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Conte

Issue 3 March 2006 On sale February 22 – March 21 2006

SPOTLIGHT ON CICHLIDS

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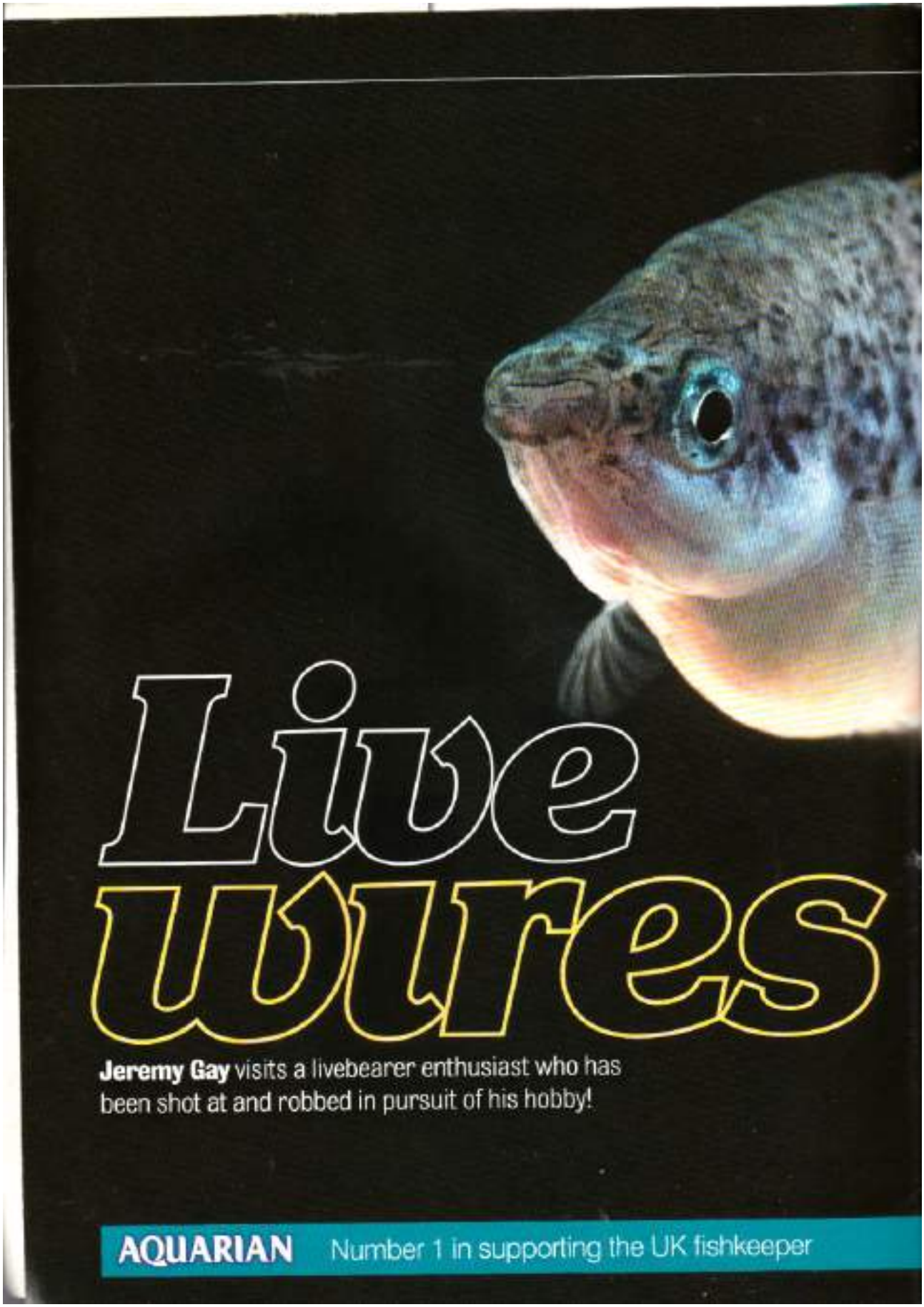
ON THE COVER

Cover picture of 'red melon' Discus by Neil Hepworth. See pages 82-83.

THE PFK RETAIL GUIDE

recycle



Live wires

Jeremy Gay visits a livebearer enthusiast who has been shot at and robbed in pursuit of his hobby!

Dave Macalister has been a familiar face on the UK club scene for decades, and is well known for his expertise and experience on livebearers. He is vice chairman of Corby and District Aquarist Society, and a committee member of the British Livebearer Association, or BLA for short.

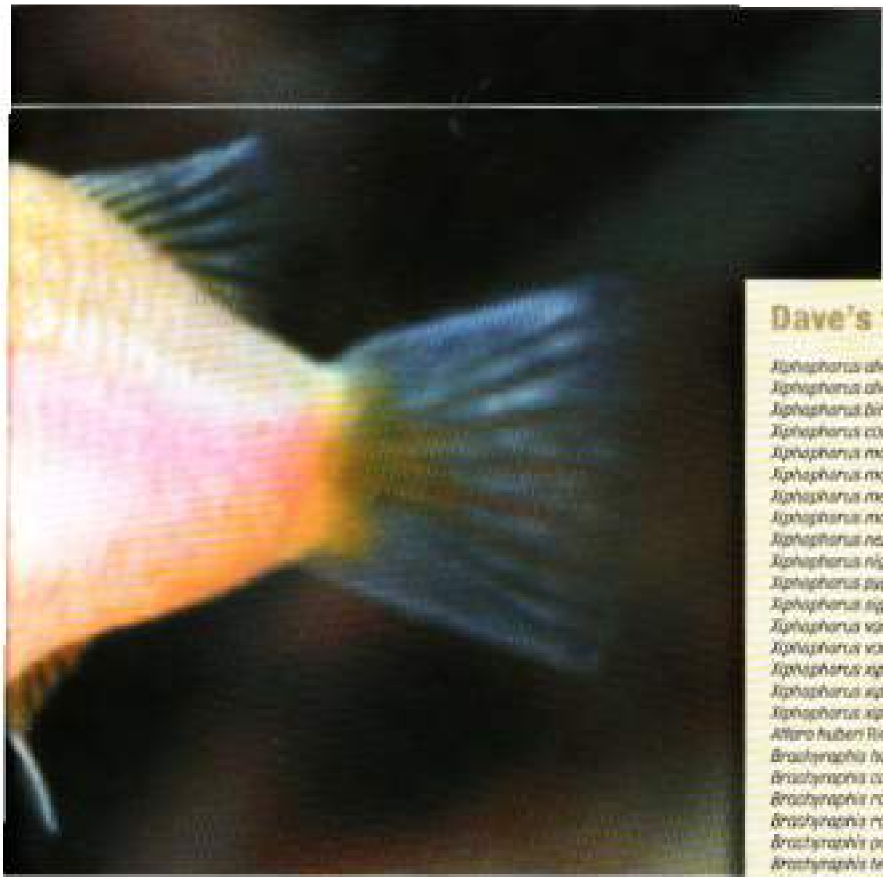
Dave has been keeping fish for over 35 years, and his fascination with livebearers has taken him from keeping Marigold platies all those years ago, to specialising in the genus *Xiphophorus*. He shows his

PREVIOUS PAGE:
Xiphophorus hellerii montezumae

ABOVE:
Priapella compressa

ABOVE LEFT:
Xiphophorus alvarezi "red"

LEFT:
Zoogenetacus tequila



fish regularly all over the country and has literally won too many awards to mention, but admits that his greatest triumph on the show bench was winning the Champion of Champions in Manchester five years ago, with a spectacular *Xiphophorus birchmanni*. On a personal level, Dave gets great satisfaction from seeing the decendants of species that were originally collected by him, on sale on the lists of commercial fish breeders around the world.

Dangerous pastime? No, not really...

The *Xiphophorous birchmanni* remain Dave's favourite species of fish, in a collection that contains nearly 60 species, most of which he has collected himself. One that is still on the wish list however, is *Xiphophorous gordoni* – a very rare fish that is listed as endangered. His passion for fishkeeping took a step further when he and fellow enthusiasts decided to go and collect the fish themselves from Central America.

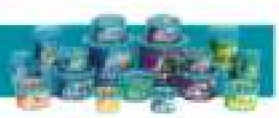
Dave has now been on 12 collecting trips with more in the pipeline, and has visited nearly all of the countries where livebearers can naturally be found. These include Mexico, Guatemala, Belize, Panama, Costa Rica, Cuba and Peru. The one place left to explore is Columbia, but Dave reckons that it is just too dangerous to go collecting there. He says that if a group of westerners walking through the wilds of Columbia happens to accidentally stumble upon an illegal activity, the people who are protecting that activity are not going to believe that you are there looking for fish.

In fact, on Dave's first ever collecting trip, he was shot at. He has also been involved in a car accident when the vehicle rolled over three times and hit a tree, narrowly missing a two hundred foot drop on the other side of that tree. He's even been robbed! But those tales are certainly not the norm and Dave can laugh about them now. He says that Costa Rica was a paradise, and that Cuba was very pleasant too. He has become so experienced in collecting that he regularly receives emails from fellow BLA members both inviting him on trips and asking for his advice on where to find

Dave's fish list

Xiphophorus alvarezi "red" Rio Candelaria Jalacor, Guatemala
Xiphophorus alvarezi "yellow" Coban – Chisec road, Guatemala
Xiphophorus birchmanni Orizatlan, Mexico
Xiphophorus cortezi Vinasco, Mexico
Xiphophorus malinche Rio Claro, Mexico
Xiphophorus mayae Panzos, Guatemala
Xiphophorus meyeri
Xiphophorus montezumae El Quince, Mexico
Xiphophorus nezahualcoyotl El Salto, Mexico
Xiphophorus nigrensis Rio Coy, Mexico
Xiphophorus pygmaeus Nuchichuayan, Mexico
Xiphophorus signum Semococh, Guatemala
Xiphophorus variatus Laguna, Mexico
Xiphophorus variatus Vinasco, Mexico
Xiphophorus xiphidium "1 spot" Rio Corona, Mexico
Xiphophorus xiphidium "2 spot" Rio Santa La Marina, Mexico
Xiphophorus xiphidium "crescent" Rio Corona, Mexico
Alfaro huberi Rio Quehanas, Guatemala
Brachyrhaphis hartwegi Escuintla, Mexico
Brachyrhaphis cascajalensis Palenque, Panama
Brachyrhaphis roseni David, Panama
Brachyrhaphis roswithae El Valle, Panama
Brachyrhaphis parismina Chiriqui Grande
Brachyrhaphis terrabensis San Andres
Brachyrhaphis holdridgei Main docks
Brachyrhaphis hessfeldi Palenque
Carlhubbsia stuarti El Estor, Guatemala
Carlhubbsia kidderi
Gambusia alvarezi
Girardinus metallicus "yellow"
Micropoecilia picta "red"
Phallichthys fairweatheri
Phallichthys tico
Priapella compressa
Priapella olmecae
Priapichthys puetzi
Allotoca zacapuensis
Allophorus robustus
Allodontichthys tamazulae
Allodontichthys zonistius
Allodontichthys polylepis
Chapalichthys pardalis
Chapalichthys lateralis Los Berros, Mexico
Chapalichthys sp. Guadelupe Aguaterra, Mexico
Chapalichthys sp. Los Pinos
Skiffia multipunctata La Luz, Mexico
Zoogoneticus quitzeoensis La Luz, Mexico
Zoogoneticus tequila
Rivulus weberi

Bleeding heart platies
Ruby nose platies
German red roundtail guppies
Weber/Smaragd bottom sword guppies
Pauly/Aach top sword guppies
Italian green roundtail guppies



News

These news stories come from the Practical Fishkeeping website. To read them in full – and hundreds of others – visit: www.practicalfishkeeping.co.uk

NEWS IN BRIEF

WHALE VOMIT IS WORTH THOUSANDS

A couple in Australia have found some whale vomit that could be worth over £100,000 if they sell it. They first spotted it washed up on a beach and didn't realise what it was until they did research after seeing it still lying there two weeks later. They looked it up on the internet, and found that it was a hardened lump of whale vomit called Ambergris.

