen) hang upside down below the water. With their front legs and the tip of the abdomen just touching the surface they can sense the smallest vibration. These innocuous looking creatures are highly predatory and will even attack tadpoles and fish fry.

Of course, as anyone will know who has looked at a drop of pond water through a microscope, most of the life that inhabits a pond is microscopic and just as fascinating — Rotifers, Copepods and the small, but deadly Hydra — but that's another story.

**left** The plants come right down to the water's edge in this water garden at Pensthorpe. This is ideal for many amphibians and other animals which come and go in a wildlife pond.

PHOTOGRAPH: DAVE BEVAN

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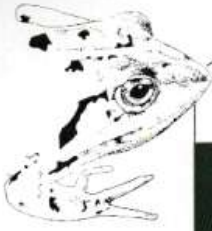
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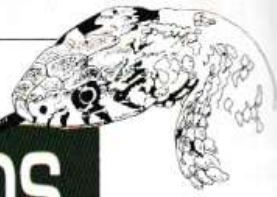


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# Bob & Val Davies's FROGS & FRIENDS



## Herp Fact File: SOUTH AFRICAN SAND FROGS

Until recently South Africa did not allow exports but evidently controls have now been relaxed to allow the export of frogs and toads (but not reptiles we were told). Even so certain rare or protected species are not allowed out. From what was possibly the first consignment, we obtained a pair of Tremolo Sand Frogs (*Tomopterna cryptotis*) — a species we had only previously seen in books. Although some South African species have a wider distribution and have previously arrived from other African countries, we cannot remember ever having seen Tomopterna on dealers' lists.



The genus is evidently distributed throughout sub-Saharan Africa and is also represented in Madagascar and India. Five species occur in South Africa; although successful in arid regions they occur in various other habitats. Essentially burrowers, the short, squat body, short limbs and rather granular skin gives these small (4cm) frogs a toadlike appearance. Although they may occasionally be seen during the day, they are basically nocturnal — coming out to feed in the late evening. Coloration is cryptic but they are quite attractive being various shades of light/dark brown and cream with a light dorsal stripe. Both sexes have a dark edging under the lower jaw — in males this extends over much of the throat.

Our pair have settled into a vivarium containing 8cm (3 inches) of coarse sand which is kept slightly damp in the lower layers. A small pool completes the set-up. Burying themselves is accomplished by a "sideways shuffle" as they back into the sand using the hard matatarsal tubercle — interesting to watch. The room is warm — daytime temperatures reach 26°C (78°F), night 20°C (68°F). Food requirements are simply crickets introduced in late evening — dusted with multivitamins three times a week. Because of their small size crickets must not be too large. Eggs are laid in water — tadpoles are said to be stout, benthonic and sluggish. No information on their breeding season was available but possibly it was over when they were obtained (March) but breeding is a possible future project — hopefully.

**above** Sand Frog, mainly nocturnal but nevertheless an interesting vivarium subject.

PHOTOGRAPH: BOB & VAL DAVIES

## Further Reading

*South African Frogs*. Passmore and Carruthers (Revised Edition). ISBN 1 86812 517 3. Hardback, 322 pages.

This second (revised) edition of the original 1979 book can be thoroughly recommended to anyone interested in frogs and toads. Although primarily a field guide it is also a scientific work containing not only species descriptions but also information on various biological aspects, identification keys and photography.

Each species is illustrated in colour; black and white photographs show key identification

features, sonograms of the frog's call and a distribution map complete the picture. Several of the species are not endemic to South Africa and are familiar in the hobby having been imported from other African countries.

*The Beaver Pictorial Guide To Water Plants*

This little (20 page) booklet was purchased for £1 when we were looking for some new plants for our frog pond. Each page shows nine plants — the inside cover contains brief hints on planting and pond management. Although not every picture is clear enough for positive identification, the booklet is useful in that it

does give a good idea of many flowering species including 33 different Water Lilies.

One drawback is the absence of any guide to height so further reading might be necessary for certain species. Whilst browsing we had almost purchased a Norfolk Reed (*Phragmites australis*) — luckily we didn't since page 14 shows a ~~swamp~~ dwarfed by this plant. It would have looked ridiculous in our pond.

## National Amphibian Day (USA), October 7/10 1999

Too often there tends to be a lack of co-operation between disparate groups such as hobbyists, zoos and scientists. It was interesting to receive advance notification of this event which appears to be a combined effort with "breeders, scientists and hobbyists participating".

Presented by Mars Preservation Fund inc. it is billed as "the first event to support captive breeding, conservation and ethical commerce of amphibians". Proceeds go to the Declining Amphibian Population Taskforce (DAPTF) and the Centre for Ecosystem Survival.

The varied events include: show/sale (October 9 and 10), workshops and lectures, field survey workshop, benefit auction and a visit to the National Aquarium, Baltimore — home to numerous species of Arrow-poison frogs among others.

Anyone lucky enough to be able to attend should note that a number of venues are involved and spaces are limited for some activities.

Further details, if required, from: International Amphibian Day, 241 Colonial Hwy, Hamilton, Virginia 20158, USA. Tel: (540) 338 2961, or <http://www.mediasoft.net/olson/iad>.

## New National Group Formed

Readers in the north west may be interested to learn that a north west branch of the International Herpetological Society has been formed. Meetings are held at the Blue Planet Aquarium (Ellesmere Port) on the first Sunday of every month, starting time 7.00pm.

We gave a talk and slide display on keeping and breeding arrow-poison frogs at the first meeting (May 2) but missed the second meeting due to illness.



## Reactions to Colour

Among reptiles and amphibians coloration can serve several functions although the reasons for some colours may be speculative. Despite the fact that the significance of coloration has not been thoroughly explored in all reptiles it is obvious that in some species it plays a part in threat behaviour. This particularly applies to chameleons. Normally fairly solitary creatures, both males and females use colour changes in a complex display when they encounter another of their species — in some cases disturbance by the keeper also produces this response. This is by no means the only use of colour change — it is also a response to variations in temperature, seen also in certain other lizard species.

Two interesting and puzzling reactions to colour have been observed in our collection; a male Yemen (or Veiled) Chameleon would respond to a bright green polo shirt by producing a throaty hiss and making violent sideways swipes at the front glass. This ploy is a common reaction in chameleons and seems both defensive and offensive. Other colours of shirt, including bright red, did not produce a response.

Another puzzling reaction was seen in our female Frilled Lizard (*Chlamydosaurus kingii*). She is normally perfectly tame, handled and hand-fed by Val. In captivity the threat response, extending the frill, is rarely seen but a certain jumper — a sort of darkish mustard colour caused her to back into a corner, frill and jaws open. This behaviour was repeated whenever she approached. Eventually the penny dropped — it was the jumper she objected to. Having changed the jumper for one of another colour, she immediately became perfectly amenable and took food from the hand.

In both cases, once the cause became obvious, wearing the offending garments was discontinued; although to prove the theory several experiments were made with the same results. Other colours have had no effect, why these two is a mystery.

**above** Female Frilled Dragon displaying, having decided she didn't like the colour of Val's jumper.

PHOTOGRAPH: BOB & VAL DAVIES

Speakers have been arranged for the next few months and other activities are in the planning stage at the moment. Jon Coote will be giving a talk on July 4 about vivarium set-ups and how to display animals. Wirral Reptile group also hold meetings at the Blue Planet on Wednesday evenings (usually around the 14th of each month).

## Diary Dates

Reptile and Spider Show (formerly B.R.A.T.S) to be held at Colmers Farm Leisure Centre, Bristol Road South, Northfield, Birmingham, on Sunday, July 18, from 11.00am to 5.00pm. For details telephone Joan on 0958 665014 or Brian on 0966 400173.

## A Case for Captive Breeding?

The Tortoise Trust newsletter (Spring 1999) contained a rather depressing article on the plight of Asian turtles and tortoises which are being collected in their thousands irrespective of species (apparently any will do) for food and medicine, mainly in China. The report quotes 7,716,000 pounds (3.5 million kg) into Hong Kong alone during 1996. These are practically all taken from the wild as turtle farming is a slow process and not practised to any great extent.

One sad aspect is that in this trade, rare and endangered species are indiscriminately included. Researchers have spotted new (previously unknown) species in the food markets and some new species and subspecies have been discovered in the wild. Even those latter, will no doubt fall prey to the collectors before they can be studied. In many parts of Asia certain species have practically disappeared from areas where they were once common.

In some cases legislation prevents the legal export of chelonians even for captive breeding. Relatively few Asian species have been bred in captivity, and then only in small numbers. Asian Box Turtles, mainly *Cuora amboinensis* (occasionally *C. trifasciatus*) have been fairly common in the pet trade for some years but breeding them would seem to be a rare event. A few other Asian species have appeared in the trade, if anyone has specimens it would be a worthwhile project to make a serious attempt at captive breeding. Positive identification of advice can be obtained from the tortoise Trust at BM Tortoise, London WC1N 3XX Tel/Fax:01267 211578. E-mail ttrust@globalnet.co.uk <http://www.tortoisetrust.org>



**above** Asian Box Turtle. Specimens on sale are often purchased in food markets and may be heavily parasitised.

PHOTOGRAPH: BOB & VAL DAVIES

East London & Essex Reptile and Amphibian Fayre to be held at Goresbrook Leisure Centre, Ripple Road (A13), Dagenham, Essex on Sunday, August 15, from 10.00am to 4.00pm. For further details

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Bob & Val Davies's  
AtoZ of Reptiles & Amphibians

**A** *Ambystoma*

A genus of Salamanders in the family Ambystomatidae containing about 26 species collectively referred to as Mole Salamanders which is also the common name of one particular species — *A. talpoideum*. The genus is widely distributed in the USA from South Eastern Alaska and Southern Labrador down to the Mexican Highlands. Some species are conspicuously marked with light markings on a dark background in variable patterns. Mostly heavy-bodied with a large, flattish head and wide mouth. Coastal grooves (vertical folds along the sides of the body) are fairly typical of the genus. Most southern species breed in winter, sometimes in autumn or spring. Northern species normally breed in spring. Mating and egg-laying usually occurs in standing water although the Marbled Salamander lays among moist debris, guarding the eggs until they are covered by rising water levels. Eggs can number thousands. In some species larvae can reach a large size before metamorphosis and neotony, i.e., retention of larval characteristics such as gills, which necessitates a totally aquatic existence, is not unknown particularly in montane forms.

Requirements in captivity are relatively simple: a few inches of damp substrate with cork bark refuges. Feeding is generally easy; earthworms, slugs and crickets — specimens will often accept food including strips of raw, lean beef although this should not be the sole diet. Breeding time is often adapted to the prevailing conditions. Larvae can be cannibalistic and should be raised individually.

Of the 26 or so species the most commonly seen in the trade are: Tiger Salamander (*A. tigrinum*), 18-21cm (7-8.25 inches), the record size is 33cm (13 inches). Dark background; highly variable pattern of light bands, often incomplete or running together, enclosing dark spots. Females' markings usually grey, white in males providing a striking contrast to the black body.

Mole Salamander (*A. talpoideum*), 8-10cm (3-4 inches), the record size is 12cm (4.75 inches). A short, stubby creature with a large head. Body may be black, grey or brown with pale flecks of white/pale bluish. As the name implies it is a confirmed burrower. Less commonly available than the above.

Axolotl (*A. mexicanum*) is an aquatic, neotonus Salamander which breeds in its larval form. Now endangered in the wild. The wild form is black but several colour mutations such as gold, albino, leucistic and piebald have been developed by captive breeding. A popular vivarium subject for many years. Requires cool conditions 20°C (68°F) in summer, 12°C (54°F) or lower in winter. Frequently available commercially.

*NB: Most Salamanders require relatively cool maximum temperatures. If higher than around 21°C (70°F) they can become distressed.*

right Young Tiger Salamander. Many specimens have this barred appearance.

PHOTOGRAPH: BOB & VAL DAVIES



right Pink form Axolotl. This colour morph is common in the trade.

PHOTOGRAPH: C. SPENCER



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Send your completed Word Search to: Dept Holiday, Tetra Competition, PO Box 2162, Bournemouth, BH2 5ZA.

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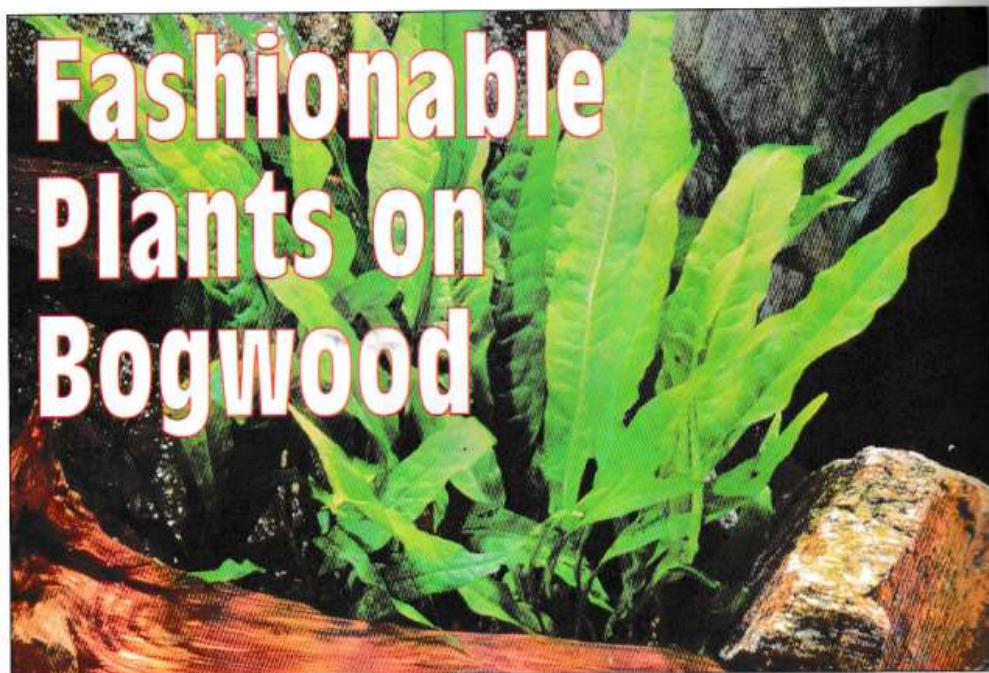
Entries to arrive no later than September 10 1999.



