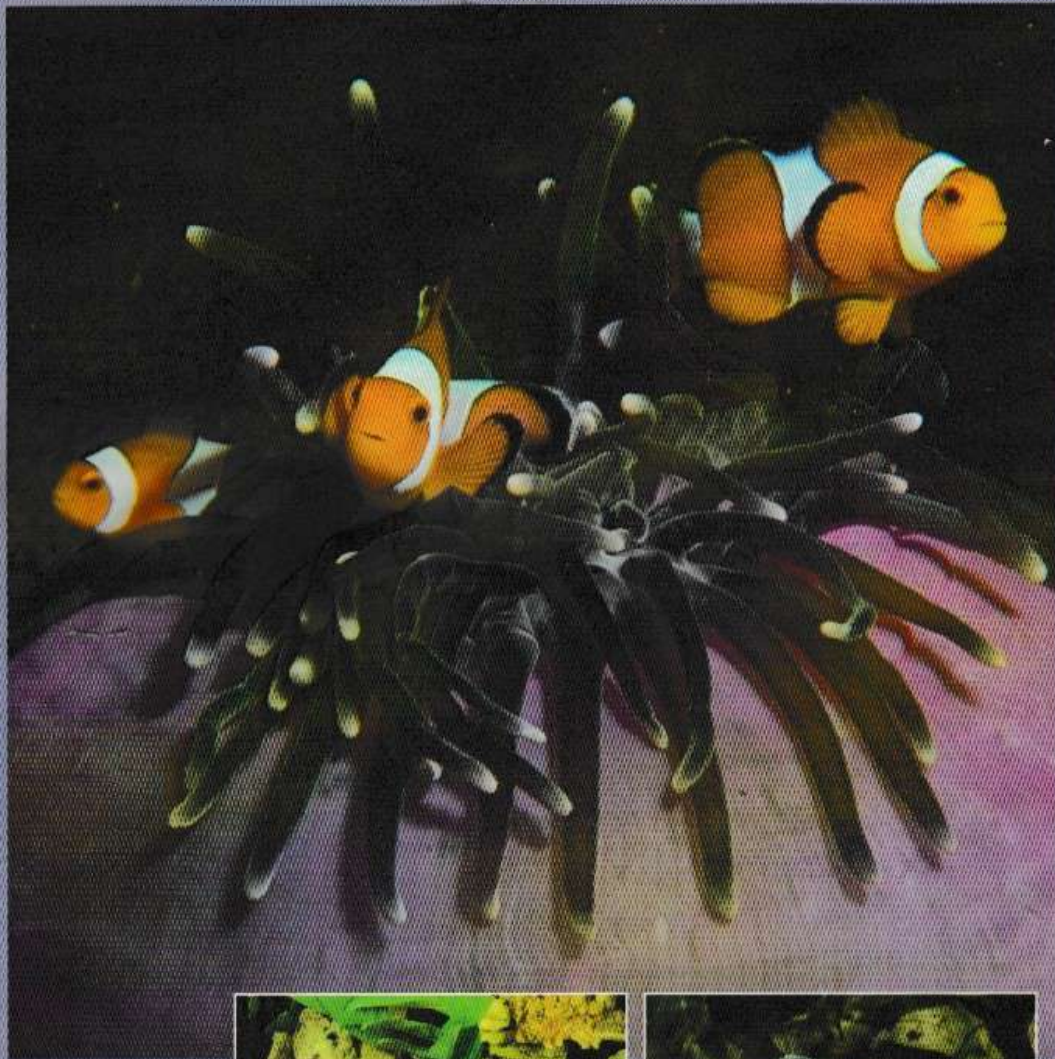


# AQUARIST & PONDKEEPER

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THIS ISSUE

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The Better Fishkeeping Magazine





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## AQUARIST & PONDKEEPER

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## EDITORIAL

As I wander around fish shows and through various aquatic events readers sometimes come up to me and say they are having trouble obtaining a copy of the magazine. People often think this is because the magazine is not reaching their local shops and, in the past, that may well have been the case.

Since Inline Magazines Ltd have taken over, however, we have put a lot of effort into making sure the magazine is out there where you can buy it. Yet some of you are missing out. The problem seems to be A&P's popularity! Each newsagent only has a finite number of copies to sell and once they are gone, that is it.

Obviously, as Editor, I take a keen interest in how well the magazine is being distributed so I check out my local newsagents regularly. I even count the number of copies they buy in and keep an eye on how quickly they sell!

In Lincoln City this month one of the larger independent newsagents had only three copies of September issue to sell. They went within a few days of the magazine arriving. The same was true in Market Rasen and several other towns.

This means if you were unlucky and walked in one of these shops a week after A&P hit the shelves you would not be able to find a copy. The solution to this sort of problem is for regular readers to subscribe or order their copy of the magazine from their local newsagent.

That way you will not miss out on even one issue of *Aquarist & Pondkeeper* — The Better Fishkeeping Magazine.

  
EDITOR

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## COVER PICTURE



COVER & COVER STORY PHOTOGRAPHS: LES HOLLIDAY; TEXT: DAVE GARRATT

## IMAGES OF THE CORAL REEF

The sight of a Clownfish gently nestling, or almost wallowing, in the tentacles of an Anemone must be one of the most enduring sights in the marine hobby. The image has been used to sell many books and products within the hobby, as well as being a staple of "coffee table" books and television programmes featuring the coral reef, leading to the relationship being appreciated by a much larger audience than marine hobbyists. Despite the high light level required by an Anemone and the sensitivity of some Clownfish species, achieving this endearing biological relationship is not beyond the beginner, providing a little experience has been gained and the appropriate research done beforehand. Clownfish (along with the Damselfishes) belong to the Pomacentridae Family and not surprisingly are also known as Anemonefish.

► *Continued overleaf*

**above** Purple Base Anemone and Common Clownfish, *Heteractis magnifica* and *Amphiprion ocellaris*.  
**below** Purple Base Anemone and Two-banded Anemonefish, *Heteractis magnifica* and *Amphiprion clarkii*.





DAVE GARRATT takes a close look at the definitive image of the Coral Reef:

PHOTOGRAPHS: LES HOLLIDAY

# Images of the Coral Reef

## Anemones: flowers of the sea

Their name immediately links them with the world of flowers and it is easy to suppose that they derived the name from the flower like appearance of the extended tentacles. Sea Anemones belong to a large phylum of over 9000 animals known as Cnidaria.

They all possess stinging cells and include Anemones, Stony corals, Soft corals, Sea Pens, Hydroids, Polyps and Jellyfish. Because their entire life cycle consists of a polyp stage, Anemones, along with the corals and sea pens, are sub-divided into the Anthoza Class, however this still leaves 6,000+ species.

## A sting in the tail

The body of an Anemone is divided into a mouth, main body and a pedal disc, the mouth being surrounded by rings of tentacles. There may be a single ring of thick tentacles or several rings of many, smaller, feathery ones. These tentacles are covered with the stinging cells, or nematocysts, that earn the Phylum its name. The nematocysts are sensitive to protein, with the slightest stimulation causing them to release, at high speed, a penetrating barb that injects venom into the tissue of the victim. There are thousands of these nematocysts and large numbers will be activated simultaneously causing considerable venom injection and an overwhelming of the unfortunate victim.





## Clownfish immunity

The make up of the mucus coating present on the skin of Clownfish endows them with immunity against the stinging nematocysts and leads to the amazing relationship between these two creatures. Such relationships, where each species live in close proximity to the benefit of both are termed symbiotic. In truth this particular affair is rather one sided as the Clownfish gains protection whilst the Anemone does not seem to benefit, leading to suggestions that it is not a truly symbiotic relationship. Observations that the Anemone may gain from the remains of food brought back by the Clownfish are regarded as a tank based phenomenon that is not relevant in the natural habitat.

## The relationship: aquarium versus natural habitat

In their normal habitat all Clownfish are found in association with an Anemone and so derive protection from predators on the reef. Only the largest Clownfish will stray from the safety of the tentacles and even then by only a few feet, the smaller Clownfish will hug the tentacles.

The captive environment brings one great change to this relationship by removing the predators. Consequently, although wild caught Clownfish will always seek out an anemone in a tank, many seem equally happy without one. However, it tends to be the larger or more aggressive species that adapt to an Anemone-free tank life, whilst more timid species can suffer badly.

Another change in the aquarium is that the readiness to share an Anemone on the reef disappears abruptly once a Clownfish is settled in a tank and its territorial instincts become enhanced. Apart from a pair of Clownfish, a group of juveniles, or two Clownfish of very differing sizes, Clownfish will not share an Anemone, instead they will viciously defend their station against all comers, other Clownfish included.



## Not playing the game

Two Anemones seen for sale have no relationship with Clownfish and apart from a brief mention will not feature in this article. Both are found in the Caribbean, where there are no Clownfish. They are *Pachycerianthus mana* (Tube or Fireworks Anemone) and *Condylactis gigantea*.

**far left** Sand Anemone and Common Clownfish, *Heteractis aurora* and *Amphiprion ocellaris*.

**top of page** Purple Base Anemone and Skunk Clown, *Heteractis magnifica* and *Amphiprion akallopisos*.

**above** Carpet Anemone and Two-banded Anemonefish, *Stichodactyla gigantea* and *Amphiprion clarkii*.



## IMAGES OF THE CORAL REEF



**left** Carpet Anemone and Two-banded Anemonefish, *Stichodactyla mertensii* and *Amphiprion clarkii*.

**below** The Common Clownfish (*Amphiprion ocellaris*) are now being bred in captivity in large quantities. This pair are part of TMC's breeding programme and are nursing a recently laid batch of eggs.

**right** A few months later and the young Common Clowns are ready to be sold to aquarium shops.

*Condylactis* are easy to feed and require only moderate light levels hence they are fairly easy to keep. As its name suggests the Fireworks Anemone is a spectacular sight but its powerful sting and eight inch long flowing tentacles make it a serious hazard to other invertebrates and fish.

## Requirements of Anemones in captivity

Anemones have a symbiotic relationship with single celled algae, known as Zooanthellae, that reside within the tissues of the Anemone. The algae are photosynthetic, i.e., they utilise sunlight to produce their energy requirements. The Anemones are thought to derive most of their energy requirements through the Zooanthellae's activity whilst the algae themselves appear to utilise vital trace elements from the Anemone's waste products. The relationship is a true symbiotic one as it brings benefits to both species.

The photosynthetic nature of the algae demands that adequate lighting is provided for any tank housing Anemones. Lighting should be via specialist daylight marine tubes or metal halides. Anemones are sensitive creatures and as such demand excellent water conditions and are not suitable for a beginner until a little experience has been obtained. They also require at least a moderate water flow around them. Occasional deflation to a fraction of their normal size should not cause alarm as they are merely expelling accumulations of unwanted waste products.

If after the initial settling in period your Anemone continues to wander around the tank, then you have a problem. Such behaviour is an indication that the Anemone is not happy with the conditions in the tank. It could be water quality, lighting levels, attack from other invertebrates or poor water circulation.

## Anemones commonly available to the hobby

### *Heteractis aurora* (Sand Anemone)

As the name suggests this Anemone (previously called *Radianthus simplex*) is found anchored to a sandy base. It has a limited attraction for Clownfish although several Amphiprion have been reported as pairing up with it if a more suitable species is not available.

### *Heteractis magnifica* (*H. Ritteri* in some texts)

These two very similar Anemones are sold as *H. magnifica* and/or *H. Ritteri*, previously being known as *Radianthus Ritteri*. These Anemones are readily accepted by many Clownfish and are relatively hardy, thus making them one of the best choices for the marine tank.

### *Heteractis malu*

Another relatively easy Anemone that Clownfish will readily associate with. Previously called





*Radianthus malu* or *Marcranthea cooki*.

#### Bubble Anemones

As typifies Anemones the common term has been used to cover different species. The species previously known as *Radianthus gelam* is now known as *Entacmaea quadricolor*. They readily play host to Anemone fish in their natural environment.



#### Stichodactyla (Carpet Anemones)

Previously known as *Stichactis* species these Anemones were once common in the hobby but are now rare and expensive. They are not easy to keep and possess strong stings that they will readily use on other tank mates. Therefore, despite being attractive to many Clownfish they are not really to be recommended.

#### *Anthopsis koseirensis* (Pink Malu Anemone)

A beautiful species, similar to, or even a sub species of *Heteractis malu*, that possesses pink tips to its tentacles. Many Clownfish will readily use this Anemone.

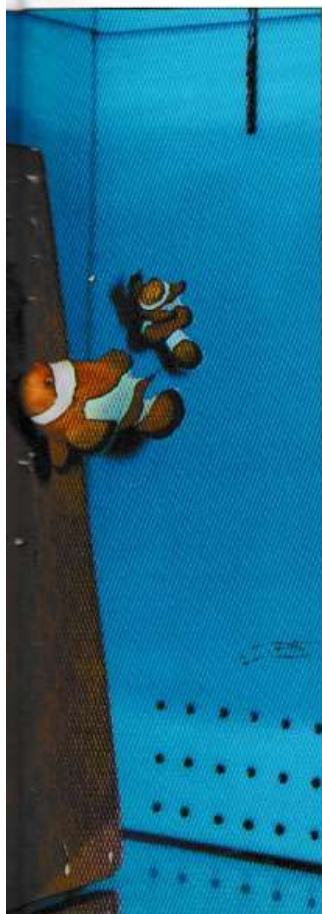
### Clownfish requirements in captivity

The Clownfish listed below are found in various regions of the Indo-Pacific where they will reach sizes at least half as big again as the quoted aquarium sizes. They will all readily associate with Anemones, at least the wild caught specimens do (and thereby hangs a tale). I have two tank bred and raised black vari-

eties of *A. ocellaris*. I was warned when I purchased them that they may not take to an Anemone and sure enough they will not go near one. Having seen a group of three week old *A. ocellaris* take up residence in an Anemone on their first ever glimpse of one (it was still in someone's hand at the time whilst being placed into position in the tank!), this came as quite a surprise to me.

Being omnivorous means Clownfish are easy to feed taking a variety of food such as small live food, flake, algae and vegetable based food, and frozen foods such as small crustaceans. The species listed are the commonest, relatively hardy ones.

Anemonefish can be paired and will spawn in captivity and unless stated otherwise all the following species have all been bred and raised in captivity, indeed many commercially raised fish are now available to the hobbyist and should be purchased wherever possible, as opposed to taking fish from their natural habitat. Breeding represents a great interest and challenge for the experienced marine aquarist and with this in mind I would recommend the excellent book by Joyce Wilkerson.



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## IMAGES OF THE CORAL REEF

## Species commonly available

*Amphiprion akallopisos* (Skunk Clown)

A small, peaceful, Anemone dependent species, only reaching two inches in captivity, found throughout the Indo-Pacific region where its preferred host is *H. magnifica*.

*A. clarkii* (Two-banded Anemonefish)

A peaceful, wide ranging species attaining a length of three inches in the aquarium. Readily chooses an Anemone and is not too fussy, being found with *Heteractis aurora*, *H. crispata*, *H. malu*, *Entacmaea quadricolor*, *Stichodactylus gigantea* or *S. mertensii*. However, it also appears to exist quite happily in captivity without an Anemone.

*A. ephippium* and *A. frenatus* (Tomato Clowns)

Two very similar species. They attain a tank size of three inches and associate readily with Anemones appearing to prefer *H. crispata* or *E. quadricolor*. Both may show aggressive tendencies in captivity.

*A. ocellaris* and *A. percula* (Common Clown, Percula Clown, False Common Clown)

These are smaller species only reaching two to two and a half inches in the aquarium. The common names suggest a confusion with these species. Some authorities consider the two species as a single related species whilst others classify them separately. Both of these fish epitomise the picture of the Clown/Anemone relationship. They are found in the Indo-Pacific with *A. percula* having a more Southerly distribution. Both will readily associate with *H. magnifica* or *Stichodactyla* Anemones and as they mature in captivity they will defend their Anemones quite aggressively. There is a commonly held belief that *A. ocellaris* is the hardier of the two.

*A. perideraion* (Pink Skunk)

The widespread Pink Skunk is a shy fish that remains small in captivity at a maximum of two inches. To succeed it will need an Anemone, with *H. magnifica* being the preferred host.

*A. polymnus* (Saddle-back Clown)

The range of this species is the Western Pacific. This aggressive species will reach three inches in captivity and prefers as its host *H. crispata* or *Stichodactylus*. I assume captive breeding is possible although I could find no mention of it.

*A. sebae*

A Clownfish from the North West Indian Ocean that will reach three inches in the

aquarium. The host anemone appears to be *Stichodactyla* but I have seen this species, which can be aggressive, exist quite happily without one. I can find no record of captive breeding.

*Premnas biaculeatus* (Maroon Clown)

The female of this Indian Ocean species may reach four inches in your tank although the male will remain smaller. An aggressive species that will associate with Anemones but like other larger aggressive species it seems perfectly happy in captivity without one.

## Sex

(see Dr Allen's reference, chapter 4)

I would like to conclude with a few notes on the amazing sex life of the Clownfish.

A group of Clownfish, consisting of a mature pair of fish and a number of sub adults, will live within the protective tentacles of a host Anemone. The largest fish will be the female whilst the next largest will be her sexually mature mate and this fish will keep his position as the dominant male by displays of aggression towards the sub-adults. This strict hierarchy is also maintained amongst the sexually immature sub-adults with the larger ones exerting their authority over smaller fish. If the female is lost then within two weeks her partner will have changed sex to become the female.

The most dominant sub adult will then exhibit rapid growth and become the new mature male partner. Dr Allen states that it is the Clownfish's dependence on an Anemone that makes sex changes essential to ensure survival of the species. If sex changes could not occur then the death of one of the dominant pair would leave a 50 per cent chance of the dominant fish being the same sex. The fish would then have to leave the Anemones protection in search of new partners.

However, it has been shown that Clownfish that are released away from their host Anemone quickly fall prey to predators, hence a trip to another site in search of a new partner, plus the attempted eviction of the resident fish, would be too hazardous — the sex change routine makes such a journey unnecessary.

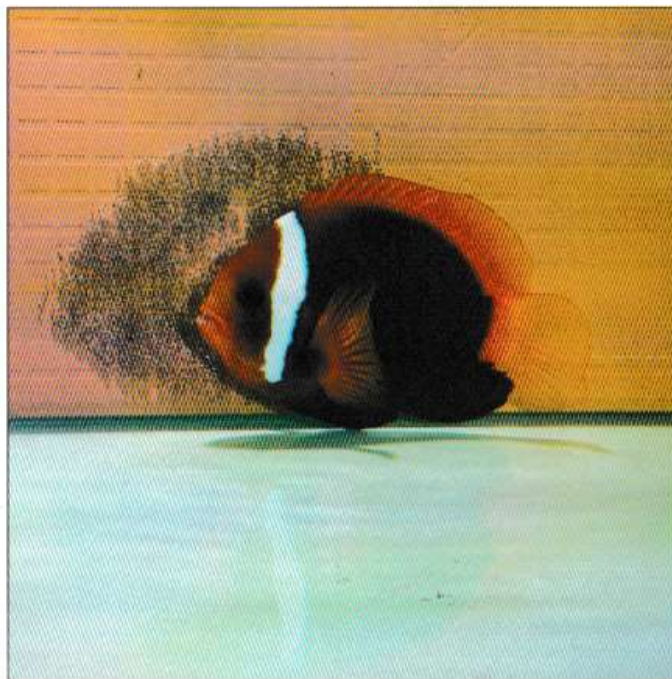
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- Dr Gerald R. Allen. *Anemonefish of the World*. Aquarium Systems, 1979.  
 Martin Haywood and Sue Wells. *The Interpet Manual of Marine Invertebrates*. Salamander, 1989.  
 Bob Goemans. *Marine Fish Monthly*, Salt Corner: Anemonefishes, December 1998.

## Further Reading

- Clownfishes*. Joyce Wilkerson. ISBN 1-890087-04-1. £22.

**left** Tomato Clowns (*A. frenatus*) are also being bred in quantity at TMC.





Derek Lambert's  
**Cutting Edge**

PHOTOGRAPHS BY DEREK LAMBERT UNLESS OTHERWISE STATED

• In this 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

Over the years there have been a number of fish which have been a challenge to devoted fish breeders all over the world. A statement such as "Breeding: not precisely known", throws down the gauntlet to breeders. I have no idea why this should happen but it works every time for me.

Even if the fish concerned is probably just a simple egg-scatterer I have to try breeding it just to be sure. This is all very well when it is a beautiful fish which will sell like "hot cakes" once I have hundreds of them spare. The trouble is I even have to try with nondescript fish

which will only fetch a few pennies in even the best auction.

One such nondescript fish which I have recently bred in large numbers is *Microrasbora rubescens*. The few references to this species that I could find suggested it was a typical egg-scatterer, and not particularly diffi-

cult to breed. The remarks, however, were vague enough to leave a doubt in my mind. This species is closely allied to *Rasbora* and belongs to a genus I had never spawned before. This gave me an added incentive to try as *Rasbora*s are considered to be one of the more difficult groups to breed and so remain a challenge.

I set my group up in rainwater which had been acidified with peat. A few mops were placed on the bottom and the group were fed with lots of small live foods. Within a few days the group spawned into the mops and produced several hundred eggs. The adults were then removed and several days later the fry were free swimming.

These proved to be some of the smallest fry of any egg-layer I have come across. Infusoria was fed for a full two weeks before even the largest were big enough to move on to newly hatched Brine shrimp. Once taking this live food they soon put on length and depth and reached adult size (2cm) in less than eight months.

Whilst breeding this sort of oddball is quite rare, there are other species which fishkeepers the world over have been trying to succeed with for a long time. One of the most notable is *Poecilocharax weitzmani* — Black Darter tetra. This beautiful little fish has always been thought of as one of the characins which cares for its young, but precisely how it does this has not been known. In the end it was discovered that the pair spawn in a cave with only a small opening. This allows the male's over-sized head to poke out and intimidate any fish which comes near its territory.

**top left** *Botia nigrolineata*, a recent import which had many aquarists wondering if it was *Botia siathimunki*.

**left** *Poecilocharax weitzmani* has only been bred in captivity a few times but now solid information is known about how it reproduces more aquarists should be successful.

PHOTOGRAPH: MAX GIBES







**left** *Microrasbora rubescens*, male. A nondescript fish which is closely allied to Rasboras and belongs to a genus I had never spawned before.