Ambergris is thought to be a digestive aid to whales, and is occasionally ejected when the whale throws up bile. When first thrown up, the fatty lump is soft, but hardens to become rock-like with grey colouration and a vein pattern running through it.

Ambergris has a sweet smell and is used by the perfume and pharmaceutical industry. Because it is a rare find the lump is said to be worth a substantial sum of money.

OSCAR HAS THE MARK OF ALLAH

A Lancashire retailer has sold an Oscar to a man that told him its pattern had the mark of Allah. The man told the retailer that the pattern showed the Arabic symbol for Allah on one flank and Mohammad on the other.

Walker Aquatics in Rossendale, Lancashire had had the fish in one of their tanks for about eight weeks, and estimate that it is about two years old. Tony Walker, the owner, didn't know whether to believe the man or not so sold it to him for £10, but thought he must be serious when the new owner went on to spend another £200 pounds on a tank and equipment for it. The fish is still in Tony's care until the tank is mature, and the fish has stirred up a lot of local interest.

WAR ON ZEBRA MUSSELS

Scientists at Cambridge University have developed a "Trojan horse" or "Biobullet" pill, that can kill off populations of an invasive freshwater mussel called the Zebra mussel. The mussel is native to the Caspian sea, but has become a major pest in the USA and is causing hundreds of thousands of pounds worth of damage to water treatment plants by encrusting pipework and drains.

The pills are sucked in by the mussel as they filter feed, and release potassium chloride which will slowly kill it. No other organisms are effected.

UK's first Cownose ray spawning

The Oceanarium in Bournemouth has become the first public aquarium in Britain to breed Cownose rays. The strange looking marine fish are livebearers, and two females recently gave birth to one pup each.

Cownose rays are gregarious fish that live in large shoals in the wild, migrating over long distances. The aquarium keeps the rays in a large group and has done since 1998, when they introduced them at one year old.

When the rays first gave birth, the Oceanarium liased with a public aquarium in Chicago that had previous experience in breeding and raising the same species. The Oceanarium is constantly expanding its list of captive raised marine species, and Marine biologist Oliver Butting said "We have a great track record for the captive breeding of sharks, seahorses and southern stingrays, so we are extremely proud to add Cownose rays to our successes. Captive breeding not only shows that the creatures are happy in their environment and behaving as they would do in the wild, but also helps reduce the demand on wild populations. We are incredibly excited that our continued care for the school of rays over the last eight years has resulted in the first captive-bred Cownose ray births in the UK, and we have high hopes that these will be the first of many."

The pups are said to be doing well and already have a 20cm/8" wingspan.

More fish news: Visit the Practical Fishkeepir

First westerners to win at All Japan Koi show

The weekend of January 21-22 saw Koi breeders and collectors from around the world gathered in Tokyo for the highlight of the Koi calendar, The 37th All Japan Combined Nishikigoi Show.

The All Japan Combined Nishikigoi Show is held every January by the All Japan Nishikigoi Promotion Association, the professional Koi trade association and attracts simply the very best Koi in the world with over 1600 Koi entered this year ranging in size from 10cm/4" to over 1m/40" in length and with values reaching up to six figure sums.

The last few years have thrown several challenges at Japan's Koi breeders, particularly those from the birthplace and spiritual home of Koi in Niigata prefecture. In November 2003, at the Koi industry's busiest time, the first case of Koi Herpes Virus (KHV) was confirmed in Japan and then on October 23, 2004 the Niigata area was devastated by an earthquake, the epicentre right in the heartland of Koi production, destroying many ponds, Koi and homes, something from which the area is still recovering from.

The discovery of KHV in Japan has led to significant changes in the organisation of this, and all Koi shows in Japan. Historically all Koi from certain show classifications and sizes, for example all 70cm/28" Kohaku, irrespective of owner would be placed together in the same show vat in order that they could be judged in direct comparison with one another. The mixing of Koi from different sources in this manner is no longer possible

nor sensible and now each exhibitor has their own vat. The vats have screens to prevent water splashing between them.

This year saw another significant first. Three years ago two English Koi keepers, Mark Crampton and Martin Plows, set out on a mission to become the first westerners to win Grand Champion at the All Japan Koi Show. To do so is not as simple as turning up at a dealer's premises and buying the most expensive Koi. There are very few Koi capable of winning the highest honour in Koi keeping and it is only after working extremely hard at building a relationship with the Koi breeders and dealers that you will ever get the opportunity to be 'introduced' to such specimens. Having then secured a Koi with the potential for such greatness everything needs to be right on the day of the show with the Koi being judged on its skin quality, size, shape, pattern and consistency of colour.

Owning a Koi like this is different to Koi keeping as most hobbyists know it. This is more like owning a racehorse where the day to day care of the animal is left in the hands of professionals.

Back in 2003 Mark and Martin were introduced to a Maruten Kohaku at Narita Koi Farm in Nagoya. This Koi had been bred by Sakai Hiroshima Koi Farm, the largest of all the breeders in Japan and was tipped for greatness; Kentaro Sakai believed it to be the most perfect Koi they had ever produced. The Koi was left in the hands of Narita Koi Farm to be grown and nurtured in their very best pond. In 2005 the Maruten Kohaku was entered in the show, where it came second.

During 2005 Mark and Martin purchased another Koi, again a Kohaku produced by Sakai Hiroshima Koi Farm and again with potential to achieve success at the show.

As the date of the show approached many discussions took place regarding which Koi should be entered. Voting for the Grand Champion is done by secret ballot and continues until such point as one Koi achieves a majority verdict. Mark and Martin were advised that if they had two Koi both in contention for Grand Champion that there would be a risk of weakening their chances possibly allowing another Koi to sneak in with that all important majority. So, a decision was made that the newer of the Kohaku would be entered – a decision that turned out to be the correct one. The Kohaku was nominated as one of five contenders for the Grand Champion prize and in the first round of voting secured 41 out of 95 votes. In the second round it achieved the all important majority vote, therefore winning by a bit of a landslide.

LEFT: The winning Koi. ABOVE: It's tradition for the winners to be thrown into the air three times (top). From left: Tony Pilham of Koi Water Barn (Mark and Martin's UK dealer), Kentaro Sakai, Martin Plows, Mark Crampton.

Following the victory the Koi was given the name Jessica Rose after Mark's young daughter.

Mark Gardner

News

Mudminnows hybridise in the Hudson river

According to scientists, wild populations of mudminnows have been hybridising for several decades in the Hudson river, USA. The two species involved are the Eastern mudminnow, *Umbra pygmaea* and the Central mudminnow, *Umbra limi*. The species only occur together in the Hudson river and have been breeding with each other as well as their own species.

Robert Schmidt from Simons Rock College, and Robert Daniels from the New York State Museum, were studying minnows caught from a brackish marsh called Manitou Marsh, when they first became aware of what might have been happening.

The fish that were caught there didn't resemble other of the native species as they can usually be told apart by their colour pattern. *U. pygmaea* has a striped pattern; *U. limi* has blotches or vertical bars. The Manitou Marsh specimens were some way between the two.

Normally, anyone wanting to properly identify the mudminnows could use an identification manual that looked at where the fish were collected and their colour pattern, but since the hybrids had appeared, the natural range of both species had moved slightly and the different colour pattern of hybrid species was causing confusion too.

What's more, the type specimens for both species had been lost previous to Schmidt and Daniels working on them, so they had to designate new type specimens called neotypes, in an attempt to identify and thus separate the original two species.

DIARY DATES

March 5
North West Cichlid Group is meeting at Rainford Labour Club, Ormskirk Road, Rainford Merseyside. Contact Bill Jones. 0781 1 549477

March 8
Dunstable and District Aquarist Society is meeting at Slip End Village Hall, Near Luton, Bedfordshire. Contact Martin Allan, 01442 264828

March 10
Catfish Study Group (UK) auction at Highfields Working Men's Club, Ratcliff Street, Barnsley, Lancs. Contact Roy Barton, 01942 243130

March 19
Deer Urfa Aquarist Society is meeting at The Charles Young Centre, Talbot Road, South Shields, Tyne and Wear. Contact Brian Ramsbottom 0191 4821920

March 25
Fish, Fish Fish at Sparsholt College in Hampshire. Talks and workshops on breeding biology, aquaria, pond building, and angling. Trade stands. Tel: 01962 776441; www.sparsholt.ac.uk

World's smallest fish causes sizeable controversy

A recent scientific paper described what could have been the world's smallest fish, but an American scientist said that he had described an even smaller one months earlier.

Maurice Kottelat and Tan Heok Hui, of the Raffles Museum of Biodiversity Research in Singapore, described *Paedocypris progenetica*, a south east Asian cyprinid that is just 7.9mm long. The tiny adult size of the fish made it a contender for the title of world's smallest fish, a record that was previously held by *Trimmatom nanus* at 8mm.

This was quickly dismissed though by an American scientist who said that he had described an even smaller fish months earlier. Ted Pietsch of the University of Washington said that a deep sea anglerfish from the Gulf of panama has a sexually parasitic male that is fully grown at a mere 6.2-6.5mm, making it the real world's smallest fish. It appeared that Britz and Kottelat were unaware at the time of publishing their paper.

Females of the anglerfish, *Photocorynus spiniceps* grow to 4-5cm long, but it is the tiny males that attach themselves to the females that are the world's smallest fish, and smallest known vertebrate. They are known as ectoparasites and sexual parasites, as males permanently attach themselves to the backs of females by biting them and then fusing their skin with that of the female.

The free swimming *Paedocypris progenetica* would still have been of some interest however as being a freshwater fish, it would have taken the record from a string of previous marine record holders.

Dr Ralf Britz, one of the scientists that wrote the *Paedocypris* paper said that "The whole exchange is quite amusing and in the end, what is important is that we appreciate that there are still many areas on this globe that are unexplored."

TAXONOMIC RESEARCH

Moenkhausia pankilopteryx
This new addition to the genus takes the total number of *Moenkhausia* up to 60. It has a dark spot on the caudal peduncle and two humeral spots. The first humeral spot is black and elongated vertically, whilst the second spot is dark and not visible on all specimens – Zootaxa.

Cordylancistrus nephelion
A new suckermouth catfish has been described from Venezuela. It was discovered in tributaries of the Tuy river and is said to be at risk of extinction due to pollution – Zootaxa

Gastromyzon cranbrooki, asroides and venustus
Three new loaches have been described in Borneo. They were all discovered in the Temburong River in Brunei Darussalam, Borneo. *G.cranbrooki* is said to be similar in appearance to *G. borneensis*, which is common in the hobby. The difference between the two is that *G.cranbrooki* has 9-10 grey bars on its body, with a dark brown back marked with a pattern of grey reticulations. It also has 56-60 scales in the lateral line series- Zootaxa

Otothyropsis marapoama
This new plec is in the subfamily Hypoptopomatinae and has been placed in the new genus *Otothyropsis*. It was discovered in a freshwater stream in the Rio Tiete, a river in the upper Rio Parana basin in South East Brazil.

Parodon moreirai
The new characin was found in streams in the Rio Sagucai basin in South East Brazil. Some adults of this new species actually lack dentary teeth, which are often used to distinguish many *Parodon* from their relatives. *Parodon moreirai* can be told apart from other parodontids by its colour and morphology and through the difference in its chromosomes.

Ancistrus verecundus and Ancistrus parecis
Two new *Ancistrus* have been described. *A. verecundus* is from the Rio Madeira basin and *A. parecis* is from the upper Rio Juruena and Rio Tapajos in Brazil.

The PEOPLE'S POLL

Are fish easier to keep now than they used to be?

Has better equipment and better understanding led to fish being easier to keep, or is extensive line breeding in captive stocks causing fish to become less hardy and more difficult?