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IGGY TAVARES finds plants which live away from the substrate:

PHOTOGRAPHS: IGGY TAVARES UNLESS OTHERWISE STATED



**above** This clump of Java Fern is growing on a piece of bogwood.

PHOTOGRAPH: MP. & C. PIEDNOIR

An aquarium is often the centrepiece of our living room's decor. In order to create a suitable and interesting habitat for the fish as well as to add colour and appeal for our own benefit, the aquarium is often aqua-scaped with plants. Today, many aquarists use plastic plants in the aquarium because these offer instant colour and do not deteriorate or need maintenance, apart from the occasional wash.

Green plastic plants look very realistic indeed and I often use them in my cichlid aquariums where real plants might not survive long because of the digging activities of some cichlids! Moreover, plastic plants are also available in a range of colours such as reds, yellows and blues, giving the artistic aquarist the opportunity to create a surreal home for their fish.

Real live plants for the aquarium have been making a big comeback over the last few years, particularly in Europe. Although unrooted bunches of plants such as Amazon Swords, *Bacopa*, *Cabomba* and *Vallisneria* are always available and selling well, there has been a growing tendency to move to potted plants. The plants potted in stone wool are well-rooted and do well in an aquarium that is adequately lit.

Many varieties of potted plant are usually available and include several species of *Cryptocoryne*, *Echinodorus*, *Aponogeton* and even Amazon Swords to name a few. The potting material contains slow-release fertiliser to provide the plants with nutritional requirements for many months. The only disadvantage is that the pot size is usually about 2.5 inches tall, requiring a gravel depth of at least 3 inches

to cover it, since uncovered pots are detrimental to the plants as well as being aesthetically displeasing.

## Plants rooted to bogwood

A new trend that has appeared in London over the last few months is the availability of plants rooted to bogwood. This attractive natural decoration to the aquarium is not cheap. While potted plants might cost between £3 and £7, a plant growing on an 8 inch piece of bogwood will set you back at least £15 to £18. However, the bogwood usually carries several plants, is very attractive and is well worth the money. Not all plants lend themselves to attaching and growing on bogwood. To date, only five species of plant attached to bogwood are commonly available here in London. These are Java Moss, two varieties of Java Fern, *Anubias* species, *Bolbitis heudelottii* and *Riccia*.

Java Moss (*Vesicularia dubyana*), a firm favourite particularly with the aquarist who breeds small fish, is often available loose in small tubs. This fine stranded plant, when placed in an aquarium if left undisturbed, will over time attach itself to the substrate. This capacity has been utilised to attach the moss to bogwood. I have seen some stunning moss covered bogwood pieces that always seemed to attract all the small fishes in the aquarium. This resulted in a shoal of fish congregating over and around the moss on bogwood creating a very pleasing effect.

It has long been known that Java Fern (*Microsorium*

*pteropus*) does not like being planted in gravel, but that it will readily attach itself by dark brown roots to the outside of a firm substrate such as rock or bogwood. Java Fern is a hardy plant that will do reasonably well in most tropical aquatic environments. The fern is particularly easy to propagate, since old mature leaves tend to produce many plantlets along the leaf margins.

## A sturdy addition to any aquarium

Java Fern with its large dark green leaves on bogwood is an attractive and sturdy addition to any aquarium, which should last for a long time with very little care. Another variety of Java Fern, *Microsorium pteropus* sp. 'windelov' has variegated dark green leaves but the same rooting system enabling it to attach itself to bogwood.

*Anubias* species are striking plants with beautiful leaves. Although they prefer to be rooted in a deep substrate, its rhizome base lands itself for attachment to bogwood from where its roots can work their way downward. *Anubias* do well in aquariums because they do not need particularly strong light to grow. The striking good looks of *Anubias* species make them a best seller. Several species are available and include *Anubias barteri* and *Anubias pfzelli*.

*Bolbitis heudelottii*, the African water fern from tropical West Africa, is a plant that I have only across recently. Its dark green, long, thin undulating leaves which can grow to 10 to 15 inches, at first glance gives it the appearance of corkscrew *Vallisneria*. Since *Bolbitis heudelottii* grows from a thin black rhizome, it is ideally suited for attachment to bogwood and makes a stunning addition to aquarium flora, especially as it does not require strong light to do well.

## A nice ornament for the aquarium

A recent find was *Riccia* attached to granite, which made a very nice ornament for the aquarium. *Riccia*, or Crystalwort as it is commonly known, is usually found as a floating plant, but will attach itself to the substrate if the lighting is strong enough. Therefore, *Riccia* on granite would need strong lighting to maintain it in good condition.

Another surprising find was Moss Balls in the aquarium. Initially I thought that the moss was coating a round pebble but found that this was not the case as they were very light and could easily be pushed along. Many moss balls in the aquarium gave one the impression that one was viewing a small stream where one might find green covered pebbles.

**above right** *Bolbitis heudelottii* does well with only moderate lighting.

**right** Moss Balls have recently become more widespread in the trade. Initially I thought they were pebbles covered with stem growth but in fact they are very light and can be easily moved around.

## Conclusions

Aquatic plants on bogwood make an attractive addition to help create a natural looking habitat in the aquarium. The plants available on bogwood are all hardy and will do well in most aquariums which have reasonable lighting. They do not make particular demands on water, but do best in neutral, clean water. The few species available on bogwood usually grow from rhizomes. It might be possible that others such as *Marselia quadrifolia* as well as other member of the *Bolbitis* genus such as *B. fluviatilis*, *B. hydrophylla* and *B. lonchospora* will also make suitable plants for attachment to bogwood.

Some might consider that the price of plants on bogwood to be on the high side, but this is unlikely to come down in price because of the time and effort required to create these works of art. However, there is nothing to stop you creating your plants on bogwood for around £7 to £10.

All you need to do is to loosely tie, with nylon fishing line, some Java Fern or *Anubias* species to a suitable well soaked piece of bogwood. In time the plant's roots will attach themselves to the bogwood to give you your very own plant sculpture. But why wait? Treat yourself and your aquarium to instant natural beauty.



PETER A. LEWIS is quite happy to be "shell-shocked" by the wide variety of species: PHOTOGRAPHS: PETER A. LEWIS

# Shell-dwelling Cichlids ...

## from Lake Tanganyika

Over my 30 years of being involved with the tropical fish hobby and, in particular, the maintenance of fishes from the family Cichlidae, I have always found myself drawn toward the smaller species as opposed to the real "Guapotes" of the cichlid world.

As a result, when the first shell-dwellers began to be exported from Lake Tanganyika during the mid-seventies a few species inevitably found their way into my collection. At the time the two most common were *Lamprologus ocellatus* and *L. ornatipinnis*.

Today, however, a totally different scenario exists with

many species available within our hobby that fall under the generic description of "dwarf shell-dweller". Unfortunately, with the increased availability of species from many shoreline areas of the Lake, comes the unavoidable confusion associated with new imports as trade names and location identifiers are used to differentiate these new imports.

For example, a new shell-dweller became available being sold under the name of "Pearly Ocellatus" only later to be

**below** *Lamprologus ornatipinnis*, an early popular species.





## SHELL-DWELLING CICHLIDS ... A Lake Tanganyikan species

identified as *Lamprologus meleagris* (Buscher, 1991), the "Lace *Lamprologus*". Yet I still see fish lists with both these listed for sale as if they were different species, even at different prices!

### My observations

Over the last few years I have been fortunate enough to obtain many of these newer dwarf Lamprologines that I have both photographed and spawned in captivity. I would like to present an account of my observations and experiences which I must first preface with the remarks that these are my experiences with these cichlids, maintained in aquaria in my home, they are not observations made on the behaviour of these fishes in the wild, nor should they be taken to mean that this is how these cichlids must behave when housed in an aquarium.

Many accounts exist in hobby magazines that relate to the "plasticity" of the behaviour of the cichlids we maintain in the hobby, survival and procreation seeming to be the common thread running through all the published accounts.

However, the provision of certain conditions and aquarium decorations will, most assuredly, result in different levels of comfort and security existing within the life of the captive species. Shell-dwellers will breed in flowerpots, some more easily than others, but give them a shell and watch how different their behaviour becomes.

### A reputable source

Equally important, when acquiring a species new to your collection, it is important that the source is a reputable dealer or breeder who has a genuine knowledge of the

provenance of the young specimens being provided.

While not always possible it is preferable to purchase mature adults and rely upon your own knowledge of the species to establish their true identity.

Before discussing the individual species contained within the genus *Lamprologus* we need to first consider the question of this genus.

The last review of Lake Tanganyika's cichlid fauna appears to be that undertaken by Professor Max Poll in 1990 in his paper published in the Academie Royale de Belgique. In this review Poll rejected the restrictions placed upon the genus *Lamprologus* by Columbe and Allgayer who defined *Lamprologus* as "those species found in the Zaire River" and who erected three new genera of Tanganyikan cichlids, namely *Neolamprologus*, *Paleolamprologus* and *Variabilichromis*.

As an alternative Poll organised the 57 accepted genera collected from Lake Tanganyika to date into 12 tribes that appeared to share a common ancestry and rejected two of the three genera proposed by Columbe and Allgayer, these being *Paleolamprologus* and *Variabilichromis*. Poll did, however, retain *Neolamprologus* and the rehabilitated genus *Lepidolamprologus* as proposed by Pellegrin in 1904.

### Superficial study

However, in common with Loiselle, I feel that Poll's study was superficial at best and while I certainly can agree with such reclassifications as placing *Lamprologus calvus* and *L. compressiceps* into the new genus *Altolamprologus* I cannot see the reasoning behind placing such cichlids as *N. tretocephalus* alongside *N. multifasciatus* as being in the new "*Neolamprologus*" genus.

In my estimation the genus *Neolamprologus* has now



become the "miscellany" genus into which any Lamprologine is placed until further studies can be done to justify such placement.

For this article, rather than merely revert back to the 'catch-all' genus of *Lamprologus* I propose to use the list published by M. Smith in 1995 as a compromise to the dynamic situation being experienced throughout these two genera.

## Natural habitat

The shell-dwellers available to the hobbyist all appear to originate from the coastal waters of Lake Tanganyika inhabiting the sandy littoral zone at depths ranging from 5-30m, with a bottom comprising fine sand or mud littered with the empty shells of the snail, *Neothauma tanganicensis*, which these fish inhabit as a source of both shelter from predators, one of which is the largest cichlid in the Lake, *Boulengerochromis microlepidotus*, and a site for egg-laying and brood-tending by the female.

Of particular interest are *Lamprologus signatus* and *Neolamprologus brevis*, both species having been confirmed at depths down to 50 metres.

The temperature of Lake Tanganyika remains stable year round at approximately 26.5°C. Their natural food is small invertebrates and freshwater shrimp in particular, and as such in captivity each species will relish a feeding of Cyclops, Daphnia or live Brine Shrimp.

In an aquarium, clean, well-aerated water at a temperature of 25-28°C is preferred with a pH between 7.8 and 8.8.

Hardness may vary from 500-600 ppm TDS. Water changes amounting to 25 per cent every 14 to 21 days are appreciated; excessive water changes can, however, be detrimental especially if the aquarium contains fry younger than four weeks of age.

All the cichlids from Lake Tanganyika that are classified as "shell-dwelling" and that show a definite preference for living around and spawning in vacated snail shells are known as "ostracophilic" cichlids.

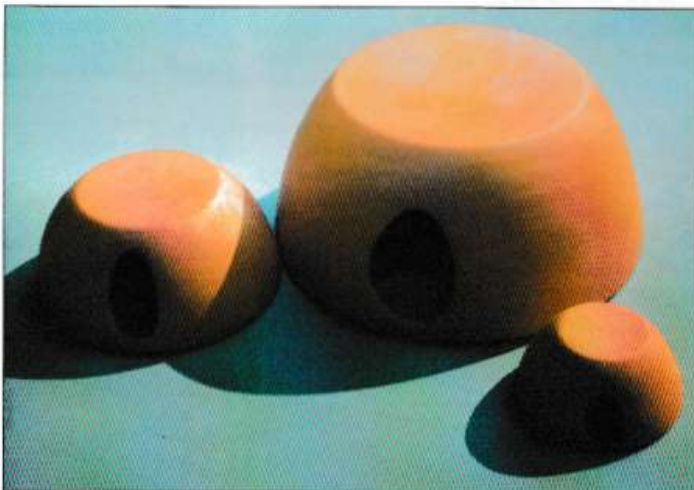
Such a description is derived from the Greek and merely means "shell-loving". To date most of the cichlids that fall under this description belong in the genera *Lamprologus*, *Neolamprologus* and *Telmatochromis* of which it appears that *T. burgeoni* (Poll, 1942) is the only currently identified species of this genus that appears to an "obligatory" shell-dweller.

## Special requirements

If a breeding colony containing several fish is to be established then it



**far left**  
*Lamprologus meleagris*, the so-called "Lace Shell-dweller".



**above**  
*Lamprologus brevis* is a deep-water species.

**left** As an alternative to shells, terracotta pots can be used.

is recommended that at least one square foot of "floor space" should be allowed for each male and that at least one shell is available for each fish in the colony.

While not always the case, many of the shell-dwelling cichlids have adopted the practice of burying their shells until only the opening remains. This practice is more evident with wild imports and is often a key to spawning when all else fails.

Ideally the tank floor should be covered with 5-7.5cm of very fine gravel, preferably clean sand, such that each species may practice what comes naturally and bury their shell.