When I bred this fish an upturned pot was used for the small drainage hole enlarged until it was just big enough for the pair to pass through. The tank was only 12 x 8 x 8 inches and had a peat substrate and some plant cover. The water was very soft (maximum 50ppm) and acidic (pH 5.5-6.0) and the temperature was set at 76-80°F.

The female spent most of her time lurking amongst plants whilst the male took up residence in the pot, only venturing forth when food was placed in the aquarium. This consisted of Brine shrimp and Grindal worms. Once the pair were in breeding condition (this took some time as my fish were newly imported and very thin) they started courting.

Eventually the female followed the male back into the pot. Here spawning occurred and several hundred eggs were laid on the vertical pot side. These took about five days to hatch during which time mother stayed next to them to fan and care for them. Once free swimming I removed both parents and started feeding them on infusoria.

They took Brine shrimp from about the fifth day onwards and could even manage Micro worms as soon as they were free swimming.

The youngsters were sexable at 2cm in body length, by which time the males larger and more colourful finnage had started to develop. Now this species has been bred in captivity a few times, things look set for the other member of this genus — *Poecilocharax bovallii*. This species is much rarer in the hobby and to be honest I have never seen it in real life.

The few pictures I have looked at (a pair illustrated in Baensch

Aquarium Atlas Photo Index 1-5) makes them appear to be fairly similar in body and fin shape but with less colour. Specimens of this species were apparently imported to Europe in 1991 but no one managed to breed them then and they have probably not been offered on trade lists since.

Even *Poecilocharax weitzmani* is rarely imported of its own accord but turns up as a bi-catch with Cardinal Tetras.

Moving on to recent interesting imports, a Loach has been baffling aquarists for a few years now. They were originally imported as *Botia sidhimunki* but were found to grow much larger and tended to remain a lot slimmer. They have now been identified as *Botia nigrolineata* — Black-lined Botia.

This species was described by Kottelat and Chu in 1987 and comes from the Yunnan Province of China. They reach about 7cm in length and make wonderful community fish. Interestingly, a number of true Chain Botia have been arriving in the UK with shipments of this new loach and appear to come from the same area.

Finally this month I have to report on three new species of Catfish to have been described by German scientist Dr Joachim Knaack. The first is a new member of the Ancistrus genus. *Ancistrus claro* (Knaack, 1999) was originally known as the Vermicular-lined antenna catfish and first reached Europe in 1993. This pretty little species grows to about 8cm and is one of the more attractive members of this genus.

It comes from the Rio Claro,



**below** *Botia sidhimunki*, the Chain botia, is a well known fish which has been popular in the hobby for many years.

Rio Coxipo and several of its smaller western tributaries. Females are darker in coloration and have spots rather than vermiculations. Males also have the huge "bristles" which this genus is famous for.

The next species described is a new *Hypostomus* species. *Hypostomus mutuae* (Knaack, 1999) comes from the Rio Mutuca which is part of the Mato Grosso area of Brazil. Until now it was referred to in Glaser & Glaser *Aqualog: Loricariidae* (1995) as LDA 09 — "Golden-Black-Spot" *Hypostomus*. It is far less attractive than the previous species and the common name may have more to do with wishful thinking than reality although it does change colour depending upon mood, so the photographs may not have done it justice. From these it appears to be a light brown fish with darker brown spots. Maximum size appears to be 12cm.

The third species in the series is another *Ancistrus*. *Ancistrus cuiabae* (Knaack, 1999) comes from 36km SE Pocone, Pantanal, Mato Grosso, Brazil. The type locality is a permanent remnant water of Rio Bento.

Whilst I have been fishing in many different parts of the world this is one habitat I don't think I would like to visit. Spectacled caiman (Alligators to you and me!) lined the river banks here

watching whilst specimens of this new species of Catfish were being collected.

This new *Ancistrus* looks like it will be a tremendous hit once it is readily available. The body colour is reddish-brown to almost black with fine white to yellowish spots all over. Males have distinctive "bristles" but otherwise the sexes are similar. Males apparently fight for territory, so it would be best to keep a single pair or possibly one male with several females in a well planted aquarium. Include plenty of bogwood as this will be used to hide behind or in during daylight hours. Maximum size appears to be approximately 11cm.

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- Knaack, J. 1999. A New Species of Bristlenose Catfish of the Genus *Ancistrus* Kner 1854 from the Mato Grosso, Brazil (Pisces, Siluriforms, Loricariidae). *Tropical Fish Hobbyist*, Vol XLVII, No 10, pages 70-76.
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# NewsDesk

## OBITUARY

### KEITH BANNISTER (1942-1999)

As a child Keith knew what he wanted to do, he wanted to work with fish, but, more than that he wanted to become an ichthyologist, and that is what he did. He was working at the Natural History Museum when I first met him, a kind of "mad-scientist" character who would shriek with delight when he came across something of interest and demand that everyone in the vicinity come and a gaze in wonder at ... a dissected barb! A few years later he was involved in organising a London university Extra Mural course at the Museum which was extremely well attended by students and aquarists, providing a solid foundation in the understanding of fish. Keith's particular talent was his ability to communicate at all levels and, if you showed an interest, he would go out of his way to help and guide you.

Keith worked mainly on African barbs, but such was his interest in natural history, he also encompassed, among other things, such diverse topics as blind Cave fishes, the food of Otters and Fossils of the Sahara. He spent much time in Africa, a continent he loved, collecting and documenting the fishes of various regions.

When he left the museum, Keith became an aquatic consultant preparing reports for the RSPCA and CITES on the aquarium trade, he edited or was an associate editor of various Journals and he lectured widely both in the UK and overseas. His last visit to Africa was as a liaison officer to coordinate a biodiversity project on Lake Tanganyika. It was during this time that he fell ill and, on one of his trips home, was diagnosed with pancreatic cancer. Scientist to the end, Keith enrolled on various experimental projects to discover more about this disease, as always hoping that some good would come from it.

Keith saw the best in everyone regardless of age or sex or colour or creed. He was never happier than when he was sharing a delight of the natural world, from a beautiful sunset, to a tiny glow-worm, or the intricacies of a fish skull, to the skill of a spider spinning its web. He was one of the old time scientists, working for the sheer pleasure of what was to be discovered and freely passing on this knowledge. His infectious enthusiasm and sense of humour endeared him to all.

GINA SANDFORD

## Terry Hill awarded Bronze Medal

Terry Hill, of The Koi Pond Konstruction Kompany, won the Bronze Medal at Hampton Court International Flower Show.

Last month Dick Mills reported on the Hampton Court

Flower Show and mentioned how good Tetra's "Taste of Japan" water garden was. Dick, however, was unaware that Terry Hill designed and built the garden from scratch. The whole project took months from conception to completion and involved Terry in weeks of work building the bridge by hand in his own workshop.



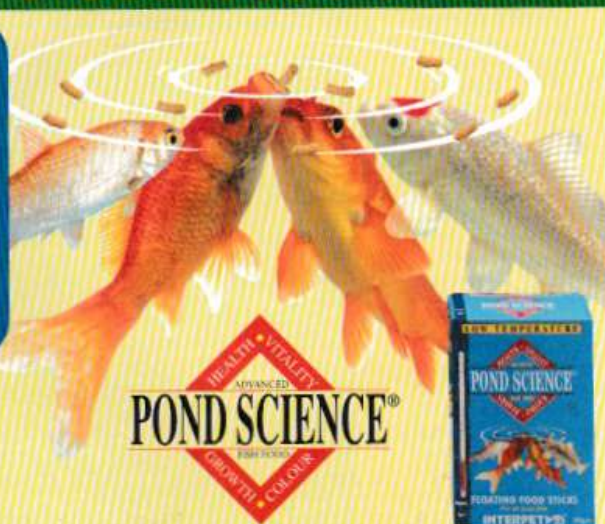
## THIS QUIZ SHOULD GIVE YOU FOOD FOR THOUGHT

	True	False
Fish don't need food in the winter	<input type="checkbox"/>	<input type="checkbox"/>
Wheatgerm is best for fish in the cold	<input type="checkbox"/>	<input type="checkbox"/>
All fish are prone to disease in the spring	<input type="checkbox"/>	<input type="checkbox"/>

If you answered true to any of these questions, you may be surprised to hear that not only can fish feed down to 5°C, they also find wheatgerm less digestible in cold weather.

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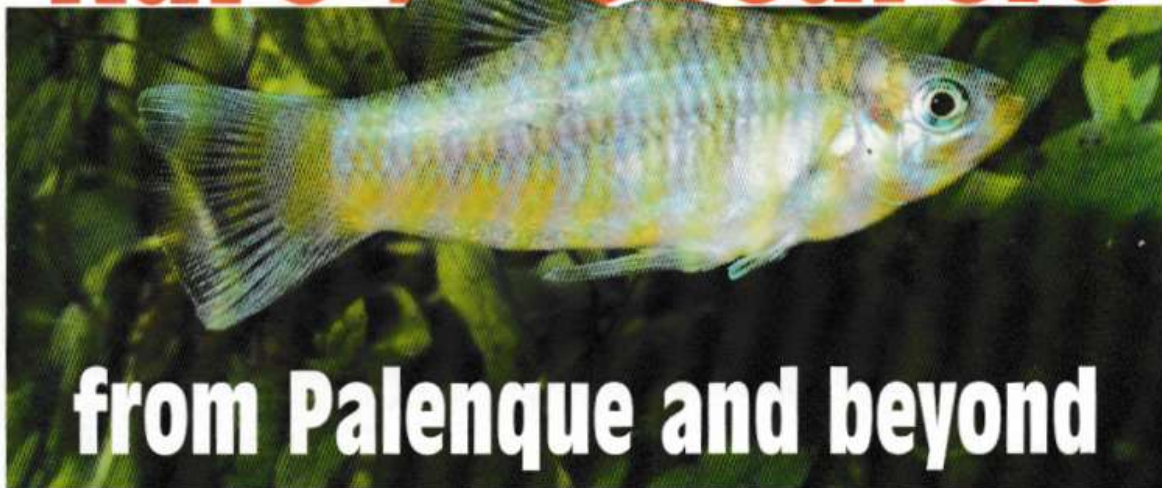


TROPICAL

PAULINE LAMBERT treks through Mexico's jungles in search of livebearers:

PHOTOGRAPHS: DEREK LAMBERT

# Rare Livebearers



## from Palenque and beyond

**M**any years ago explorers hacked their way through tropical rainforest to discover the astonishingly beautiful Mayan ruins at Palenque. These ruins stand on the edge of the Chiapas escarpment of Southern Mexico surrounded by forested hills overlooking the vivid green Guatemalan jungle beyond.

In recent times I drove a Volkswagen Beetle from the flat coastal plains surrounding Villa Hermosa to make my own discoveries — the livebearers of Palenque and areas within easy reach of there. As a dedicated livebearer enthusiast this region is a treasury of fishes for me.

Whilst staying in Palenque I started my fishing in the Hotel Nututum grounds, through which a wide and fast moving river flows. This was my first experience in using a seine net which I found rather hard to control. I knew that *Priapella compressa* were swimming around in this river. They nibbled at my legs and I could see them quite clearly in the crystal clear water, but all I could catch were hundreds of *Astynax mexicana* which leapt into a seine net which was becoming increasingly difficult to handle in the strong current. I gave up when I lost my shoes and my hat!

I decided that it might be a good idea to head for the ruins which were close by. On my way — a few minutes down the road in fact — I spotted a stream running through the fields. This looked promising — the promise was fulfilled — soon I was surrounded by hundreds of livebearers: *Priapella compressa*, *Xiphophorus helleri*, *Belonesox belizanus*, *Pseudoxiphophorus bimaculatus* and *Heterophallus echeagarayi*.

### The Golden Blue-eyed Livebearer

*Priapella compressa* belongs to the family Poeciliidae and was described by Alvarez in 1948. It is found in numerous locations in the Rio Grijalva system, Chiapas, Mexico. This is a robust, chunky fish growing to 5cm females and 3.5cm males. The overall colour of the body and caudal fin is golden yellow with an iridescent green sheen suffusing the upper part of the body. The dorsal and caudal fins are edged in

white. The common name for this species is the Golden Blue-eyed Livebearer which aptly describes the lovely body coloration and the deep blue eyes of young specimens.

The Golden Blue-eyed Livebearer is a lively species which is best kept in a large, planted aquarium with good filtration. Frequent partial water changes are a good idea. The tank needs a tight fitting lid for this is a great jumper. The breeding pattern is rather erratic and, as females have no gravid spot and are chunky fish anyway, it is difficult to see when they are pregnant. Some fry may survive in a heavily planted species colony tank but for greater success it is best to remove the female to a breeding tank thick with plants.

Pike Livebearers — *Belonesox belizanus* — were described by Knor in 1860 and are another member of the family Poeciliidae. They are long, slender, predatory fish growing to 10cm males and 18cm females. They lurk amongst the heavy vegetation and with their sharp, backward pointing needle-like teeth wait for the next meal to swim along.

In the aquarium, this species can be trained from birth to take other foods than live fish, however, a diet of live fish is essential if maximum size is to be attained and you hope to successfully breed it. The Pike Livebearer is easy to keep but feeding new horns can be a real problem. I had a very large female who gave birth to 200 fry. They were thin and needle-like in appearance and were about 2cm long. I watched their birth and when she passed the 100 mark I called out "Stop!" but she took no notice and carried on. Each of these new-born fry would require a baby fish a day to become healthy, robust youngsters. I was very worried. I had to take them by the bucketful to the wholesalers who were pleased to take them off my hands.

Beautiful as this fish is, with its green back and blue sides flecked with gold, I decided there was more room for them in the Rio Michol, Palenque than there would be in my tanks when they started to breed. I left them well alone.

The *Xiphophorus helleri* found in the Rio Michol are one of the numerous colour forms found in the Atlantic drainage systems of Mexico. Wild





**far left** *Priapella compressa*, the Golden Blue-eyed Livebearer, is a lively species which is best kept in a large, planted aquarium with good filtration.

**left** *Heterophallus echeagarayi*, the Palenque Flyer, and with its large pectoral fins, which resemble wings, is aptly named.

*helleri* Swordtails can grow to 14cm even 22cm with sword, but size in the wild is very variable. This species has been hybridised with the Platy to produce the many beautiful colour varieties you see in the shops. The Swordtails in the Rio Michol were not very large but were very colourful. Swordtails of the *helleri* type are very easy to keep and breed. They need large tanks with good filtration and regular partial water changes.

## The Palenque Flyer

*Heterophallus echeagarayi* was described by Alvarez in 1952. The common name is the Palenque Flier and with its large pectoral fins, which resemble wings, this fish is aptly named (the common name is also much easier to remember and pronounce). The fish is easy to spot from above because of the shining scales on the head. It swims just under the surface in the deeper parts of the stream to which it descends when it sees your net, this makes it very difficult to catch. The Palenque Flier is a rather nondescript fish in poor lighting but, in sunlight it can be quite stunning, being a lovely shade of blue with a caudal fin edged in black and a black spot in the dorsal.

It is a very small species with males growing to 2.5cm and females to 3.5cm and has, so far, only been found at this one location. With its upturned mouth it enjoys insects caught at the surface. Wingless fruit flies are a favourite food in the aquarium. The Palenque Flier is an agile escapee so a tight fitting lid is required. Although closely related

to *Gambusia*, it is quite peaceful. Average brood sizes in my tanks have been 15 but the fry will be eaten, so you need to trap the females to save the fry. I hate trapping fish but sometimes it is the only way to save the babies.

I sat on the low footbridge, in the shade of a tree by the Rio Michol and was loathe to leave but eventually I did reach the Mayan ruins where exploration was very hot work in the steamy heat of the tropical rain forest.

Several days passed, I visited the magnificent falls at Aqua Azul where *Priapella compressa* were to be seen yet again. A short drive further on and I arrived at the spectacular waterfall of Misol-Ha where an, as yet, undescribed species of *Priapella* has been discovered. With "No Fishing" signs posted all over the site I decided to leave the new species

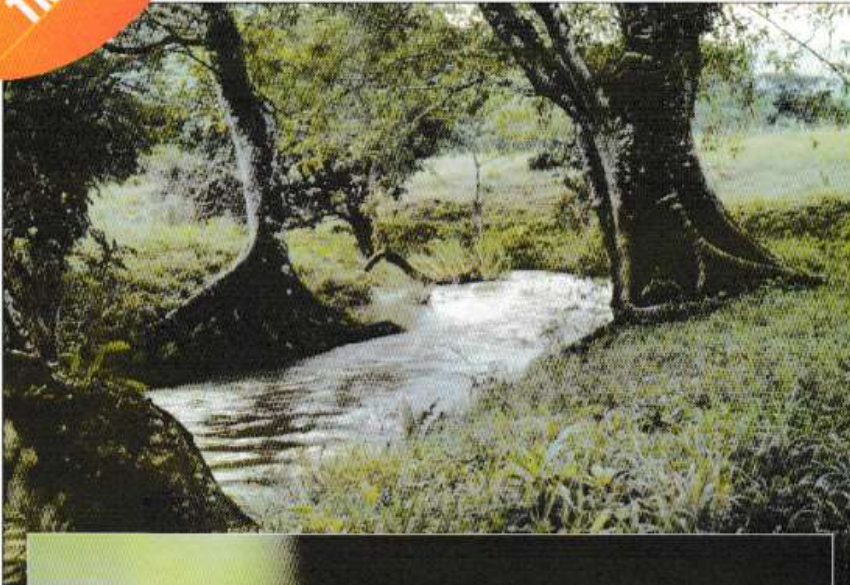


**right** *Poecilia sulphuraria*, the Sulphur Molly, is a very rare and desirable small Molly.



TROPICAL

## RARE LIVEBEARERS ... from Palenque and beyond



**top of page** The Rio Michol, home to several species of livebearers — *Priapella compressa*, *Xiphophorus helleri*, *Belonesox belizanus*, *Pseudoxiphophorus bimaculatus* and *Heterophallus echeagarayi*.

**above** Pike livebearers, *Belonesox belizanus*, are long, slender, predatory fish growing to 10cm males and 18cm females.

**right** Banas del azufre, the sulphur springs at this popular Mexican holiday spot, are the only known habitats of *Poecilia sulphuraria*, the Sulphur Molly, and *Gambusia eurystoma*. Both species are very easy to catch as they are present in their hundreds of thousands.



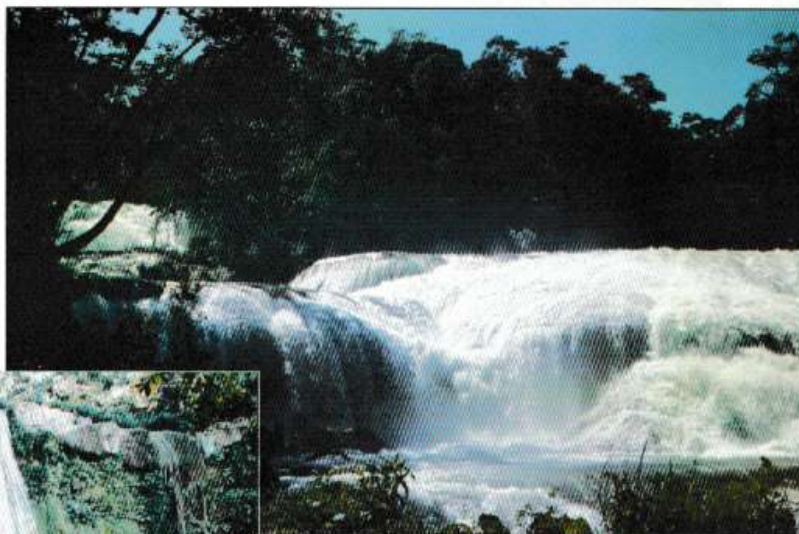
where it was. Then I moved on to search for other livebearers within easy reach of Palenque.

It was quite a long drive to Banas del azufre but well worth the journey. I like small Mollies and the Molly at this location is a little beauty. I have found Mollies, on the whole, easy to breed, but its a certainty that the one that is so desirable and so lovely should prove itself to be rather difficult to keep and breed in the aquarium. Found in the sulphur springs at a popular Mexican holiday spot, *Poecilia sulphuraria*, the Sulphur Molly, is easy to catch as it swims in the sulphurous waters in its hundreds of thousands. The water, however, turns milky white in the bucket and the sulphurous smell takes a long time to dissipate.

*Poecilia sulphuraria* was described by Alvarez in 1948 and has only been found in this one location. It is a very small species, males grow to 3cm and females to 3.5cm. The back is a gleaming silvery blue and vertical black lines run along the sides — faint or pronounced according to the mood of the fish. The fins are grey with black flecks. Courting males' finnage turns orangy yellow. Some



**right** The magnificent falls at Aqua Azul where *Priapella compressa* are to be seen yet again.



**below** The spectacular waterfall of Misol-Ha where an, as yet, undescribed species of *Priapella* has been discovered.



specimens have many black blotches on the body and can be almost totally black. The belly of a gravid female is deep turquoise blue.

## All foods devoured with relish

Sulphur Mollies are happiest in a shoal which moves as one when you approach the tank. In the shoal they are very lively but tend to sulk if you only have a pair. All foods are devoured with relish, they have large mouths for their size and are hungry all the time. So far, a long term successful breeding colony has not been established in aquarium conditions. I have had one or two small broods which could not be flock bred — Sulphur Mollies hunt their fry. Up till now I have only had one or two pairs and they have never looked completely happy. Now I have a good group of wild caught fish with mixed ages in a colony who appear to be

enjoying their aquarium life. I am waiting for them to breed. (But that's another story).

*Gambusia eurystoma* was described by Miller in 1975 and is sympatric with the Sulphur Molly. When I first saw this small *Gambusia* (males grow to 3cm females to 3.5) I found it very dull in colour, but in the aquarium at home it is quite lovely — even the young fry, a few weeks old now, are showing the blue sheen over much of the body. The fins are black speckled. My female had to be trapped to save the fry and her first brood was six. They were quite large at birth and are looking good on the twice daily feeds of Brine Shrimp supplemented by fry food. This is a species we are learning more about now, for it is a fish that has rarely been maintained in the hobby. It is indeed a fish that is on the cutting edge of the Livebearer world.

I hope that through this article I have introduced you to a few of the rare livebearers of Mexico which you are unlikely to see in the shops.