Well, easier to keep or not, there are certainly more fish in the shops and in more variety than ever before. The 'Yes' vote was the majority vote but certainly not an overwhelming one, as many of you thought captive bred fish were weaker than a decade or two ago and thus more difficult to keep, despite greater knowledge, technology and better equipment.

Those who voted maybe couldn't decide whether technology had overcome genetic inbreeding but most people thought that the internet, plus greater knowledge, plus better technology has made fishkeeping easier.

Carlo Ballara says that "understanding the microbiological processes involved in fishkeeping and the modern emphasis on large, frequent water changes have made running an aquarium simpler."

Nigel Wood from Avon agrees and says: "Electrical equipment is now virtually 100% reliable," and that "we know chlorine is certainly not helpful for fishkeeping," and mentions the advent of silicone as being greatly advantageous over putty.

Dave Richards from West Yorkshire said "I had fish years ago and all I had to read were books which didn't even mention cycling a tank, let alone test kits. Now we have the internet it is much easier to find help to a problem and what conditions different fish need. Also items such as RO units have become available and filtration equipment is better enabling us to keep more sensitive fish."

Says Patricia Prosser in Gwent: "Fish are definitely easier to keep nowadays than 20 years ago. Today there are a variety of internal and external filters with lots of helpful suggestions to maintain a healthy, happy tank. Tank testing kits are great, I can't recall many being around years ago but now we are stuck for choice. My husband and I have been really hooked.

"I think with all the support of various treatments for virtually anything that might occur, marine fish are easier to keep," says Anne Anderson of Herts.

Rachel Green of Nottinghamshire thinks: "Discus, angels and most marines spring to mind as fish that are easier to keep through breeding and better technology. Guppies, gouramies and Neon tetras are much more difficult to keep, along with many other bread and butter fish. Over production and a need to make money quickly with these fish has seen standards in health and vigour fall."

Meanwhile, Sam Watson from Oxfordshire says: "It is fair to say that the advance in aquarium technology including advanced filter systems has meant that the water in an aquarium can be maintained at the optimum level more readily. However, this technology does not alter the fact that if you do not maintain an aquarium properly you will still fall foul of the same problems that arose years ago."

Many readers remember the good old days like Peter Wright of Yorkshire who voted "no" and says: "I remember 50 years ago when I first kept and bred common tropicals, things seemed much easier. Water was taken straight from the tap, warmed up and added to the tank. Most of the present chemicals and treatments were unheard of."

Livebearers were frequently mentioned in readers comments like Hannah Morrison in Hampshire, who said "Most fish, especially livebearers are now far more inbred and therefore much less hardy."

Brad Scott agrees "Fish like Guppies are not half as hardy as ten years ago," and "Guppies in most shops look slightly deformed with bent backs."

Says Chris McNally "Given the constant advances in the equipment and greater understanding of the fish we keep, the majority of fishkeeping has become easier. Sadly through the loss of virility in the more frequently kept species and the rise of modified fish and dyed species, it's harder for people to start out with the right fish for their needs."

HOW YOU VOTED

Are fish easier to keep than they used to be?

YES 58%

NO 24%

MAYBE 17%

Next month's poll

Should fish be kept in bare tanks?

Many retailers, wholesalers and breeders keep their holding tanks bare. Is it OK to keep fish in such a stark environment or is clinical the way forward for healthy, disease free captive fish? Have your say by voting on our website and adding your comments.

www.practicalfishkeeping.co.uk

ABOVE
It took three days to fill the tank via the Nitragon.

ABOVE
Phil doubled the skimming capacity by adding a second AquaMedic Turbo Flotar Multi skimmer.

BELOW RIGHT
The Schuran calcium reactor was large enough for the bigger tank, but Phil decided to use a larger CO2 bottle than he'd had on his previous set-up.

and lighting, and the tank would not be connected to the sump. Three things would be critical:

- With no skimming, both zoo- and phytoplankton populations would be able to reach dense populations. Filter-feeding sessile inverts on the living rock, and corals added from the old tank, should benefit from this, as well as populations of those microfauna that have planktonic larvae.
- Microfaunal populations would be free from predation by fish.
- The tank would not be fed (the tangs would get all they needed during this period from the algae growing in the tank) so nutrient levels should not increase unduly.

During phase one, the large volume of new water should be able to maintain calcium and alkalinity at adequate levels for the invertebrates that were present, so the calcium reactor would not be needed at this stage either – provided this period wasn't too long. This first phase would be of critical importance to the long-term success of the tank, in relation to building up large populations of microfauna and in maximising the potential of the living rock by encouraging the growth of sessile invertebrates.

● Stage 2

In the second phase, the tank and sump would be connected, the calcium reactor started up, and then the twin skimmers added, one at first, the other later as the fish population grew. The planktivorous fish would gradually be added, to make up the final fish population. The invert population would also be built up. By the end of this phase, all the tank's technology would be up and running, and all the inhabitants present.

Although phase 2 would use skimming, the presence of the refugium should ensure at least some supply of plankton, and the increasing level of feeding (as fish numbers increased) should also provide food for corals and other sessile invertebrates.

● Stage 3

The third, and longest, phase would simply be the tank in its mature state, with no great changes being made, other than to prevent or correct any problems.

Get going!

I started work on the aquarium in March 2005. Having decided on the size, I had the cabinet built first, with the intention that it would be ready when the tank was delivered, avoiding the need to store the tank and then lift it onto the cabinet later (no mean feat, given its weight!). I got a carpenter to build it, and the result was fine. The cabinet has a base of 20mm/¾" ply to spread the load on the floor, a frame of 100mm x 50mm/4 x 2" softwood, 10mm/⅜" ply sides and top, and panelled softwood doors. I painted the inside of the cabinet with white gloss paint and the outside was painted to match the room.

Once the cabinet was finished, the light unit was fitted. Having bought the lights from STM, a local electrician fitted them, wiring them into a spur from a ring main, with a cable coming through the ceiling above the tank and a fused isolating switch up above.

With lights and cabinet in place, the tank was ordered from World of Fishes in East Grinstead. Made of 10mm/⅜" glass, drilled through the base, with a single overflow weir in the rear left corner, I went for a hole in the base rather than the back panel (as in my old reef tank) because I wanted to get the tank close up to the wall behind it. Getting it into our house was interesting; we had to dismantle part of the kitchen to get it in, then take it up some steps at the back of the house before finally getting it in place! I vacuumed the tank to remove any dust and washed it down.

Fill 'er up!

Filling the tank needed over 800 L/176 gal. of purified water. I've always used either a Nitragon or a de-ioniser, and I went for the Nitragon as it's faster, can be recharged easily, and in practice the water quality produced seems to be more than adequate for reef aquarium purposes. I connected it to the nearest tap, then ran a long length of pipe to the tank.

After each 100 L/22 gal. had gone into the tank I checked the Nitragon output for nitrate. The intention was to stop filling as soon as any nitrate was detected, recharge the unit, and then continue. In practice, I only needed to recharge the Nitragon once before completing the fill, so two sessions over three days had the tank full enough. I didn't fill to the full 60cm/24" depth, because during the first phase of the tank's life I wouldn't be using the sump, so I didn't need to have any water going over the weir. Instead, I filled to about 50cm/20", to allow for displacement when I added rock and sand.

To circulate the water and mix the salt, I added two Visitherm 250W heaterstats, plus an Eheim 1060 pump. At this point I got some idea of the scale of the aquarium, when the flow from the 1060 looked and felt a bit feeble, not really reaching the far end of the tank; I'm used to tanks where a single 1060 can provide vigorous water movement throughout.

The next step was to add the salt. Again, this was a bigger job than I'm used to: one whole 25kg bucket of salt plus part of another had to go in. After it had dissolved overnight, the specific gravity was checked and adjusted slightly. The tank was now at 27°C/80°F; s.g. 1.026 – both values reflect the fact that these days I prefer to keep temperature and salinity a bit higher than traditional aquarium values, to stay closer to natural conditions.

Next issue

Phil brings life into the system by adding living rock and sand, and stocking the first invertebrates.

Ask the Experts

Got a query or a fishkeeping problem? PFK's expert team of fishkeepers is on hand to help.

You can email your questions to: **questions@practicalfishkeeping.co.uk**

TROPICAL LETTER OF THE MONTH

THE WINNER OF THE TROPICAL LETTER OF THE MONTH wins a Tetratec IN600 internal power filter. A key feature of the Tetratec filters are the ease with which they are maintained. There is no need to remove the entire filter, as all components can be quickly and easily removed in-situ. In addition, the flow rate can easily be adjusted, and the direction of the flow can be altered. The IN600 is suitable for tanks up to 200 l.

Red robins in a bubblenest

Q I have a Red robin gourami in a Juwel Rio 125 community tank, and would like to get one or more companions for it with a view to breeding them. Are they sexable, and how do I go about encouraging them to spawn?

LOUISE ALLEN, PLYMOUTH

A There are two gouramis I have seen labelled as 'Red Robin', but I am assuming you have a colour variety of the Dwarf gourami, *Colisa lalia*. It differs from the wild coloration in that the male has an almost solid red body with a blue dorsal fin, whereas females retain their usual grey drabness. Females are the smaller sex.

Checking out your tank size, and given the territoriality of these fishes, it's probably not a good idea to have too many pairs in your set-up. If you can obtain very young fishes, then two pairs or two trios (one male, two females) is about the maximum. Adult fish should, I think, be restricted to a single trio.

The main problem with breeding this species of gourami is the notoriously high mortality rate of fry. They are weak, and difficult to raise in any number.

Red Dwarf gourami

My recommendation is usually to try the Honey gourami, *Colisa chuna*, first, as their fry are fewer but more robust.

If you intend to persevere you will need a separate tank, heavily planted, and introduce just the one female. Feed her well, and wait until she fattens up with eggs before introducing the male. If he recognises her as a spawning partner he will begin to build a bubblenest, which involves the incorporation of plant pieces and mucus-coated air bubbles to bind it all together. This behaviour may take a few days to start, although there have been instances of almost instant nest-building.

If no nest appears within a couple of weeks, try either fasting the fishes or dropping the water level and topping up with cooler water. Feed mainly live food such as brineshrimp, as this can act as a spawning trigger if the main diet is flake or prepared foods.

During spawning, the male embraces the female under the nest and she lays glass-clear eggs that float up into the bubbles. The male then drives the female away and tends the eggs, and any resultant fry, himself.

When they become free swimming after a couple of days they will need copious amounts of small living foods such as rotifers and infusorians, before graduating to baby brineshrimp or powdered fry food. You need to keep the water changes up to maintain a good composition and encourage the young to grow, but in these early stages there are inevitable losses.

ANDREW SMITH

Above: Rosy barbs can be kept in an unheated set-up.

Don't mix barbs with goldfish

Q In quite a few books it says that Rosy barbs can stand temperatures as low as 18°C/65°F. Is it possible to keep them in an unheated aquarium with common and fancy goldfish?

CHRIS DAVIES, VIA EMAIL

A Yes, it is quite feasible to do this. Rosy barbs, *Puntius conchonius* are a very widespread species in Asia, and can be found in the foothills of the Himalayas, where the temperature can fall even lower than 18°C/65°F. I would not keep them cooler than this, however, and you will need to be careful if goldfish are included in the set-up. Most barbs are partial to a wee meal of firs, and with fancy goldfish I fear the temptation would be too much. Keep them on their own instead.

PETE CUTTLE

Top tankmates for *Corydoras*

Q Would Upside-down catfish be happy in a *Corydoras* tank with hard water and, if so, would I need to feed them floating flakes to supplement the frozen foods I normally use for bottom-dwellers?

JUNE BATCHELOR, GARTHOUSE OF FLEET

A The Upside-down catfish, *Synodontis nigriventris*, belongs to the family Mochokidae, and this species is found in the Niger and Zaire river systems of Africa, growing to 10cm/4" standard length. It is ideally suited to a community aquarium as long as you provide hiding places amid bogwood and tall aquatic plants.