The theory behind this behaviour is that it gives added security from detection and prevent theft by such large cichlids as *Lamprologus callipterus*, an inhabitant of the same zone that has been observed carrying inhabited shells off in its mouth back to its own territory. This gravel or sand substratum should be fine, coral sand is adequate but silver sand is ideal.

The water should be clean and well aerated using an appropriate air operated sponge filter in the tank corner. Undergravel filters should be avoided since most shell-dwellers spend tireless hours rearranging the

## SHELL-DWELLING CICHLIDS ... A Lake Tanganyikan species

aquarium substratum which results in an exposed filter and total disruption of the filter's effectiveness.

If a tank is to be established with no sand or fine gravel as bottom cover then each shell should be placed on a shallow saucer full of sand to cater to the needs of these cichlids to excavate around the shell.

Typically the fish will either excavate beneath the shell causing the shell to subside until all but the opening is apparent or will patiently cover the shell with sand, mouthful by mouthful or grain by grain, until the same result is achieved. A trick to removing these fish from their shell, without also taking the shell from the aquarium, is to place a nine-inch length of plastic pipe upright in the tank such that the shell can be placed on top of this pipe and yet still be fully submerged.

Eventually the fish will leave the shell only to note its new position and to return to the floor of the aquarium where it feels more secure. The empty shell can now be removed from the top of the pipe and the fish caught, provided no other suitable refuges exist.

### Keys to successful breeding

The majority of shell-dwellers are aggressive, territorial, dwarf, conchicole, cichlids. Their spawning routine can be characterised by weak pair bond formation between male and female as part of a colonial breeding and social structure, or as a harem situation with one male serving a loose colony of four to five females that each preserves her own territory within the overall territorial boundaries established by the male.

**below** This *Lamprologus boulengeri* investigates a possible hideaway.

Being typical cichlids many of the shell-dwelling species will often fight to the death if territorial squabbles erupt and the aquarist attempts to establish a single colony containing several pairs but provides an inadequate number of shells.

A sure sign that a particular fish is being shunned is the persistent evidence of this fish in one of the upper corners of the tank, this fish will not dart for cover when disturbed and will rarely be allowed to feed. To prevent the death of this fish, usually a male, it should be removed and placed in an alternative aquarium.

Water conditions are not critical but should be in the middle of the range preferred by the species in question, since the coastal conditions of Lake Tanganyika are not too variable provision of suitable water is rarely a problem. An appropriate starting point would be water at 25.5°C with a pH of 7.8 and a hardness in excess of 10 dGH.

An essential element with most of the species covered is the provision of adequate empty snail shells of a suitable size. If a true colony is to be established, then the aquarist must provide at least one more shell than there are fish in the tank. It appears that most species will continue breeding until the tank is saturated with offspring and mature breeding pairs.

Once this stage is reached, the aquarist has to merely thin the population by taking out a few dozen shells, which are bound to contain fish or fry, replacing them with empty shells then set up another colony in a fresh tank using the displaced fishes. Spawning can often be initiated by a water change coupled with an increase in temperature by two or three degrees above the aquarium norm.

### Next Month

*Lamprologus* species



# KOI EXTRA

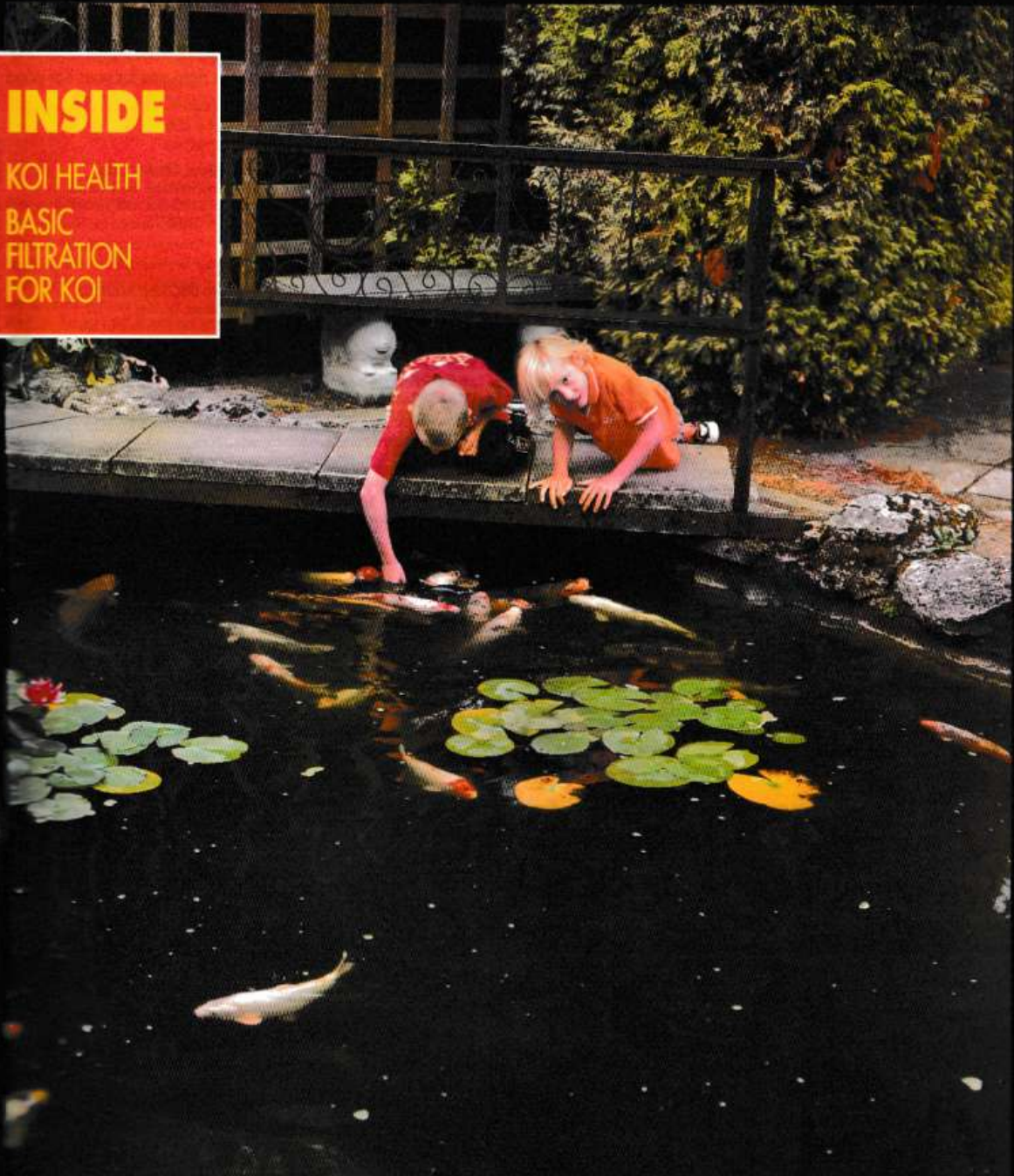
THE MAGAZINE FOR DISCERNING KOI KEEPERS

Volume 2 Number 4

August 1999

## INSIDE

KOI HEALTH  
BASIC  
FILTRATION  
FOR KOI



## WHO'S REALLY ILL ... YOU OR YOUR KOI?

◀ because you're sick of figures! Most of us no doubt believe this ammonia content to be at a "safe" level based on the colour of the test reagents but what if the ammonia level increases, even slightly because the Koi spawn, the filtration system blocks, the pump stops, a power?

Just consider what the ammonia does to the Koi. Initially, as the ammonia concentration increases, the Koi produces extra mucus to protect itself from this irritant, the gill tissue begins to swell and then in response to the continuing insult, the cells of the gills begin to multiply, rather like a callous formed in our hands. This cell growth causes the gills to become thickened and unable to absorb essential oxygen from the water, release carbon dioxide and ammonia and for the Koi to regulate the water content in its body. The blood chemistry is also disrupted, making it difficult for the red pigment to absorb oxygen and release it again in the tissues.

Gill hyperplasia — ammonia.

No wonder the Koi feel sick!

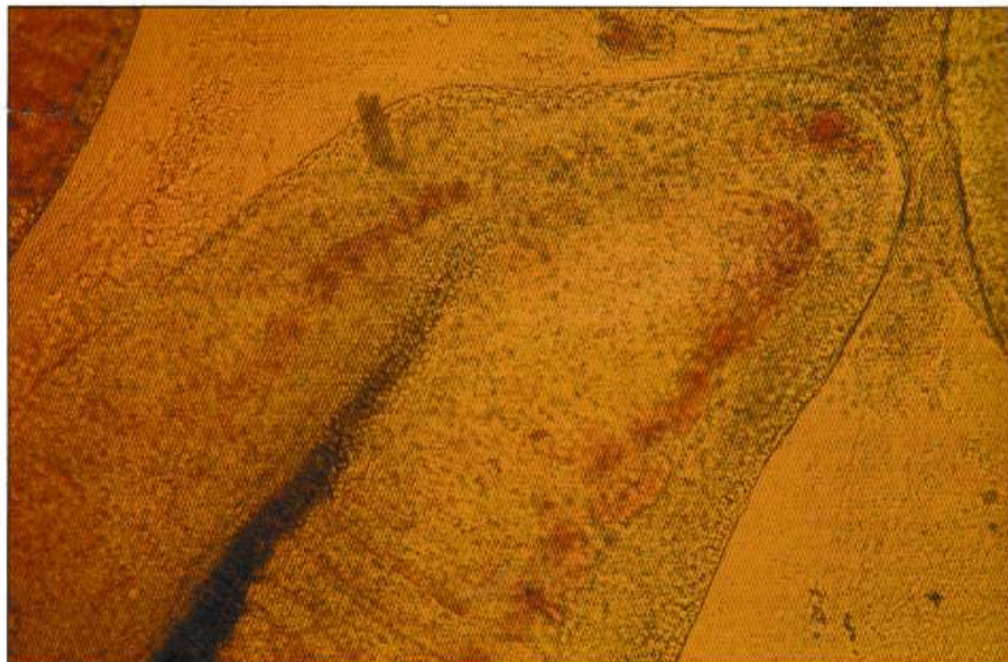
### CONSIDER ONE MORE POINT

Before leaving the topic of ammonia altogether, let us just consider one more point, is any quantity of ammonia polluting the water acceptable? The answer has to be a simple "no". Protein cannot be stored in the body, unlike sugars, fats and oils, so any excess protein has to be removed from the body. We humans shed this waste protein as urine, Koi produce only a very small fraction of protein waste as urine, the bulk of it is shed as ammonia by the gills. Normally, there is no ammonia present in the environment, so the Koi can easily get rid of this waste. Where ammonia is polluting the water, it becomes increasingly difficult for the Koi to shed the ammonia from the body, so it begins to accumulate inside the Koi. Needless to say, the

accumulation of ammonia in the tissues, damage to the gills, changes in blood chemistry stress the Koi, make them feel sick and weaken them, leaving them open to secondary infections.

Testing the water conditions tends to come very low on the list of priorities for many of us, although at the first sign of any Koi behaving differently, becoming lethargic, ceasing to feed in the summer or even finding a dead fish, the very first action should be to test the water conditions. Fish are quite exceptional in the number and variety of medications which are available with which to medicate them and often in the absence of an accurate diagnosis of the problem. Compare the numbers of fish medications that are available for treating fish with those that we may purchase over the counter for treating other household pets such as cats, dogs, rabbits, hamsters and birds.

All medicines, whether its



headache pills for ourselves or medications to add to the water for the Koi, have benefits but they also have side effects, some of which are extremely unpleasant. It is, therefore, our duty to ensure the Koi really do need that course of treatment before liberally applying it to the pond and adding a couple more millilitres for good measure. Treatments which are based on the dye malachite green readily lose their colour when added to alkaline water — its a great temptation to add a bit more to the pond because the colour has disappeared and therefore the medicine cannot be effective — but it is!

### A WITHDRAWAL PERIOD

Malachite green has been used extensively in aquaculture for many decades but it is no longer used in the food fish industry because it is teratogen, which means it causes deformities in the developing embryo. All drugs used on animals for human consumption must have what is known as a withdrawal period, which means a period of time after the last treatment which allows for all traces of the drug to be metabolised and removed from

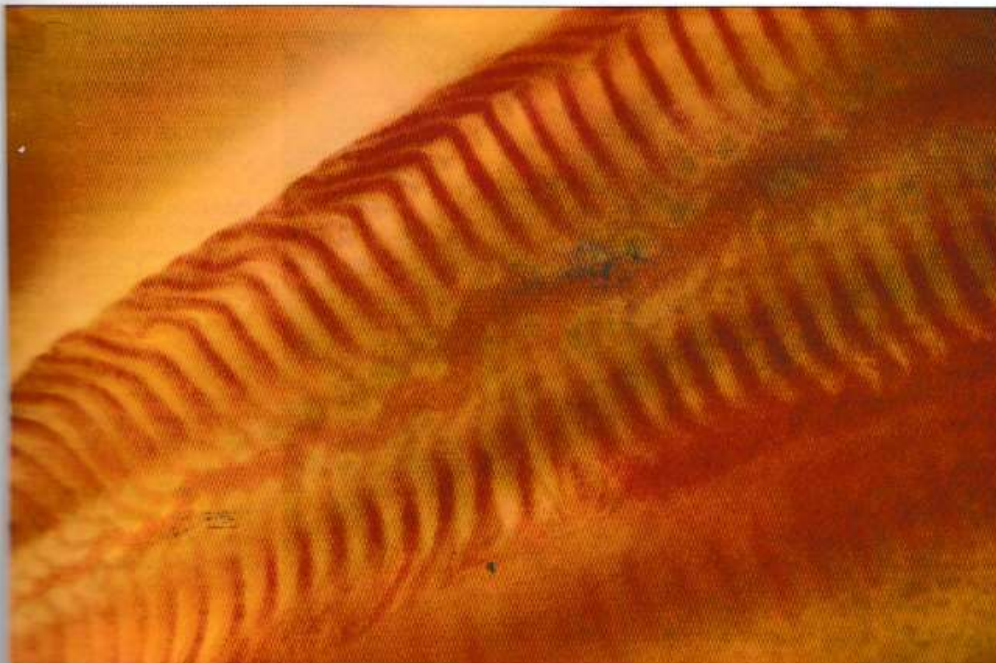
the tissues. The withdrawal period, if any, is unknown for malachite green. So, even though that dying Koi cost a few pounds and you want to find some way of getting a bit more value for money, putting it on the barbecue is not to be recommended! Whilst on the subject of treatments, one of the biggest headaches is how much water is actually in the pond and therefore how much medication is added? A simple question but the answer? Many of us resort to taking the dimensions of the pond and using these to ESTIMATE the number of litres/gallons of water, this does not take into account any accidental contouring of the pond surfaces. The alternative is to use a flow meter as the pond is being filled and then you know exactly how much water is in the pond — until the bottom drains are pulled, filters purged, water changes take place and then again we realise that even using a flow meter, the figures we use are only a guide to the volume of water in the pond. Finally, most of the parasites and diseases we dread are already there, on the Koi or in the pond and for most of the time all manage to live in

harmony. It is not in the interests of any parasite to overwhelm its host so the latter dies because it means the parasites will die as well. Where there is an outbreak of most commonly-encountered parasites such as White Spot, *Trichodina* sp., *Chilodonella* sp. Costia or Flukes then there is some underlying stress, which is weakening the Koi and rendering them susceptible to disease.