## Find out more

If you wish to find out more about rare livebearers why not join Viviparous — The Livebearer Information Service? Membership is £10 a year. Contact Roger Winter, "Simmondley", Peppard Road, Sonning Common, Reading, RG4 9NJ, for further details or send a cheque or PO made payable to The Livebearer Information Service.

## A&P Fact File

All these livebearers were found in hard, neutral to alkaline water and have been successfully maintained and bred in my local water which is very hard and alkaline. The temperature ranges from 73°F to 76°F. All my fish receive daily feeds of Brine Shrimp, we also collect *Daphnia* from the local moat, Mosquito Larvae from our water butt and use a good quality flaked food as well. Chopped earthworms are a particular delicacy for the larger fish.



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# Ask A&P

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I have just purchased four *Xiphophorus clemenciae* from a breeder at the Tyne Tees A.A. Convention and was hoping you might be able to provide me with more information about them. The only book I have which mentions them says they are a very delicate species which is hard to breed and requires perfect water chemistry for success. Is this information correct?

A. Stephenson, Norfolk

*Xiphophorus clemenciae* — the Yellow swordtail — was for many years one of the most desirable of all swordtails. Part of its charm was its lovely blue and red striped body coloration and lemon yellow sword, together with its diminutive size (7cm at maximum). The other part of its charm, which really made it so desirable, was its total unavailability. For years it was always the fish other people knew someone who had a few. Of course they never had enough spare to pass some on to other aquarists, nor indeed did they even share any with their

best friend who is telling you about them having some. With the passing years myths grew up about them and despite many aquarists and scientists searching at the type locality very few were ever found.

It took Dr Klaus Kallman to discover that this species is really an inhabitant of small streams and is actually quite prolific in some areas. He then passed this information on to several aquarists and new collections arrived in the hobby during 1991.

The information in your book is typical of what was known of this fish about eight years ago before these new collections were made. Since then aquarists have found them to be much easier to keep and breed than their predecessors.

All the new collections come from small tributaries of the upper Rio Coatzacoalcos basin where the water is hard and moderately alkaline. During the rainy season they turn into fast flowing rivers with a water current is so fast you would have problems keeping your footage. In the dry season, however, these habitats are totally different. Water flow is reduced to barely a trickle and the water temperature during the day rises to above 80°F.

This seasonal variation means that *Xiphophorus clemenciae* has to be a fairly adaptable fish to survive in these habitats. In captivity they will tolerate a wide range of conditions providing the water is clean and there is some plant cover available. They eat a wide range of foods but their diet should ideally contain some live foods.

Otherwise they are much like ordinary Green Swordtails (*Xiphophorus helleri*) and will produce broods every four weeks. For such small fish they are remarkably productive with broods of up to 50 being recorded for a female only 5cms in body length. The fry grow quickly if well fed on newly hatched Brine shrimp and will start to sex out when they are four to six months old.

To obtain maximum adult size it is important to include strong filtration in the rearing tank which creates a water current. Internal power filters are ideal for this. The other important factors to growing the babies up to maximum size is cool water temperatures (maximum 74°F) and plenty of swimming room. House no more than 15 fry in a 24 inch long aquarium. A brood of 50 will need a 48 inch aquarium as a minimum.

left *Xiphophorus clemenciae* — one of the most desirable of all Swordtails.

PHOTOGRAPH: DEREK LAMBERT

Q Can you suggest some Cichlids which would be suitable for my 24 inch community aquarium? I have Platies, Zebra Danios, Dwarf Gouramis, Corydoras Catfish and a few Hatchet Fish at the moment. My water is very soft and slightly acidic. I have some caves and bogwood in my tank, as well as Amazon Swords and Cryptocoryne Plants which are all

growing nicely.

J. Rutherford, Devon

A Whilst many Cichlids are not suitable for a community aquarium like yours, there are a few which would do well in this situation. *Kribensis* (*Pelvicachromis pulcher*) are hardy and will mix well with other fish as will a number of *Apistogramma* species.



*P. ramirezi*, a good fish for community tanks.

PHOTOGRAPH: DEREK LAMBERT

Another really good choice which is commonly available and cheap would be Rams (*Papilochromis ramirezi*). Make sure you purchase captive bred fish as these will

take commercial flake foods without any problems. Wild specimens rarely adjust to flake foods and often have to be fed on live foods exclusively.



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.



DR DAVID FORD looks at a method of preparing water suitable for fishkeeping:

PHOTOGRAPHS: M.P. & C. PIEDNOIR

# Reverse Osmosis

## What it Does ... And What it Doesn't

**W**ater from Reverse Osmosis equipment isn't suitable for fish! It is, however, an ideal source of purified water for preparing water suitable for fishkeeping, especially marines and breeding specialist fish such as Discus.

Used alone it is just too pure for fish to live in — they need the mineral salts that RO takes out, even the softwater species. On the other hand, all but the very expensive commercial models let through some solutes, such as nitrates, that are a problem for some fish and all invertebrates. The smaller, less expensive models designed for the fishkeeper may be as much as 95 per cent efficient (however this will depend on the quality of the model you buy), so the water is not distilled quality, but still excellent for reducing hardness and eliminating toxic levels of chemicals.

### What is RO?

Imagine a semi-permeable membrane, i.e., a bag of liquid that allows some liquid to seep through. In fact, if that liquid is water, that is what you are! So too are your fish, indeed all living creatures on Earth. Nature exploits the fact that if a liquid one side of the membrane has more dissolved solids than liquid on the other side, there is a difference in pressure too (called osmotic pressure, because the process is called osmosis). Nature always tries to equalize pressures, so water from the less dilute side flows (seeps) through to the concentrated side, until both are equal solutions and the pressure difference becomes zero.

Freshwater fish have a higher osmotic pressure than their surrounding water (blood is thicker than water) so they are taking on board water all the while. They have to excrete this copiously and continuously, as fishy urine. Anything that interferes with this (e.g., heart failure, kidney problems, even general infections) causes the osmotic inflow to exceed the urinary outflow and the fish swells — which aquarists call "bloat" or "dropsy".

Marine fish have the opposite osmotic problem: their blood is less salty than the surrounding sea (their blood salt copies the primordial oceans where they developed many aeons ago). So water is drawn out of the fish by osmosis, hence marine fish drink the seawater and extract the lost water — this is why an ammonia crisis will stress freshwater



fish (who do not drink) but will kill Coral fishes within the hour.

Over to space technology. The Space Programme required water for their astronauts, so a simple, mechanical, recycling system was needed. Their scientists decided a process developed by a commercial company

**above** Discus breeders find water produced using RO units particularly valuable in hard water areas.





**left** RO units can be a useful piece of equipment for marinists, especially those wishing to keep living reef systems in high nitrate areas.

in the late 1960s, called "reverse osmosis" might meet their needs. This worked by increasing the pressure on "dirty" water so it was greater than the osmotic pressure, pushing clean water in the opposite direction through a membrane.

The principle was simple, the difficulty was finding an artificial membrane that would let water through and nothing else. Two compounds were successful, cellulose tri-acetate (CTA) and the more complex (and expensive) mixture named TFC (Thin Film Composite).

The area of membrane required for a meaningful flow of water was huge and space is at a premium for Apollo projects, so the sheet of CTA or TFC is wound like a roll of wallpaper and the tube inserted into a sealed container. Impure water pumped into this unit, sealed so a pressure can be applied, and the pure water is collected from a central pipe as it seeps through the membrane.

Commercial spin-offs meant cheap CTA-based units were developed for domestic use to give purified water for the general public worried about pollution of drinking waters. CTA is less effective than TFC (allows "leakage" rates of 90 per cent against up to 98 per cent for TFC) so when manufacturers built units for fishkeepers, the more expensive TFC was chosen (one reason the units are dear to buy, but this is offset by low running costs).

Dozens of models were developed and sold to the American aquarists and when they arrived in the UK the terminology and data were all in American-English. The flow rates are based on 24 hours of US gallons (17 per cent smaller than ours) and quoted at 77°F (no UK tapwater reaches this temperature).

## Designs for fishkeeping

The mains pressure of most UK tapwater supplies (of 30 to 40 psi) is just adequate to "push" pure water through the membrane in reverse osmosis. Do check with your local water authorities — if the mains pressure is lower than this, there is no point in purchasing a standard RO Unit, you will need to get a model that has an extra pump to increase water delivery pressure.

The size of the unit determines throughput; a fish-house will need more pure water than a single tank owner. A single, but large, aquarium need only use five gallons per week for top-up or part water changes, so there is no need for a unit that boasts 35 gallons a day (even if US gallons).

RO Units work best if run continuously. If shut down, the membranes can clog or become damaged by chlorine in the tapwater. Another factor is that continuous flow costs money where a water meter is fitted to the

household supply. However, the rejection ratio is about five to one, i.e., to get five gallons a week means 25 gallons flows through the Unit, giving an annual usage of just over 1,500 gallons or about £5 per year metered cost.

The rejected water need not be lost: it is high in mineral content and can be used for watering

house or garden plants providing they are not acid lovers.

## What do they cost?

Prices start around £100 for a basic unit, with a large unit (50 gallons a day) at £250, but add-ons can bring the total bill to many hundreds of pounds. However, running costs are pence per week. Replacement RO cartridges (containing new membranes) are around £20 and are only needed once every two, sometimes even three, years.

Note that pre- and post-filter units will need more frequent changes than the RO one. Especially the Carbon filter, used to remove chlorine before TFC membranes. This needs changing every six months. Check if your local water suppliers have started using chloramines, rather than chlorine. This can exhaust standard Carbon filters in a matter of days, so extra de-ionising filters will be needed. These are standard supply in the USA where chloramine is widely used. The American aquarists call them DI units and refer to the systems as RO-DI.

Many units have additional de-ionising "Pods" to overcome the nitrate problem and Prefilters to remove floating matter down to a micron in size. Mineral mixes are also sold to add-back the essential solutes to make the very pure water produced suitable for freshwater fishes.

In fact most manufacturers produce a host of add-on units for the technophile such as metering gauges, pumps, Carbon Filters (a useful addition because it removes chlorine, which can damage the membrane), Float Valves and collection containers, plus kits for connecting to the mains supply.

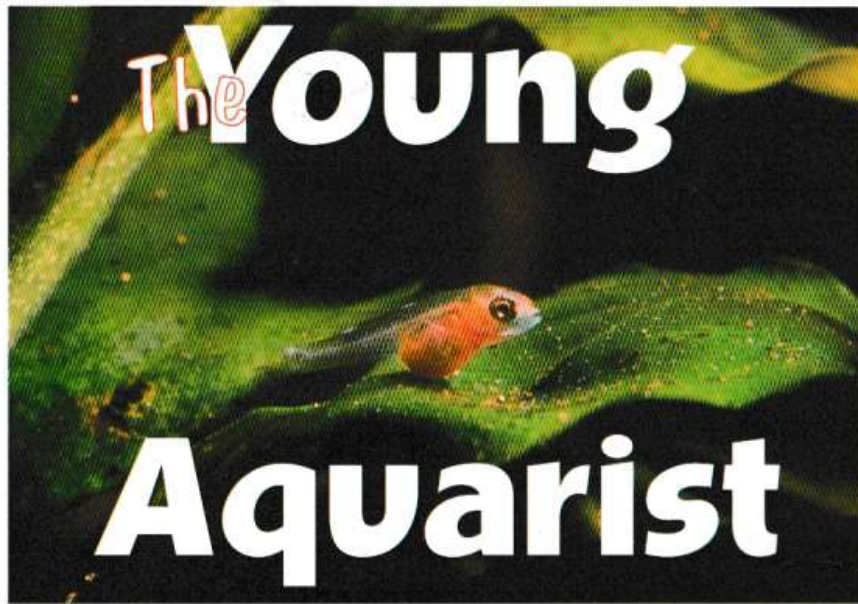
## Conclusions

In today's increasingly polluted waters the only method of guaranteeing pure water is by distillation, which is very expensive to set-up and to run. De-ionising (note: not ion-exchange) water is less expensive but complicated and needs constant attention and replacement.

The simple and cost effective method is Reverse Osmosis, but the drawbacks listed above need to be considered. The answer is for Aquatic Retailers to install commercial units and sell the pure water and certainly every Aquarium Club should have a unit for members to call on. They are an essential system for marinists, especially living reef systems, and those wishing to breed Discus.

We ordinary aquarists, however, with the tropical tank or pet Goldfish, can rely on good old British tapwater and leave the RO systems to the technophiles.





PHOTOGRAPH: M.P. & C. PIEDNOR

It was a very exciting day when we went to buy the "home" for our fish. We bought a 24x12x12 inch tank complete with hood and light, a heater/thermostat, gravel and a sub-gravel filter with airline, airstone and small pump. Sub gravel filters are the cheapest to buy and are very efficient. A friend of ours runs a shop and uses them in all his tanks and many of them have been running for 10 years. These filters are flat plates with an uplift tube and are placed on the bottom of the aquarium and covered with gravel to a depth of about three inches. Medium pea-sized gravel is the best for general purposes. We also bought a selection of hardy plants but at this point in time we did not buy any fish.

### Top Tips

- During the running in period the Heater/stat should be tested to make sure that the temperature remains within the safe limits. I've known these to malfunction — so test it out (you don't want cooked or frozen fish in your tank, do you?)
- All gravel should be thoroughly cleaned (ugh! I hate this job). Place the gravel in a bucket, cover with water and turn the gravel over and over, rinse and repeat in fresh water over and over again.
- Position your tank where it pleases you. Do not place it in front of a window (unless you want water that looks like pea soup). Do

not place it on an unsupported shelf (we did this until the shelf started to bend under the weight of all that water).

### Preparing a home for your fishes

After laying the assembled undergravel filter on the aquarium base cover with the washed gravel. Then put your ornaments, rocks etc. in position and place an upside down saucer above the surface of the gravel. Train a gently flowing stream of water onto it (this avoids disturbing the gravel too much which brings up cloudy bits yet again!).

Half fill the tank with tap water if you intend to have plants (it's much easier to plant up a half filled tank than a full one). The furnishing of your tank is up to you. You may want ornaments, rocks, bogwood or just plants but, whatever you decide, everything must be washed thoroughly. Remember the shy fishes appreciate caves and hidey holes.

Plants should be washed in a mild salt solution and rinsed in fresh water to get rid of any snails' eggs (snails can become a problem — I'll tell you a tale about a snail in a future column). You will have to experiment a little with plants as their success depends on water conditions, lighting and tank site. Don't be too disappointed if you fail. We have, frequently. Note well that the difficult plants are usually

the most expensive. *Cobomba* is a reasonably cheap one and looks good when you buy it but we did not have much success with it in the early days.

Of all the plants that I have used in an aquarium the most versatile is *Valsneria spiralis*, but you need many plants for it to look good. It will probably be short when you buy it but it can grow very tall. Whatever you use to furnish your tank, leave plenty of open swimming room at the front.

When everything is in position fill up the tank and turn on the light. You should try 12 hours on to start with if your tank is in a shady corner, but if you don't have any plants in the tank you only need the light on when you want to look at your fish.

Now, leave the tank for a few days to settle, for water temperature adjustment and for plants to root. At this point you need what every good aquarist needs ... patience.

Soon you'll be ready to go to the shops and buy your first fishes, we'll go there in next month's column.

See you then.

### Warning

All rockwork, gravel, etc., should be bought from your aquarium shop — not collected from a beach, river or field. Some rocks will dissolve in water and may cause serious problems for your fish.

Many of you reading this column will be keeping fish already. Have you had any problems or experiences you want to share with other young aquarists through this column? Do you need help? Then you can write to me at: Pat's Young Aquarist Page, Inline Magazines Ltd., Suite 4, Invicta Business Centre, Orbital Park, Ashford, Kent TN24 0HB. All letters which enclose a stamped addressed envelope will receive a personal reply regardless of whether your letter is published. Or you can also contact me directly by e-mail at: White.Shark@btinternet.com

See you next time ... **Pat**



# Fish Profiles



PHOTOGRAPH: DEREK LAMBERT

## Peppered Corydoras (*Corydoras paleatus*)

By Linda Lewis

This is arguably the best of the Corydoras catfish; it is certainly one of the most popular. The reasons for its popularity are many. Firstly, it is cheap and in plentiful supply. Secondly, for a catfish it is remarkably lively. Thirdly, it is attractive and small enough to earn its place in many a community tank.

When people who are not catfish fans are asked to describe a catfish they may use phrases such as ugly to look at, uninteresting, never do very much except sit on the bottom. In some ways of course, they may be right, for plant a single corydoras in a community tank and it will seem as though the world is turning without him. Animated only at feeding time, the small, plainly coloured fish will be easily overlooked. The transformation comes when you have a group of Peppers.

The body is covered in dark blotches, hence the peppered tag. When the fish is in good condition a metallic iridescence will appear. Most of the fins are without colour, but the caudal fin, or tail, is peppered like the rest of the body. The fun thing is that there is a difference between male and female. In most Corydoras species, the female's outline is different, plumper, than the males, but in Peppers there is another pointer too. When a male is mature and in breeding condition, his dorsal fin will grow until it is noticeably longer and much more pointed than that of the female.

Once you have a pair then it is almost inevitable that spawning will occur at some stage as long as water conditions are good. Spawning is a lengthy active affair with the male courting the female before the pair join up into what's known as the T position with the female's mouth joining the male's flank. This is the stage during which sperm is passed from male to female ensuring a high rate of fertilisation for any eggs. These are stuck anywhere there is a good water flow, often near the filter outlet.

Fry are easy to raise, and should be started on newly hatched brine shrimp once they are free swimming. Be warned though that the eggs can take up to eight days to hatch. As well as being easy to breed, Peppers are also easy in other ways. They are not fussy eaters and will take all kinds of food from flake to tablets, from live to frozen food, and they will not confine themselves to the substrate. Feed floating foods, and Peppers are likely to feed from the surface if this means getting their share. They are seldom still, often chasing each other as if in play, and making frequent dashes to the surface to take a gulp of air. If you're not sure about putting a catfish in your community tank, think again. Try a group of Peppers then sit back and watch the fun begin.

### PEPPERED CORYDORAS CV

FAMILY: Callichthyidae  
SPECIES: *Corydoras paleatus*  
ORIGINS: Brazil  
AQUARIUM TYPE: Community  
FEEDING POSITION: Mainly bottom feeder  
SIZE: Up to 7 cm  
TEMPERATURE: 72-80°F  
DIET: Catfish pellets and tablets, plus all other foods



PHOTOGRAPH  
M.P. & C. PEDONOR

## Ghost or Glass Catfish (*Kryptopterus bicirrhus*)

By Linda Lewis

Think of a ghost fish, what would it be like? Not easy to see, transparent perhaps.

It might have a strange ghostly appearance and unusual way of swimming. Well that's the Ghost (or Glass) catfish to a tee. Once seen, this fish will never be forgotten. Totally see-through, it closely resembles a living kipper skeleton. Amidst the framework of bones can be seen a silvery sac which contains the fish's organs, and its stomach.

There are two very fine, long barbels that the fish uses to feel its way around and to locate food. When a normal fish swims it keeps its body more or less horizontal. The ghost catfish swims at an angle, with its head held up above its body.

When these strange fish are seen for sale it is so very easy to overlook them. Not only are they transparent and therefore hard to spot but they are also very inactive. A group can stay motionless in mid-water for hours and hours, only bothering to move to escape danger or to take food. If cover, such as an overturned flowerpot is provided, the catfish may spend much of the day sheltering together inside.

Although not fussy regarding water conditions, these delicate looking fish are very sensitive to upsets and disturbances. They do not take kindly to being caught or chased, and a bang on the glass will set them off into panic mode. This entails out of control racing round the tank as if oblivious to other occupants, or obstacles. It can also mean an unscheduled leap out of the tank, so keep the lid on at all times. After a mad dash the fish will then suddenly stop.

What makes this all the more disconcerting is that the fish may not be in a normal position when it does this. Instead it may come to a halt and turn completely upside down, or even stand on its head. You, as a concerned fishkeeper, will see this and start to worry, especially when an hour later you return to the tank and find that the fish has not budged a millimetre. Do not be tempted to give it a prod! Have patience. It may take ages, but finally the catfish will simply pick itself up, and swim sedately off as if nothing unusual had happened.

The fish moves very gracefully by means of fluttering its very much extended anal fin. It is by rippling this fin that the fish manages to retain its place in the water, as though hovering. The dorsal fin is virtually absent, being reduced to a single, hard to spot ray. To keep them happy you must give them the company of their own kind. Lone specimens will pine away and die. As with many catfish, this species can be long lived. You should expect to have them with you for around ten years.

### GHOST OR GLASSFISH CV

FAMILY: Siluridae  
SPECIES: *Kryptopterus bicirrhus*  
ORIGINS: Thailand, Malaysia, Borneo, Java, Eastern India  
AQUARIUM TYPE: Peaceful community  
FEEDING POSITION: Surface and midwater  
SIZE: Up to 15 cm  
TEMPERATURE: 70-79°F  
DIET: Flake and live foods, will eat fry



TROPICAL

STEVE PUNCHARD & GARY COWBURN, with over 40 years of Discus keeping and breeding between them, bring our readers a new regular column on Discus by two top Discus breeders:  
PHOTOGRAPH: STEVE PUNCHARD

# The Discus Pool



**W**e are often asked: "Can Discus be kept in the same aquarium as Angel Fish?" Well, from personal experience and from what other aquarists have told us, they certainly can — providing a few guidelines are followed.

Angel fish have the reputation for aggression, especially at feeding time, and Discus have the reputation for shyness and timidity. We have to agree that Angel fish can be aggressive, but so can Discus. The main guideline we advise is that small Discus should not be placed in the same aquarium as large Angel fish. The larger Angel fish will intimidate small Discus causing them stress which often leads to stunted growth. They may even die if not removed from this situation.

A good friend (Alan Fielding) however, has an excellent set-up which contains both Discus and Altum angels. The 12 medium to large Discus live and thrive alongside the six large Altum angels without any problems. This aquarium, with its lush growth of plants and stunningly beau-

tiful fish is a fine show piece which would be the envy of many aquarists.

## The set-up

Examining the setup in detail we can see why Alan has been successful. The aquarium size is 6 x 2 x 2 feet and its back has been painted sky blue. It is lit by 4 fluorescent tubes and decorated with bogwood. The base is covered in fine gravel and there is a selection of growing plants.