I would purchase at least four specimens, maybe more. They cost between £4 and £8, depending on size and availability. This fish thrives on a mixed diet including good quality flake, granular and frozen foods. Females tend to be deeper-bodied than males. Aquarium spawnings are known, but not well-documented.

I have kept them with *Corydoras* with great success, and you should be able to do the same as long as you do not overstock the tank.

CHRIS RALPH

YOUR TROPICAL EXPERTS

Write to us using the form at the end of the Ask the Experts section or email questions@practicalfishkeeping.co.uk and we'll forward your query. Please note we can't offer a quicker service for email queries as every question has to make its way to the 'top of the pile'. Please include a stamped addressed envelope for letters sent by post.

PLANTS
PETER BRADLEY is our plant expert.

HEALTH
Dr PETER BURGESS is an expert in fish health. He lectures at Plymouth University.

BREEDING
RICHARD HARDWICK of Wharf Aquatics has a huge knowledge of oddball fish.

LIVEBEARERS & BREEDING
JOHN HUNDLE is a fish breeder and expert on livebearing fishes.

CATFISH
CHRIS RALPH is a catfish expert and part time lecturer at Sparsholt College.

LARGE CATFISH
DARREN LAVLEY is a large catfish and big fish specialist.

INVERTEBRATES
ANDREW SMITH, of the Invertebrate Association of Great Britain, is an expert on invertebrates.

WATER QUALITY: GENERAL
Dr JOHN EVANS, of Wharf Aquatics, has a vast amount of fishkeeping knowledge.

TECHNICAL
Dr DAVID FORD has many years of experience.

SUCKERMOUTH CATFISH (Loricariidae)
JULIAN DARNALL is the man behind PlanetCatfish.com. He's kept catfish all his life.

MARINE AQUARIA
Dr NEALE MONKS runs a popular online marine FAQ.

RAINBOWS, GOURAMIS & PENSIONERS
PETE CUTTLE has 40 years' fishkeeping experience and 23 years as a Class A show judge for the FBAS.

Ask the experts

Achieving the mangrove look

Q I am about to set up a brackish tank, and want to make it look as though there are mangrove roots coming down into the water. What type of sand should I use as a substrate, and do any companies make artificial mangrove roots?

GINA NEIL, VIA EMAIL

A In a brackish water tank, unless you are using live mangrove plants, it is best to use artificial wood rather than bogwood, which acidifies the water. A small amount won't do too much harm, other than tinting the water brown, but too much will lower the pH, stressing the fish. An advantage with artificial wood is that it is relatively light, and you can silicone pieces to a cover glass or the back of the tank so that they appear to hang down.

Choice of sand is not critical. Silver (silica) sand is chemically inert, and the best choice for fish that tolerate slightly brackish water (such as Bumblebee gobies, Orange chromides and Spiny eels). However, with fish that need strongly alkaline water – Monos, Scats and Archerfish – use a mix of river sand and coral sand. Coral sand buffers the water, keeping it alkaline, and it is readily available from marine retailers.

Since you don't plan to grow live plants, you need only enough to cover the tank floor – 3cm or less. If you're using an undergravel filter, you cannot use fine sand, but coral sand on its own should work fine.

NEALE MONKS

Monos require strongly alkaline water.

Ben Ingworth

Love second time around

Q I have a pair of Siamese fighters which I am trying to breed. They did so once in a community tank, but the eggs were eaten by other fish. I have a separate tank for them, but when I put them together the female did not seem interested, even though she seemed plump and the male made a bubblenest. Are there any triggers to get them to spawn?

DANIEL BONNACE, VIA EMAIL

A It is important, when breeding *Betta splendens*, that both fish are ready. The female usually takes a battering if she is not in spawning condition, and plumpness is not always a sure sign that she is.

Feed her well, and keep her completely separate from the male, and out of his sight for a while. When they are shown to each other again, if she is ready she will show transverse barring on her flanks and the small white egg spot (papilla) will appear under her belly. Some breeders keep males and females in adjacent jars and wait for the males to built a nest before putting the sexes together.

As you have spawned this pair once, next time should be easier, and I am sure you will obtain some fry.

ANDREW SMITH

A female fighter may take a battering if she's not ready to spawn when the male is.

Peter Hamilton

Breaking the surface

Q I would like to set up a tank with plants that grow out of the water. Can you advise on suitable species, and what type of filtration would you recommend for such a system?

RONNIE GRUBB, DALKEITH

A My favourite plant for growing out of the top of the tank is *Hygrophila corymbosa* 'stricta'. It is easy to cultivate and will grow into a lovely shrub and flower for four months with Wisteria-like blooms.

Another plant worth looking at is *Bacopa caroliniana*, which bears purplish blue flowers. Good quality Amazon swords will also produce beautiful flower spikes. I would recommend one supplied by Tropica, known as 'Red Flame'. Remember, this plant requires lots of space.

As for filtration, I like the Juwel range of internal filters. They have a large surface area and are easy to maintain.

PETER BRADLEY

Stingrays need quieter company

Q I have a 180 x 60 x 60cm/6' x 2' x 2' tank with a 30cm/12" Arowana, a 38cm/15" Giraffe catfish and a 23cm/9" Ornate bichir. Would I be able to keep a ray in the same set-up?

DES GOODMAN, VIA EMAIL

A Stick with your Arowana, with perhaps a Florida spotted gar at the surface.

The Giraffe cat is far too boisterous to be kept in the company of rays, and its inquisitive nature could land it in serious trouble from their poisonous spines.

Ornate bichirs are opportunist feeders with pretty poor eyesight, and they often strike at the slightest movement to see if what's in front of them is actually edible. The edge of a stingray's disc could be the target, with disastrous consequences.

Try some of the catfishes from the family Doradidae – they are totally peaceful, have a good suit of armour and don't dash around the tank.

RICHARD HARDWICK

Clown loaches have very hard mouths for dealing with snails

Ian Hamilton

Case of the biters bitten

Q I have a curious problem in my 180 x 75 x 45cm/72" x 30" x 18" tank, which is home to two non-aggressive species of snakehead, three Clown loach and several other peaceful fishes.

The Clown loach have started to nibble the snakeheads around the gills – this is not continuous behaviour, but when it happens it can go on for some time, with three *Botia* all concentrating their attentions on one fish. The snakeheads do not seem to mind, but they have begun flicking on the gravel. Please can you advise me what to do?

BRAD EMMET, VIA EMAIL

A This is a difficult one. Does the worrying of the snakeheads' gills coincide with feeding time? I ask because snakeheads, which generally eat pieces of mussel, prawn etc, don't always swallow straight away, particularly when their eyes are bigger than their bellies (which is often the case). I just wonder if your Clown loaches are sensing this food in their mouths and pecking at the gills in search of any stray particles.

Constant pecking around the operculum by Clown loaches, which have very hard mouths for dealing with snails, could no doubt damage the snakeheads, resulting in infection and possibly death.

Clown loaches are one of my old favourites, and yours are acting out of character. However, because all three are behaving in this way I'm afraid you may have to remove them for the sake of the snakeheads.

Fish compatibility is not always as black and white an issue as is made out, and this is just one more example. You could say you have been very unlucky.

RICHARD HARDWICK

Whitespot that won't go away

Q I have introduced what appears to be whitespot into my tank with some new Cardinal tetras. I have kept tropical fishes since 1953, and am quite used to diagnosing and successfully treating this parasite, but this particular strain is proving impossible to eradicate.

I have tried Protozin, which normally does the trick, as well as King British whitespot cure, but the problem is slowly spreading through the tank. I have some expensive fish as well as some 10 year old favourites, which I do not want to lose. Can you suggest anything, please?

J. TAPPER, VIA EMAIL

A Based on recent feedback from experienced fishkeepers such as yourself, there does seem to be a particularly resistant strain of whitespot parasite doing the rounds. A local aquatic store, which I rate highly in terms of the staff's knowledge, experienced a similar problem only last month; it took them ages to eradicate the parasite.

They eventually controlled the outbreak using repeat doses of a malachite green remedy in combination with UV sterilisation to reduce the levels of infective stages (theronts) in the water.

All I can say is, carry on with the chemical treatment. Maybe UV sterilisers will become increasingly important in combating these 'resistant' strains of *Ichthyophthirius*, though I would never rely on UV alone to tackle whitespot. Having studied both marine and freshwater whitespot parasites I am taking a close interest in this emerging situation. Good luck, and keep persevering.

PETER BURGESS

SO YOU THINK YOU KNOW...

Andrew Smith uncovers a wealth of interesting facts on the diversity of the world of anabantoids.

● The word 'anabantoid' is derived from the Greek word meaning (loosely!) to 'travel up', referring to the visits the fish make to the water surface.

● Anabantoids have a breathing organ called the Labyrinth organ which gives rise to their other name – Labyrinthfish. The organ is a series of folded membranes that carry out the oxygen/carbon dioxide exchange at the water surface. This enables these fish to survive oxygen-poor waters, where fish with gill respiration alone would not.

● Male Siamese fighting fish, *Betta splendens* cannot tolerate each other and will flare, butt and bite a rival on sight! Even its own reflection can start this reaction and it is a favourite trick of specialist *B. splendens* breeders to place a mirror next to the tank to get the males to stretch out their fins. In competitions, the *Betta* have to be kept in containers with cards between them and their fellow competitors, and the cards are only removed when the judge wants to ascertain the condition of the fish.

● The 'Fighting fish' does not resemble the domesticated *B. splendens*, which has short fins and a very thick-set bullish look with upturned mouth and lips (some call it pug-nosed). These are known as Plakats, which translates as 'Biting fish'. Two of these types of fish are placed in the same container so a fight will ensue, with bets being placed on the outcome.

● Some *Betta* have been found in what can only be described as liquid mud, rolled up in a ball still living. As long as the fish remains moist

DID YOU KNOW?

● The Gambel, *Betta hasselti*, has an unusual way of resting: it lays completely on its side, flat, on the base of the tank, which can give the impression that the fish is dead!

and they can take in atmospheric air via the Labyrinth organ, they can survive.

● The Paradisefish, *Macropodus opercularis*, was thought to have been the first tropical fish kept as an ornamental pet, but this fish is robust enough to withstand lower temperatures and some don't consider it a true tropical fish. Its close relative, *M. ocellatus*, from China, is the most northerly found anabantoid and can live in very cold conditions, having been documented as surviving nights as cold as -5°C.

● The largest of the anabantoids are in the genus *Osphronemus*, a group of species that grow to over 60cm/2' long and are farm bred as food fish. The smallest are in the genus *Parosphromenus*, the Liquorice gouramis. At 1.8cm/3/4" *Parosphromenus ornatocauda* is a jewel in miniature.

● Male Dwarf gouramis *Colisa lalia*, will actually spit droplets of water to take down food above the water surface in a similar way to the Archerfish, *Toxotes jaculatrix*. They are also one of the two species of gourami (the other being the Moonlight gourami, *Trichogaster microlepis*) that actively pull up plants and collect the pieces to bind in with the bubbles of their nest. This can result in a tangled dome of vegetation in a corner of the tank that juts out of the water.

● Spitting droplets of water is also used by the Honey gourami, *Colisa chuna*, for egg recognition in the bubblenest. Given their smaller size, the Honey gourami constructs the largest nest that falls into disrepair almost as soon as it is complete. Honey gourami males entice the female to the nest site by performing a dance in front of her, head up and tail down, and swimming back and forth under the nest. The eggs are gathered together into a clump the size of a hazelnut and tended by the male. Fry of this species are jet black when they hatch.

● Spike tailed paradisefish, *Pseudosphromenus cupanus*, will build a bubblenest at the water surface, in a cave, under a leaf, anchored to airline, under the sponge of a filter, and have even been reported to spawn on rocks like some cichlids! The females turn completely black when in spawning dress.