### ACCURATE DIAGNOSIS

It is also important to obtain an accurate diagnosis of the resulting disease and it is very likely that you will require the professional services of your local veterinarian. These people have a wealth of knowledge not just of disease but epidemiology, drugs their benefits and side effects and the way they act within the animal. Often we wait until a small problem has escalated into a major disaster, call in the professionals too late and when all the Koi have died, stand with our arms folded, passing judgement on the inability of the vet to solve the problem — but whose fault was it in the first place?

Healthy gill tissue.



# BASIC FILTRATION FOR KOI

**BARRY GOODWIN**

looks at what a filter does and how to establish the right one for your Koi pond

*Photographs by the author*

**D**o I need a filter? If I had £1,000 for every time that I have been asked that question I

would be a rich man living in the Caribbean!

A filter system is at the heart of a Koi pond and everything revolves around it. Indeed, your Koi would not live for very long without one. It is true that some small ponds do support the odd Koi, along with their Shubunkins and Goldfish, but these Koi do not have a very happy existence, do not grow, and are mostly very lethargic and unresponsive.

Compare this to a well-filtered

Koi pond with its population of active growing Koi, and you will see what I mean.

There are misapprehensions about the operation of filter systems, and many people still think that they are there to take dirt out of the water in order that we may see our Koi. It is also true that many so-called "Koi Pond Filters" are built with this in mind, and as a result they work very inefficiently indeed.

## **NATURALLY OCCURRING BACTERIA**

A filter is there to take out the

Koi-induced pollution of ammonia. It does this by the establishment of naturally-occurring bacteria within the medium. These bacteria oxidise the ammonia firstly to nitrite, which is also poisonous to Koi. It is then oxidised further to nitrate, which for the amounts in which we can expect is relatively harmless to our Koi. Far from removing dirt particles from water with such a filter, it should be fed only with clean water hence the necessity to provide a means of removing dirt before it reaches the biological mass in the filter. This is done by the provision of a settlement chamber. Such a chamber is situated at the beginning of a filter and



Wooden decking such as this is ideal for hiding a gravity fed filter system that is adjacent to the pond.

can be designed to use the force of gravity to settle out solid matter.

It can also be what is termed a vortex chamber where a rotational movement is imparted to the water and thus dynamic forces are generated to separate the solid matter.

This matter settles, in both designs, to a sump where it can be easily flushed away.

In a true Koi filter, the biological stage(s) have large open pieces of medium that will not block with fine silt. These provide a free passage for water at all times. Matting cartridges come into this category, for when properly designed the water flows alongside the matting surface, through the cartridge, and not through the matting fabric itself.

## A BOTTOM DRAIN IN THE POND

Also, water is best taken to such a filter via a bottom drain in the pond, and this should be considered at the pond design stage. It is virtually impossible to add such a drain as an afterthought!

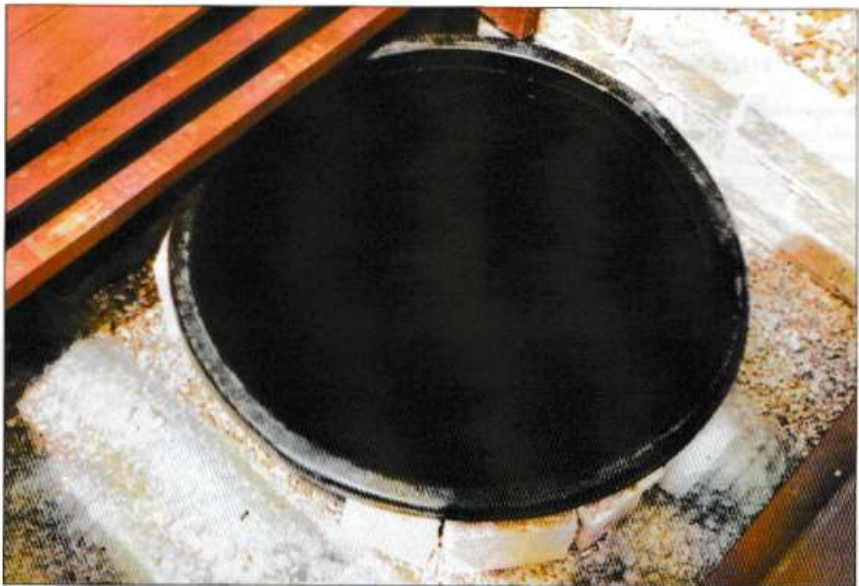
There should be provision made within the filter to enable all of its chambers to be flushed to waste, usually by the provision of slide valves, although rotary valves are better but more expensive.

This will, if carried out on a regular basis, prevent sludge building up in the system that will decrease the efficiency of the biological processes.

Two types of Koi pond filter are in evidence nowadays; the pump-fed filter and the gravity-fed filter. A pump-fed filter normally sits above the level of the pond and has its pump in the pond. The water is pumped to the filter and returns to the pond via gravity overflow.

A gravity-fed filter is just the opposite and this sits at the same level as the pond. The water level throughout is the same as that of the pond, and the pump is situated at the end of the system. This takes water out of the filter, returning it under pressure to the pond.

The deficit of water thus created in the filter is replenished under gravity from the pond. Gravity-fed systems are much



more efficient than pump-fed as they allow for proper settlement of solids to be carried out prior to biological filtration.

## AVOIDED LIKE THE PLAGUE

A pump in a pump-fed system tends to liquidise such matter, not allowing it to settle correctly. Now that we know the basics of a filter system, we should be able to spot a good

commercial system at ten paces, as some of them are to be avoided like the plague.

If you wish to design your own system, then follow the guidelines given here as closely as possible — you can even pinch some ideas from the odd commercial system.

If you wish to go beyond basic commercial systems, there is a whole world of filter design to consider. The square vortex systems from Piet and Aquatic Supplies are very good indeed, as are the World of Koi 380

TOP OF PAGE A spraybar system fitted into a pump fed filter. This ensures even distribution of the water throughout the medium.

ABOVE A vortex chamber for settlement, fitted in a hobbyist's system.



**BASIC FILTRATION FOR KOI**

◀ systems. These provide for filter aeration in the transfer ports rather than in the medium and this is the latest line of thinking. Remember that all waste water flushed from your filter and pond must go to sewage and not to surface water drains. The direction of water flow through filter medium is immaterial as long as it is arranged to let the entire medium share the flow evenly. It can flow from the top to the bottom, from the bottom to the top, or even horizontally. Just make sure that there is nothing impeding the flow, or encouraging the flow to "track" directly from the inlet to the outlet connections.

The size of pipework is important, and many DIY hobbyists fall down rather badly here. Remember that pipes feeding your filter need to be much larger than the pipes taking water out to the pump.

Conversely, if your pump is in the pond, feeding the filter, then the outlet pipes from the filter to the pond need to be bigger. In

the first instance, you could drain your filter, as a small diameter pipe will not replenish it fast enough. In the second instance, you could overflow your filter, emptying the pond.

**USE THE CORRECT MATERIAL**

It is always advisable when considering filter medium, to use the correct material bought over the counter at a Koi retailer. This is for the simple reason that you can be sure that it is Koi safe.

Although many other materials would be considered to be mechanically suitable, there is no guarantee that they will not give off toxic substances when submerged in water for long periods. Plastics are particularly vulnerable here, particularly coloured materials.

**SITING IMPORTANT**

The siting of a filter system is

relatively important and it should be as close to the pond as possible. Many people place a gravity fed filter under decking that is used as a walkway by the side of the pond. Others hide pump fed systems, that are naturally above pond level, behind a hedge that is adjacent to the pond, and others bury them, forming a rockery.

One of the legacies of a good filtration system is an abundance of nitrate in the pond water, and this is a good nutrient for algae. This can manifest itself as the single celled variety, which gives us the dreaded green water. It can also encourage the filamentous types that we know as Blanketweed — better known as the Koi keeper's curse. Green water is taken care of by the use of UV Clarifiers. The water is pumped through these and the UV radiation affects the algae cells, rupturing them and causing them to stick together or flocculate when they are removed from the water by settlement.

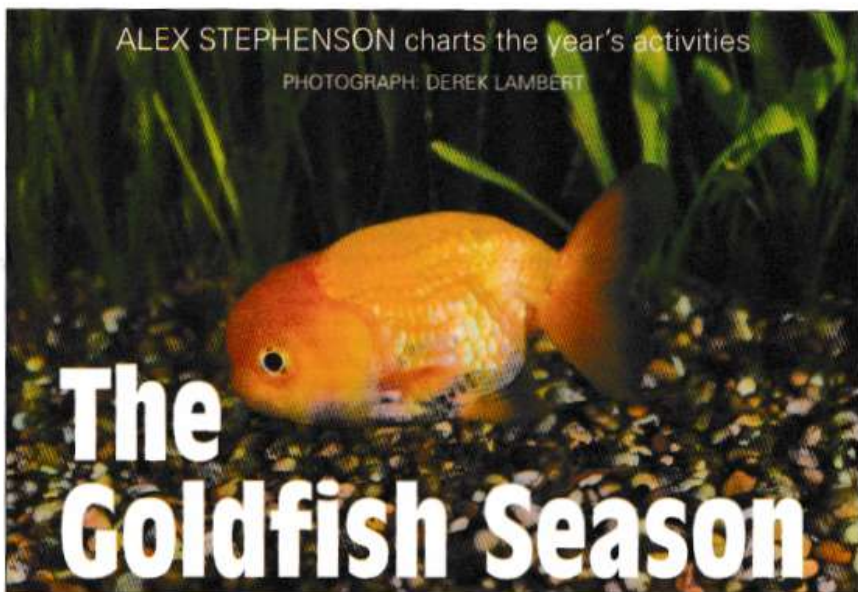
A vegetable filter is not only functional but can also be a garden feature. This superb arum lily is one of two magnificent specimens in the author's filter along with mimulus and iris.

**NO ONE HAS THE ANSWER**

Blanket weed is another thing, and no one has the complete answer — yet. This is nourished by nitrate from filtration, phosphate, a by-product of Koi metabolism, and calcium carbonate. Sunlight also plays a great part in the propagation of both types of algae and oxygenation in the growth of Blanketweed. Control all of these factors and you should be able to control Blanketweed.

ALEX STEPHENSON charts the year's activities

PHOTOGRAPH: DEREK LAMBERT



# The Goldfish Season

## PART 4: Rearing and Growing On

It's a fact of life that some of the articles appearing now will have been written some time ago. Such is the nature of publishing. So, I am assuming that by now we have got some decent weather, with ambient temperatures suitable for Goldfish keeping.

Many hobbyists have, in addition to a fish house or indoor set-up, one or more ponds. Rearing ponds for fish do not have to be elaborate showpieces. Just a volume of water of sufficient area and depth to prevent rapid swings in temperature. The normal rules of fishkeeping still apply of course, with the usual attention to water quality.

If you have successfully bred some young Goldfish earlier in the year, this may be a good time to turn them out, giving them the benefit of more space and a more natural environment. If good weather prevails, you could be amazed at the progress young fish make in a relatively short time. As a bonus, this also releases valuable tank space for other things. Unfortunately our climate is not ideal for Goldfish.

## Exotic forms monitored regularly

Short summers mean a short growing season so, make the most of it. Long-bodied varieties are normally hardy and are unlikely to have any adverse reactions to the change in lifestyle. However, some of the more exotic forms should be monitored regularly to make sure they are thriving. Keep a check on the condition of finnage, particularly with long-finned types. "Milky" finner congestion is almost always a sign of poor water quality.

By the end of the warm season, long-bodied youngsters are 1.5-2 inches long, they should be safe to leave out permanently. This is assuming your pond is suitable. Youngsters smaller than this may not have sufficient body weight to get them through the winter and you may have to consider bringing them in at some point. Personally, I almost always leave mine out. The theory being, if there are any weak ones, they won't make it. This helps to maintain the hardiness of the strain.

Generally speaking, deep-bodied varieties are not so tough, and normally bring them inside for their first winter. Any of these retained for future breeding stock will be returned to an outside pond the following year, to grow on, and will spend their second winter outside proving their stamina.