The filter system has been built into the end of the tank where it is cased in out of sight. It has a built in chamber system which houses several different media, including bio-balls, siporax, sponge and filter floss. The water is pulled through a sieve at the bottom of the first chamber by a small pump (a power head in this case) and travels up and down



through each chamber. The purified water is then returned to the aquarium gently breaking the water's surface.

Alan has introduced a CO2 dosing system which is proving successful and he has the lighting on for only five to six hours per day. This is usually during the evening and helps reduce algae growth. The water used in this aquarium has been purified prior to use and is pH 6.8, GH & KH 2. The temperature is kept between 82-86°F. The diet consists of a commercial Beef-heart mix, Blood worms, adult Brine shrimp, White worms and several commercial Discus dry foods.

The range of plants in Alan's tank includes: *Cryptocoryne balansae*, *Cryptocoryne nevillei*, *Cryptocoryne wendtii*, *Echinodorus sp.*, Amazon swords, *Echinodorus tenellus*, Pygmy chain swords, *Nymphaea stellata*, *Vallisneria asiatica var. biwaensis*, Twisted vallis, *Vallisneria gigantea*, Giant vallis, and *Vallisneria spiralis*, Straight vallis

Apart from 12 Discus and six Altum angel fish, Alan also has a number of other fish living happily as part of this community. These are: 20 *Paracheirodon axelrodi*, Cardinal tetras; four *Hyphessobrycon erythrostigma*, Bleeding Heart tetras; one German Ram; eight *Hemigrammus bleheri*, Rummynose tetras; six *Ancistrus sp.*, Bristlenose catfish; six *Corydoras* (various species)

The final question we need to ask is: "What about the problem of aggression?"

When Steve visited Alan recently he witnessed the Angels and Discus at feeding time and noticed it was the Discus who were more active and first to the food. The size of the aquarium (6 x 2 x 2 feet) helps, as it allows the fish to find their own space or for them to shoal together depending upon their mood. Both species appreciate this option but they also mix together peacefully as well. So in this setup the problem of aggression seems to have been solved.

## IMPORTANT POINTS FOR SUCCESS

- Initially keep larger Discus with smaller Angel fish — never the other way around.
- Use a large deep aquarium — both Discus and Altum angels grow very tall and need the extra depth to be comfortable.
- Keep the fish at a temperature between 82 and 86°F. This is normal for Discus but a little higher than would be usual for Angels.
- At feeding times feed at both ends of the aquarium to give less dominant fish a chance to reach the food.
- Feed a well balanced diet which suits all the fish in your aquarium. A selection of the following would be ideal for this set-up: Beef-heart mix, Blood worm, adult Brine shrimp, White worm and a mix of good quality dried commercial Discus foods.
- Light the aquarium in the evenings only. This will help prevent excessive growth of algae and keep the fish calmer during the day when lighting is not needed.
- Keep the aquarium clean with good filtration and lots of large water changes.
- Check the pH level regularly and make adjustments as necessary. The pH should be kept between 6.5 and 7 at all times. About 6.8 seems to be ideal.
- Experiment with different plants, using a mixture of real and plastic, if you have to, depending upon their difficulty of maintenance.
- Carbon dioxide helps with plant growth but is a personal choice and not essential to the success for this set-up.

Steve and Gary are happy to answer any questions readers have. Simply send your query with a SAE to: Ask A&P, Discus Pool, Inline Magazines Ltd., Suite 4, Invicta Business Centre, Orbital Park, Ashford, Kent, TN24 0HB. All letters will receive a personal reply regardless of whether your letter is published. You can also contact Steve and Gary directly by e-mail at: [enquiries@puncharddiscus.co.uk](mailto:enquiries@puncharddiscus.co.uk)

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Bob & Val Davies's

# FROGS & FRIENDS



## Herp Fact File: Senses and Sensitivity - CHAMELEON SENSES

Although various other lizard species are arboreal, chameleons are uniquely adapted to such a lifestyle with their divided, grasping feet and prehensile tail. The latter feature occurs in certain other species but not to the same degree as in chameleons. Two groups of chameleons; the tiny *Brookesia* from Madagascar, sometimes called Stump-tailed Chameleons, and the small Leaf-tailed Chameleons (*Rhampholeon*) of Africa lack prehensile tails, or at best the tail can only grip weakly but neither of these climb to any great extent, much of their time is spent on the ground among leaf litter, although they will climb, mainly at night among low bushes.

### The Senses

Most lizards possess ears, visible externally as an aperture or as a tympanic membrane. Lack of these in lizards is so unusual that at least two genera are actually named "earless", namely the Bornean earless monitor and the Earless lizards of the USA. Chameleons have no external ears but are not deaf as sometimes thought. The internal ear is simplified but is said to be capable of detecting frequencies from 200 to 600 Hz according to species. Smell and taste are detected by the tongue which transfers minute particles to the Jacobson's organ at the back of the mouth. A small "tendrill" on the tongue tip is visible when the animal is "tongue-testing". This is thought to detect animal scents. Males leave secretions on branches possibly to mark territory.

The protruberant eyes which rotate independently giving all round vision without the need to move the head are a unique feature among reptiles. Eyes can be a give away to predators. Many fish and amphibians possess an eye-stripe as an aid to concealment — a feature often seen in chameleons. Although most of the eye is covered with skin leaving a relatively small pupil exposed, the vision is extremely sharp and effective at substantial distances. It has been suggested that the chameleon's eye is roughly equal to a telephoto lens of 100 to 150 millimetres.

When prey is spotted both eyes focus on it producing binocular vision that enables distance to be judged accurately — essential for the adhesive tongue to shoot out and hit the prey. Studies of the eye structure point to the ability to see colours from red to violet but apparently not infra-red or ultra-videt (some lizards are known to see the latter). Colour plays an important part in the life of chameleons; together with certain body movements it is used as a complex means of signalling to



others whether attracting a mate or repelling a rival. Chameleons' visual ability is diurnal — the eye lacks the necessary structures that permit night vision.

### Sensitivity

The sense of touch, thermal sensitivity and light sensitivity complete the chameleons sensory attributes. Most chameleons are attracted to heat sources. Sensitivity to light is thought to be via the parietal eye — a common feature in many reptiles particularly the Tuatara of New Zealand. Situated on the head, between the eyes, covered by scales in chameleons, but not in all reptiles, the parietal is light-sensitive, mainly to blue and violet light rays and, being linked to the nervous system, it is thought to control numerous biological activities. Chameleons kept without suitable light tend to exhibit abnormal coloration and do not pursue normal activity including feeding.

Watching a chameleon move shows that the feet and tail are sensitive areas. Movement is generally slow and deliberate. The feet gently test the branch and will move to another spot if rough or sharp projections are encountered. The tail acts in a similar manner — exploring until a suitable surface is found before coiling round it like a fifth limb. Scales on the underside of the tail have a different texture which assists in gripping.

Together with the shape of the body and coloration (including the ability to change colour) the above senses aid survival in the chameleon's particular niche. The ability to sit concealed, catching prey with very little movement is a fascinating example of adaptation.

**above** A juvenile *Chamaeleo rudis* keeping a watchful eye on its rear.  
PHOTOGRAPH: BOB & VAL DAVIES

## Diary Dates

Sunday, October 31: Portsmouth Reptile and Amphibian Society Trade Show. To be held at Mayfield School, Mayfield Road,

Northend, Portsmouth, 11.00am - 4.30pm.

Sunday, November 7: BHS Captive Breeding Committee Annual Stock Sale and Show. To be held at New Denham Community

Centre, New Denham, just off Junction 11 of the M40. Open to the public from 12 noon until 4pm. Captive bred reptiles and amphibians, dry goods, equipment and books for sale. Also society displays.



## IT'S ALL IN THE DIET

Success rates in keeping and breeding lizards have improved over the past twenty years or so since their dietary requirements have become better understood and the importance of dietary supplements and full-spectrum light has been realised. One important aspect is the interaction of calcium and vitamin D3. Since commercial livefoods such as crickets have a low calcium to phosphorus ratio (Ca:P) captive lizards can easily suffer from a Ca:P imbalance.

In the wild the action of sunlight on lizards' skin assists in the synthesis of vitamin D3 which in turn enables calcium metabolism. Because of the absence of sunlight in the vivarium keepers feed multivitamin/calcium supplements and use full-spectrum fluorescent tubes which produce varying amounts of ultraviolet A (UVA) and ultraviolet B (UVB) according to the type of tube used.

Dietary deficiencies or imbalances are common in pet Green Iguanas and Tortoises which are often fed on a restricted, or incorrect diet. Humans would also suffer if fed on one or two food items only, so it makes sense to provide as much variety as possible — plus supplements. Reptiles kept outside with access to natural sunlight need less in the way of supplements but the diet should still be varied.

However, placing lizards outside in a glass vivarium on sunny days is likely to prove fatal due to overheating — in any case UV light does not penetrate glass so there is no benefit. In the USA wire mesh cages for Green Iguanas are popular — some models can be wheeled outside on sunny days but caution is urged: lizards can die if unable to find shade when their preferred body temperature is reached.

A friend recently left his female Frilled Lizard (*Clamidosaurus kingii*) for mating with our male. This duly occurred and she eventually produced eight eggs (a good clutch for this species — six is more common) but only two of the eggs had a properly calcified shell. She had run out of calcium halfway through the third egg which was only half covered. The defective eggs were encased in a membrane that was already partly collapsed. At his request the eggs were placed in moist vermiculite for incubation (a vain hope for six of the eight). Within a couple of days they had developed a thick coat of fungus and had to be removed.

What went wrong? On a previous visit she had been a "finicky" feeder, not eating anything like the same amount as our specimens. Her owner said she had been feeding on an occasional thawed pink mouse and a few locusts (dusted with vitamin/calcium supplement) but had not been under full-spectrum light. Placed with our speci-



mens her appetite increased, possibly due to the competition, but she must have been lacking in either calcium or vitamin D3 to metabolise the calcium. Even the five weeks under a correct regime before egg deposition was insufficient to correct the problem.

Dietary problems can be long-term — an animal may look all right and apparently be eating well until after weeks, even months, problems suddenly manifest themselves. Prevention is better than cure — some problems can be irreversible — correct diet with appropriate supplements and suitable lighting should be provided from the start. Choose a supplement with a high calcium content and do not mix different brands — this upsets the balance of the nutrients. Most full spectrum tubes are said to be effective at a distance of six inches (15 cm) and to lose their UVB output after six months. One new type claims to be effective at 12 inches (30 cm) and to last 12 months.

On an optimistic note, the two shelled eggs, although rather small, are still incubating but it is possible the embryos may not be strong enough to break out at hatching as they may be deficient in calcium also. Hatchlings which need to be assisted by the keeper snipping the egg often do not thrive. It is worth noting that gravid females usually benefit from a little extra calcium. Pure calcium dusting powder is available from good shops.

**above** Unshelled eggs showing a rich crop of orange and black fungi. Two shelled eggs are unaffected.

PHOTOGRAPH: BOB & VAL DAVIES

## AMPHIBIAN DISEASES

Fishkeepers have no doubt experienced finding a dead fish which was apparently "alright" the previous day. The same thing can occur with amphibians — death can be quite sudden in many cases, often without a clue as to the cause. Even reading all the literature in the world is not going to make the keeper an expert — sometimes symptoms may be apparent but correct diagnosis may need swabs, x-rays, blood/tissue samples and other tests all of which take time and cost money; in the latter case it is often more than the animal cost in the first place.

Cessation of feeding is often the first sign of sickness but amphibians are by nature secretive and mainly nocturnal — some species will steadfastly refuse to emerge and feed if there is any light present so the increasing presence of uneaten livefoods in the vivarium may be the first indication but this may simply be due to overfeeding. Inspecting a specimen in its daytime hiding place does not always reveal anything amiss — the response to disturbance is usually to remain still or shuffle further into the substrate. Arboreal frogs tend to remain hunched up on the vivarium wall or on leaves during the day. This lack of daytime activity can be a drawback when purchasing new stock — the advice to "see the animal feed" is often given but shops are not open overnight!

Buying healthy amphibians (and reptiles) is often a matter of luck — the animal may look alright but could be in the early stages of disease,

possibly having been stressed by capture and subsequent experiences. It is frequently some time after purchase before the problems occur. Of course the creature may be healthy and become sick due to dirty conditions, incorrect diet, unsuitable housing and temperatures either in the dealer's or the keeper's accommodation. Two common causes of infection are keeping amphibians in a vivarium which has previously held another species and mixing species.

In the first case there may be pathogens present, especially if the previous occupants have died, to which the newcomers will succumb. In the second, most amphibians produce skin toxins which may be harmful to other species and one species may be carrying disease to which it is immune whilst the other has no immunity. This seems particularly to apply to species from different parts of the world. A common fault, which does cause fatalities is mixing captive-bred poison frogs

► Continued on page 30



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## Bob & Val Davies's Frogs & Friends

### Amphibian Diseases

◀ Continued from page 29

(Dendrobatidae) with wild-caught Mantellas from Madagascar — the former have succumbed either to disease or skin toxins.

Amphibians diseases, like those of fishes, may manifest themselves by external symptoms inflamed or weeping patches anywhere on the body, pustules or lesions, fungal type growths, sometimes around the mouth. Fungus diseases in amphibians do not exhibit the cotton-wool appearance (as in fish) if the subject is out of the water, they then have a brownish, shiny appearance. Many keepers resort to fishkeeping remedies for topical treatment — these may work on occasion but misdiagnosis can easily occur and the incorrect medication used. In some cases more than one organism may be present possibly needing antibiotics and antifungal drops.

A most recent sudden death for us was a Sand frog (see *Frogs and Friends*, August 1999). The food was disappearing but that could have been eaten by its companions, yet it was found one morning, grossly



**left** Sudden death — cause unknown. A sand frog with oedema and lesion.

PHOTOGRAPH:  
BOB & VAL  
DAVIES

swollen and with a lesion first visible through the belly skin. The swollen condition is not uncommon in frogs but having trawled through available literature a swollen body can be due to several things including; acute pulmonary emphysema and hypervitaminosis D3 with hypercalcaemia (too much vitamin D3 which increases uptake of calcium from the large intestine inducing deposition of calcium in various organs) plus various bacterial infections in which several strains of bacteria may be present.

The exact cause remains a mystery — whatever it might have been it was too rapid to take any kind of remedial action.

## AtoZ of Reptiles & Amphibians

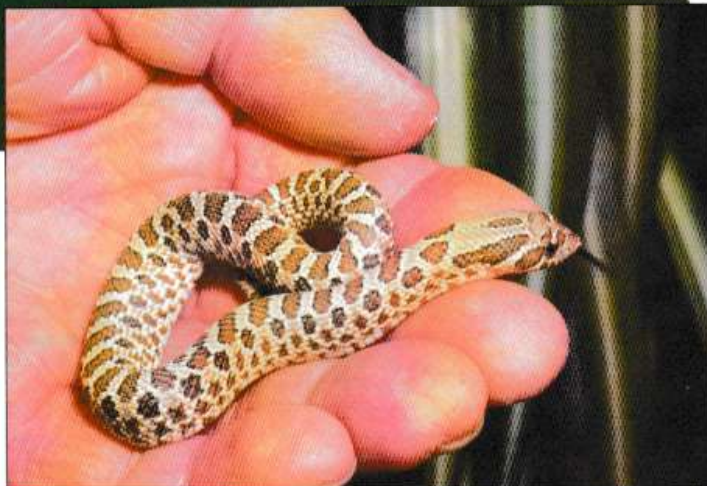
### C Colubridae

This is by far the largest family of snakes containing around one thousand, five hundred and sixty two species divided into 292 genera. Numerous attempts have been made by taxonomists to divide them further into as many as twenty tribes, subfamilies and families. Colubrid snakes, often referred to as "Harmless Snakes", together with the Front-fanged Snakes (*Elapidae*) and the Vipers (*Viperidae*), belong to a group known as "Advanced Snakes" to distinguish them from the "Primitive Snakes" (Boas, Pythons and five smaller, lesser known families). The distinction is based on various physical features, both internal and external.

Colubrids are found on all continents, except Antarctica, they range from near the Arctic Circle to Tierra del Fuego but are absent from some islands including Ireland, Iceland and New Zealand. Most species measure 20 inches (50 cm) to 66 inches (2 m) but extremes of five inches (13 cm) to 119 inches (3.5 m) exist. The head is usually distinct from the body which tends to taper, although some burrowing forms have a cylindrical body. Eyes may have a horizontally or vertically elliptical pupil but it is round in most species. One distinctive feature is that in all species only the right lung is functional. Colubrids lack any vestiges of limbs — the Boas and Pythons tend to possess clawlike spurs that are actually vestigial remains of their ancestor's hind limbs.

A wide range of food choice occurs among the groups — Kingsnakes and Milksnakes (*Lampropeltis*), Racers (*Coluber*) and Ratsnakes (*Elaphe*) generally eat small mammals but the Kingsnakes also prey on other snakes. Specialised feeders such as the Egg-eating snake (*Dasypeltis*) and Asian snail-eaters exist but other Colubrid diets include fish, frogs, lizards, worms, slugs, birds and salamanders. The latter item together with eels are the basic diet of the American Mud snake (*Farancia abacura*).

Probably the most familiar Colubrids are our native Grasssnake (*Natrix*), the American Garter snakes together with the Kings, Milks and Rats (commonly kept by hobbyists). Although generally referred to as "Harmless Snakes" certain species have venom fangs at the rear of the mouth. In most cases the mouth is too small and the venom too weak to affect humans but the Twigsnakes (*Theloternis*) and the Burrowing asps (*Atractaspis*) are two exceptions being potentially harmful as is the Mangrove (*Boiga dendrophila*) which used to be widely available in the trade until it was placed on the Dangerous Wild Animals list and now needs a D.W.A. licence.



**above** Hognose snake (*Heterodon nasicus*), a Colubrid with an upturned snout for winking toads out of sand.

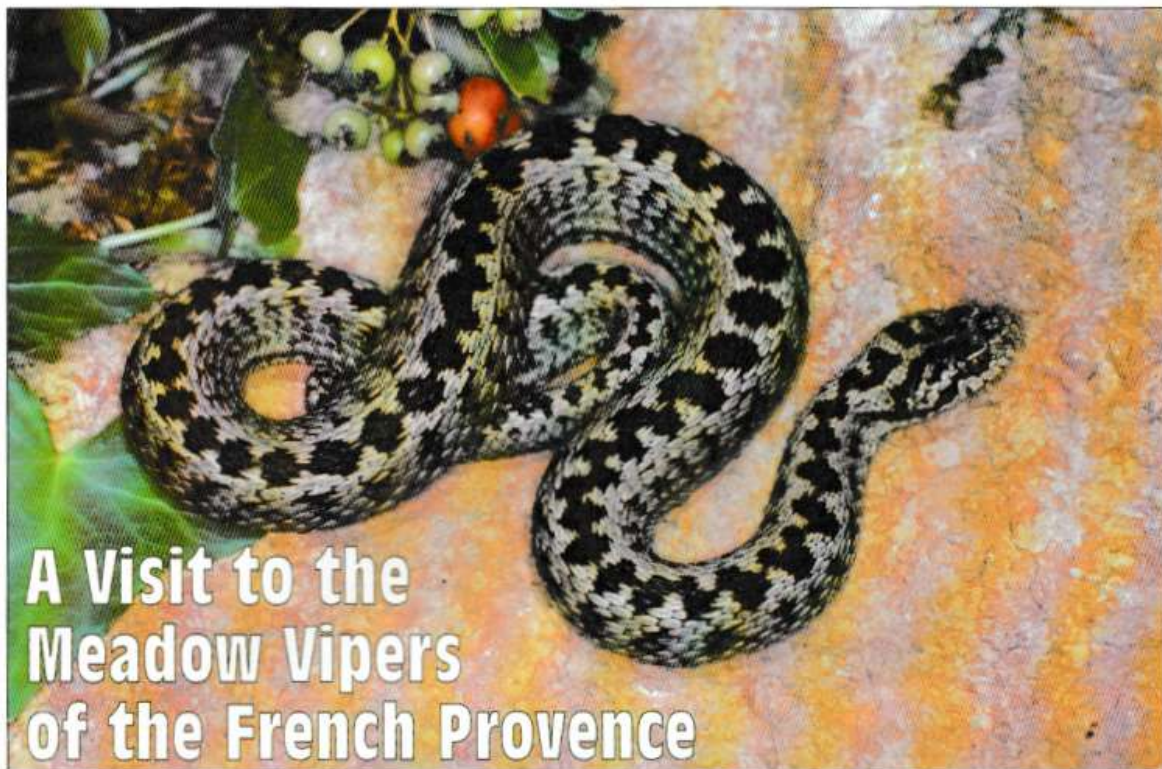
PHOTOGRAPH: BOB & VAL DAVIES



G. & H. NICOLAY highlight the plight of many snakes in French Provence:

PHOTOGRAPHS: HARALD NICOLAY

# UNDER FIRE



## A Visit to the Meadow Vipers of the French Provence

**T**raditionally the rarest snake of Europe, the Meadow Viper, has been pushed to the brink of extinction by habitat destruction and direct persecution in most of its naturally fragmented range. All former populations in Austria and several in other regions have already been extinguished. Only 200 to 300 individuals are estimated to survive in France.

### Inoffensive inhabitant of mountainous grasslands

Years ago, in late spring, we had to abandon our first attempt to photograph the elusive Meadow Viper (*Vipera ursinii*) in Italy. High up in the Abruzzi mountains a ferocious snow storm put an abrupt and chilly end to our endeavour.

Luck pivoted to our side during a recent excursion to southern France. On the sun-baked, wind-blown Plateau du Coussol we finally managed to get our first glimpse of a wild specimen of this extraordinary adder.