● The Chocolate gourami, *Sphaerichthys osphromenoides*, is a matriarchal mouthbrooder; the female incubates the spawn for the duration. It was originally thought to be a livebearer, though, as initial imports found lots of extra little gouramis than had originally been sent in the containers. The females in the containers at the point of export were probably well advanced in their mouthbrooding, and released the fry in transit.

● The fishes in the genus *Trichopsis* produce a clearly audible sound and are known as Croaking gouramis. The largest, *T. vittatus*, is one of the easiest anabantoids to maintain and breed. Both male and the female make the croaking sound, which is produced by rapid fanning of the pectoral fins over the skeleton, with the Labyrinth organ acting as a sound chamber. Interestingly, the smallest of the Croaking gouramis, *T. pumilus*, produces the loudest noise, and it is only the males that make the sound.

● When a Pearl gourami male builds a bubblenest, and a female is not present, he sometimes guards a completed nest and picks up and spits grains of sand into it. With the sand weighing much more than eggs, it can fall through the nest and onto the substrate, causing a small pile to form. The reason for these 'sand hills' is not clear.

● Despite their small size (around 5.5cm/2"), the wine red-coloured *Betta* of the *B. coccina* group are long lived. It is not unusual to have specimens live well beyond five years and still be fertile – both males and females.

● *Parosphromenus* species have all but dispensed with a bubblenest and are secretive cave spawners. They lay around 20-40 large eggs (for their size) and stick them to the roof of the cave. The fry don't free swim for at least five days, meaning they are better developed and more likely to survive.

● The African anabantoids consist of bubblenesters, the *Microctenopoma* species, and free-spawning *Ctenopoma*. Both used to be in the same genus, *Ctenopoma*, until a few years ago. The bubblenesters are almost like African gouramis both in their demeanour and spawning behaviour.

● The free spawning species of *Ctenopoma* spawn at night; the males use spines behind the eyes and at the root of the tail to grip the female in the spawning embrace. Several males pursue gravid females and the spawning embraces last for a second or two. The eggs are lighter than water and float along with an oily secretion to give them extra buoyancy.

● *Ctenopoma* species are long lived, and *C. kingsleyae* in particular have been reported to live well beyond 40 years, so be prepared to keep them for a long time!

● The *Sandelia* species endemic to South Africa, and in particular *Sandelia bainsi* from the Kowie River, are among the rarest fish species and the Blaauwkrantz Reserve is the first such nature reserve set up specifically for a species of fish.

● Kissing gouramis, *Helostoma temminkii*, have fleshy protrudable lips and appear to actively engage in kissing by touching their lips while swimming back and forward. Whether there is any sexual function to this behaviour is unclear, as the fish are extremely difficult to sex!

ABOVE: Ctenopoma are long-lived fish. Pic shows G. acutirostre.

DID YOU KNOW?

● Climbing perch, *Anabas spp.* from South-east Asia, can migrate across land from habitat to habitat. The air around them has to be moist and the movement across land takes place when the air temperature is at its lowest. Despite their name, however, they do not climb trees!

Interested in Anabantoids?

To find out more about these fascinating fish, send a stamped, self-addressed envelope to Mrs C. Clark, 19 Chiltern Crescent, Scrattbrough, Doncaster DN5 7PE, or visit the Anabantoid Society of Great Britain website www.asgb.org

Ask the experts

CICHLID LETTER OF THE MONTH

THE WINNER OF THE CICHLID LETTER OF THE MONTH wins a Tetra Test Laboratest kit, containing tests for nitrite, pH, GH, KH and CO2.

What price this new pike cichlid?

This red body colouration is natural, not dyed.

Q I already have a 15cm/6" pike cichlid which I find truly impressive. On a recent visit to a shop I saw a 2.5cm/1" Orange pike for which they were asking £30. Is that a fair price, and would this fish be dyed or natural?

NEAL HOSKIN, HALSTEAD

A It is very difficult to say what is, or isn't, a fair price – it depends on whether people are prepared to pay it. There is no doubt that when something new and exciting comes on to the market the price is often a lot higher than for other fishes that cost exactly the same to produce. Then again, for all I know this may be a new species from a remote location where there is no formal collecting infrastructure. In such cases the costs of 'production' will be much higher and the profit margin quite small. What it all comes down to is whether you, the customer, want the fish enough to pay the asking price.

I doubt if the fish in question is dyed. There are Orange pike cichlids, such as one of the undescribed species from the Rio Xingu. Pikes do often command high prices, and there are enough attractive ones around for there to be little point in dyeing drab ones. Plus they are almost certainly wild, and dyeing fish is the province of the mass-production breeders.

A few points to note – adult coloration in large pike cichlids is often very different to that of juveniles but, as adults are usually the more colourful, you are probably safe. Remember that not all pikes are large – maybe the colour of this one indicates a dwarf species. Most importantly, don't forget that large pike cichlids are piscivores and will eat other fish, including each other, up to three-quarters their own size. If you did buy these little pikes, putting them in with your 15cm/6" fish would be a very expensive mistake. And keep an eye on them, if one gets larger than the other(s) you may again find it snacking on its fellows.

If this was the adult Rio Xingu species, black with a salmon-pink belly, you wouldn't see me for dust and I'd pay more than £30!

Peace reigns in a smaller tank

Q I have a spare 60 x 30 x 38cm/24" x 12" x 15" tank and would like to turn it over to Keyhole cichlids and *Apistogramma*. Could I keep a pair of each of these, along with some tetras, if I provided sufficient hiding places?

LEE WILSON, VIA EMAIL

A Because Keyholes are so peaceful and tend to live away from the bottom, and Apistos are very much bottom-oriented, I think you will get away with it. Provide caves for the Apistos – the ideal type is a 8cm/3" clay drainage tray for a flowerpot with a small V-shaped door gently nipped out of the rim with pliers. Put in a couple of large pieces of bogwood and lots of plants to provide cover for the Keyholes. Java fern grown on bogwood is excellent, and the Apisto caves can go under the bogwood. You could also plant some dwarf Cryptocoryne, hair grass (*Eleocharis*) or Dwarf chain swords, *Echinodorus tenellus*, in front of the wood, but leave open space in front for the tetras. Keyholes and most Apistos prefer soft, slightly acid water, and require it to breed. Some Apistos will breed in hard water, and Keyholes will live in it happily, but will not successfully spawn. Check out the requirements of the apisto species and if you can't provide for them, look for a species that suits your local water.

FACTFILE

Heros efasciatus

Common names: Severum.

Size: Up to 30cm/12" total length, but usually smaller.

Distribution: The mainstream Amazon basin and the lower Rio Negro.

Habitat: Tangles of roots and dead wood along the margins of rivers and lakes.

Aquarium: Minimum 120 x 38 x 38cm/48" x 15" x 15" for a full-grown pair, decorated with bogwood (and scattered rocks if desired). Plants can be grown but soft foliage may be nibbled.

Water parameters: Ideally very soft with a pH in the range 6-6.9, but established aquarium strains do well in hard, alkaline water. Good quality, but avoid strong filter currents.

Temperature: 25-28°C/78-82°F.

Diet: Omnivorous with herbivorous tendencies. Feed a mixed diet including some vegetable matter. Likes earthworms.

Sexing: Males are larger, have a dot on each flank scale, and markings on the cheek.

Breeding: A substrate spawner which usually spawns off the bottom and seeks an elevated site (eg, the surface of a piece of bogwood) for guarding the larvae/fry. A raised temperature to 28°C/83°F or higher) may be required to trigger spawning. Eggs number several hundred.

Similar species: All *Heros* are rather similar, and there is much variation within species. The source locality is the best way to identify new wild imports. Most are simply different forms of *H. efasciatus* but at inflated prices.

Other: The common name relates to the long-standing belief that this species was *H. severus*, now known to be a mouthbrooder. *H. appendiculatus* is a synonym. There is a golden aquarium 'sport' as well as the natural forms. A very peaceful cichlid for its size, and it can be kept in groups or with other large peaceful fishes if the tank is big enough.

***Heros efasciatus* is a substrate spawner.**

YOUR CICHLID EXPERT

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MARY BAILEY is the foremost cichlid writer in the UK and a long-term monthly contributor to PFK.

You want more fish, not fewer

Q I set up a mbuna tank with a large rock cave, plus some smaller caves and live *Anubias*. I bought three *Labidochromis caeruleus*, three *Labeotropheus trewavasae* and what was sold to me as a male and two female *P. socolofi*, but the male has become dominant and bosses all the others, including his females, around the tank. I now think I may have been sold three *Metriaclima lombardoi* instead of *M. socolofi*. If they do turn out to be the wrong fish, should I take them back to the shop?

PAMELA HINCHLIFFE, USA EMAIL

A It is easy to tell *socolofi* and *lombardoi* apart. *P. socolofi* is a pale, sky-blue fish (both sexes) with only faint or no darker stripes. Both sexes have black streaking in the tail, anal and posterior dorsal fins, and some individuals have a black band along the dorsal. The body is fairly slender, about 12.5cm/1" deep maximum in a 10cm/4" fish. The upper head profile is slightly convex and the mouth small, with no out-turning of the lips.

In *lombardoi*, males are brown and yellow with a violet sheen, females are a bright sky blue with darker stripes. The body depth is greater (3cm/1¼" in a 10cm/4" fish), with the upper head profile quite steep and the upper lip slightly upturned. The mouth is slightly open, and 'pouting'.

I think your problem is twofold. First, while I don't know how long your tank is, I would imagine it is at least 90cm/3' (if not, you shouldn't be keeping mbunas), and nine mbuna is not enough for a tank this size. Stocking rate should be 50-60cm/20-24" total length per square foot of bottom. That's about 15-18 fish in a 90 x 30cm/36" x 12" tank.

Second, mbuna require wall-to-wall rocks, creating masses of caves. Your décor doesn't sound like that!

If you have insufficient fish and insufficient rockwork it is almost inevitable that one male fish will rule the roost. I don't think you need to take any fish back. Instead, invest in some more fish and add lots more hiding places.

Male *Metriaclima lombardoi*.

Ask the experts

MARINE LETTER OF THE MONTH

THE SENDER OF THIS MARINE LETTER OF THE MONTH wins a Tetratest Nitrate test kit. High nitrate levels in a marine aquarium can severely affect the health of both fish and inverts – levels below 10mg/l are recommended. Tetra's Nitrate test kit will do 45 tests and is suitable for freshwater and marine use.

Banana wrasse, *Halichoeres chrysus*.

Going over to the salt option

Q I would like to convert my freshwater tropical tank into a reef system.

Are there any health and hygiene issues involved in making the changeover, what basic equipment will I need, and can you please recommend some suitable fish species? The tank is 120 x 40 x 45cm/48" x 16" x 18" deep.

HARRY HANDFORD, BARTON-UNDER-NEEDLEWOOD

A Your tank and equipment should be quite safe to re-use for a marine system, once you have given it all a good clean. However, you probably shouldn't use any décor from a previous freshwater tank in a marine system, just in case it has been in contact with medications that might be toxic to marine fish and inverts.

Unless you upgrade your lighting, don't try to keep corals or anemones – feather duster worms, shrimps, hermit crabs and brittle or serpent stars will, however, be fine.

Your tank will hold about 60cm/24" total length of fish, but don't keep any individual specimens larger than 15cm/6".

Your selection could include: one of the following dwarf angels – Coral beauty, *Centropyge bispinosus*; Cherub angel, *C. argi*; African flameback angel, *C. acanthops*; – and/or any of the following: Banana wrasse, *Halichoeres chrysus*; Silver-belly wrasse, *H. leucoxanthus*; Firefish, *Nemateleotris magnifica*; Zebra torpedo goby, *Pterelleotris zebra*; Sea fighter wrasse, *Cirrhilabrus rubriventralis*; Six-line wrasse, *Pseudocheilinus hexataenia* (but don't keep with a Sea Fighter); Midas blenny, *Ecsenius midas*; Bicolor blenny, *E. bicolor*; Yellow watchman goby, *Cryptocentrus cinctus*; and Flame hawkfish, *Neocirrhites armatus*.