All ponds are different, just as all pondkeepers are different. I know some pond owners who clean out their pools regularly every twenty-five years, whether they need it or not! How they get away with it is a mystery to me. In my opinion, ponds for rearing batches of young fish are not the same as the "ornamental pool" and should be managed differently. My stock ponds get a complete clean out every year, at the end of the season. In addition to this, I do part water changes as required. In summer, constant exposure to strong sunlight can be damaging as well as a form of cruelty, so I provide plenty of shade.

Opinions vary about whether young fish do best in clear water or green water. I'm a "happy medium" man myself, believing that, on balance, mild green water is beneficial. "Pea soup", however, I regard as dangerous. The concentration of algae in thick green water is a major factor in altering the chemistry, with extreme changes of pH and oxygen levels taking place between night and day. Also, to support this amount of algae, the water must be full of nutrients, a situation which can promote disease organisms as well. As a guide, I like to be able to see my fish about eighteen inches below the surface.

## Feed well on the best available

To get the maximum benefit from the short growing season, young fish need to be well fed on the best available foodstuffs. Most breeders have their own preferences, some even have their own secret recipes. I tend to use a range of top-quality pellet foods, together with frozen Bloodworm, live Daphnia, and anything else I can find such as Mosquito larvae. Earthworms are great too but, these are used mainly for the adult fish.

Not all breeders keep records, although I think most do. When you've got a memory as unreliable as mine, it's essential. These records can be as simple or as comprehensive as you like. The sort of information I record is, type of fish, details of parents, date of spawning, how many kept, and anything else I think important. Oh yes, and which pond I put them in. You wouldn't believe how easy it is to mislay fish, when you can't remember where you put them.

**above** More exotic varieties like this Lionhead need regular monitoring to make sure they are thriving in an outdoor growing-on pond.

## It's a Wild Life ... Capture it with Canon

In celebration of its status as WWF's first ever Conservation Partner, Canon is launching a series of initiatives to bring wildlife conservation into the public eye.

To mark the launch of the relationship, Canon Sure Shot camera buyers will be able to enjoy a colourful bonus to their purchase, in the shape of a free, dolphin design beach towel.

The aqua-blue towel is available via redemption to all customers purchasing the Canon Sure Shot Z135, Z70W, 105 Zoom, 85 Zoom and waterproof Sure Shot A1, between June 14 and September 30 (QD and Caption versions included).

The promotional leaflets feature information on WWF's Buyer Beware campaign.

Says Canon's Marketing Manager, Robert King: "Many people become unwittingly involved in the illegal trade in wildlife when, as holiday-makers, they buy souvenirs such as coral and ivory. We hope that by raising awareness of this trade that may be driving many species to the brink of extinction, we can encourage our customers to use their cameras to take only pictures and leave only

# News Desk

footprints."

In addition to spreading the word, Canon are also encouraging their customers to support WWF through a donation, or by purchasing an additional beach towel at a cost of £14.99, from which £6 will go directly to WWF.

WWF collection tins will be positioned in all independent camera dealers for the duration of the Beach Towel promotion.

Canon is further supporting WWF by inserting information leaflets into all their compact camera kits. The leaflets, which are being printed at Canon's expense, promote WWF's Animal Watch scheme.

Head of Corporate Partnerships at WWF, Patrick Chapman, said: "These leaflets will reach around half a million camera buyers. It costs just £2 a month to join Animal Watch and membership will help to provide some of the world's most threatened animals and their habitats with a safer future."

So whether you are interested in supporting wildlife, living a wild life, or both, this summer

Canon cameras offer the best way to capture those memories on film.

Customers requiring Canon Brochures should call 0800 616417 or visit the Canon UK website at [www.canon.co.uk](http://www.canon.co.uk). WWF's award-winning website can be found at [www.wwf-uk.org](http://www.wwf-uk.org).

For further information please contact: Canon (UK) Ltd., Canon House, Manor Road, Wallington, Surrey SM6 0AJ. Tel: 0181 773 6000. Fax: 0181 669 8974.

## Stuart Turner Exhibition Steams into the River & Rowing Museum

A fascinating new temporary exhibition opened at the River & Rowing Museum on Wednesday, June 23.

*It's a Stuart — It's All Right* celebrates the internationally-acclaimed Henley-based company, Stuart Turner Ltd., which has

been manufacturing engines and pumps for worldwide distribution for nearly a century, and includes some of the more unusual circumstances in which the products have been used.

*It's a Stuart — It's All Right* was the familiar accolade which greeted Stuart Turner products worldwide, enabling the company to build an enviable reputation and remain at the forefront of engineering design.

In addition to manufacturing engines which generated electricity and powered various modes of transport, Stuart Turner Ltd. played an important role in both World Wars and on several expeditions to far-flung corners of the globe.

A Turner engine powered the navigation lights on Sir Ernest Shackleton's ill-fated expedition to the South Pole in 1914. His ship, *Endurance*, was marooned for nine months and the crew drew great comfort from the light and heat generated by the engine.

During the First World War, Stuart Turner Ltd. made Klaxon horns to warn of gas attacks in the trenches and, in the Second World War, its model steam engines were parachuted into enemy territory and used by undercover agents in the jungles of the Far East to power radio sets.

The exhibition also looks at the development of the company's range of pumps. It wasn't until Alex Park invented a new type of gland to solve the problem of leakage around the pump spindle in 1935 that the future development of the water pumps, which are now the main product of the company, was secured.

Over the last 70 years Stuart Turner Ltd. has provided pumps for garden fountains, the fish aquarium on the Queen Mary liner, milk cookers, bilge pumps and cellar pumps for beer.

"It's absolutely fascinating to discover the diverse uses which Turner products have been put to," said Paul Mainds, chief executive of the River & Rowing Museum. "It's a tribute to the company that its engines and pumps have stood up to such rigorous demands over the past century."

*It's A Stuart — It's All Right* runs until October 17, 1999 and is open to all paying visitors to the Museum. Admission prices: £4.95 for adults; £3.75 for children, senior citizens, the disabled and the unemployed; and £13.95 for a family ticket for four. Free parking is available for visitors. Visitor enquiries to 01491 415619.

## Newts on the Move

*Harry Parker reports:* Blackpool planners and English Nature are keeping a close watch on the move of a colony of an estimated 1,000 endangered great crested newts from a £10 million, 20 acre new technology business site development at Bispham, near Blackpool. The newts are being transferred to wetlands and ponds of the Martin Mere nature reserve and bird sanctuary near Ormskirk.

Developers Blackpool Challenge Partnership state that the operation to retrieve and move the amphibians will be a necessarily slow and painstaking operation as the wilful destruction of even a single protected Great Crested Newt could result in fines of up to £1,000.

Delays to the development of about a year are expected with increased costs of an estimated £200,000. When completed the site — close to sports car makers TVR — will provide 200,000 square feet of high tech business units and 500 jobs.



# Derek Lambert's Cutting Edge

PHOTOGRAPHS BY DEREK LAMBERT UNLESS OTHERWISE STATED

• In this new monthly column I shall be focusing on new and rare fish which have become available to the hobby recently for the first time or have returned again after a long absence. I will also be including fish which are in need of captive breeding if they are to survive in the long term.



**top of page** *Nematobrycon lacortei*, a very rare import which is only seen once in a very long time. PHOTOGRAPH: MP. & C. PIEDNOIR

**above** A male common Emperor Tetra. Very different in colouration when you take a close look.

**right** *Glossolepis wanamensis*, an attractive Rainbowfish with distinctive finnage which is now extinct in the wild.

My first fish is the gorgeous Characin *Nematobrycon lacortei*. This is a close relative of the Emperor Tetra and has similar finnage but it has a blood red iris and other body colour differences, as you can see from

the photographs.

The one and only time I came across live specimens was in 1989 when I took Jim Langhammer (the retired curator of Belle Isle Aquarium) to Wholesale Tropicals in

London and there was a tank full of them for sale.

Jim had been searching for this species for ages and bought a few pairs to take home with him. I didn't realise just what a rare find they were at the time and didn't bother buying any for myself. Since then I have bred thousands of ordinary Emperor Tetras and would love to try my hand at this rarity, but never seen them for sale.

If you have come across them in a shop or know of anyone breeding them, then please write to me at the office address or e-mail me and I will pass the information on in next month's column.

The main fish I am going to concentrate on this month, however, is a Rainbow, right at the cutting edge of the hobby... The Lake Wanam Rainbow was always a rare fish in the wild with its range being restricted to just this one lake. The lake itself is about 2-3 kilometres across and is home to another Rainbow (*Chilatherina fasciata*).

African Tilapias had been introduced by 1980 but at that time had not impacted too badly on the native species. We have recently had reports that other exotic

species have been introduced and the Lake Wanam Rainbow has become extinct.

Fortunately there are captive breeding populations held by the specialist societies and a few commercial breeders in the USA work with this fish as well.

If you are lucky enough to come across some of these lovely fish don't be put off by their drab, slate grey colour as youngsters. Once mature, males develop a lovely golden sheen over much of the body and the middle rays of the anal fin extend dramatically, eventually reaching well beyond the caudal peduncle.

Males develop an extremely high back and deep body. This is common in many old Rainbowfish but looks particularly dramatic when combined with the fin extensions.

As far as captive care goes they are just as hardy as most Rainbows. Mine live in very hard and alkaline water, but other people have had success in soft water with a neutral pH. They eat all foods and are peaceful community fish.

They are unable to tolerate poor water quality. Any trace of ammonia or nitrite in their water and they will be in serious trouble. High levels of nitrate will also stress them. Good filtration and regular partial water changes are,



therefore, a must.

Aeration is also appreciated but seems to excite them to the point of jumping right out of the water. For this reason a tight fitting cover glass is a good idea.

Obviously, with such a rare fish captive breeding is very important. My own group have now started to produce eggs, but like many young Rainbows these are still infertile. Young male Rainbows take longer to become sexually mature than the females, so for a few months infertile eggs are produced, despite courtship and apparent mating taking place most mornings.

Those people who have had success with this fish tell me it follows much the same pattern as many of the other larger Rainbows with lots of small eggs being deposited in plants or spawning mops daily. These take two weeks to hatch and the fry need infusoria or a liquid fry food for about a week before they are able to take newly hatched Brine Shrimp.

Rare Rainbows also seem to be the flavour of the month at BAS in Bolton. They have been importing a whole range of new species to the British hobby over the last few months.

Two species which particularly caught my eye were *Rhadinocestrus ornatus* and *Telmatherina celebensis*. Both beautiful fish and well worth the high price you will probably have to pay for them.

Much cheaper and yet just as well worth seeking out for a

community tank are Golden Wonder Panchax. These are more correctly called *Aplocheilichthys lineatus* — Gold Form but the trade, being what it is, wanted a snappy name so the Golden Wonder Panchax was born.

As you can see from the photograph males are a stunning golden colour throughout. Females have much less colour but still have a little of the golden hue. With a maximum size of 8cm and peaceful but robust nature, they make the perfect addition to an aquarium for medium sized fish. Being a surface dweller they fill a niche in the aquarium which can be quite difficult to find inhabitants for.

They will happily take all kinds of commercial food, but if you want to breed them, some live foods should be fed as well. Unlike many Killifish, this species will successfully breed in normal tap water - even if that is very hard and alkaline. The eggs are deposited into mops hung from the surface or in floating plants.

Unfortunately, they tend to eat any eggs they can find so I use mops to breed mine in and collect the eggs every day. These take about 14 days to hatch and the youngsters will take newly hatched Brine Shrimp as soon as they are free swimming.

One word of warning about



this species. It is the best escapologist I have ever come across. Even the slightest hole or gap in the cover glass will give them something to aim at and out they will jump. In fact I have lost more fish of this species to suicide than to old age!

Finally this month I am pleased to report that at the recent Viviparous Convention several interesting *Brachyrhaphis* species were available including *B. roseni* and *B. terrabensis*. These were

descendants of fish collected on the A&P Costa Rican Quest.

I have also had reports of at least two species of Cichlid from this trip which are also spawning on a regular basis now. Youngsters from these will hopefully be circulated within the BCA by the end of this year.

If you have any information for this column send it to: Cutting Edge, Inline Magazines Ltd., Suite 4, Invicta Business Centre, Monument Way, Orbital Park, Ashford, Kent, TN24 0HB; or E-mail them to: aandpeditor@btinternet.com

**left** *Telmatherina celebensis*, one of the new rare Rainbows being imported.

**above** Male *Brachyrhaphis rhabdophora* descended from fish collected on the A&P Costa Rican Quest.

**top of page** *Aplocheilichthys lineatus*, Gold Form. A lovely surface dwelling Killifish, suitable for community tanks.



In the last column we looked at some of the sites where you could find out which fish (and indeed many other animals) are endangered in the wild for a variety of reasons.

Aquarists are able to help with conservation efforts in many ways; some will have the facilities to take part in a breeding scheme for an endangered fish, but those who don't have the room or time for such personal involvement can help by simply using their voices as members of the "aquatic lobby".

There are plenty of us out there and if everyone speaks up then developers and governments sometimes take notice.

This month we will look at a variety of ways that aquarists and internet users are doing their bit to help out some of the species in trouble.

Ornamental Fish International (<http://www.ornamental-fish-int.org>) represents a large part of the aquatic hobby, especially aquarium dealers.

They contribute regularly to organisations working directly to aid conservation. The current grant recipients are the Ocean Voice/Haribon Foundation scheme for training Filipino fishermen to use hand nets, and Project Piaba in the Amazon (although the OFI site does not state the amount of the grants given).

The Ocean Voice scheme has been running for some time, and is concentrating on teaching local fish collectors how to do so with the minimum of disruption to the coral reefs where they work, specifically by the use of hand nets instead of sodium cyanide. This ensures that only the fish they actually take are affected, instead of leaving behind them a trail of poisoned fish on the reef.

You can find out more about this work, and other things that Ocean Voice are involved in, at <http://www.ovi.ca>, although the web site itself contains little information,

# Caught in The Net

KATHY JINKINGS logs on for more Internet fish information

mostly pointing to published reports that you can get.