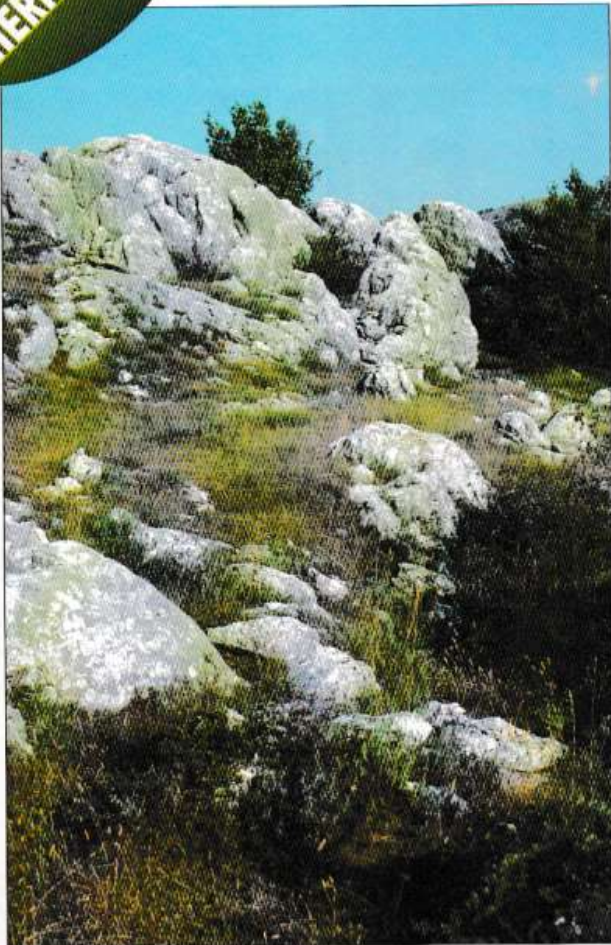
Confusion still reigns concerning the systematics of *Vipera ursinii*, named after the Italian count Orsini who first discovered the species. Currently French specimens are grouped with Italian and Yugoslav populations into the subspecies *V. u. ursinii*. This appears sensible, as individuals from these countries are indistinguishable in terms of morphology and coloration. This is a curious phenomenon in view of the thousands of years during which these populations have prevailed in lofty isolation. Although common in other European *Vipera* species, sexual dimorphism is not known in this midget adder.

The Meadow Viper is the smallest of the European adders. Females reach a total length of 40 to 50cm. Males remain smaller. The venom is weak and bites to humans and livestock are not considered dangerous. Meadow Vipers subsist mainly on Orthopterans (crickets, locusts, grasshoppers). Early in the season when insects are still scarce they readily devour small rodents and lizards if available. The reproduction rate is low. Only one to seven live young (average four) are born once

**above** The Meadow Viper (*Vipera ursinii*) is the rarest European snake.



## THE FRENCH PROVENCE MEADOW VIPER



per year in autumn. They measure 12 to 14.5cm. Hibernation takes place from around October to April or May.

A number of factors have led to the drastic decline of this exquisite species. The seriously endangered Meadow Viper is only known from a few, scattered localities in France. Restricted to elevations between 900 and 2,200m, it inhabits grasslands and meadows, sheltering under boulders, rock piles and the spreading branches of pygmy junipers. Due to harsh climatic conditions and poor, rocky soils, the mountainous steppes only had a marginal economic value in the past. However, in recent years the pressure on remaining stretches of pristine land has constantly increased. The final refuges are developed for tourism, recreation or ameliorated for improved pastures. Although unable to confirm a single serious incident of snake-bite due to the Meadow Viper, the inhabitants of the area we interviewed were convinced that the inoffensive little adders are highly-toxic to humans and live-stock. Some households put all their faith into baffling arsenals of assorted remedies which they anxiously demonstrated to us. Consequently all vipers — and probably most other serpents — are killed on sight by visitors and natives alike.

Theoretically the entire herpetofauna is protected under French law. This includes the killing, capture, transportation and commercialisation of specimens. In spite of this, countless specimens of the little Meadow Viper also fall victim to collectors. Local residents confirmed newspaper allegations, that collectors come from far away to poach the handsome adders for private collections and for the illegal trade. This is a disgrace and sheds an undesirable, injurious light on all reptile enthusiasts both amateur and professional. To the best knowledge of the authors, there are presently no sincere institutional efforts to stem the rapid decline of this unique element of the French herpetofauna.

Although Meadow Vipers readily feed and have been bred in captivity, they typically succumb after a short time. Probably this is due to difficulties encountered when attempting to reproduce the specific microclimatic conditions required by these charming little creatures. Clearly, the sincere snake hobbyist must not fuel demand by maintaining this species in a private collection. As a matter of principle venomous species should only be kept in public show collections or for research purposes. But, most importantly, it would be unacceptable to knowingly participate in the demise of this precious creature.



### Reptilian neighbours

The Meadow Viper shares its habitat with numerous other fascinating reptiles. The harmless Smooth Snake (*Coronella austriaca*), which occurs sympatrically, is often mistaken for an adder and needlessly

**above left** Typical habitat of the Meadow Viper on Plateau de Caussol.

**left** Harmless Smooth Snakes (*Coronella austriaca*) are frequently mistaken for adders and needlessly killed.





**left** Victim of water pollution and changing land use patterns, the Pond Terrapin (*Emys orbicularis*) is struggling for survival.

killed. The Southern Smooth Snake (*Coronella girondica*) is a near relative. This attractively patterned serpent is however confined to lower altitudes. The rear-fanged Montpellier Snake (*Malpolon monspessulanus*) is also a typical species of the coastal belt. These large snakes are often heard when noisily crashing through the undergrowth, long before they are actually seen. Numerous other reptiles, such as the land tortoise (*Testudo hermanni*) and the Pond Terrapin (*Emys orbicularis*) frequenting streams and permanent water, are fighting their own battles against extinction.

Amongst the lizards, the magnificent Green Lizard (*Lacerta viridis*) and the giant Ocellated Lizard (*Lacerta lepida*) are the most impressive. But others such as the diurnal Wall Lizard (*Podarcis muralis*) and the nocturnal Moorish Gecko (*Tarentola mauritanica*) are far more numerous and can frequently be observed in urban areas.

The most elegant snake encountered in southern France is the Aesculapian Snake (*Elaphe longissima*). This docile colubrid is found in sparsely forested areas, along streams and bushy hillsides. During the day these agile constrictors hunt for their mainly warm-blooded prey, both on the ground and above it. Captive bred individuals are occasionally available.  
Thanks to



## The Ecological Museum at La Gaude

More than 40 years ago a Danish traveller was so enchanted by the beauty and natural history of the French Provence, that he remained for the rest of his life. Ib Schmedes spent much of his time studying and documenting the regional flora and fauna, his special passion revolving around local entomology (the study of insects). His most outstanding contribution to the causes of conservation and nature preservation in the region was undoubtedly the foundation of the Ecological Museum at La Gaude.

Coming from the coast, following a 15 minute drive up a winding back road, the visitor reaches La Gaude, a picturesque 4,000-soul village tucked away in the mountains some 240 metres above sea level. "La Coupole" (French for dome) dominates the hillside with its peculiar dome-shaped glass roof. The futuristic building houses an array of community facilities such as a theatre and the impressive Ecological Museum.

Numerous local vertebrates and invertebrates are displayed in glass tanks, aquaria and terraria. Outside a number of landscaped enclosures house reptiles and amphibians typically encountered in the vicinity of La Gaude. A botanical collection complements the animals displayed.

Certainly the museum constitutes an important and praiseworthy attempt to introduce the local fauna and flora to a broader public. It thus deserves to be sincerely recommended to visitors from near and far.

### Acknowledgements

The authors would like to extend their gratitude to Dr Philippe Ewald of the Natural History Museum in Nice for information graciously shared and for copies of articles and to the staff of the Ecological Museum of La Gaude for their exceptional patience and hospitality.

*The Eco-Muse Vivant "La Coupole", Quartier Sainte-Appolonie, F-06610 La Gaude, France. Tel: 93249747. La Gaude is along route D18, about 10 km inland from Cagnes sur Mer, near Nice.*

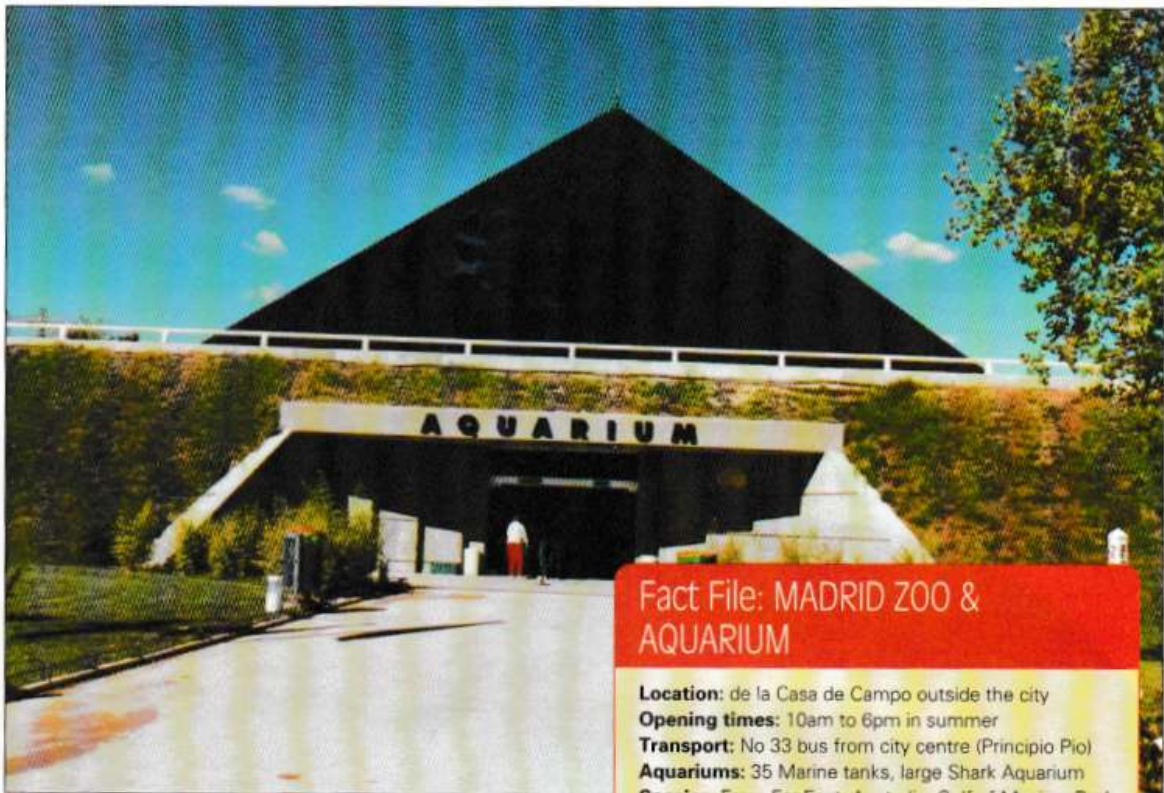
**left** Subadult specimen of the Ocellated Lizard (*Lacerta lepida*), bred at the Ecological Museum in La Gaude.



IGGY TAVARES visits the political and cultural capital of Spain:

PHOTOGRAPHS: IGGY TAVARES

# Al Aquarium in Madrid



## Al Aquarium

**T**he Madrid Aquarium and Zoo is at de la Casa de Campo a few kilometres outside the city centre, but is well served by a bus service (no. 33, every 15 minutes) from Principio Pio near the centre.

The nearest Metro station is Batan followed by a short taxi ride (I actually took a taxi ride from hotel near the centre all the way!)

Madrid Aquarium, which is part of the Zoo, was only opened in 1987 and is a modern facility, where a large range of marine fish from around the world are beautifully presented.

### Fact File: MADRID ZOO & AQUARIUM

**Location:** de la Casa de Campo outside the city

**Opening times:** 10am to 6pm in summer

**Transport:** No 33 bus from city centre (Principio Pio)

**Aquariums:** 35 Marine tanks, large Shark Aquarium

**Species:** From Far East, Australia, Gulf of Mexico, Red Sea and Mediterranean Sea

**Other Attractions:** Aquatic shows at Dolphinarium

**Zoo:** Good selection of animals

**Highly recommended for a visit**

A wide variety of aquarium shapes and types with beautiful settings keep the visitor impressed and entertained. The 35 aquariums are well stocked each containing colourful species from one particular locality of oceans or seas of the world.

Many of the fish do, in fact, come from the Malaysia, Philippine, and





**far left** Entrance to the treasures within.

**left** Coral reef with fish, *Chrysiptera cyanea* (blue), *Chromis viridis* and *Meiacanthus smithii*.

Australia complex although there is a good selection from the Red Sea and the Gulf of Mexico.

On entering the Aquarium one comes across a large open top palladium type set-up depicting a coastal-type environment from the Gulf of Mexico and containing large shoals of *Sarpa salpa* and *Lisa* species, among others.

Here two species of Ray and some flatfish were so well camouflaged on the bottom that I did not see them. I was also fascinated by another larger open top set-up (93,600 litres) which was subject to a large surge and splash every few minutes and contained fish from around the East Indies.

Here larger colourful species such as *Melichthys Niger*, *Acanthurus leucosteron*, *Naso vlaminghi* and seven other species happily swam around in almost natural surroundings and were a pleasure to study.

An adjoining smaller traditional aquarium (16,500 litres) contained a large shoal of the beautiful but odd shaped-shiny fish, *Selene vomer*, which intermingled with the striped *Chaetodipterus faber*.

Many smaller aquariums of various shapes and ranging in size from 700 to 5,000 litres were beautifully presented and contained from Mud-skipper, Crabs and Sea Horses to colourful Clownfish and Gramma species.

A walk-around aquarium with the yellow and black striped Golden Trevally, *Gnathanodon speciosus*, mixed in with *Trachinotus basilloni*, made a colourful display.

A good selection of Butterflyfish and Angelfish populated two beautifully-furnished aquariums (e.g., *Forcipiger longirostris*, *Chaetodon semilarvatus*, *C. lineolatus*, *Pomacanthus maculosus*, *P. imperator*, *P. semicirculatus*, *P. chrysurus*, to name some) while another aquarium contained fish belonging to the Acanthuridae family (e.g., *A. achilles*, *A. japonicus*, *Zebrasoma veliferum*).

On the other hand a large tank containing a few Barracuda seemed strangely empty with just a few fish swimming around listlessly. Perhaps the Barracuda had devoured some of their siblings!

Around the corner one came across a small tank containing two species of Shark from Australian waters, *Heterodontus portjacksoni* and *Orectolobus maculatus*. Opposite is the huge Shark tank, which is the star attraction of the Madrid Aquarium.

The huge aquarium of 1,000,000 litres contained several individuals of three large species of Shark (*Odontaspis taurus*, *Carcharhinus plumbeus*, *Ginglymostoma cirratum*) and large Rays (*Dasyatis americana*) all from the

oceans around Central America.

The Shark tank, lit primarily by natural light from above, has a seated arena that allows visitors a chance to spend time observing the Sharks especially on the occasion of their feeding.

Upstairs (which is built like a solarium thus allowing light to enter the Shark tank below), has a large plastic Shark hanging from the rafters. Three tanks house species of fish from the Mediterranean Sea while the rest of the solarium is given up to large posters which describe the history of fishing (in Spanish).

Downstairs film shows in Spanish about fish, run in a small auditorium, while well-stocked shop sells fish paraphernalia.

Outside, situated near the Aquarium, is the Dolphinarium where Aquatic shows with Dolphins, Seals and Sea Lions are put on daily. The 7,000,000-litre facility can seat 3,000 visitors and is supposed to be spectacular, but, unfortunately, I missed the mid afternoon show, as I had to return to Madrid.

## The Zoo

Madrid Zoo is arranged in continental sections, and is well stocked with 3,000 animals usually housed in fairly spacious outside enclosures rather than cages.

The African section, for example, had all the large animals, including African Elephants, Rhinos, Giraffes, and even a herd of Hippopotamuses, as well as Zebras and various Antelopes.

The Lion and Tiger enclosures were large and separated from the public by a large moat and high wall. Other cats included Cheetahs, Leopards and Panthers to name a few.

The inhabitants of the monkey section are always a hit because the inhabitants always perform various acts to keep the onlookers amused.

The zoo is involved in investigation, education and reproduction of endangered species. The zoo tries to provide a natural habitat for the animals in its care by providing a combination of indoor and outdoor facilities, which emphasise the concept of "territory" so as to increase the feeling of freedom.

The psychological needs of the different species are very much kept in mind as well as requirements concerning food and general physical conditions. All this makes for healthy animals that look reasonably content under the circumstances.



# Product Reviews

## The Emperor of the Amazon

By Dr David Sands  
Presented by Kathy Jinkings on  
CD ROM

This is the second CD ROM brought out by this team and reaches the same very high standard as the first one. Once it was up and running (it seemed to take ages to load onto the computer), we were treated to some atmospheric background music. A menu duly appeared with all the main subjects listed. These included ecology, habitat, the fossil record, the aquarium, maintenance, etc. In fact, just about everything you could possibly want to know about Red Tailed Catfish including the fact that it grows to seven feet in length.

Browsing through the various subjects we became more and more irritated by the background music, so clicked on this

button. A menu of five options appeared including random selection, atmospheric, classical, no background music, or river sounds. For fun we set it for river sounds. Within a couple of minutes this started to grate as well, so the silent option was selected instead.

Now we went into "The Aquarium" section. This included an overview of a survey The Red Tail Catfish Club had undertaken into the average tank size that members were keeping their catfish in. Top of the list was 60x18x18 inches, next came 72x18x18 inches, and third was 72x24x24 inches. The section informed us that what was really needed was a tank 72x48x30 inches as minimum, but 96x48x30 inches would be better.

We moved on from this and took in the filtration section. This was well presented and informative, as were all the other sections we browsed through. Full marks for this



The Red Tail Catfish. PHOTOGRAPHY: GORDON WOODS

effort; it is just a shame that the topic was not one with greater appeal to general aquarists who don't have a swimming pool in which to accommodate their fish!

• *Emperor of the Amazon can be purchased from AquaEco, 148 Blackburn Road, Heapey, Chorley, Lancs PR6 8EL for £40.*

*Next month we start a new series of reviews on several popular filters designed for 24 inch aquaria. Initially they will be examined by our team of experienced aquarists before being installed in tanks for long term testing. Six months later we will return to evaluate their performance.*

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JIRI PALICKA tells of his experiences breeding the Glassfish from India:

PHOTOGRAPHS: JIRI PALICKA. TRANSLATION: MARY-BAILEY

TROPICAL

# The Indian Glassfish

## PARAMBASSIS RANGA

**T**he Glassfish family *Ambassidae*, which includes the Indian Glassfish (*Parambassis ranga*), is one of the many families of fishes that make up the order *Perciformes* (perch-like fishes). The majority of the members of this family live mainly in the sea or in brackish water (*Gymnocharacinus filamentosus*, for example, is a typical brackish water representative of the group). Only a few genera have adapted to fresh water but those that have make rewarding aquarium pets.

*Parambassis ranga* is one of the Glassfishes that have been kept in captivity the longest, and was imported into Europe as long ago as 1909. It originates from waters in India, Myanmar and Thailand, where it lives in huge shoals in fresh as well as brackish water. It was formerly so widespread and common in India that it was even used as fertiliser, from which we may deduce that it breeds prolifically in its natural habitat. In nature it attains a length of 7cm maximum, while in captivity it remains smaller at up to 5cm.

In captivity, however, there are some problems in maintaining and breeding this species and this may be why the species is not very widespread among aquarists, despite all efforts to establish it. I personally have maintained it on numerous occasions, so I am well aware of the difficulties and problems likely to arise.

### Company of peaceful species essential

The Indian Glassfish is a very peaceful fish, but, depending on its surroundings, can be very timid. It is a shoaling fish which does well in the company of other quiet and peaceful species, and I have concluded that the company of such tankmates is essential, having observed that its timidity increases appreciably when it is kept by itself.

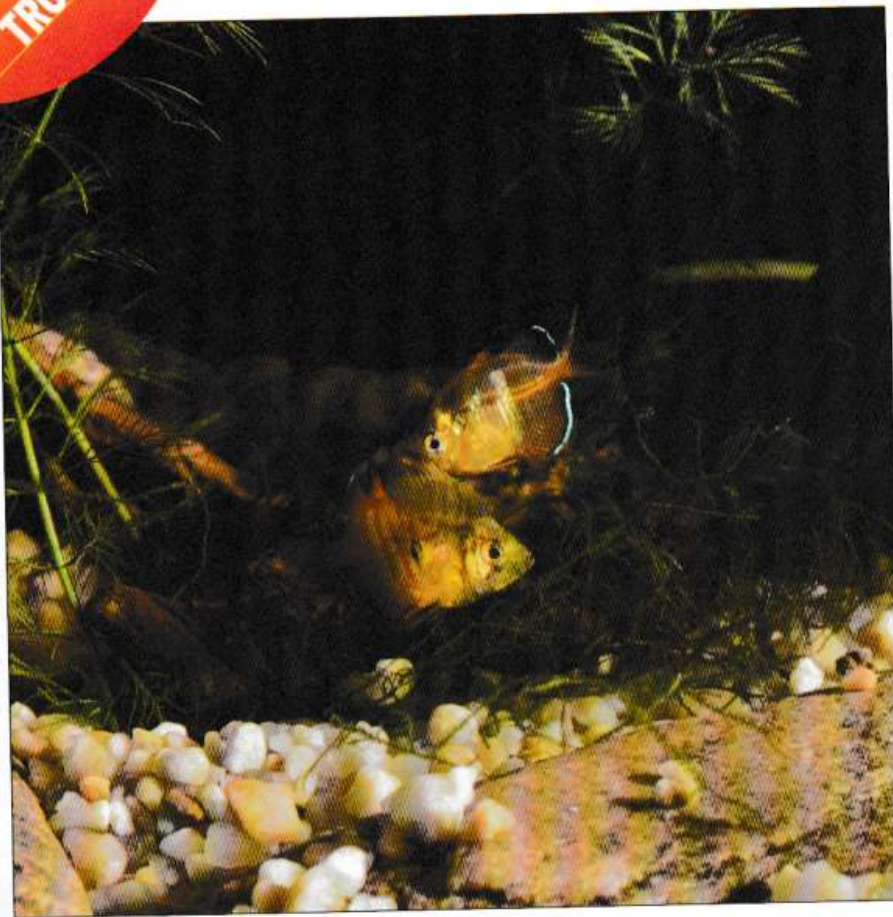
The timidity problem became apparent after I had kept some of these Glassfishes in a separate tank for a few weeks. The tank was sited in a quiet spot subject to hardly any disturbance, so the fishes became accustomed to absolute peace and quiet. Whenever they were offered food, however, the frightened fishes would hide among the plants, not coming out until long after I had gone away, when there no longer any movement near the tank. There was no sign of their adapting to the disturbance. On the contrary, I noticed that the slightest "interference" with the tank, inside or out, would send them into a panic causing a zig-zag

**above** Adult male in full colour.



TROPICAL

## THE INDIAN GLASSFISH



or spiralling flight.