Your tank will need about 25kg of living rock, which should be the only biological filter in the system. It should be complemented by a 2-3cm/¾-1½" layer of sugar-fine aragonite sand substrate. If you fit a skimmer on (or in) the tank, that will be useful.

Other key items you need are circulation pumps (powerheads) giving a total hourly flow of at least 10 times tank volume, and some chemical filtration – an internal filter packed with carbon would do a good job.

A letter doesn't really provide enough space to answer all your questions, so I suggest you get hold of a copy of the book *The New Marine Aquarium* by Michael Paletta (Microcosm, ISBN 1-890087-52-1). This tells you all you need to know about keeping a simple marine system.

PHILIP HURST

Clown species just don't mix

Q I have two Common clowns in my established reef tank, and would like to add a Maroon clown and perhaps other species. Would this be feasible?

T. PRICE, CRAVEN ARMS

A Mixing different species of clownfish is not usually a good idea, the exception being in very large tanks. I wouldn't add a Maroon clown to a system containing other clown species, as this fish is extremely aggressive and would probably kill your two Common clowns quickly – there is a great size difference between them.

PHILIP HURST

Maroon clowns are aggressive.

Will skimmer be too big?

Q I am planning my first reef tank, which will measure 120 x 45 x 50cm/48" x 18" x 20" deep.

What size skimmer should I use on it? My dealer recommends a Deltec MC 600, but I am worried that such a large skimmer could strip the system of vital trace elements.

COLIN FERGUSON, EAST KILBRIDE

A A good rule of thumb for skimmers is to buy one rated for a tank that is one-and-a-half to two times as large as your aquarium. The biggest risk of buying an oversized skimmer is simply paying too much money for it. An outsized skimmer is very unlikely to have serious effects on levels of trace elements, especially if you do regular partial water changes, but you will find that it strips plankton from the aquarium. In practice, that isn't too much of a problem if you feed your fish well.

Your tank has a gross capacity of about 270 L/60 gal. so you would need a skimmer rated to 400-500 L/ 90-110 gal. A Deltec MC 600 (rated to 700 L/154 gal.) may be a bit over the top, but not wildly off. If you're looking for a hang-on model, the choices are a bit more limited than if you are planning to run a sump.

PHILIP HUNT

Snails love diatom algae.

Diatoms will go as time passes

Q My marine tank, which contains two fish, a couple of snails and a hermit crab, is starting to be plagued by a brown algae which covers the glass and substrate. How can I get rid of it?

BRIAN BLAKE, WITNEY

A You don't say how long your tank has been up and running, but I would guess that it is only a few months old. The brown algae you describe is probably a type known as diatoms – if so, it will typically be like a soft, golden-brown film growing on the glass (where it sometimes looks a bit hairy), rocks and sand.

Diatom blooms are almost inevitable when setting up a marine aquarium. Your snails probably eat it (they love diatoms), but it may be growing too fast for them to keep it in check.

The good news is that such blooms are usually self-limiting and disappear of their own accord. You may find them recurring during the first year of the system's life, but you don't need to do anything other than carry on cleaning the tank glass so you can see your fish.

PHILIP HUNT

Plenums aren't all that complex

Q I intend setting up a marine tank with a plenum system, and would appreciate your advice on the best materials and type of sand to use.

BRENDAN MOSELEY, BOLTON

A I'm not convinced that the design of plenum-based sand beds is particularly critical – and although I ran one successfully for a while, I don't think they are any better than any other kind of sand bed.

The classic way to build one is to create a platform from eggcrate plus window screen, lay down a 50mm/2" layer of 2-4mm coral or aragonite sand on top, then another layer of window screen/gravel tidy (to prevent digging animals going right down to the bottom of the bed). Finally, add 30-50mm/1.5-2" of 2-4mm sand.

You can plant macroalgae or mangroves in a plenum system, but obviously you can't put mangroves in the sand bed itself, as the roots will not have enough space.

Aim for natural sea water levels of calcium and alkalinity, about 450mg/L and 7-10 dKH. You can use sodium bicarbonate as a buffer, but do so cautiously, checking the alkalinity as you go. Complementing this with calcium chloride to top up the calcium levels gives you a crude version of a two-part additive. Do keep an eye on salinity with this type of supplementation, however, as it will creep up. You are adding both sodium and chloride, which will need to be kept in check with regular part water changes and careful use of a hydrometer.

If you use cured living rock and live sand in your system it will probably be mature, so test for ammonia and nitrite and stock in about a week.

PHILIP HUNT

YOUR MARINE EXPERTS

Write to us using the form at the end of the Ask the Experts section or send an email to us at questions@practicalfishkeeping.co.uk and we'll forward your query to the right expert. Please note that we cannot offer a quicker service for email queries as every question is answered in turn and each one has to make its way to the 'top of the pile'. Please include a stamped addressed envelope for all letters sent to print.

GENERAL PHILIP HUNT is a UK marine biologist who has shared his experiences with PFK readers for many years.

GENERAL JULIAN SPRUNG is a USA marine expert. He's written several books on reefkeeping and marine inverts.

GENERAL Dr BOB GOEMANS, USA reef expert, is best known for his study of plenums and living sand filters.

REEF AQUARIA TIM HAYES runs Midland Reefs. He has bred a number of marine fish and propagated many coral species.

GENERAL KEVIN DAVIES of Aqua Medic has been keeping marines for over 20 years. He has kept a wide range of fish and inverts, and has been successful with some of the more 'difficult' species.

How to brighten up your tank

Need a bit of colour in your aquarium? **Pete Cottle** thinks the easy-to-keep *Glossolepis* rainbowfishes will brighten it up.

The first pair of Glossolepis Rainbow fishes that I saw, *Glossolepis incisus*, was at an aquatic exhibition nearly 30 years ago held at the Alexandra Palace in London. They looked magnificent and many people were attracted to them until they saw the price – £250 for the pair! Yes, they looked nice, but not that nice! Fortunately, we don't have to pay anywhere near that price today in order to acquire this or most other species of rainbow.

Named in 1908 by Weber, it was nearly 70 years before *Glossolepis incisus* finally became available, when two German aquarists brought back live specimens to Europe in 1973. These days it's always on sale but, unfortunately, probably due to breeding of some poor quality fish, the rich red colour of the male adult fish is not always as good as it could be.

The fish of the genus all originate from Papua New Guinea and Irian Jaya, and to date only eight species have been described. Some are found in lakes, while others inhabit rivers. Only *Glossolepis incisus* has become established in the aquarium market – *Glossolepis dorityi*, *pseudoincisus*, *leggetti*, *maculosus*, *multisquamata*, *ramuensis* and *wanamensis* are still quite rare but becoming less so.

Keep 'em clean

The *Glossolepis* rainbowfishes are easy to keep and are extremely tolerant of water conditions, providing it is clean and clear. The species I currently keep are all in hard water with a pH in excess of 7.2. Because most of them grow to quite large sizes, (10-15cm/4-6"), they benefit from having plenty of tank space. In general, a tank of at least 90 x 38 x 30cm/36" x 15"

x 12" should be considered the minimum. Adult fish require plenty of swimming space and room for the females to hide away in a quiet corner to escape the attentions of the male fish.

A well-planted aquarium is also a great benefit to these fishes; like all fish, they show their best colours when they feel comfortable in their environment. That's why when you see these fish displayed in a shop, they may not be at their best simply due to lack of plants. Very often, they will only show a silvery pattern with little colour. Don't allow this apparent lack of colour to put you off! Once settled into a planted aquarium, they will soon start to show gorgeous colouration. They can be kept at temperatures between 22-27°C/71.5-80°F and will accept variations both higher and lower by a few degrees. They seem to enjoy water movement and can often be seen swimming in the current created by the outlet from an internal filter.

"Once settled into a planted aquarium, they will start to show gorgeous colouration."

Food matters

Strictly speaking, the *Glossolepis* fishes should be considered carnivores. In practical terms, however, this does not mean that they will go around the aquarium trying to devour everything in sight! Yes, they will eat fry in the tank but are not known to attack other fishes. I currently have small *Danio nigrofasciatus* and *Chela dadyburjori* in with *Glossolepis dorityi* and they co-exist without any problems.

The *Glossolepis* will eat almost all foods such as dried flaked foods, frozen foods like glassworm and bloodworm, and live foods like Daphnia, glassworm and bloodworm. Even pieces of garden worm are greedily eaten. The live foods are particularly suitable for getting the fish into good condition for breeding.

ABOVE
Red rainbows, *Glossolepis incisus* once sold for £250 a pair!

Fact File

Common name: Red rainbow.
Scientific name: *Glossolepis incisus*
Size: Male 12cm/5", female 10cm/4".
Origin: Lake Sentani, Irian Jaya.
Remarks: This species is the most commonly available. The bright red males are a real 'show off' in a community tank. Easy to breed.

Common name: Dority's rainbow.
Scientific name: *Glossolepis dorityi*
Origin: Western Papua.
Size: Male 10cm/4", females slightly smaller.
Remarks: This is a delicately coloured fish. The overall light olive green has a pattern of red spots along the lower half of its flanks. The red spots are every other row of scales. Fairly easy to breed and raise.

Common name: Leggetts rainbow.
Scientific name: *Glossolepis leggetti*
Origin: Irian Jaya.
Size: Around 10cm/4".
Remarks: To my knowledge, this species has yet to be made available to the aquarium trade. A rather nice looking fish with pinkish flanks and pale blue lateral line and upper body.

Common name: Millennium rainbow.
Scientific name: *Glossolepis pseudoincisus*
Origin: Irian Jaya.
Size: Male 8cm/3", females 7.5cm/3".
Remarks: For some years, aquarists had all sorts of problems keeping and breeding this species. Possibly as a result of continued breeding, they have become easier to keep and breed. Why they were introduced as the Millennium rainbow is beyond me! A smaller species, very similar to *Glossolepis incisus*.

Common name: Spotted rainbow.
Scientific name: *Glossolepis maculosus*
Origin: Papua New Guinea.
Size: The smallest species of *Glossolepis* 5cm/2".
Notes: A beautiful fish with a greenish blue coloration. Has a series of black spots along its sides. Number of spots varies and may well be different on one side of the fish to the other. Not difficult to breed.

Common name: Sepik rainbow.
Scientific name: *Glossolepis multisquamata*
Origin: Irian Jaya.
Size: Generally grows to around 12cm/5".
Remarks: Found in swampy lagoons and the floodplains of northern New Guinea. The only rainbowfish found in this type of biotope. I am not aware of this species being imported into the UK.

Common name: The Ramu rainbowfish.
Scientific name: *Glossolepis ramuensis*
Origin: The Ramu river system, Papua New Guinea.
Size: A small species of *Glossolepis*, males only reaching 8.5cm/3", females somewhat smaller.
Remarks: This species has only recently become available in Europe and I was able to bring back some good breeding stock from Fischhaus Zeplow in May 2003. They are quite easily bred and raised. Clean, clear water appears to be essential.


Glossolepis benefit from plenty of swimming space.

Glossolepis ramuensis

Bred like wildfire

In a community tank, the fish will spawn almost continuously – just a few eggs every day will be deposited on plants, hanging by an adhesive thread. Unfortunately, the eggs will be eaten by other fish as well as the parents, who have no parental feelings whatsoever!

If you wish to breed and raise these species, you will have to place them in another separate tank. A minimum tank size of 45 x 25 x 25cm/18" x 10" x 10" for small adults or 60 x 30 x 30cm/24" x 12" x 12" for mature specimens is required. Generally, no special water conditions are needed. I use a large woollen mop in the tank for the fish to deposit their eggs in. The male fish will display to the female and when really excited, will show what appears to be a 'flashing light' on top of his head. He then tries to encourage the female to enter the sides of the mop and will quickly move alongside her. They shimmy together for a few seconds, and then the female deposits an egg onto a wool strand. This is repeated until the female has had enough.