Project Piaba is involved in many aspects of conservation and education, including a number of projects with a direct effect on the aquarium hobby. They are working to establish quotas of fish that can be removed by the ornamental trade while leaving a sufficient population to replenish itself.

The web site indicated by the OFI link, <http://www.inpa.gov.br/>, is in Spanish, but English readers can find Project Piaba at <http://www.fua.br/piaba/>. This is only a small site, but does give an overview of their work (along with a gallery of pictures of fish!).

Although only North Americans can join, the Native Fish Conservancy illustrates the sort of activities that aquarists can become involved in and what they can achieve.

At <http://www.nativefish.org/>, you can read articles about native fish (native to America, that is), join email lists to talk to other interested people, and read about, or join in, some of the programmes of activity. Many fish species are threatened by exotic species which have been released into waters where they do not naturally occur.

The NFC is attempting to do something about this with its "Exotic Removals" program. Teams of volunteers go out and catch oscars, jewel cichlids, and other things that have no business in

American rivers.

The smaller ones go to aquarium stores to help raise funds, and the bigger ones are terminated humanely. Exotic fish caught in this way are also sold through club auctions, thus helping to support local aquatic clubs as well.

Active help and advice is offered to aquarists (including schools) wanting to keep native fish successfully, and a breeders' program encourages such aquarists to spawn their fish rather than just settling for keeping them alive.

South African *Sandalias* are receiving help from closer to home, from the Anabantoid Association of Great Britain, in collaboration with other concerned people. *Sandalias* are little known to aquarists, but are unique fishes remarkable for having the least-developed labyrinth organ of all the anabantids.

The *Sandelia* now has reserves specially set up for it and controlled in South Africa, and these require active maintenance, including the manual removal of vast quantities of *Azolla* on a regular basis.

You can find out more about the *Sandelia* Project, as well as the other activities of the Anabantoid Association, at <http://www.geocities.com/RainForest/Andes/5819/welcome.htm>.

Reef Relief, at <http://www.blacktop.com/coralforest/>, presents lots of information on the

problems facing coral reefs as well as other environments such as mangrove swamps.

You can find out lots about the problems and what the organisation is doing to try to counteract them. Reef Relief offers two ways for you to help out: you can become a member and help them directly, or you can check out the action alerts page.

This gives you a list of the current trouble "hot-spots" around the world, and what the problems are. It also gives you the addresses of the people who could do something about it if they wanted to, and offers useful tips on how to write an effective letter.

Many people assume that their solitary letter will have no effect on anything, and is therefore a waste of time. While one letter won't achieve much, if everybody writes one governments tend to take notice.

This is probably the cheapest way to help out — it will only cost you five minutes and a stamp. There are currently nine action alerts on the site, so anyone interested in fish should be able to find something that they care about.

Aquarists do not come across pelagic sharks very much, but these fish not only get a bad press, but far more sharks get killed by people than the other way around.

Check out the Pelagic Sharks Research Foundation at <http://www.pelagic.org/> for a well-designed web site that may cause you to feel sympathetic enough towards them to want to help them out.

Kathy Jinkings

British Aquatic Resource Centre —  
<http://www.cfkc.demon.co.uk>

AquaSource International —  
<http://www.aquasource.demon.co.uk>

## CAUGHT IN THE NET

VERNON EYDMANN describes his experiences with this majestic fish

PHOTOGRAPHS: MICHAEL ROSE UNLESS OTHERWISE STATED

# Discus: King of

**S** Still regarded by many aquarists as the ultimate freshwater tropical fish, the Discus remains a "difficult" fish for many fishkeepers. Indeed, most novices still shy away from them, both as a display fish and even more so as a breeding fish. Despite the great strides in breeding these beautiful fish and their ready availability today, their reputation is not undeserved. This accounts for their scarcity and relatively high prices but for those who do succeed in keeping them, they are a fish beyond compare and the triumph of breeding them brings a satisfaction beyond measure.

Their home in the quieter waters of the Amazon basin originally made them difficult to find and study. Despite being described by Dr. Heckel in 1840, it was not until 1921 that live specimens were first imported to Europe. Even then, due to their large size and high degree of oxygen consumption, these fish proved difficult to transport. They were also hard to catch as they live close to sunken branches

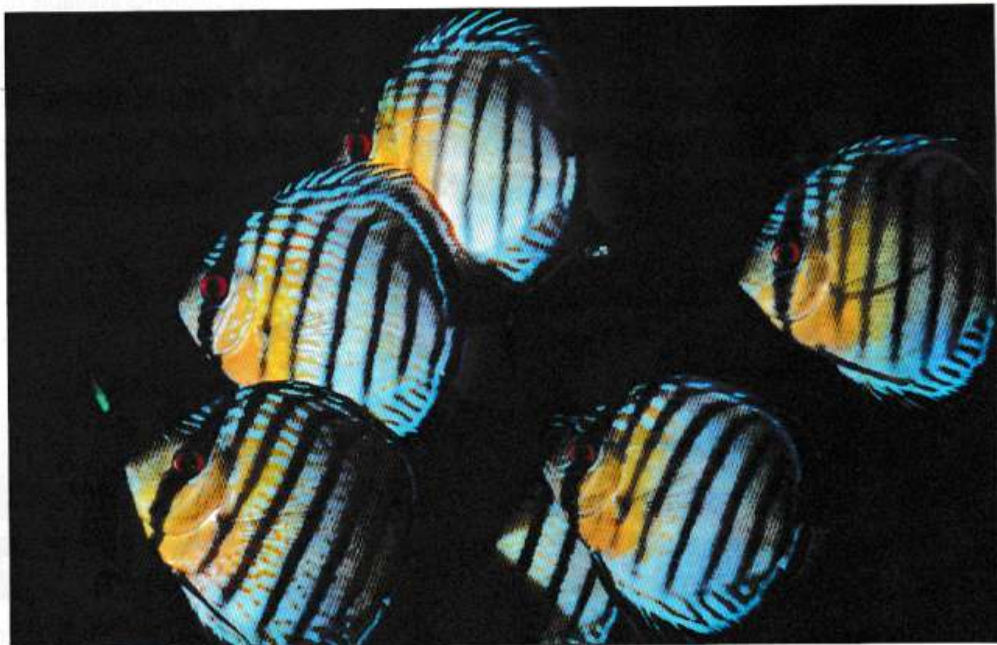
and are very cautious by nature. This ensured that they were expensive and rare from the outset. Added to this was their susceptibility to disease and difficulty in breeding and maintenance. They soon became a fish for the specialist only.

## Virtues outweigh the vices

Despite the problems of keeping them, the virtues of these fish far outweighed the vices. They are gentle and peaceful for a cichlid and can blend in with other aquarium fish although they fare better when kept alone. The large size only accentuates the beauty and this is incomparable. I do not intend going into the disputed classification of these fish but there are at least two species and several sub-species which appear under various names, normally dictated by the prominent colour. Thus there are red, green and blue discus regularly on sale. All of them are similar in maintenance and breeding. Progress in these areas now means that many fish available today are aquarium bred and reared which makes them hardier and easier to maintain.

So, if we are to keep these fish, what are the main

**below** A school of Discus make a truly stunning sight.  
PHOTOGRAPH: MP. & C. PIEDNOIR





# Aquarium Fishes

**above** Tender, loving care — this pair are keeping a close watch on their newborn youngsters.

requirements? Housing is obviously the first and because of their large size they require a large aquarium. Full grown fish are about 13-15cm and should have at least a 30-50 gallon tank with a depth of 45-60cm. They have been bred in smaller tanks but the more room the better and the depth is essential for breeding. They are more demanding than most other fish in water quality and I am a great believer in trying to emulate nature where possible. They require clear, clean water and a clean tank. It is worth sterilising everything in advance, particularly if breeding is the objective.

Soft acidic water is required, similar to their natural rivers. About pH 6.5-6.8 and kept at approximately 76°F. The water should have regular partial changes so it is a good idea to keep a stock of clean pre-prepared water available at all times. A quiet location is also essential as they tend to be nervous and do not like too bright a light. The question of cleanliness is of paramount importance as they are susceptible to disease caused by bacteria from dirty or poorly maintained tanks. For this reason it is advisable not to have sand or plants that decompose readily. Both harbour disease. Plastic plants and rocks are probably best and plenty of empty space for the fish to manoeuvre in as they will develop regular swimming channels.

Although they may be kept with other fish and make a dramatic addition to the community tank, they certainly do best when kept on their own and a display of just these fish is a sight to behold. It is also absolutely essential if breeding is considered. In the past Discus have been accused of starving themselves to death but no animal naturally does this and the fault invariably lay with poor living conditions or poor choice of food. They like live food and Tubifex worms provide a good

staple diet. However, variety is the key and Daphnia, Whiteworms, Mayfly larvae, Fairy shrimp and Brine shrimp are all taken. It must be emphasised that all food should be washed thoroughly before feeding. They may nibble on young plants but they are not vegetarians and enjoy hunting live prey.

## An indication of health

Discus are susceptible to a variety of diseases, many caused by poor management and can be avoided by cleanliness, general preventative measures and proper feeding. An indication of health is that a healthy Discus holds its head pointed down, while a sick one is constantly pointed up. The iris of the healthy Discus is usually dark red and this will fade to pink or yellow when the fish is sick. There is one disease known as "Discus disease" which shows itself as white puffs above the eye and along the lateral line. This is invariably fatal once it reaches the fish's brain. There are reported cures and it is worth trying them on so valuable a fish.

Inevitably, once the basic problem of maintenance is overcome, the aquarist will want to move on to breeding. This is more of a challenge but not beyond the capabilities of most Fishkeepers.

To breed Discus successfully requires a large tank which offers maximum privacy. Any disturbance is likely to ruin your chances. A quiet, dark corner is preferable or even a room which is not used. Some breeders actually cover the tank once spawning has occurred. Discus prefer to choose their own mates so buying an established pair is one of



**DISCUS** ... The King of Aquarium Fishes

the best methods of ensuring success. Otherwise it is a good idea to keep several fish in a tank and let them pair off naturally. Success lays in obtaining a matched pair and providing them with the required conditions.

The tank and everything in it must be clean and sterile. The only things required in the tank are those that the fish will lay their eggs on. Many breeders prefer a large Amazon sword plant and these are ideal if clean. They should be rooted in small flower pots or plastic dishes, although plastic plants may work just as well. Most breeders prefer a smooth surface such as slate or pottery which can be kept clean easily.

Filtration and aeration are necessary. An undergravel filter is best but an outside filter can be used but mask the inlet with cheesecloth to prevent the fry being sucked in. As the water needs to be acidic a peat moss filter will help. Frequent partial water changes should be made, possibly as often as twice a week, but beware of disturbing the breeding fish.

To induce breeding the temperature should be raised gradually to approximately 84°F. The parents will spawn in

typical Cichlid fashion on a flat surface and will take turns at fanning and guarding the eggs. It is essential that the parents have the tank to themselves. There should be no need for scavengers if the tank is kept meticulously clean.

**The most interesting time**

Once the fry hatch they will remain fixed for the first sixty hours, after which time they become free-swimming. This is the most interesting time for it is now that they will attach themselves to the large flat sides of their parents and begin to feed. Discus provide secretions from their skin for the young to feed on and this is the main reason that the young should be kept with the parents. Their first natural food should be newly hatched Brine Shrimp, Rotifers and finely chopped Tubifex. Once they can take this they will soon move on to other, larger live food.

The babies will take on their disc shape in less than five weeks but need a year to reach sexual maturity. Reports of cannibalism among Discus is normally attributable to disturbance and, if the fish have sufficient privacy and care, they are ideal parents and the entire breeding procedure will provide the aquarist with a great sense of achievement as well as hours of pleasure.

For those who are interested in these fascinating fish it is worth reading more about them before investing in the fish. Preparation and meticulous housekeeping are the keys to success but the successful Discus keeper will be adequately rewarded by the king of aquarium fish.

**left & below** The most interesting time of all — fry feeding on their parents' mucus.



ROY OSMINT takes a commonsense approach:

PHOTOGRAPHS: DEREK LAMBERT UNLESS OTHERWISE STATED

# Holiday

# Fish Care



Everyone loves a good holiday. A week or two of sun-drenched freedom and relaxation in some far-off location well away from all the pressures, restrictions and disciplines that seem increasingly to burden our lives. At least that is the theory!

As the much-planned, and eagerly-awaited, day of departure draws close an air of expectation and excitement begins to permeate the whole household. That something out of the ordinary is imminent is also often unavoidably communicated to our pets that seem instinctively to sense, with rather less enthusiasm, that they too are about to experience a complete change of circumstance or routine.

But although for them the prospect of a visit to a neighbour, friend, cattery or kennel may not be a particularly appealing one, at least we can set off in the knowledge that they will be well cared for during our absence.

Aquarium fishes on the other hand, are, in this respect as many others far more accommodating and trouble-free. No

**above** An aquarium like this one with growing plants in needs the lights turned on and off whilst you are away. A simple timer switch is easily installed and provides an accurate means of controlling aquarium lighting at all

need here for expensive and disruptive special arrangements. Some commonsense preparations and the application of a few basic rules are all that is needed to ensure that both you and your charges have a stress-free break from one another!

## The over riding concern

For many fishkeepers, and especially those relatively new to the hobby, the over riding concern at holiday time is, not surprisingly, what to do about feeding? Although this worry is perfectly understandable, it is in truth quite probably the single aspect of least importance and need not, in most instances, present a problem at all.

Providing the aquarium is well established, properly maintained and houses fairly mature subjects there is absolutely no reason why your fishes cannot be left completely to their own devices for the duration of your absence without suffering any harm whatever. In fact it might even conceivably do them a bit of good!