Glassfishes, however, kept with other fishes calmly swim after food and show no signs of being distressed. In a well-planted community aquarium individual territories are established and occupied, with each and every intruder being promptly chased away. In this situation Glassfishes do very well and exhibit glorious colours and battles between males in the community aquarium, as they fight for mates, can be observed. I have never known any of these battles to end in tragedy; more often they seem to be largely to impress females and induce them to spawn — the females seem very willing to spawn when there are quarrelling males in the community.

Indian Glassfishes are very sensitive as regards water chemistry, perhaps because they are not widespread in the aquarium hobby and hence have not been acclimated to variable conditions. Clean, good quality, water is essential for successful maintenance. The water chemistry, in particular the pH, requires particular attention. Throughout their relatively short lives (two to three years in those I have bred) these fishes are very sensitive to any sudden change in pH. Neutral water is the most suitable, and in a densely planted aquarium that can be difficult to ensure.

For this reason it is best to select plants that produce an alkaline environment, which these fishes can tolerate without difficulty. A sudden drop in pH usually has fatal consequences, and the survivors are as a rule immediately attacked by fungus, often followed by bacterial skin infections and sometimes also fin rot. The fishes are likely to suffer a

similar fate if they are kept, long-term, in an acid environment, or if they are transferred from old, mature, water to a newly-set-up tank filled with fresh water. The addition of marine salt at the rate of one to two grams per litre has proved very effective, and will also combat bacterial attack.

The water temperature for general maintenance is not so critical: Indian Glassfishes will thrive at a temperature of 20-24°C, and can survive for short periods at temperatures down to 16°C.

### Feed live foods whenever possible

Careful attention should be paid to the choice of foods to be offered, especially if the intention is to breed the fishes. Whenever possible they should be fed on live foods, and the diet should be as varied as possible. Problems may sometimes be encountered when feeding larger live foods Glassworm and Bloodworm, and such foods should be chopped into smaller pieces before use. If possible it is better to offer smaller live foods, especially Daphnia, which are preferred by Glassfishes. Flake foods can also be offered, but these are better used as a supplementary food when live food is in short supply. Well-fed, healthy, fishes will spawn readily.

The breeding and rearing of the Indian Glassfish is a little difficult and requires both practical experience and a good knowledge of microscopic foods. Spawning can be achieved using a shoal or a segregated pair, a



**far left** Glassfishes can exhibit glorious colours when males battle for mates.

**below** The pair come together amongst a clump of plants. Here the male can be seen wrapping his body and fins around the female.



cal period they are, however, very picky and will not necessarily take every food offered.

In the course of rearing Glassfish fry I have experimented with various types of microscopic live foods, and on the basis of numerous observations I can state that rotifers are the food taken least often, especially those species that are not very mobile. By contrast Cyclops nauplii, particularly the red and orange forms, are taken with great relish. I have achieved the best results using Slipper Animalcules (*Paramecium caudatum*) during the first two to three days. A sign that the fry are taking food is when they assume a horizontal position in the water. Only then do I begin feeding with nauplii. From this time on the fry grow relatively quickly, and after three weeks they look like miniature replicas of the adult Glassfishes.

**below** A few days into development the larvae still has some of its egg sac left.

**bottom of page** Once the egg sac has been used up the real difficulty in breeding this fish becomes apparent — feeding the youngsters.



small spawning tank of about 10 litres capacity being adequate. Spawning mesh should be placed on the bottom to prevent the parents from devouring the newly-laid eggs. For both spawning and hatching I use medium-hard water (8-10 dGH, up to 5 dKH), if necessary adjusting the pH to between 7.3 and 7.5. This water is taken from the community tank and allowed to stand for about a week. After a pair (sometimes several pairs) have been introduced into the spawning tank, I raise the temperature to 29°C and spawning usually takes place the same day, or the next day at the latest. The pair spawn either at the bottom or at the surface, so the addition of plants is unnecessary. Four to ten very small transparent eggs are laid at each pass, and a single pair can lay a total of up to 300 eggs at a spawning. The eggs are so small that they can easily be overlooked by an inexperienced breeder. Immediately after spawning is completed the adults are moved back to their own tank.

The larvae hatch after 18 to 20 hours (development takes longer at a lower temperature), and adhere to the sides of the tank for four to five days. They then fill their swimbladders with air, and swim free in a rather unpractised fashion. On the first day they hang vertically, head-upwards, beneath the water's surface. On the second and third days they swim at an angle of 45 degrees and are then capable of catching their first live food. This is a critical point, and if they can be provided with suitable live food then you can expect breeding success. During this criti-





TROPICAL

## THE INDIAN GLASSFISH

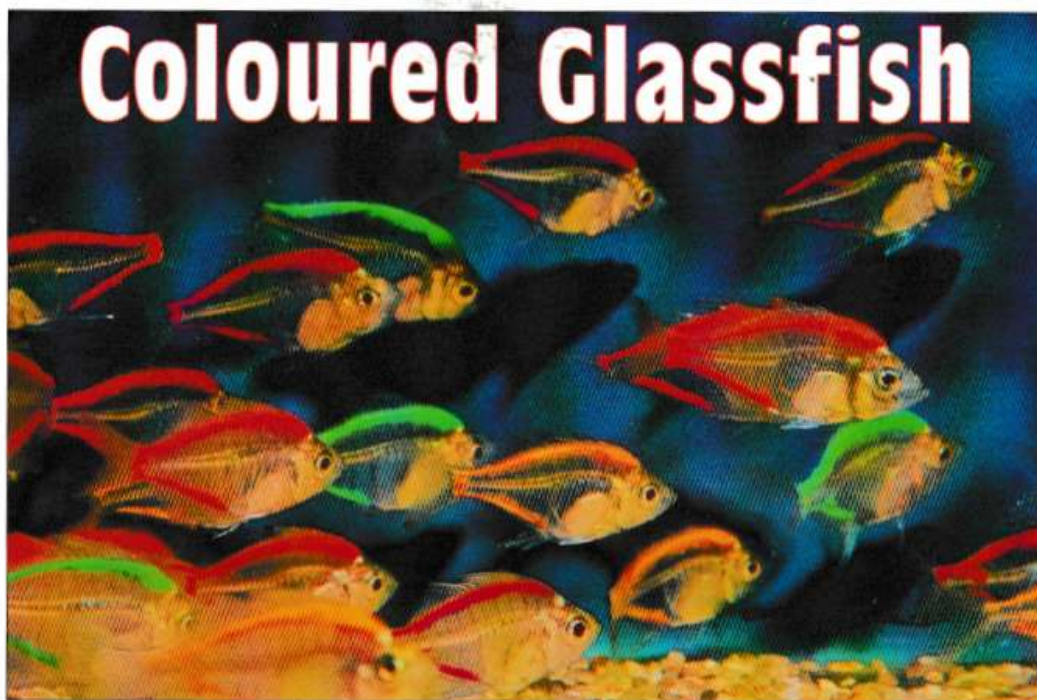
### Check the pH regularly

Once the initial problem of getting the fry feeding has been overcome, it is most important to check the pH regularly, as feeding can alter the pH, a fact often forgotten by beginners and neglect of this can lead to failure.

This has necessarily been but a short summary of the knowledge I

have acquired through experience in keeping and breeding Indian Glassfishes. I have tried to provide you with the most important information which may help you to avoid the mistakes often made by those interested in the maintenance and breeding of these fishes. Despite the problems, I would recommend this species, even to less experienced breeders, as its maintenance and breeding will lead to an increase in knowledge, in particular as regards water management.

ROY OSMINT lifts the lid on the cruel world of coloured Glassfish: PHOTOGRAPHS: M.P. & C. PIEDNOIR



It is with great dismay that I have over the years all too frequently observed many retail outlets offering for sale Glassfish of vivid coloration. The delicate translucence of the previously described fish having been invaded by lurid purples, blues, yellows and oranges!

Specimens of this type are never natural. Fishes exhibiting such colours have been cruelly injected with artificial fluorescent dyes in an attempt to make them more appealing to a wider commercial market. The practice must unfortunately be fairly successful in this respect for it appears to continue unabated. In most instances, I feel, purchasers are likely to be relative newcomers to the hobby who initially become attracted to the vibrant colours in the dealers show tank. Often not realising that the fish are totally unnatural, and completely unaware of the distasteful methods used to bring this about.

Everyone is obviously perfectly entitled to their own opinion of this sort of thing. Personally, not only would I never consider buying them, but would also be seriously discouraged from in any way patronising a dealer that offered them for sale. At the very minimum, in my view, tanks at the point of sale containing such specimens should bear labels that clearly indicate that the inhabitants have been treated in this way with artificial colouring. At least this would present a "level playing field", enabling everyone, having been apprised of the facts, to make

their own conscious decision. But in any event surely there are more than enough natural beautifully coloured tropicals readily available at modest cost to choose from, without the need for creating freaks of this type!

### Considerably shortens lifespan

Quite apart from anything else, the process involved in introducing artificial colouring not only stresses and damages the fish but also undoubtedly shortens its life span considerably. There is additionally the question of disease — especially Lymphocystis! This is a viral condition that can infect any fish, particularly one that has sustained an open injury through, for instance, poor handling. It manifests itself in the form of small cauliflower-like lumps that form on the body and/or fins. Although not generally fatal, it is extremely unsightly and actively debilitates the fish. It is also not an easy condition to successfully treat.

Artificially coloured Glassfish are highly susceptible to this infection, as a direct consequence of being man-handled and injected. In some cases evidence of it can be found on specimens exhibited in a dealers show tank. Often it will appear following the stresses of netting and transportation.



**previous page** Fishes exhibiting such colours have been cruelly injected with artificial fluorescent dyes in an attempt to make them more appealing to a wider commercial market.

**below** What has it all been for? A month or so later most of the dye has disappeared. Most fish treated this way, however, do not survive long enough to rid themselves of the dye but fall prey to various infections, instead.



## A&P Fact File

For many years the Indian Glassfish was known in the hobby by the scientific name of *Chanda ranga*. Other synonyms include *Ambassis lala*, *Ambassis ranga*, *Chanda lala* and *Pseudambassis lala*. *Parambassis ranga*, as it is now called, belongs to the Ambassidae family (previously it had been placed in both Chandidae and Centropomidae) which contains approximately 40 species. They inhabit coastal seas and inland waters of India, East Africa, Southeastern Asia, and parts of the Indo-Australian Archipelago. Of these about 20 species occur in predominantly freshwater habitats and all tend to be rather small glass-like fish. The largest member of the family is the Giant Glassfish which grows to 20cm in body length and comes from Northern Australia and New Guinea.



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As we move towards the Second Millennium, this Shorewatch column will cover all the seas and oceans on Earth in the next century. Although the oceans cover 71 per cent of this planet, most of the marine life occurs in the shallower seas near the continental land masses. This is known as the Continental Shelf. About half of the biomass (all the life) of this planet lives in the oceans.

## The sun — source of energy

Almost all the life requires the energy of the Sun, the organic wastes of the life in the shallow seas eventually descending to the ocean floor. At the start of the food web, the energy of the sun combined with carbon dioxide, water and minerals is synthesised by plants and plankton to drive their growth and reproduction. On the land these autotrophic organisms are the grasses, flowers and trees, and in the sea, the phytoplankton (plant plankton) and the algae (seaweeds).

The light required for the shallow water and intertidal algae is considerable. In the brightest days of the English summer, the light at midday on the seashore measured 45000 Lux and figures of

Andy Horton's

# SHOREWATCH

50000 Lux are recorded. In tropical seas the light levels will be even higher. It is rarely possible to attain such high levels in the home aquaria. The food web of the sea is not mimicked. The artificial environment of a marine aquarium contains mostly heterotrophic organisms, fish and invertebrate animals that feed on plants, or more often on other living creatures or on dead organic matter.

## Living rock

In the shallow seas, almost every rock, from the hardest granite, through the softer sedimentary rocks, sandstones and limestones, to the lightweight porous rocks and coral broken off the reef by storms and hurricanes that are imported for the marine tropical aquarium, are covered in some form of life. This rock is imported dry together with its attached life but kept as moist as possible in a plastic bag.

After arriving at the wholesaler's tanks, the rock is placed in

filtered seawater and inspected for its natural life.

Algae, in small green or red tufts, are often present with pink coralline encrustations, which are a species of algae. Just about any minute bug can come creeping out of the rockwork. These often include species that contrive to be a nuisance in the aquarium, microalgae, the green hair types and others that thrive, colonial sea anemones that reproduce rapidly in captivity, and the abundant bristleworms.

These animals seem to defeat most attempts at eradication in the display aquarium. One suggestion is to remove the fish and any anemones or life you wish to keep to a spare aquarium and turn off the heater and allow the main aquarium to cool (below 20°C) for about two weeks. Most marine life is very sensitive to temperature outside their normal experience and all but the hardiest worm will die. Alas, the algae may survive and this will need to be weeded out like in a garden, before it spreads out of control.

## Native living rock

Rock collected from the British intertidal zone can also be attractive, sometimes stained red or encrusted in varying shades of pink with microalgae, and miniature sea anemones, sea-squirts and hydroids (sea-firs). Unlike the tropical aquarist, the animals that emerge from the rocks are not treated as unwelcome pests but as an additional part of the discovery of the marine world.

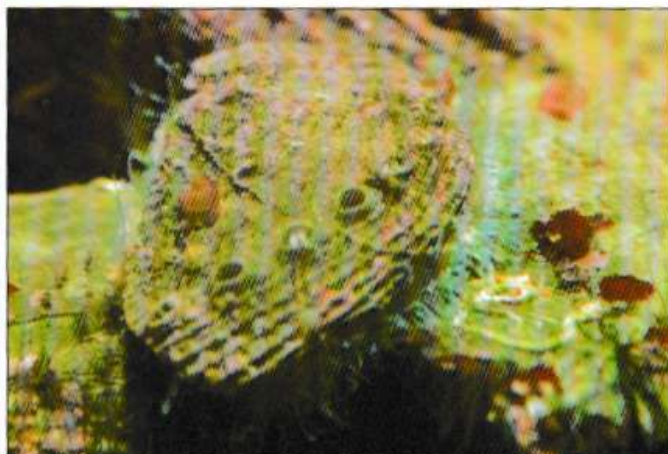
Small colourful nudibranchs (sea-slugs) emerge from crannies, small fish larvae, tiny crabs and other crustaceans, and even small Clingfish, *Apletodon microcephalus*, somehow manage to hide themselves in the smallest space.

## Mystery guest

Of course, the same applies to the tropical marine aquarist. He, or she, may be lucky enough to discover something unusual that arrived with his lump of rock. This was the case when I received an E-mail from Richard Huggett of Eastbourne to identify an animal he thought had arrived on a piece of limestone from Devon.

Just from a written description it is often difficult to be sure of what anything is. It grew from a virtually invisible limpet-like larvae to an actively foraging mollusc 34mm long in 18 months. It turned out to be an Abalone, or Ormer, from the coast of east Africa with the scientific name of *Haliotis rugosa*.

## SHORE WATCH Fact File



The Abalone, *Haliotis rugosa*, arrived accidentally in living rock from seas of east Africa, and grew to an adult in Richard Huggett's aquarium. Abalones are gastropods. In the Channel Islands, the similar Green Ormer, *Haliotis tuberculata*, is a highly prized food.

PHOTOGRAPH: ANDY HORTON

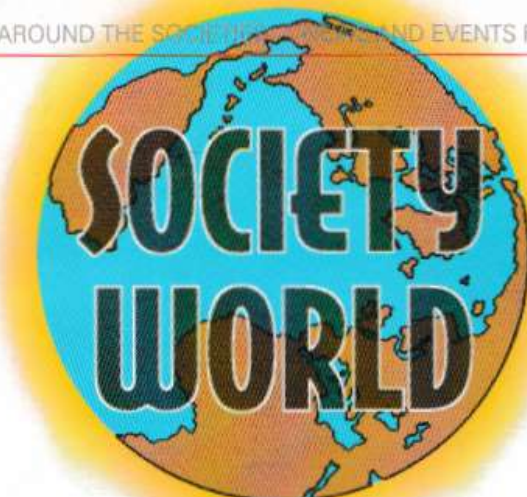
Andy Horton will be able to answer the first question about British marine life free of charge (if a SAE is provided). Please send any queries to Andy Horton, Shorewatch, Glaucus House, 14 Corbyn Crescent, Shoreham-by-Sea, Sussex BN43 6PQ. The answer to your question, as well as a list of popular books, may be found on the British Marine Life Study Society website. URL = <http://ourworld.compuserve.com/homepages/BMLSS/> E-mail = [bmlss@compuserve.com](mailto:bmlss@compuserve.com)



## Why should I travel all the way to Manchester for a fishkeeping festival?

This is a question many people have asked over the years and there are almost as many answers as there are people who attend this kind of event. For most, it seems to be a chance to buy some really good bargains and track down some rare or unusual fish which the local shops rarely, if ever, stock. There is, however, far more to these exhibitions than just this.

For a start it is a chance to meet other aquarists from all over the country and exchange information and ideas with them. A quick look in the bar area and you will usually see 10 or 12 "schools" of aquarists huddled together discussing the best way to culture White-worms, or why they think the new piece of equipment from such and such a company is complete and utter rubbish or



the best thing since electric aquarium heaters. In fact, this is where the real product reviews are aired!

If you wander round the show hall you will come across all the major manufacturers stands displaying their latest products and often selling old lines at a major discount. Several of these have free advice services with well known experts on hand to answer your questions. Specialist societies are also well repre-

sented, as are many of the local clubs.

The FNAS will also be willing to help with free advice and information. By the end of the day you should have found someone (probably several someones) to help solve any problem, or give you advice on any project you might be planning.

Since this is a fish show, you will also see hundreds and hundreds of fish. Many of them of

will be of the highest standard you will ever see anywhere in the country. There will be varieties you have never seen before — even in the books.

Finally, and of course most importantly, *Aquarist & Pond-keeper*, sponsors of this event since its inception, will be present with its own display stand. During the weekend many of our contributors will be present at the Festival, so you may be lucky enough to bump into Kathy Jinkings in real life rather than just in cyberspace. Our Editor, Derek Lambert, will be present on the stand all weekend and there are even suggestions that Andrew Standing and Alan Hulyer from our main office will be splashing their way up to the event at some point.

This has been just a brief overview of why you should trek all the way up (or down) to Manchester for a fishkeeping festival. We hope this has whetted your appetite and look forward to seeing you at the British Aquarist Festival this year — together with the thousands of others who make the trek year after year.

## EVENTS, SHOWS & FESTIVALS

FEDERATION CONTACTS: AofA, Chris Ralph, 01703 560318; FBAS, Paul Corbett, 01983 721246; FNAS, Arny Chadwick, 0161-652 6207; FSAS, Hugh Bowie, 0131 539 2790; USA, John Reid, 01738 634689; YAAS, Terry Nelson, 01724 289736

### OCTOBER

- 1/3 British Killifish Association Convention. At The Portland Hotel, Buxton. Lectures including overseas speakers. Show & Auctions. Contact David Mellor on 01663 746381 for full details
- 3 Basingstoke A.S. (AofA) Open Show
- 3 Halifax A.S. (FNAS) Open Show & Auction
- 4 Reigate & Redhill A.S. (FBAS) Auction
- 9/10 Irish Tropical Fish Club Open Show. Tel: 46 71913 for more details
- 10 Washington A.S. & P. (FBAS) Open Show & Auction
- 10 Doncaster A.S. (YAAS) Open Show & Auction
- 17 Halifax A.S. (FNAS) Open Show & Auction
- 17 West Cornwall A.S. (FBAS) Open Show
- 23/24 British Aquarists Festival, Manchester (FNAS). See advert for full details.
- 24 Dunstable D.A.S. Auction. Contact Ian Pitts on 01462 731225 for details.
- 31 Scottish International Open Show (FSAS), Supreme Championship & Auction. To be held at Grangemouth Community Education Unit. Contact Jim Bryson on 01324 882065 or Jim Sheakey on 01475 704219 for full details.

### NOVEMBER

- 2 Southend & Leigh A.S. (FBAS) Auction
- 5/7 Association of Southern Aquatic Societies Millennium Celebration Fishkeeping Weekend. Contact Paul Corbett on 01983 721246 or Jack Stillwell on 01705 691030 for further details. The FBAS Supreme Championship will also be held at this event. Contact Alan Henderson on 01536 268269 for further details
- 7 Bradford A.S. (YAAS) Open Show & Auction
- 7 Merseyside A.S. (FNAS) Auction
- 12 Doncaster A.S. (YAAS) Auction
- 21 Viviparous Livebearer Auction & Show at The Junction Pub, Featherstone, Pontefract. Contact Peter Moore on 01977 709790 for further details.
- 28 TV Cats (AofA) Meeting & Auction

### DECEMBER

- 4 FBAS AGM & General Assembly

### OCTOBER 2000

- 20/22 Supreme Festival of Fishkeeping (FBAS) to be held at Bracklesham Bay, near Chichester, Sussex

## B.A.F. CHAMPION OF CHAMPIONS CONTEST

HAVE YOU WON FIRST, SECOND OR THIRD BEST IN SHOW THIS YEAR AT ANY OPEN SHOW IN THE UK?

If so, then you are eligible to enter your fish in the "Champion of Champions" contest, the premier event of its kind. For further details contact Mr A. Chadwick on 0161-652 6207



TROPICAL

DR PETER A. LEWIS concludes his series with *Neolamprologus*

species: PHOTOGRAPHS: DR PETER A. LEWIS

# Shell Dwelling Cichlid Lake Tanganyika

## *Neolamprologus boulengeri* (Steindachner, 1909)

This colourful shell dwelling species was in the original collection taken from the lake by Horn in 1908 and subsequently described by Steindachner. *N. boulengeri* has a confusing taxonomic history in that it has been known by the synonyms *Julidochromis boulengeri* (Poll, 1946), *N. hecqui* (Boulenger, 1899) and *L. kirivaithai* (Meyer, 1986). It was left to Staeck in 1988 to set the record straight and affirm the name proposed by Steindachner in 1909.