From an adult pair of fish, up to 40 or 50 eggs can be laid in the course of a day. The eggs are adhesive and can either be individually collected or left in the mop for about 10 days. At this stage, the adults should be removed. On hatching, the fry are immediately free swimming near the surface of the water. I start feeding with ZM food grade 000 dispersed in a little water and at the same time, add Ramshorn snails to eat up any food that settles on the tank base. All rainbow fry are extremely small and it is a week or so before they are able to accept newly-hatched brine shrimp. Even then, they do not grow fast. After one week, I start changing water – about 20% on a daily basis. After a month or so, I introduce them to other live Cyclops and *Daphnia* if it is around and chopped Tubifex worms are also readily consumed. After around two months, the young fish require more tank room as a 45 x 25 x 25cm/18" x 10" x 10" tank is just too small for 40 or 50 small rainbows. Regular water changes and plenty of good food will see them gradually mature into fine young adults.

Shark reef!

Tim Hayes visits a reef aquarium with a difference.

Looking at the coral reef before you, you could be forgiven for thinking that you're somewhere in the tropics. But you're actually in the centre of Europe, in the Czech Republic to be precise. This reef aquarium contains anemones, soft corals, a few stony corals, large *Tridacna* clams, and mushroom anemones. There are plenty of fishes, including surgeons, rabbitfishes, wrasses and angels. So far everything seems to indicate a straightforward, standard reef display, albeit one of proportions that would make any aquarist green with envy – while at the same time probably being glad they didn't have to pay the electricity bill.

Suddenly a shoal of brightly coloured reef fish whips sideways and the next thing you see is a shark coming towards you! Yes, this is a reef tank with sharks! It's home to a pair of Blacktip reef sharks and a Whitetip reef shark.

This beautiful and unusual aquarium is at Zoo Svety Kopecek in Olomouc and what makes it even more remarkable is the fact that it is filtered using the Miracle Mud method pioneered by Eco System Aquarium from the US. No protein skimmer is used on this tank and no ozone is employed, the remaining filtration compromises UV sterilisation, zeolite, carbon, and Ecophos (a phosphate remover from Eco System Aquarium that's currently only available in the USA and a handful of European countries).

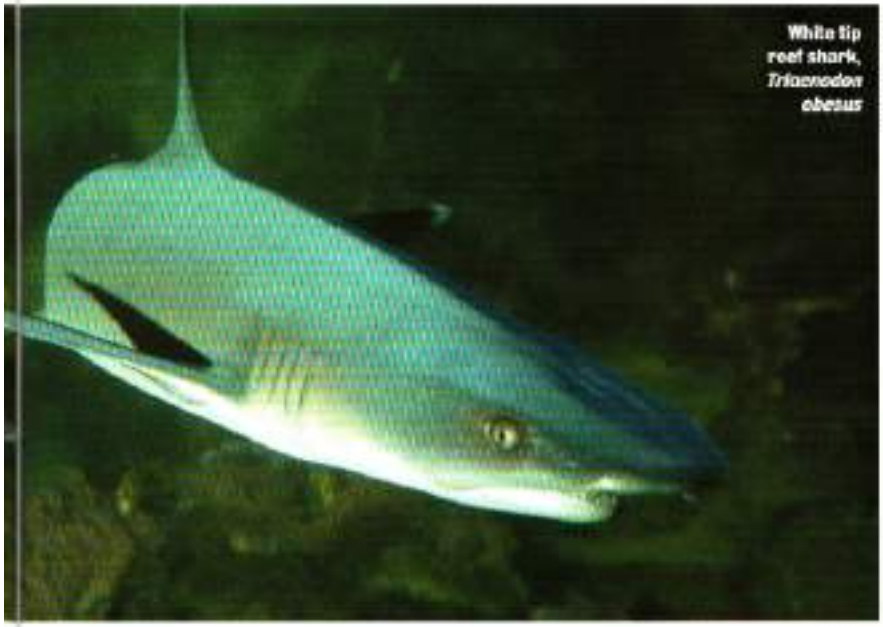
This 40,000 L/8800 gal. aquarium replaced an earlier 16,000 L/3525 gal. shark tank in June 2003 with the filtration and tank equipment installed by Jiri Berka of MOIA (a rough translation of the company name is The Modern Interior Aquarium). The aquarium has an irregular shape, presumably as a legacy of the smaller aquarium it replaced – in practice this provides plenty of room for the sharks to swim a figure of eight circuit of the tank.

Setting in

There were remarkably few problems getting the new system up and running, although it did take a little time to learn the right method of adding new fish without losing the odd one, once the sharks were settled in!

These sharks, the Blacktip, (*Carcharhinus melanopterus*), and Whitetip, (*Triaenodon obesus*), are true inhabitants of the reef. In the wild both species are widespread in the Indo Pacific area; they're inshore species, mostly living their lives on the reefs, feeding on reef fishes and cephalopods – octopuses. The maximum length of both species is around 180cm/6'. The long term goal of this system is to successfully breed the Blacktips.

The sharks are in beautiful condition, their skin has a wonderful glossy appearance and is free of the skin defects often seen on sharks in captivity. Although the accompanying reef fishes are fed frequently, the sharks are fed only twice a week. One problem when feeding them is that there tends to be a lot of oils released from the food, resulting in a film or oil slick on the surface of the water. This can cut down light penetration and interfere with gas exchange and to combat this potential problem, surface skimming is used to remove the film of oil from the display to a point in the sump where it can be manually removed. Fortunately with only two feedings a week this



White tip reef shark, *Triaenodon obesus*

The long term goal of the aquarium is to breed the Blacktip Reef sharks.

isn't too arduous a task. The accompanying fish are all in good health and growing very fast, there's a suspicion that this may be due to them having to remain vigilant, given that they're sharing the tank with three, potentially fish-eating, sharks!

The system

OK, it's a big tank and a big tank needs a big filter. Rather than relying on a single filter, there are two parallel filter systems. This is a very sensible idea as in the event of an equipment malfunction you don't lose all filtration, and it also has the advantage of allowing one system at a time to be shut down to allow for routine cleaning and maintenance.

The filters are located in a room directly behind the display that also acts as a form of heat exchanger for the system. Each of the two filters

What's in the tank?

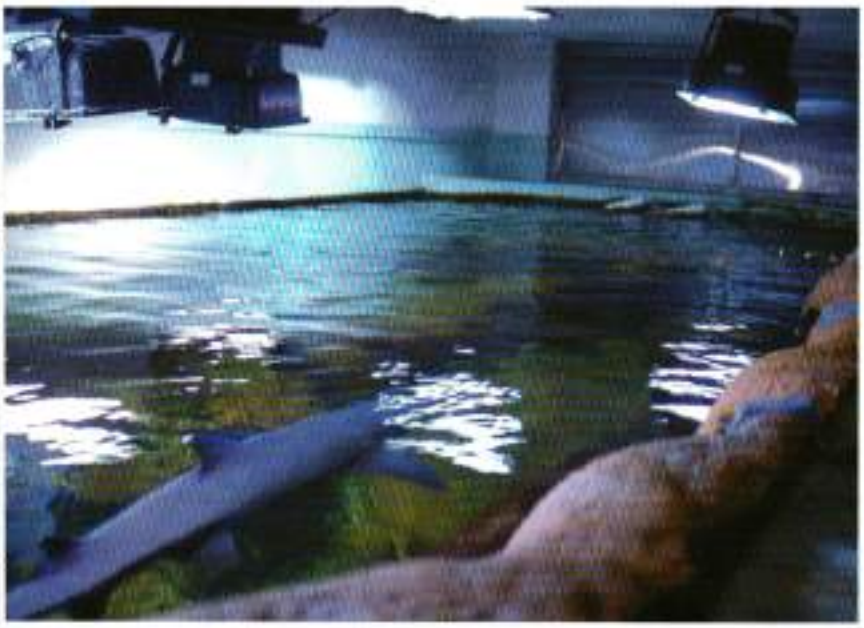
Fish

- 8 Powder blue tangs, *Acanthurus leucosternon*
- 2 Orangespine unicornfish, *Naso elegans*
- 1 Indian Ocean sailfin tang, *Zebrasoma desjardini*
- 2 Purple tangs, *Zebrasoma xanthurum*
- 1 Scopas tang, *Zebrasoma scopas*
- 2 Powder brown tangs, *Acanthurus japonicus*
- 3 Regal tangs, *Paracanthurus hepatus*
- 1 Clown surgeonfish, *Acanthurus lineatus*
- 5 Yellow tangs, *Zebrasoma flavescens*
- 2 Red dottybacks, *Labrapinus cyclophthalmus*
- 2 Longfish bannerfish, *Heniochus acuminatus*
- 2 Humphead bannerfish, *Heniochus varius*
- 1 Yellowtail Coris, *Coris gaimard*
- 4 Foxfaces, *Siganus vulpinus*
- 2 Golden jacks, *Gnathodon speciosus*
- 1 Majestic angel, *Pomacanthus navarchus*
- 10 Barred flagtails, *Kuhlia mugil*
- 4 Bluestreak cleaner wrasse, *Labroides dimidiatus*
- 8 Blue green chromis, *Chromis viridis*
- 16 Yellowtail blue damsels, *Chrysiptera parasema*
- 10 Azure damsels, *Chrysiptera flavipinnis*

You'll note that there are no Clownfish. Early on in the reef's life it was discovered that clowns are not really appropriate species to include in a shark tank – they proved to be sitting targets for the sharks as the sharks can easily take them directly out of their anemones.

Invertebrates

Predominantly hardy soft corals like *Sarcophyton* and *Sinularia* plus a mixture of various Corallimorpharian species – mushroom corals, all of these growing to great size. *Tridacna* clams are growing well in this tank, probably as a result of their feeding on the higher levels of dissolved organics and nitrate that you'd expect to find in a shark tank. Species of host anemones are also present, along with a few specimens of stony corals.



ABOVE:
Lighting comes in the combination of 3x1000W, and 5x400W HQI lights.

ABOVE:
The sharks' food is regularly dosed with vitamins to keep them healthy.

consists of a 1m diameter Vortex-Vortilter (to deal with particulate waste), a 1m diameter nitrification filter with a special size of Bio-Balls to give a very large biological surface area, an Eco System filter (containing 135kg of Miracle Mud and, of course, Caulerpa), and two Trop Tronic 14,000 lph pumps. The outflow from one of the pumps on each system goes through a UV steriliser consisting of 6 – 36W UV lamps. Phosphate removal is handled by a separate filter filled with 20 l/4½ gal. of Eco Phos phosphate absorption media, which is changed every three months. A 15% water change is performed each month, using RO water – that's a massive 6,000 l/1,320 gal. With the relatively large water change, and the fact that Eco System filtration is used, no additional supplements are needed, although the sharks' food does get regularly dosed with vitamins.

The tank is 9m x 3.5m x 1.6m/30' x 12' x 5' deep (as the aquarium is of irregular shape these are the maximum dimensions). Each sump is 4.5m x 0.6m x 05m/15' x 2' x 1½' deep. Total volume of Miracle Mud is 270 kg (that's 60 large bags!)

This reef is lit with 3 x 1000W HQI lights plus 5 x 400W HQI lights. These were described to me as being 'nature lights' which I take to mean that they are of a daylight spectrum, probably 6,500°K. The greenish colour cast of the tank bears this out, though the depth of the tank will also have an influence.

Sharks at home?

Something I don't want to do with this article is encourage you into thinking about setting up a shark tank. I don't believe sharks should be kept in captivity other than in public aquaria. It is completely irresponsible to buy any shark unless you have the resources that allow you to provide the facilities equivalent to that of a public aquarium.