I have on many occasions over the years left my own aquariums unattended for periods of up to three weeks without losing or harming a single fish. To many, the idea of leaving a captive or totally dependent creature for a fortnight

## HOLIDAY FISH CARE ... A commonsense approach

without food is likely to appear cruel in the extreme and quite unforgivable. Indeed, with almost any other animal it most certainly would be.

Why then should fishes be so different in this respect? To begin to appreciate this it is necessary to consider the actual nature of an aquarium and what we are trying to achieve within it.

A well established and correctly managed aquarium is much more than simply a container full of water in which fishes are housed. The aim should always be to simulate a total underwater habitat that is effectively capable of sustaining a finely-balanced biological equilibrium. In other words an almost complete miniature ecosystem. It is this that fundamentally sets it apart and allows the whole set-up to be more capable of self-support.

In any event most fishes are designed to be able to tolerate quite lengthy periods without food. This often occurs in the wild during winter months and in certain regions during the hot arid season when they rely on internal body reserves to tide them over.



### Occasional feeding breaks beneficial

I am personally convinced that occasional feeding breaks in most aquariums are in fact highly beneficial, and even in normal circumstances my own charges frequently get one day a week without added food. Moreover, I have often noticed when returning from a holiday that my unfed fishes frequently seem to exhibit a previously unnoticed vitality and zest. But then again perhaps they are just pleased to see me!

Fry and very young fishes are the notable exception to this generalisation. They must receive frequent small quantities of food if proper growth and development are not to be irreparably inhibited. For this reason breeding attempts are, where possible, best postponed until after the holiday. Where this is unavoidable the only really satisfactory solution is to seek the assistance of an experienced fishkeeping acquaintance to undertake "fry-sitting" duties.

Of course, to many, the obvious answer to holiday fish care is to call upon the good offices of a relation, friend or neighbour. Certainly this can prove a perfectly satisfactory arrangement — it can also turn out a complete disaster!

If the minder is an experienced fishkeeper then chances are all will be well. The main problem with non-fishkeepers is that they almost invariably seem to judge that the quantities of food they are instructed to give will be insufficient to sustain the apparently constantly hungry aquarium inmates.

The consequence of this judgement often being that they then take it upon themselves to introduce far more and, in the process, failing to realise or appreciate the serious damage that this can bring about to the overall balance of the system. Not only can uneaten food quite quickly break down to cause water clouding, oxygen-depleting pollution and sustenance to undesirable organisms, but also obviously the more food that is consumed the greater the waste products that will naturally be excreted, placing a further burden on the system.

### Importance of not overfeeding

Where you are intending to entrust care to others do make certain they understand the importance of not over feeding and preferably always leave measured portions in individual containers to be given only every three or four days.

The real secret of successfully over-holidaying

**above left** A tank like this one which has no growing plants in it is best left without light during your absence.

**left** It is amazing just how much waste matter will build up in a gravel filter bed. This is why a good clean out a month before you depart is important. PHOTOGRAPH: FRISBY AQUATICS, HULL

your fishes is to ensure that on the day of departure conditions in the aquarium are just right. This involves a certain amount of planning and preparation which should start about a month before, with a substantial partial water change and general clean-up. Remove from the aquarium about 50 per cent of the water from the bottom using a siphonic gravel cleaner to get down deep into the substrate bed.

Where undergravel filtration is in use pass a length of air-line down the uplift tube and suck out water and dirt from beneath the filter plates. (This is, incidentally, a good tip at any time). Take out any accumulated detritus from the bottom such as uneaten food or dead plant material, but do not at this time remove any algal build-up except on the front glass.

Many fish species will happily graze upon this during your absence. Where other filtration methods are employed clean the container and some of the filter medium using only water from the aquarium. This will help ensure that the essential bacteria colonies are not wiped out and can, where necessary, easily re-establish.

This partial water change and clean up, though the biggest and most comprehensive, should not be the last before departure. During the intervening weeks leading up to the holiday carry out normal routine maintenance with partial water changes of no more than 30 per cent.

The actual frequency of these will be largely determined by the number and types of fishes as well as the size of the aquarium. Large messy species such as Goldfish, Koi and some of the heavyweight tropicals will need them more often than their smaller, more environmentally-friendly cousins! In any event time things so that the last one is carried out three days prior to departure.

## One month countdown to your holiday

During the one month countdown to your holiday no new fish or plants should be introduced into the aquarium from any source. The reasons for this are threefold. Firstly, such additions can adversely influence the biological equilibrium of the system. Secondly, there is always the risk of bringing in infection, the recognisable symptoms of which may not become apparent until you are relaxing on some sun-kissed beach. Lastly, in-tank peace and harmony can be upset.

Not all individual fish necessarily follow text book behavioural patterns and even among normally amiable species rogues and trouble makers do sometimes occur. Each of these potential problems, can, when you are present to observe and identify them be effectively addressed. But during periods of prolonged absence things can quickly snowball out of control, with possibly disastrous consequences!

Another question that frequently arises in connection with holidays, is what to do about the aquarium lights — should they be left on or switched off? In answering this let us take a look at why we illuminate



the tank at all.

In general terms fishes themselves do not require bright light as a prerequisite to well-being. They are perfectly happy and healthy in subdued conditions. Artificial light in the aquarium, therefore, serves only two main purposes. For natural plants, that must have it in sufficient intensity and duration in order to photosynthesise and flourish, and for ourselves, so that we can see and appreciate the aquascape in all its beauty.

## Switch the lights off!

It follows then that if the fishes do not require it and you will not be there anyway, it is the presence or otherwise of natural plant life that will determine the absolute need for tank lighting. If, like many, your aquarium is decorated using artificial plants the question is answered — switch the lights off!

The most satisfactory solution for real plants is undoubtedly an electronic time-switch. This provides a totally trouble free and accurate means of controlling aquarium lighting at all times. These can be purchased for a reasonable outlay and are simple to install.

A single device can be used to control more than one tank by connecting together via a junction box, assuming of course that each tank has the same lighting duration requirement. This really is a worthwhile investment under any circumstances. Once installed you will wonder how you managed without it!

We have seen that the usual considerations for the feeding and general care of our animals during holiday absence do not necessarily apply in the same way when it comes to fishes, and that outside carers can sometimes unwittingly cause far more problems than they solve. But even the best-laid plans can be upended by the unforeseen. This is nowhere more apparent than in malfunctioning equipment.

Heaters, thermostats and filters are the life support systems of many aquariums. A sticking stat for instance can cause a disastrous "boil-up" or "cool down" in a tropical tank if we are not around to identify the problem and take appropriate remedial action. The assistance of a friend or neighbour to pop in and carry out one or two agreed checks can help overcome this potential worry.

But do remember to hide the food supply! Over-holidaying your fishes need not be a problem. The application of a few common sense rules and some basic preparations are all that is needed to ensure that all will be well when you return home from your well earned and much needed break. Bon voyage!

**above** Young fry will rarely survive long periods of starvation and if they do will often remain stunted all their lives. Breeding attempts are, therefore, best left until after your holiday. Some fish, however, have other ideas! PHOTOGRAPH: MP. & C. PIEDNOIR



Andy Horton's

# SHOREWATCH

Examining the biology and behaviour of rockpool fish and marine invertebrates.

## Total Solar Eclipse

On August 11 most eyes will glance towards the celestial bodies as in Cornwall and parts of the English Channel the Moon will be seen to move directly in front of the Sun. Viewers in a path about 100 km (62 miles) wide will be able to see a total solar eclipse, if the weather is favourable. This path is known as the "zone of totality, or annularity".

Because the Earth is rotating whilst on its journey around the Sun, while the Moon revolves around the Earth, the narrow shadow of the Moon moves rapidly from west to east (at about 3,200 k.p.h. or 2,000 m.p.h.) across the Earth.

### Zone of Totality

In a 13 km (8 miles) wide band in the centre of this zone the total eclipse will occur for about two minutes over Cornwall south of Truro from 11.10am BST and move rapidly across the English Channel to fall over the French coast between le Havre and Dieppe.

The centre of the eclipse track falls over Swanpool Beach in south Falmouth. A total eclipse can be seen for a shorter period over the whole of Cornwall; at Padstow the duration will be just over a minute in which the day will be turned almost as dark as the night.

### Partial Solar Eclipse

In Cornwall, the Moon will start to obscure the Sun at 9.55am BST and the partial eclipse will last for over two hours. In the other parts of Britain a total eclipse will not occur and at its peak coverage in London the best that viewers will see will be a crescent Sun at 96 per cent coverage.

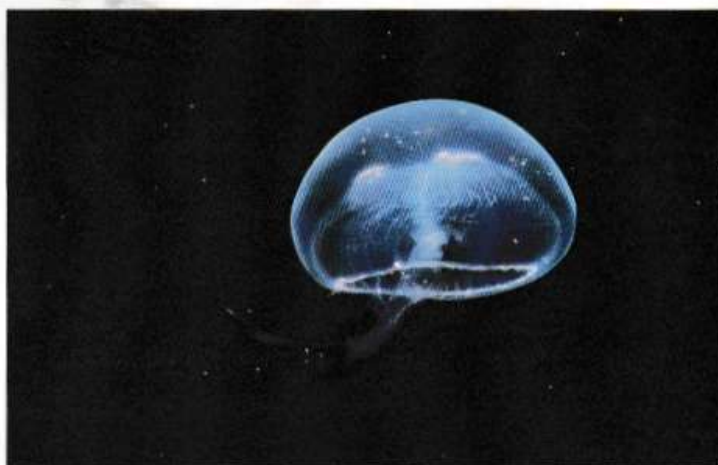
This is not nearly so impressive as a total solar eclipse with the corona. The remaining sunlight will still be far too bright. On the south coast at Bournemouth and Weymouth and on the islands of Jersey and Guernsey in the Channel Islands the coverage will be over 99 per cent and a short trip out to sea to see the total eclipse may be extremely popular.

In northern England the extent of the eclipse will be gradually less, but a much smaller partial eclipse will be visible even in the north of Scotland at about 80%.

## Tides wait for no man

If at every new Moon the Moon passes

## SHORE WATCH Fact File



The Moon Jellyfish, *Aurelia aurita*, was present in enormous numbers in the English Channel this summer. Thousands pulsed around in Shoreham Harbour, Sussex, often washed up against the sides of wharves.

PHOTOGRAPH: MP. & C. PIEDNOIR

between Earth and the Sun, why is it that an eclipse does not occur every month? The answer lies in the Moon's elliptical orbit around the Earth. The Moon will only pass directly in front of the Sun at the inward extreme of its orbit.

Rockpoolers appreciate that the position of the Moon has an effect on the tides. Once a month the Moon orbits between the Earth and the Sun when it is called the New Moon and this produces the spring tides when the tide moves higher up the beach and also recedes the furthest.

The Full Moon occurs when the Moon orbits so that Earth is between the Moon and the Sun. On both occasions the Sun and Moon are in alignment producing the greatest gravitational pull and the greatest variation of tides known as the spring tides. When the Moon is at a tangent to the Sun, its gravitational pull counteracts that of the Sun and the tide variation is smaller. These are the neap tides.

tides are the best times to go down to a rocky shore and explore. If you consult the Tide Tables to arrive at least one hour before low water you will have plenty of time to explore the area where the sea laps against the rocks exposed by the receding tide.

It is in the pools and under the rocks at extreme low water that the fauna resembles that of the shallow sea and the greatest variety of life can be discovered. Fish, Crabs, Sea-anemones and myriads of other life forms normally only seen by the SCUBA diver will be revealed.

In the short time these lower pools are uncovered they do not have time to heat up under the sun's rays and become devoid of oxygen. Consequently, they are able to support a greater range of species than the pools higher up the shore.

## Best rockpooling areas

Rockpoolers quickly learn the low spring

## Sea temperature

In August the surface sea temperatures around the British Isles reach their maximum. In the English Channel a temperature of 17°C is attained offshore. In sheltered bays, especially where the sun can

## SHORE WATCH Fact File



The Seahorse, *Hippocampus ramolusus*, is such an exceptional discovery on the northern coast of the English Channel that specimens should be returned to the sea.

PHOTOGRAPH: ANDY HORTON

heat up the sand before the tide comes in the temperatures have been measured up to 21°C and in upper shore pools the water may get even warmer.

Water has a high specific heat and will heat up and cool down much more slowly than the air. The variable air temperature is likely to reach 28°C in the shade this month. On the North Sea coast the sea is older slightly colder reaching a maximum of only about 14°C at Newcastle-on-Tyne.

Despite the temperature difference being only small, the life on Tyneside shore is much less varied. This is because of the cold winter North Sea temperatures fall down to below 5°C and kill any southern species

### Cornish shores

Bearing the full brunt of the Atlantic waves, the promontory of Land's End at the southwesternmost tip of the English mainland, conjures up a vision of the attractive ruggedness of the Cornish coastline.

On the southern coast there are softer sandstones and other sedimentary rocks, and bays of soft sand and broken shells have been sculptured. It is a beautiful rockpooling area. Not only is Cornwall favoured by having the shore topography, or landscape, suited to the small rock pool fish and other life, but because the seas are warmer the variety is so much greater than the North Sea coast.

Cornwall or the rocky coast of Wales is the place to go for a rockpooling holiday.

Generally, the further south west you go, the richer the variety there is to be found

between the tides. However, a few of the northern species will be absent as they will be unable to endure the warm summer seas.

### Marina fauna

The seas around the British Isles comprise a mixture of the Arctic-Boreal fauna and the

Lusitanian fauna. The Arctic fauna contains valuable food fish like the Haddock and Cod, present in enormous numbers in relatively few species, which reach their most southerly point of distribution in the English Channel.

In contrast, the Lusitanian fauna contains species that live in warmer water of the Atlantic and Mediterranean and contain and greater number and more colourful variety of species. Many of these fish and invertebrates are small and colourful and make ideal aquarium exhibits. The Lusitanian fauna reaches its most northerly point of distribution on the southern and western shores of Britain.