*N. boulengeri* is yet another dwarf shell-dweller that is attractively marked and that exists in an aquarium around a territory that has a shell as its focal point. Wild specimens for export are collected close to the town of Kigoma on the north-eastern shores of Tanzania. Males attain a length of 6.25 cm while females remain only slightly smaller. In a tank containing both sexes the males can easily be identified since

they are constantly displaying to the females and challenging other males.

The dominant male is distinctly marked with a pattern of black blotches across light brown flanks. Two of these markings extend into the dorsal fin, the first, at a point two to three spiny rays along this fin, the second at approximately the centre of the dorsal. Although young of this species resemble closely *N. hecqui* and *N. kungweensis* it becomes very obvious as the species matures that indeed it is different. In addition to the characteristic blotch pattern across the flanks and into the dorsal *N. boulengeri* has a distinct orange-yellow border to the edges of both the dorsal and anal fins.

The caudal, pectoral and pelvic fins are clear. *N. boulengeri*, like many of its cousins, is a harem breeder with one male taking care of three to four females. One mature female may produce as many as 60 eggs during each spawning which can be as often as every six to eight weeks.

*N. boulengeri* does not appear to be an obligatory shell-dweller since earthenware caves will also be used as spawning sites. The aquarium





# ichlids from

should also be furnished with an ample layer of fine gravel or sand as the substratum so that any shells may easily and efficiently be positioned and buried to the individual requirements of each fish in the tank. Normally the male will not be too large to fit completely into the shell such that he will be forced to eject his milt at the mouth of the shell that he then vigorously fans into the interior of the shell.

## Neolamprologus brevis (Boulenger, 1899)

I maintained the "original" *N. brevis* in my tanks many years ago and recently I have acquired two variants known as *N. brevis* "Gold Spot" and *N. brevis* "Zaire" or "White Tail". Both are superficially very similar to the original importation of *N. brevis* with the obvious differences implied by their trade names. Each side of the species being traded as "Gold Spot" has a large, irregular blotch approximately half way along the body that varies in colour from silver white to gold.



The species being traded as "Zaire" or "White Tail" has a vivid white border to the trailing edge of the caudal fin. Each of the various subspecies have a body that is a silver beige and flanks that are crossed with up to nine distinct, vertical silver-white bars that begin just behind the operculum and extend into the caudal peduncle. Iridescent pastel blue sparkles highlight the upper lip, below the eye and the first third of the flanks. Each of the unpaired fins is marked with silver-white reticulations while the paired fins are clear.

Both variants spawn in a fashion typical of *N. brevis*, a shell-dweller that is unusual in that the male and female invariably share the same shell and become most uncomfortable if suitably sized shells are not provided. An indication that a shell contains eggs is the presence of the female at the entrance of the shell vigorously fanning her fins to ensure an exchange of water takes place between that inside and that outside the shell.

Once the fry are mobile they are not allowed back to the shell but rather occupy the spaces between the shells and among the plants, rocks and driftwood within the aquarium. Both variants reach an adult size slightly less than 6cm with the females being slightly smaller and showing less obvious extensions to their pectoral fins.



**far left** *Neolamprologus boulengeri* does not appear to be an obligatory shell-dweller since earthenware caves will also be used as spawning sites.

**left** *Neolamprologus brevis* "Gold Spot". Despite the differences in colour this form of *Neolamprologus brevis* behaves just the same as the original species.

**above** *Neolamprologus brevis* "White Tail". This species is also being traded as "Zaire" and has a vivid white border to the trailing edge of the caudal fin.



## LAKE TANGANYIKAN SHELL-DWELLERS



**left** *Neolamprologus calliurus* was originally imported and listed as *Lamprologus* sp. "Magarae" since it was collected in the vicinity of Magara, Burundi. It is distinct among all other shell dwellers in that the male has a unique lyre-shaped tail fin, the top and bottom edges extending to lengths that equal the overall depth of this fin.

**below** *Neolamprologus calliurus* fry just venturing forth.



### *Neolamprologus calliurus* (Boulenger, 1906)

This cichlid was originally imported and listed as *Lamprologus* sp. "Magarae" since it was collected in the vicinity of Magara, Burundi. It is distinct among all other shell dwellers in that the male has a unique lyre-shaped tail fin, the top and bottom edges extending to lengths that equal the overall depth of this fin. Choosing a pair is not a problem since considerable sexual dimorphism exists between mature males and females. The anal, caudal and pelvic fins of the male all exhibit long, flowing extensions and, additionally, the male is definitely the larger of the pair reaching a total length of 8 cm while the female is barely half this size at 4cm. In many ways *N. calliurus* resembles the ever popular

*N. brichardi* since the basic body colour is a pale mauve with blue highlights distinct under the eye of the fish and males with fins to rival *N. brichardi*. A splash of orange just above and behind the eye is evident even in immature specimens.

A harem spawner, *N. calliurus* will work hard to bury their shells which, most often, are inhabited by females, since, unless the shells are very large, the male will not easily fit into such a sanctuary. I have housed this species in a 70 litre tank which I furnished with both large and small shells over a fine gravel bottom. Almost immediately after introducing two males and five females they set about excavating the gravel around the shells after which they pushed and pulled the shells into a position they found to their liking only to then move back the gravel to support the shells. Inevitably one of the males had to be removed as the females matured and the larger of the

two males assumed the dominant role and wanted to own the whole harem.

This time I removed the male to a separate tank along with one of the original five females whereupon these two fish began to breed and rear several batches of fry over the next 12 months just as would any monogamous, bonded pair. The pre-spawning ritualistic "dance" is a delight to behold as the male flares his fins toward the female as she entices him back into her territory and puts across the message that she is ready to lay eggs and needs his services to fertilise them once they are placed within the shell.

An interesting observation is that, given a choice between large and small shells, the females would invariably choose one of the smaller shells as their refuge and egg depository. Each spawning of *N. calliurus* would result in 20-25 young that were allowed to live within the sanctu-



ary of their mother's shell for four to five weeks before being banished to live under the shells and between the rocks also decorating the tank. Brood care was shared by both male and female.

## Neolamprologus hecqui (Boulenger, 1899)

Known to science since the turn of the century but only recently introduced into the hobby. *N. hecqui* is one of those dwarf shell-dwellers

about which a certain amount of confusion exists. In my considered opinion there needs to be more studies done on the interrelationships between *N. meeli*, *N. sp. "Kalumbie"* and *N. hecqui* since all these species are superficially similar also, their behaviour in captivity is comparable in many respects.

I currently maintain two separate tanks of *N. hecqui* and *N. sp. "Kalumbie"* and I am becoming more and more convinced as each type matures and begins to breed that they are merely geographical variations of the same cichlid. Both are harem breeders and both dig nursery pits outside of their shell as the fry are about to emerge. Interestingly, in the larger shells, the male that has fertilised a batch of a certain female's eggs will be allowed into her shell until such time as the fry emerge at which point he will return to his territory and allow the female to care for the young on her own. The fry from both species are tiny at birth and a uniform silver-white in colour.



## Neolamprologus multifasciatus (Boulenger, 1906)

This, the smallest of the shell-dwelling cichlids of Lake Tanganyika, is one of my personal favourites and a species that I have maintained in a colony for the last ten years. Housed in a 210 litre aquarium this colony has proved interesting from the day they were



**top of page** *Neolamprologus hecqui* has been known to science since the turn of the century but was only recently introduced into the hobby.

**above** *Neolamprologus* sp. "Kalumbie" — breeding pair. I am becoming more and more convinced that this form is merely a geographical variation of *Neolamprologus hecqui*.

**right** *Neolamprologus* sp. "Kalumbie". Young fry just emerging from their shell.





## LAKE TANGANYIKAN SHELL-DWELLERS

established and started breeding. All I have done over the last ten years, apart from regular routine maintenance of the water, is to take out a few fish each month which I have passed on to fellow hobbyists or sold at our local auction and one time, five years ago, I carefully added several mature specimens I had received from a fellow hobbyist in an attempt to inject "new blood" into the colony. Addition of these new tankmates was only accomplished after I first gave the tank a thorough cleaning, rearranged the existing shells and added a dozen new shells to the colony.

As its specific name implies *N. multifasciatus* is a fish that is distinguished by having a "many striped" pattern across its body. These stripes are always in evidence and extend into the caudal peduncle but not past the operculum of the fish. Careful examination shows that the single dark brown stripe is actually two thin stripes running so closely parallel that they appear as one. The edges of the caudal, anal and dorsal fins are highlighted with yellow-orange underscored with white.

Sexing mature specimens is simplicity in itself since, while the female is marked the same as the male, she is barely half his size, being full grown at just less than 2.5 cm while the male reaches 4.5 cm. A breeding colony can number many hundreds of fish, each one staying close to his or her shell and protecting whatever young are in the vicinity from any intruders in the tank. While I have had no trouble housing *N. multifasciatus* with mid-water fish such as Australian Rainbows, *Melanotaenia maccullochi*, which do not compete for their territory I have never felt this necessary and over the years I have devoted the one tank to this colony alone.

The depth of the tank is immaterial since *N. multifasciatus* will not venture to the water's surface, except perhaps to obtain food once a feeding routine becomes established. In fact my tank has a central pile of rock-work that extends from the base of the tank to the water's surface which is rarely inhabited save for a few fry that leave the shell pile to go exploring. Even if I place shells within this pile of rocks they will be ignored, *N. multifasciatus* preferring to stay close to the bottom of the tank among the piles of shells and excavated gravel pits.

If the shell is large enough both male and female will share a shell and

bring up several batches of fry each year. The young stay close to the shell for the first four to six weeks of their life after which time they leave and go through a transitional period where they live underneath the shells and in the gravel pits excavated by the adults. *N. multifasciatus* make excellent parents even to the extent that adults will not feast on the fry of neighbouring parents. In all my observations, even though *N. multifasciatus* is classed by some as a "harem breeder", it does appear that a particular male and female will most often set up house in one of the larger shells provided for this purpose and establish a fragile but monogamous relationship.

A very similar species was made available some years ago that became known as *Neolamprologus* sp. "Multifasciatus Big Eye", obviously close in appearance to *N. multifasciatus* but having a larger eye in relationship to the face of the fish. This cichlid is now correctly known as *N. similis* (Buscher, 1992). Close examination of both species shows the resemblance is only superficial since, in addition to its "big eye," *N. similis* has a basic body colour that is green-brown as opposed to silver-grey and the body stripes are in fact single, wide stripes that are a contrasting light green. Further the stripes on *N. similis* extend across the forehead of the fish. Both show the same size dimorphism between male and female, the female being but half the size of the male who is mature at 4.5 cm.

## References

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 Smith, Mark. *Aquarium Frontiers*, Fall 1995, pps 4, 16-19.

## right

*Neolamprologus multifasciatus* pair. This is the smallest of the shell-dwelling cichlids of Lake Tanganyika, and one of Dr Lewis's personal favourites.





# Liz Donlan's KOICALNDAR

Now that the show season is nearly over, many Koi clubs are concentrating on their monthly winter meetings and now may be the time to consider joining a club. Whilst activities vary, the general theme of meetings is fairly similar — guest speaker talking on a Koi-related topic, questions and answers session, notices of forthcoming events, etc., raffle and the opportunity to talk to other like-minded hobbyists. Many clubs also have various services such as a magazine/newsletter; library of books, magazines and videos; medications; Koi food; and smaller items of equipment. Some clubs also provide beginners' seminars

**right** One of the advantages of belonging to a Koi club is the opportunity to visit other hobbyists, dealers and gardens. On a visit to the BKKS Mid-Lincs Section, members of the Northern Koi Club were able to visit Purelands — a meditation centre containing some wonderful Japanese-style gardens and natural ponds.

PHOTOGRAPH: LIZ DONLAN



## SHOW CALENDAR

### OCTOBER

2/3 Champions Show, organised by the British Koi Keepers' Society, to be held at the East of England Showground. Contact Dave Scriven on 01226 740577 for further details. Hotel bookings with Eat Davis on 01279 860495.

#### JULY 2000

30 Yorkshire Koi Society (celebrating its Silver Jubilee) at York Racecourse. Contact Jeff Glasspole (Show Manager) on 01845 526164.

#### KOI PHOTOGRAPH SHOWS

These events are for club members only, so if you're interested in taking part you'll need to apply for membership.

### OCTOBER

2/3 BKKS Nottingham & District Section. Contact Shirley Hind on 0115 981 0923.

#### KOI CLUB AUCTIONS

A number of Koi Clubs organise regular auctions whereby surplus Koi and equipment are sold at competitive prices — unless there's half a dozen bidders interested, then the price goes in favour of the seller!

#### OCTOBER

9 Northern Koi Club at Classic Koi, Clarefarm Garden Centre, Nel Pau Lane, Leigh, Warrington, Cheshire. Entries and viewing 10am-12 noon. Auction commences at 12 noon prompt. Non-members welcome to attend and bid for items. Contact Glynnis Morgan-Davies on 01706 218243.

## KOI SOCIETY MEETINGS

### OCTOBER

6 BKKS Leicestershire Section. Guest speaker Chris Marshall (vet). Contact Karen Boyton (Chairman) on 0116 233 0797.  
10 BKKS Wyrthing & District Section. Guest speaker Kevin Goodey of Kusuri Products speaking on "How to Realise the Full Potential of your Koi". Contact Carole Cote (Secretary) on 01903 232277.  
12 BKKS Nottingham & District Section. Annual Review Slide Show with Eric Duffield. Contact Shirley Hind on 0115 981 0923.  
17 Northern Koi Club, monthly meeting at St. James Church Hall, Salford (near Hope Hospital). Contact Glynnis Morgan-Davies on 01706 218243.  
20 Cambridgeshire Koi Club. First of the winter meetings at Break's Sooker Club. Contact Graham and Jane Hagger on 01487 711129.  
28 Witham Valley Koi Society. Plans are afoot for a scientist to speak on his work with fish and their feeding habits. Contact Ray Lee on 01522 872733.

There are numerous Koi clubs in the UK and, this month, we're including a list of those which we currently have details for:

### The British Koi-Keepers' Society Sections

Central, Pat Stevens (Membership Secretary), 0121 588 2446.

Cheshire & District, Keith Grainger, 01782 773592.

Crouch Valley, Brenda Scott, 01375 642321.

East Pennine, Betty Ewer, 0114 2341151.

Ireland, Trevor Geary, 01247 466865.

Isle of Wight, Kevin Driscoll, 01983 291676.

Kenner Valley, Peter Gillman, 01635 821484.

Leicestershire Koi, Karen Boyton, 0116 233 0797.

Manchester & District, Sue Egan, 0161 480 5821.

Middlesex & Surrey Border, Jan Preston, 0181 661 2686.

Mid Staffs, Val Stokes, 01543 278359.

Northants, Peter Parker, 01908 311021.

Nottingham & District, Shirley Hind, 0115 981 0923.

Potteries & District, Tina Burgess, 07782 617526.

South East, Mick Wright, 01854 718943.

South Hants, Di Harman, 01705 596099.

Suffolk & North Essex, Alan Carter, 01206 866011.

West Wales, Basil Evans, 01554 772190.

Wyrthing & District, Carole Cote, 01903 232277.

Yorkshire Section, Andrea Thornton, 01924 275749.

### Independent Koi Clubs

Birmingham and West Midlands Koi Club, Alan Smith,

0121 422 3890.

Black Country Koi Society, Tony Bennett, 01384 395299.

Bristol & West Koi Club, Larry Lerway, 01454 898107.

Cambridgeshire Koi Club, Graham Hagger, 01487 711129.

Derwent Koi Keepers, Alison Allen, 01202 875437.

East Coast Koi Club, Alan Wright, 01503 387116.

East Midlands Koi Club, Richard Jones, 01283 224975.

Eastbourne & District Pondkeeping Club, Brian Dale,

01323 731369.

East Yorkshire Koi Society, Steve Matthews, 01964

527863, or Chris Hill, 01482 346777.

Fylde & District Koi Club, Chris Ingledew, 01772 635581.

Heart of England Koi Society, Paul Stacey, 01203 674821.

Merseyside, Syd Bennett, 01942 204948.

Midland Koi Association, Keith Hanson, 01527 545230.

North East Koi Club, Jean Hope, 0191 416 5794.

North Lincs Koi Club, Ken Bush, 01472 883377.

North of England ZNA Chapter, Yvonne Moss, 0114 289,

1457.

North Wales Koi Society, Keith Parry (Chairman), 01492

580303 or Dave Davies (Membership), 01352 762149.

Northern Koi Club (ZNA Friendship Club), Glynnis Morgan

Davies, 01706 218243.

Norwich Koi Club, Jenny Allen, 01603 452932.

Orkneyshire Koi Club, Kevin Newton, 01865 874008.

Plymouth & District Koi Keepers' Society, Sandra

Crocker, 01752 210118.

South Devon Koi Club, Stan Moreing, 01803 843019, or

Christine Brackstone, 01803 833472.

South Essex Koi Club, Mick, 01702 342460, or Barry,

01268 565739.

South West Koi Club, John Spivett, 01934 822620.

Wessex and Southern Koi Society, Mrs Jenny Lenton,

01425 276885.

Wirral & District Koi Society, Dore McCulloch, 0151 677

1582, or Steve Cope, 0151 327 7457.

Witham Valley Koi Society, Ray Lee, 01522 872733.

York & District Koi and Pond Fish Club, Amy Hudson,

01904 340185.

Yorkshire Koi Society, Rita Thomson, 01723 864867.

There are numerous Koi Clubs/Societies throughout the UK and we will publish details of their meetings each month as and when we receive details. However, don't forget to include a contact name and number. Copy for Koi Calendar can be sent to me: Liz Donlan, 594a Bolton Road, Pendlebury, Swinton, Manchester M27 4ET. Tel: 0161-794 8282. Fax: 0161-793 9696.



DAVID TWIGG unravels the mysteries of Koi varieties:

PHOTOGRAPHS: DAVID TWIGG

KOI

# Koi Varieties *Part Two*

**T**aisho Sanshoku or Sanke (meaning Tri-colour) as it is commonly known, was so named because it was first shown at the Taisho exhibition in 1915 (Taisho Era 1912-1926).

Last month we looked at the Kohaku. This is a fish that has a non-metallic skin with a single colour pattern (red) on a white base or body colour. The Sanke is also non-metallic and on a white base but this time has a pattern that uses the two colours, red and black.

Patterns found on Koi of any variety, and Sanke is no exception, should be well balanced with the larger patches of colour on the widest part of the body. A good starting point when looking for a Sanke is to think of the fish without its Sumi; if you are left with a good Kohaku then that is the basis of a good Sanke.

Sumi found on the Sanke will be in small "patches" that are placed in a balanced way along the length of the body but not normally on the head. As, when appreciating a Koi, we look at the whole Koi rather than the individual parts it is possible for the Sumi to balance up what might otherwise be thought of as an unbalanced Hi.

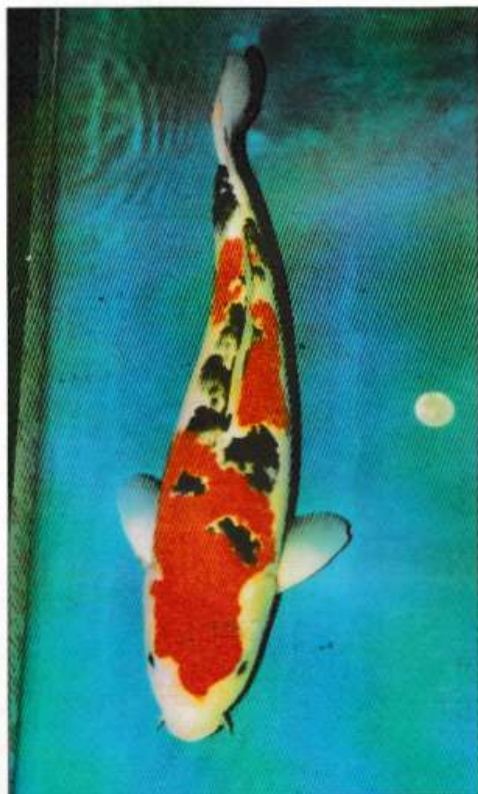
It is undesirable to have red on any of the fins of a Kohaku and the same applies to the Sanke. It is however thought that up to three "stripes" of Sumi are acceptable in the pectoral fins. Whilst it is desirable to have the two colours over a white base it is possible for the Sumi

to overlay the red completely or possibly spread across both red and white. When black is on white (preferred) it is called Tsubo Sumi and when it overlays the red Kasane Sumi.

When describing the characteristics of any variety of Koi it is also necessary to mention the attributes, body shape, skin quality and consistency of depth of colour. These factors carry a lot of weight because they show the breed quality of the Koi and are all part of the "package" that makes any Koi better or worse than another. Pattern is not the only consideration when appreciating these lovely fish. Some factors that go to make a good Koi, and should be remembered when selecting another pet for your pond, are as follows:

- Skin quality; a lustrous effect that has "depth" and glistens (should not be "flat");
- Bodies that are well shaped (not too thin or fat);
- Heads that are well rounded (not pointed, for instance);
- Eyes that are well set (not too sunken or proud);
- And an even depth of colour (it doesn't "thin").

*Next month I will have a look at the Showa Sanshoku, another non-metallic Koi that is described as being a red and white pattern on a black base colour.*



**left** An excellent example of a lovely Sanke exhibiting Tsubo Sumi.



**right** A champion Sanke that clearly shows the black stripes in her pectoral fins.



DAVE BEVAN walks us through dividing marginals:

PHOTOGRAPHS: DAVE BEVAN

POND

# Dividing Marginal Plants

*A Step-by-Step Guide*



**M**arginals are one of the largest and most varied groups of plants for use around the pond. With their roots submerged and their leaves and flowers often coming down to the surface, they help only a little to maintain the pond balance. They are, never the less, very important for their ornamental role since they are often beautiful plants in their own right. They also fulfil the important function of filling the difficult area at the edge of the pond between water and dry land.