Andy Horton on behalf of the British Marine Life Study Society will help readers who have any difficulties to pursue their interest in the marine life around the British Isles. The first enquiry will be answered free of charge but please enclose a return stamp and do not forget to include your address. For more information please write to: Andy Horton, Shore Watch, British Marine Life Study Society, Glaucus House, 14 Corbyn Crescent, Shoreham-by-Sea, Sussex. BN43 6PQ. E-Mail: [bmllss@compuserve.com](mailto:bmllss@compuserve.com) Web Site: BMLSS (England) URL= <http://ourworld.compuserve.com/homepages/BMLSS/BMLSS> (Scotland) URL=<http://www.ed.ac.uk/~evah01/bmllss.htm> The Webmaster for the Scottish site is Alan Pemberton.

## SHORE WATCH Fact File



The Circular Crab, *Atelecyclus rotundatus*, is often missed because it buries in the sand just below the surface. Small specimens are dredged up in a shrimp net pushed along in the sandy shallows at low tide.

PHOTOGRAPH: ANDY HORTON

# Fish Profiles

By RICHARD FRIEND



PHOTOGRAPH: DAVE BEVAN

## The Flying Fox (*Epalzeorhynchus kallopterus*)

Somewhere, back in the annals of time, it must have made plain sense for someone to call this fish, that has no bushy tail, is not being hunted by a pack of hounds, looks nothing like a fox, and certainly cannot fly — The Flying Fox. The torpedo-shaped body and proud dorsal fin, makes this streamlined fish resemble a Shark more than a Fox. But Flying Fox it is, and it definitely makes a welcome addition to any community tank.

It has a distinctive black line that runs from the snout right through to the fork of the tail. This divide is edged with white, against a background colour of reddish brown. The fins are large, and the pectoral and pelvic fins have developed a use as "legs" which aid the fish when it spends time resting on a root or rock, using these feet-like fins to support itself.

Found throughout Borneo, India, Indonesia, Thailand and Sumatra where they inhabit fast flowing rivers and streams. Here they tend to live in areas of minimal plant growth but with lots of algae growth on the rocks and roots. The streamlined shape helps them in the fast flowing waters, which they like to be around the cooler 72°F, but will fortunately tolerate up to 81°F. The water can be a neutral (pH 7), but they are very accommodating and will tolerate a wide range of pH in captivity.

They make a peaceful addition to the community tank where they are very active and spend most of the time on view. They will protect a territory being aggressive to their own kind, or even other "shark" like fish, however, other species are ignored. They can attain a size of 10cm in captivity and as much as 15cm in the wild.

When it comes to food, the Flying Fox has a big plus, as they will spend their day rasping your decor clean of algae. The top edge of the lip is hard with small serrations that aid the fish to scrape at the algae. In the aquarium this diet can be supplemented with algae wafers and tablet food, or even blanched lettuce leaves.

There seems no way of sexing these fish and as yet there would appear to be no recorded success in captive breeding. This means all the fish offered for sale in shops are wild caught and have made the long and arduous journey from their native homelands in Asia.

These helpful, and accommodating fish have a lot going for them as an addition to your tank.

### FLYING FOX CV

FAMILY: Cyprinidae  
SPECIES: *Epalzeorhynchus kallopterus*  
ORIGINS: Borneo, India, Indonesia, Sumatra and Thailand  
AQUARIUM TYPE: Community  
FEEDING POSITION: Predominantly a bottom dweller, but all levels are covered when browsing over rocks and roots  
SIZE: 12 cm  
TEMPERATURE: 72–81°F



PHOTOGRAPH: DEBILK LAMBERT

## Cultivated Platies (*Xiphophorus hybrids*)

Take two different species of wild Platy, add a few hot-blooded Swordtails, mix over several decades and what have you got? The modern Platy, one of the most popular of all aquarium fish.

Originally Platies came from the streams and rivers of the Atlantic coast of Mexico, down to Belize and British Honduras, not the fish farms of the Far East or North America. The habitat in the wild would have been lush vegetation, a slow moving current and a water temperature of around 73–78°F, although they have been found in temperatures as high as 86°F and as low as 60°F.

When selecting your fish from the dealer, you need to take great care. Choose only lively fish, with no clamping of fins, shimmying (slow weaving from side to side) or any sign of a whitish sheen on the flanks. These problems are brought on by some people in the trade falsely believing that all Platies need salt added to their water. In fact *Xiphophorus* (Platies and Swordtails) are a genus of freshwater fish which almost never venture into brackish water habitats.

A welcome addition to any community tank, these prolific breeders are often the choice of would be new fish breeders as their first venture into this fascinating side of the hobby. Should this be your intention, you should set the tank up well in advance of adding the female. A sponge air powered filter will suffice, frequent large water changes are a must. Do not skimp on the tank size, they like plenty of space.

Include lots of plant life in the breeding tank, particularly at the bottom. This is where the new born fry will hide until you have a chance to remove the female. The happy event will undoubtedly take place in the early hours of the morning, so check each day if your female has changed, or if there are any extra inhabitants hiding in the vegetation.

The fry will be happy to consume anything that will fit into their mouths, so crushed flake will be taken. However, newly-hatched Brine Shrimp will benefit them much better, or there are some excellent commercial foods on the market for your new fry.

The Platy comes near to the top of any popularity poll. Pick your stock and set them up in your community tank, or start your breeding programme and you will soon understand why. You'll become one of the battalion of Platy fans.

### PLATY CV

FAMILY: Poeciliidae  
SPECIES: Most modern cultivated Platies are derived from crossing *Xiphophorus maculatus*, *Xiphophorus variatus* and *Xiphophorus helleri*  
ORIGINS: Mexico, Belize and British Honduras  
AQUARIUM TYPE: Community-species tank for more success with fry rearing  
FEEDING POSITION: Mid water  
SIZE: Females 7.5cm; Males 5cm  
TEMPERATURE: 72–78°F  
DIET: Flake, Brine Shrimp, *Daphnia*, *Tubifex*



PHOTOGRAPH: MP. & C. PIEDNOIR

## The Clown Loach (*Botia macracanthus*)

If someone were to point out that the pretty little character, acting the clown in your community tank might reach 30cm in size, you'd probably wish you had not been tempted in the first place. But fear not, unless you make special arrangements this is not likely to become a worry to you. Normal size in the community tank will be much less.

*Botia macracanthus*, the Clown Loach, probably carries the prestigious title of one of the most entertaining and attractive fish in the hobby. Orange/red body with three broad slanted black stripes. Red fins and a deep forked tail, deeper in the male, set off the streamlined body. Under each eye is an effective defensive spine that is almost invisible, until set for action such as defending a territory.

Clown Loaches originate in Borneo, Indonesia, and Sumatra. They enjoy a temperature anywhere between 70-80°F, and will adapt well to most water conditions. They feed on a diet of flake and tablet foods and live foods of all kinds are taken with relish. Plenty of cover in the form of wood, rocks and plants is welcomed. Although strictly speaking nocturnal, they will soon learn that food is about during the day, so they will be as well. They are happier in a group of their own species and definitely unhappy on their own. However, they will readily make close friends with other members of the community aquarium if they are without companionship of their own kind.

These lively loaches quickly live up to their name with comical clowning ways of playing dead (an alarming habit to the unwary) and jamming themselves into seemingly impossible holes and hideaways. At other times they will cruise and forage in mid-water, as well as, like other loaches, scavenging the bottom. This is when the barbells around the mouth come into use as they search for any tit bits. Here a sandy substrate will be appreciated, although this will prohibit the use of an undergravel filter, as the finer particles will clog the slots in the filter plate. Internal or external canister filters then become a must.

They are known to be an egg laying fish, however, they are very rarely bred in captivity. This is surprising as otherwise they are relatively easy to keep, and settle well into the community tank.

An unfortunate aspect of the Clown Loach is a susceptibility to White Spot. Great care has to be taken when treating infected fish using remedies containing malachite green or methylene blue. These are moderately poisonous to Clown Loaches, so treatments devoid of these dyes should be used.

### CLOWN LOACH CV

FAMILY: Cobitidae  
SPECIES: *Botia macracanthus*  
ORIGINS: Borneo, Indonesia and Sumatra  
AQUARIUM TYPE: Community  
FEEDING POSITION: Bottom  
TEMPERATURE: 70-80°F  
SIZE: 30 cm  
DIET: Flake, Tablets, Tubifex, Earthworms and all other live foods



PHOTOGRAPH: MP. & C. PIEDNOIR

## Peter's Elephant-Nose Fish (*Gnathonemus petersi*)

Nobody could possibly have ever uttered the words "I wonder how that fish got its name?" when it came to the Elephant-nose Fish. All the pointing and sneering will not matter one jot to this character with the unfortunate proboscis, for they have very poor eye-sight. To combat this, Elephant-nose fish have developed a unique radar system all their own.

Organs in the body emit an electrical charge which makes a field around the fish similar to a magnetic field. Unlike other fish that produce a sudden strong electrical charge as defence or predatory purposes, the Elephant-nose has a permanent, although weak, electrical charge emitting from it. Thus any interference with this field is readily detected by the fish, be it enemy, obstruction or food.

The Elephant-nose fish are part of the family Mormyridae and are found exclusively in Africa. There are an amazing 100 species in the family, most of which tend to swim close to the substrate, and are predominantly solitary creatures with only a few preferring to shoal.

The flat almost leaf like body has the unusual feature of having both the dorsal and anal fins opposite each other and situated just in front of the tail, which is a large "V" seemingly stuck on the end of a long protruding stalk of a caudal peduncle.

Elephant-Noses can be aggressive to their own kind, but they pay no heed to any other fish, making them ideal and unusual additions to the community tank. Nocturnal by nature, they will soon settle to tank life and set about probing the substrate for food. Frozen foods are accepted with relish, however dried foods will be taken after a while.

A size of 22.5cm can be reached so a larger community tank is preferable. A temperature of 75-82°F is preferred, pH 6.5-7. A dense vegetation, with plenty of rocks and roots and the fish will quickly establish its territory. A sandy substrate is preferred where possible, this would of course prohibit the use of undergravel filtration.

Another unusual feature of this fascinating fish is the size of its brain, having one of the largest in the fish world. So when your Elephant-nose fish is giving you the beady eye as you are about to do something of which he does not approve — just remember that an Elephant never forgets!

### ELEPHANT-NOSE CV

FAMILY: Mormyridae  
SPECIES: *Gnathonemus petersi*  
ORIGINS: Muddy, slow-moving waters of Africa  
AQUARIUM TYPE: Large community  
FEEDING POSITION: Bottom  
TEMPERATURE: 75-82°F  
SIZE: 25cm (*G. petersi*), other species can range from 20cm to 1.5 metres!  
DIET: Frozen and live foods at first, but will accept dried food when established



## Supreme moves

The Federation of British Aquatic Societies has announced that this year's final of the Supreme Championship will take place on the occasion of the Association of Southern Aquarists (ASAS) Show & Convention on Sunday, November 7. This is due to the fact that there will not be a Supreme Festival of Fishkeeping at Weston super Mare this year.

The ASAS Show, to be held in Portsmouth, will also feature a Convention at which the speakers will be Brian Walsh, presenting the "Beauty of Fishkeeping" and Martin Munt with a presentation on "Fossil Fishes".

Full details of the event, together with local accommodation addresses, can be obtained from Show Secretary Paul Corbett (01983 721246) or Jack Stillwell (01705 691030).

Entries for the Supreme Championship are by invitation and these will be sent to those qualifying direct from the Supreme Championship Shop Secretary Alan Henderson.

Accommodation for next year's Supreme Festival of Fishkeeping — to be held at the South Downs Holiday Village, Bracklesham Bay, West Sussex, over the weekend of October 20/22 2000

# Society World

— will be limited to 300 guests. Bookings can be reserved from now on and the price for the weekend (Friday to Sunday, October 20 to 22 2000) is £68 per adult, no increase from the 1998 price.

Please contact Grace Nethersell on 0181-847 3586.

## EVENTS, SHOWS & FESTIVALS

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

### AUGUST

- 1 Three Counties Area Group.
- 1 Three Counties Group, Open Show, Kempshott Village Hall, Basingstoke, Hants. Show jointly judged by FBAS and A of A. Information from Steve Hinkley on 0118 9811261.
- 3 Gloucestershire Fishkeeping Club, St Augustine's Church Hall, Matson Lane, Matson, Gloucester. Annual photo competition. Bring along photos of projects, Ponds and Fish. More information from Caroline, 01453 824810.
- 8 Association of Midland Goldfish Keepers. Pretty Fish Show, St Laurence Church Hall, Old Church Road, Bell Green, Coventry. Information from Bob Blades, 01827 285930
- 15 KAAS, Open Show, Littlebrook Power Station Social Club (Erith & D.A.S. venue), Erith, Kent. Details from Show Secretary Adrian Dempsey, 01227 740747.
- 15 KAAS (FB)
- 29 TTA (Open Show, FB)

### SEPTEMBER

- 3 FBAS General Assembly
- 5 Alden A.S. (FN)

- 11 Hounslow A.S.
- 12 Cramlington A.S. (FB)
- 12 Silktown A.S. (FN)
- 19 Northern Area Catfish Group Open Show
- 25 Northern Goldfish & Pondkeeper's Society (I)
- 26 Darwen A.S. (FN)

### OCTOBER

- 3 Halifax A.S. (FN)
- 23/24 British Aquarists Festival, Manchester (FN)

### NOVEMBER

- 7 FBAS Supreme Championship (FB)
- 7 ASAS Show, Portsmouth (NEW VENUE)

### DECEMBER

- 4 FBAS AGM and General Assembly

## Auctions

September 5, Alden A.S.; September 12, Silktown A.S.; September 26, Darwen A.S.; October 3, Halifax A.S.; November 7, Merseyside A.S.; November 21, Northern Area Catfish Group.



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