With such a large and varied group it is possible to select for colour and cover from Spring right through until Autumn and beyond. The bright yellow Marsh Marigold appears in early spring together with the Skunk Cabbage. These are followed by the flowers of tall stately Irises and our own native Yellow Flag. Next come lovely lilac flower spikes of the Pickerel Weed and the striking colours of the Lobelias. Plants with a more prostrate habit like Water Mint, Water Forget-me-not and Houttuynia creep out into the water, whilst the varied Grasses, Sedges and Rushes add texture to the scene.

Marginals grow quickly in good conditions and many plants will have doubled in size over the past few months. Once they have finished flowering and the leaves have started to die back it is time to tidy up the pond for winter and at the same time increase your stock of marginals by dividing the larger clumps. Flag Irises are typical of marginals which can be divided at this time of year.

**left** Double Marsh Marigold in flower during early spring.



## DIVIDING MARGINAL PLANTS

### STEP ONE



Flag Irises have a large rootball and the roots may have spread out into the pond and the surrounding soil, particularly if it is not in a container. Lift the plant clear, cutting roots with secateurs, but take care not to damage the liner if one has been fitted.

**Tip:** For very large clumps use a spade to divide them into manageable chunks.

### STEP TWO



Wash off some of the soil to reveal the tuberous root and the individual plant stems.

**Tip:** Check for signs of rot.

### STEP THREE



Using a sharp knife cut through the tuber at the point where it forks making sure that each piece has some tuber with attached roots and at least one healthy shoot.

### STEP FOUR



Take an empty pond planter, at least 12 inches in diameter, and line it with hessian.

**Tip:** If you can find an old hessian sack you will be able to make your own liners at a fraction of the normal cost. Put some pond soil in the bottom and place the iris cutting in the container.



JOE SMARTT looks at mixed relationships:

PHOTOGRAPHS: JOE SMARTT UNLESS OTHERWISE STATED

## Preliminary Observations on Hybrids between ...

# Goldfish and Crucian Carp

**T**he Goldfish has been domesticated for a thousand years or so (Hervey and Hems, 1948) during which time a considerable diversity of exotic forms have been established.

In comparison with more recently domesticated species there have evolved changes of considerable genetic interest which parallel those described by Fisher (1930) in the domestic fowl. A century ago Bateson

(1894) included the Goldfish among the biological material suitable for the study of variation.

Notable genetic studies of this variation were carried out by Chen (1925, 1928), Matsui (1934) and others (Affleck, 1952). These studies were carried out without the knowledge of the polyploid (4x) nature of the Goldfish. The result was that a very imperfect understanding of



**left** The matt mutation spotting and guanin.

**above right** Reciprocal crosses between Crucian Carps and London Shubunkins like this fish were made.

PHOTOGRAPH:  
MAX GIBBS

**right** A female red metallic Veiltail similar to this fish was also crossed with a male Crucian Carp.

PHOTOGRAPH:  
MAX GIBBS



Goldfish genetics emerged (Chen 1925, 1928, 1956).

Kajishima (1977) was among the first to examine the inheritance of some of the distinctive characteristics of domestic Goldfish and established a tetrasomic pattern for the transmission of the xanthic mutant character.

There had been earlier indications of this pattern from Matsui's work in which the globe-eye character showed a tetrasomic pattern (duplicate loci) of inheritance in crosses with wild Goldfish (Funa) and a diploid pattern in crosses between domesticated strains.

## Changes in dominance relationships

This indicates a possibility of gene silencing in the course of domestication. Changes in dominance relationships appear to have occurred according to Smartt and Bundell (1996) in a reinterpretation of some of Matsui's data. The twin-tail character generally considered to be recessive has arguably become a dominant with incomplete penetrance.

The objective of the present study has been to determine (as far as possible) if changes in dominance relationships have occurred and to ascertain the nature of the genetic control of characters relating to body shape and finnage development.

Ideally, test crosses necessary for such an exploration would be with wild Goldfish stocks free from introgression with domestic populations. This ideal was impractical and the best approximation to oriental wild Goldfish was the western Crucian Carp.

Six young individuals were obtained of Crucian Carp, only one of which was female. These were spawned and approximately 200 progeny were raised. This operation presented no problem but as the fry developed some irregularities in development were noted. In a very small number development of the operculum was irregular ("out-turned operculum" vide, Chen, 1925).

More common was some irregularity in finnage development, particularly affecting the caudal fin. Fin-ray development was sinuous rather than straight and size of the caudal fin was somewhat reduced in some individuals.

Similar developments can be observed in some highly inbred Goldfish strains.

Two sets of crosses were attempted successfully. Reciprocal crosses with London Shubunkins were produced and a cross was made between a female red metallic Veiltail and male Crucians.

Spawnings were natural, no attempt was made to strip brood stock. Fertilisation was satisfactory, of the same order as might be expected



from a Goldfish x Goldfish spawning. Raising fry on Liquifry, Brine Shrimp nauplii and commercial (Aquarian) growth food presented no problems. Fry were raised in exactly the same way as pure Goldfish and with equal success.

## London Shubunkin crosses

Reciprocal crosses were made between London Shubunkins and Crucians and for all practical intents and purposes with identical results. The choice of the London Shubunkin was deliberate; in body form it is closely similar to the Crucian, the depth of body tends to be rather less, development and size of finnage are comparable.



## GOLDFISH V CRUCIAN CARP

The major difference is in the presence of the matt mutation in the Shubunkin as a heterozygote. Crosses between normal metallic Goldfish and Shubunkins give a typical 1:1 (metallic: non-metallic) test cross ratio, the cross London Shubunkin x Crucian carp gave the same ratio.

The reciprocal cross of Crucian carp x Shubunkin rather surprisingly gave uniformly non-metallic progeny. The male clearly was homozygous for the matt allele although the phenotype expressed was not that of a typical matt homozygote. (This question is taken up in a separate note).

However, non-metallics from both progenies were indistinguishable. The most obvious feature of the non-metallic progeny was that in colouration they were far from showing the typical Shubunkin blue.

The pattern of pigmentation was variable ranging from almost entirely orange with black spots and flecks through bicoloured orange and pink/pale blue to forms without any obvious xanthic pigment at all.

These approximated to the typical matt phenotype, in being devoid of both melanin and xanthic pigments. The presence of iridophores is variable, particularly on the operculum which may be reflective in whole or part. There was also, in some instances, a variable iridescent or nacreous sheen. Some individuals occur which show the full matt phenotype with no obvious sign of melanophores, xanthophores or iridophores. Genetically of course these cannot be homozygous for the matt mutant.

The significance of these observations is that the matt gene which characteristically shows incomplete dominance in the background genotype of the Goldfish, shows, in some instances at least, in the mixed genetic background of the Goldfish/Crucian cross, that it can behave as a complete dominant.

Conversely, in the Goldfish parent of the Crucian female x Shubunkin male cross we have evidence that the effect of the matt mutation on development of chromatophores can be moderated and appreciable development of all three chromatophore types can then be observed in the homozygous mutant.

In practice most observed segregations from Shubunkins mating inter se or crossing with either homozygote conform closely to the expectation of 1:2:1 or 1:1 segregations. But, as Affleck (1952) observed, exceptional individuals occur whose genotype cannot be read accurately from the phenotype but only after a suitable breeding test.

These were largely heterozygous which were distinguishable only with



difficulty from homozygotes (matts). Recently the development of highly coloured matts has acquired commercial significance with the marketing of "Sky Blues". These are attractive fish with development of a satisfactory intensity of blue colouration which can be accompanied (or not) with a reasonably intense red colour.

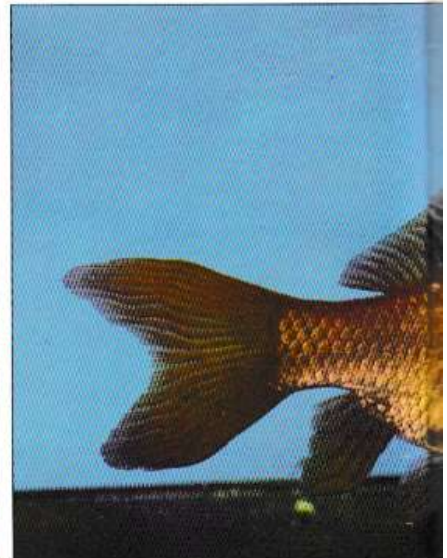
Melanin development in spots and blotches of significant size does not appear at present but it is possible that selection may establish this which would make a true breeding form of the Shubunkin which should increase even further its commercial attractiveness.

### The Veiltail cross

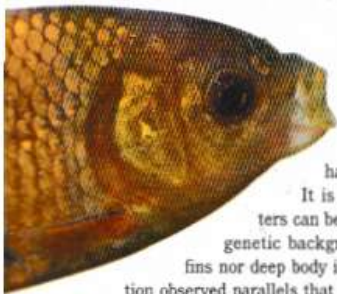
This cross between a female red metallic Veiltail and a male Crucian carp produced a very variable progeny as regards body shape and length or finnage, but was uniform in respect to the retention of wild type olive colouration and the development of single tails. These are oligogenic effects involving a pair of loci in the case of colour development and a single locus controlling single/twin tail development.

As has been suspected finnage length and body depth are polygenically controlled. While no transgressive segregation occurred, development of fin length showed a continuous range but with the shorter segregants having appreciably longer fin development than the Crucian parent, while that of the longer finned individuals fell short of that of the Veiltail parent.

A generally similar situation was apparent with regard to the body







length/depth ratio; some of the deeper bodied segregants approached the Veiltail parent quite closely in body depth and actually had a Ryukin-like conformation.

It is interesting that these two characters can be expressed so strongly in the hybrid genetic background. Neither character, ie. long fins nor deep body is fixed in the Veiltail and the variation observed parallels that which would have been produced in a pure Veiltail spawning.

There is an interesting implication in the above observations that the xanthic mutation and that which produces twin-tails behave as complete recessives whereas in a pure domesticated genetic background they behave as incompletely penetrant dominants.

It would be interesting to see if the breeders' problems brought about by incomplete penetrance and variable expressivity could be reduced as a result of reversing dominance relationships of the single/twintail alleles.

This would again have commercial implications in reducing the quantity of unacceptable culls from twin-tail spawnings which can range in morphology from web-tails in which the caudal fins are joined dorsally, to partial duplication of the fins and even to partial or complete suppression of the normal caudal fin development and the production of the "Meteor" which totally lacks the caudal fin.

## The out turned operculum

The form of Goldfish in which abnormal development of the operculum occurs resulting in an outward curling has found favour in China but not in the west. This mutant phenotype can appear in many Goldfish stocks.

However, its expression is variable, it may affect the operculum on one side only, the degree of curling may be variable also. Opercular development may also be incomplete leaving greater or lesser numbers of gill filaments completely exposed and unprotected.

This character was expressed at a very low frequency in both the Shubunkin and Crucian Carp strains. However, in the hybrid up to half the progeny showed abnormal opercular development. The characteristic was also apparent in the Veiltail hybrid though less frequent than in the Shubunkin cross.

The genetic control of this feature is unclear, it appears to be recessive with highly variable expression. Apart from the increased risk of

damage to the gills affected individuals seem to be very little affected otherwise, growing to a large size with normal viability and vitality.

## Further generations

Although there have been indications of incipient spawning, apart from one occasion on which some eggs were produced which did not develop, no successful spawnings have as yet resulted from sibling matings. It is possible that there is male sterility so it is proposed to attempt matings back to the original parental strains.

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**top of page** This species was one parent of the two crosses undertaken.

**bottom left** Two individuals, varying in body depth and finnage length.

**bottom centre** Segregant closest in form to Crucian.

**below** Slender fish with long finnage.





TROPICAL

KATHY JINKINGS guides us through the world of giant Suckermouth Catfish:

PHOTOGRAPHS: MAX GIBBS UNLESS OTHERWISE STATED

# Big Beast ...



The Royal Panaque, *Panaque nigrolineatus*, can measure two feet and is a very striking fish in its juvenile coloration, when it is grey with black horizontal stripes. In some specimens in aquaria the colouring fades to a uniform grey colour as the fish ages, although large specimens retaining their striking colour have been caught.

Sooner or later every visitor to aquarium shops will encounter the Suckermouth Catfish, members of the Loricariidae. These fish are sold interchangeably as "algae eaters" or "Plecs", in spite of being members of one of the largest families of fish. Loricariids range in lifestyles, temperament, and size, from the gentle inch and a half long *Otocinclus affinis* to the territorial giant *Acanthicus*. All these fish are fascinating to keep and watch, but many aquarists with an average sized community aquarium have been first startled, and then horrified, as their tiny algae eater grows — and grows ... and grows ...

The evidence is there to be seen in many aquarium shops, where nearly any tank large enough for it to keep its head underwater contains a huge Plec. Anyone who wants a giant catfish can buy a full-grown (or at least very large!) *Hypostomus* (Plec) or *Glyptoperichthys* (Leopard Plec) for little more than a tenner, as the shops are unable to get rid of them fast enough. In spite of this, often in the same establishment, there will be a tank of endearing little Plecs, a couple of inches long, making their way out of the shop one after another with aquarists who came in to get "something to eat the algae".

If you are looking for a clean-up squad for your community tank, a pair of Bristlenoses or a squad of *Otocinclus* will be continually at work, keeping the aquarium spick and span. On the other hand, if you have become enamoured of the giant Loricariids, and are prepared to provide a home big enough to accommodate one or more, they are long-lived, hardy and extraordinarily beautiful fish that often become "pets" rather than animated room decorations.

The Loricariids all come from South America, where the fluctuations of their home waters have led to a startling array of adaptations to make the most of what they have. In the rainy season, the fish have plenty to eat, and spawn either in burrows that they dig in the muddy banks or the substrate, or in naturally occurring holes and caves. When the dry season comes, life is somewhat harder. The floodplains dry out, and many are isolated in small oxygen-deficient pools. Others that remain in the main rivers find oxygen levels falling as the currents slow. To help with this all the big Loricariids are capable of air breathing, with varying degrees of efficiency. Air is swallowed and absorbed through the walls of the intestine, with waste gases being discharged either through the gills or the anus.

If the water levels fall too far in the pools the catfish do not have much time left, and use it as best they can by trying to walk to a new home. Their tough mailed skins mean that the fish do not dry out for an extended period of time, and they appear to be able to breathe air almost indefinitely. Using their strong pectoral fins, the fish can make it to a larger body of water, provided it is not too far away, although many succumb to drying out on burning sands with no water in sight. Those fish who have enough water to live in are still subjected to the attentions of the local populace, who take advantage of the reduced water depth to spear the catfish ready for cooking "in-the-shell". Given that they are capable of coping with their natural environment, it is unsurprising that the Loricariids are among the easiest and most resilient fish available to the aquarist.





**left** The common Plec seen in aquarium shops may be almost any one of 107 different species. This one may be the true *Hypostomus plecostomus* but without proper scientific examination it is impossible to tell.

**bottom left** *Glyptoperichthys gibbiceps*, the Leopard Plec (or sometimes "Red Plec") is capable of growing to 50cm, and are a common occurrence in aquarium shops, both as juveniles and large "rejects". This is a young fish whose colour will change a little as it matures.

PHOTOGRAPHS:  
M.P. & C. PIEDNOIR



properly described. Information about L number fish is sparse, and largely needs to be gathered from other enthusiasts or guessed from the attributes of other, similar fishes.

## Aquarium conditions

Fortunately, the giant Loricariids all have similar requirements in terms of care. They are all vegetarians tending towards the omnivorous, and require a basic vegetable diet. This can be supplemented with occasional

treats of frozen live foods or live foods that can't swim very well such as Bloodworms. There is very little point in feeding Loricariids live daphnia or any active swimmers. All vegetarians require far more bulk and produce far more waste than meat eaters, and the Loricariidae are no exception. A large Loricariid catfish will eat a prodigious amount of food, and produce enough waste to overwhelm all but the most powerful and efficient of filters. As they all enjoy water currents and high oxygen levels, it is better to err on the side of larger rather than smaller when choosing a filter. Undergravel filters will probably not cope adequately, even if you are prepared to spend your life vacuuming the gravel, so a large external power filter is an ideal choice.

As the majority of Loricariids tend towards the nocturnal, bright lighting will keep your fish inactive for most of the time. Many will happily be active in dimmer light, especially when bribed to do so by feeding. When choosing the tank, bear in mind that the Loricariids are not particularly active, but still need to be able to turn round occasionally. Their armoured skins do not permit them to be very flexible. If you have a two foot long fish, it will have great trouble turning round in a foot wide tank, no matter how long the tank is. The fish will be happier in a three-foot square tank than in one that is six feet by one and a half. Height is also wasted, as they spend their lives on the bottom or attached to the

## What's in a name?

Confusion still reigns when it comes to choosing a species by name. Not only are the "common" names often common to more than one species, but the family is in a constant state of flux as far as scientific nomenclature goes. The "original" Plec, *Hypostomus plecostomus*, started its name career as *Acipenser plecostomus* in 1758. (The genus *Acipenser* now includes only the sturgeons, a group of fish who also have tough plated skin, although this is only a superficial resemblance). It was later referred to as *Plecostomus plecostomus*, but eventually ended up as *Hypostomus plecostomus*. The original *Hypostomus*, *Hypostomus guacari*, was described by Lacepede in 1803, which actually turned out to be the same fish as our friend the "Plec".

The much smaller Bristlenose catfish, *Ancistrus cirrhosus*, started out as a *Hypostomus* before moving, eventually, to *Ancistrus*, while the Sail-fin Plec, now *Glyptoperichthys gibbiceps*, started off as an *Ancistrus* before passing through *Pterygoplichthys* on its way to its current name! The upshot of all this is that even loricariid enthusiasts have an uphill task to know the latest names for everything. As if this was not enough, new species (or variants) are being imported regularly and simply assigned L-numbers instead of names, although some have later been



TROPICAL

## BIG BEAST ... BEWARE!



**left** This fish graphically illustrates the problem with identifying Loricariids. It is clearly a White-tailed Panaque (L90) but the body colour is somewhat different to fish often illustrated as that species. So are we looking at a colour form of L90 or should this be considered yet another species?

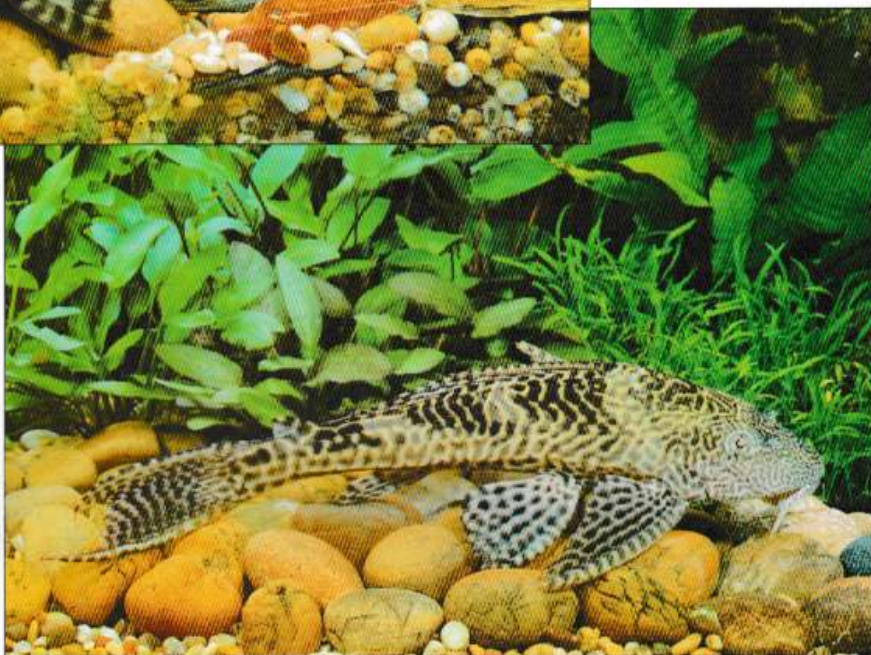
**below** *Liposarcus anisitsi*, the Snow King, are usually peaceful aquarium inhabitants, but grow to a very large size and have so far only been spawned in ponds where they build a spawning burrow in the soft mud banks or substrate, or in vegetation.

glass, and will not cavort in mid-water no matter how much of it there is.

If the catfish is to be part of a community, care needs to be exercised. Although the mailed catfish lurking at the bottom are often ignored by other fish, and are unappetising anyway, some fish may take grave exception to a catfish grazing the glass near their new clutch of eggs. Further, many of the large Loricariids can be aggressive. Although *Hypostomus* is usually regarded as a peaceful large community fish, there are several recorded instances where these fish have become killers.

Other species are even more likely to cause trouble. *Acanthicus* are very large and spiky, and although some literature (and keepers) claim them to be peaceful this is certainly not always the case. My own *Acanthicus hystrix* shows the most premeditated aggression I have ever seen in a fish. Not being a good swimmer, he has little chance of catching anything in midwater, so lurks patiently until he spots a fish swimming between him and the glass. At this point he erects his long and unpleasant interopercular spines and with a well-timed rush impales his unfortunate victim against the glass. After he has sawed backwards and forwards a few times, he retreats to allow the luckless recipient to float to the top. He succeeded in performing this manoeuvre three times before his "benefit of the doubt" was withdrawn, and now lives in solitary splendour.

There are many large Loricariid catfish that are suitable for a large aquarium, ranging from the cheap and easily found *Hypostomus* and *Glyptoperichthys* to the exotic, beautiful and expensive Panaques and *Acanthicus*. If you want an ordinary Plec, you will find it easy to acquire a large one at a reasonable price, but if you have set your heart on something more exotic you will probably need to buy a baby and raise it yourself. Remember that it will require a bigger tank sooner than you think!



## Hypostomus sp

Although succeeding in identifying a Loricariid as far as the genus level is an achievement for most retailers, not all little "Plecs" are *Hypostomus plecostomus*. A few days examining the large specimens in local shops will reveal species ranging from the dull brown to those with very beautiful markings and patterns. At present there are no less than a hundred and seven species of *Hypostomus* currently valid, and probably more to come from the ranks of the L-numbers. The fact that many change their appearance as they grow to maturity does not help the purchaser to identify his specimen. They can grow up to nearly two foot long, although many specimens reach only a foot. It seems likely that these are species differences, but since few people know what they have got it is difficult to prove one way or the other.

Various spawning behaviours have been reported: specimens introduced to North America were documented as spawning by laying eggs on smooth rocks, while those raised in Florida fish farms prefer to spawn by digging burrows in the banks of their mud ponds. *Hypostomus*