When I wrote about the NAW conference in Reef Ramblings (January PFK) I mentioned the Big Fish Survey carried out by Dr Peter Burgess. Each year NAW chooses a subject for a campaign to raise public awareness about an important aquatic issue. At the 2005 NAW conference it was agreed 2006 would be 'The Big Fish Campaign'.

Every year public aquaria all around the country receive calls from people asking if they'd like to take some fish that's outgrown its welcome because it has grown too large. All too often they're disappointed to learn that public aquaria don't want the fish and have no obligation to re-home it.

This is a serious problem that brings with it the dangers of fishes being dumped into inappropriate waters or the necessity for fishes to be euthanised, not to mention the emotional stress for the fishkeepers concerned.

The aims of this campaign are:

- To make fishkeepers aware of the problems caused by trying to offload on to public aquaria fish that have outgrown their tanks.
- To encourage a sense of responsibility among fishkeepers, retailers, and importers when it comes to fishes that can outgrow the facilities of the average aquarist.
- To question whether it's appropriate for some larger growing species to be generally available.
- To ensure that accurate information is passed on to the customer by the retailer regarding the potential size of a fish.

From the results of the survey the problem was mainly a freshwater one, but in the course of the survey six sharks were offered to public aquaria with only one accepted!

Look out for information packs about 'The Big Fish Campaign' next time you visit a public aquarium. If you'd like more information, please contact the Blue Planet Aquarium at Ellesmere Port. Tel: 0151 357 8800, info@blueplanetaquarium.co.uk

Snap up a great prize

Enter our fish photography competition and you could be in line for a fabulous prize! Read on...

How handy are you with a camera? If you've been taking pictures of your fish in the past, and you're pretty pleased with the results, then here's your chance to show the fishkeeping world just how good your photography skills are. Or why not get snapping now, and see what results you get? You never know, you could get to see your pictures published in PFK or on the PFK website – and even win a great prize into the bargain!

Seven chances to enter!

The pictures can be of fish, aquarium plants or invertebrates and you can enter up to five pictures each month from this issue up to and including the September issue – we'll print a form each month. So that means that you can actually enter this competition seven times! You can even digitally manipulate the images if you want to, but remember that all pictures you enter must be entirely your own work.

- **This special photography competition has three categories:** Professional, Amateur and Junior.
- **Professional**

This category is open to those photographers whose main income comes from their photos.

- **Amateur**

This category is open to all amateur photographers aged 18 and over.

- **Junior**

Open to photographers aged 17 or under.

Over the next few months we will be showcasing some of the best photos we receive in PFK and on our website. Any we feature will receive a small prize. Then, at the end of September, a panel of judges will choose what they feel are the best 10 photos from each category from all those we have received over the course of the competition. We will put these on display on our stand at the Festival of Fishkeeping weekend which takes place at Hayling Island from October 6-8. We'll be asking visitors to the show to vote for what they think is the best picture in each of the three categories and the picture in each category that takes the most votes will win its photographer a great prize from ALF (see box).

How to enter

Once you've decided which pictures you wish to enter, send them to us by post. Sorry, but entries sent by email cannot be accepted. You can send your photos as prints (minimum size 15 x 10cm/6" x 4", maximum size A4, or as high resolution files on CD (save as high quality JPEG or TIFF, with minimum dimensions of 1800x1200 pixels and maximum dimensions of 3508x2480 pixels). Please ensure you include the entry form (or a photocopy of the form) with your entry and send them to: **Practical Fishkeeping Photo Competition, Bretton Court, Bretton, Peterborough, PE3 8DZ.** The closing date for this month's entries is March 21, 2006. Please include a stamped addressed envelope if you wish your images to be returned at the end of the competition.

Need help?
If you need some advice on photographing your fish, check out the February issue of PFK which carried an excellent article by Ben Hawkins of Practical Photography magazine, full of hints and tips.

PHOTO COMPETITION ENTRY FORM - MARCH

Closing date March 21, 2006

Which category are you entering? (tick one)
Professional ☐
Amateur ☐
Junior ☐ (please state age)

Name..

Address...

....

....

email...

If you are happy to be contacted by Practical Fishkeeping by email in the future, please tick the box ☐
Your email address will not be disclosed to third parties.

Where do you usually buy your copy of PFK?

....

CHECKLIST

Please make sure you have included:
- Up to five prints (max. size A4) or a CD with high resolution files (JPEG or TIFF; min. size 1800x1200 pixels, max. 3508x2480 pixels
- An entry form (photocopy acceptable)
- Your full contact details on each print and CD you submit
- An SAE for the return of your prints and CD, if required.

Please tick this box if you DO NOT want your work returned ☐

Send to: Photo Competition, Practical Fishkeeping, Bretton Court, Bretton, Peterborough, PE3 8DZ. The closing date is March 21, 2006

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Things you may not know about Koi...

What's the biggest, oldest and most expensive Koi? **Keith Holmes** of Koi Water Barn uncovers these, and other, fascinating facts about these fabulous pondfish.

Whether you're a Koi Keeper or someone considering the hobby, there's a wealth of information to learn and accumulate over the years. Here are some fascinating facts about Koi you may or may not know, but either way should improve your understanding and increase your passion for the hobby.

What does Nishikigoi mean?

Although most people refer to Koi, simply as Koi, the correct term is Nishikigoi, which in broad terms means coloured or brocaded carp. Nishikigoi replaced the use of terms such as "Coloured Koi", "Flowery Koi", "Figured Koi, and "Fancy Koi" all of which were popular names to describe coloured and patterned Koi at the time of the Second World War. However due to the war, the authorities didn't agree with the use of the words "Coloured" or "Flowery" and hence the term Nishikigoi was used. Nishikigoi uses the Japanese word "Nishiki" meaning expensive cloth of many colours, and Goi which means carp; hence the meaning of Nishikigoi - a carp of many colours. The actual use of the word Koi dates back to around 2500 years

ago, when in 533BC Confucius' son was born and King Shoko of Ro presented him with a wild carp which was reffered to as Koi. Although Japan is now considered to be the home of Koi, originally they are thought to have come from Persia, and then brought to Japan via China and Korea, around 1000 years ago, although the coloured varieties which we see today are believed to have been produced in Japan. Nishikigoi are now held in such esteem that they have become the National Fish of Japan. Before having this title Nishikigoi were commonly referred to as "Living Jewels" and it was only in 1968 that Mr Hideo Miya referred to them as "National Fish".

What is the history of Koi?

Common carp are believed to have arrived in Japan 1000 years ago, where they were kept by farmers in mud ponds as a food source. These carp started to breed and with each spawning mutations developed, including the presence of different colours. These carp were not eaten but kept, and used to produce further coloured carp, and it can be said that the hobby of keeping Koi started around the 1840 to 1850's.

What are the main countries breeding Koi?

The home of Koi is Japan, and most people will confirm that the top Koi are only produced here, as the knowledge, resources, and vast amount of experience the Japanese have is not available anywhere else in the World. Along with this it has taken the farms years to create bloodlines, and get good brood stock, and many of the countries which are now producing Koi simply haven't been doing it long enough to acquire this level of expertise. Other countries which produce Koi include China, Taiwan, Thailand, Israel, and European countries including England.

How many varieties of Koi are there?

There are far too many different varieties to mention by name, but each variety of Koi will fall into a general classification as follows:

Kohaku (red and white Koi)
Sanke (white Koi with red and white)
Showa (black Koi with white and red)
Utsurimono – A black Koi with coloured markings, and includes: Shiro Utsuri (black and white) Hi Utsuri (black and red) Ki Utsuri (black and yellow).
Bekko – A coloured Koi with black markings, and includes: Shiro Bekko (white and black) Aka Bekko (red and black) Ki Bekko (yellow and black).
Asagi and Shusui- An orange and white fully scaled fish with a blue reticulated scale pattern across the back. Shusui is a diotsu Asagi.
Koromo – Including Goshiki (A red and white Koi with black overlying both the red and white scales), Ai Gomo (red and white Koi with dark blue or black edging the scales), Sumo Gomo (red and white Koi with black overlying the red scales) Budo Gomo (white Koi with a purplish colour, which looks like bunches of grapes on the Koi.
Kawarimono – This is the classification for non-specific verities of non-metallic Koi.
Hikarimuji – This is the classification for metallic singled coloured Koi and also includes Matsuba (a single coloured Koi with black overlying the scales).
Hikarimoyo – Any metallic Koi not covered in Hikarimuji and Hikari Utsuri, includes varieties such as Hariwake (yellow and white Koi) and Ki-Kusui.
Hikari Utsuri – Classification for Metallic Showa and Utsuri includes Kin-Ki-Utsuri.
Kin-Gin-Rin – This classification is given to Koi with either gold or silver in their scales.
Tancho – This is any Koi which has a red (Hi) marking on the head and nowhere else on the body.
Doitsu – These are Koi with no scales other than enlarged scales which can be found either side of the dorsal fin, and along the lateral line.

How do my Koi get here?

When you visit your Koi dealer and are looking at the vast array of fish for sale, this is the end result of a long process, of preparation, shipping, and the acclimatisation and quarantine once the Koi arrive in the UK. Many dealers will visit Japan at various times of the year to select their Koi, most notably October/November when the mud ponds are harvested and the larger Koi are brought inside. This is the best time of year for bigger Koi – for smaller Koi your dealer may visit Japan in the spring. Once Koi have been selected or ordered, shipping

FAR LEFT:
Nishikigoi means "carp of many colours".

LEFT:
Tanchos have a red mark only on the head.

arrangements will be made to get them from Japan to the UK. In the majority of cases your Koi will be packed in plastic bags, in strong cardboard boxes before being sealed, ready for transportation. In the case of very large, or high value Koi, a special box may be made from wood and lined with polystyrene to offer a higher level of protection. Once packed, they are transferred to the airline and this process may take upto 30+ hours from the time the Koi is caught to it actually landing in the UK.

What's the most amount spent on a Koi?

A typical Koi keeper may spend £9.95 on a 10cm/4" Koi, then as they become more interested in the hobby work their way up to spending a couple of hundred pounds on something larger, or higher grade. Some people develop an interest in showing fish or just want to have a very impressive collection, and if this is the case the amount they spend on Koi will increase.

Koi are no different to pedigree cats, dogs, racehorses etc, in that once you want to have the very best and compete against the best you have to be prepared to pay that little bit extra. This doesn't mean that you can't buy a Koi for under £100 and not end up with a truly amazing fish, but if you want to compete at events like the All Japan Koi Show – the top Koi show in the World – you are talking serious amounts of money for serious Koi. To my knowledge the most spent on a Koi by western hobbyists, was £100,000 by two English Koi keepers, for an amazing Marutan

ABOVE: **Top hobbyists visit their fish whilst still in Japan.**

ABOVE RIGHT: **The rigorous culling process employed by top breeders means that each Koi has a one in a million chance of making it so far as the dealer's.**

RIGHT: **Is this the largest Koi in the UK?**

Kohaku. The Koi was entered into the All Japan Koi Show 2005, and took reserve grand champion. In the 2006 show this Koi was not entered, but another owned by Martin Plows, and Mark Crampton (the owners of the Maruten) was, and it did the ultimate and took grand champion. This Koi is an amazing Hiroshima Sakai Kohaku, which has become known as the "Super Mark", although this name may well change now. What makes this achiement even more special is the fact that the All Japan Koi Show had until this year never been won by a westerner.

Both of these Koi are still in Japan and will remain there for the time being. Nowdays many top hobbyists visit Japan to select their Koi, and will leave them out there to grow on, and compete in numerous shows in Japan before eventually bringing them to the UK.

Not all high money Koi are large and in Japan, as much as £15,000 is reputed to have been paid for Koi as small as 10-12cm/4-5". At the other end of the spectrum, the £100,000 paid for the Maruteen Kohaku isn't a huge amount to pay to get the best, and the actual highest amount paid for a Koi will probably never be known – but I'm positive it will have been a lot more than £100,000.

What's the largest Koi outside of Japan?

Unless anyone wants to put me right on this point – and I would like to know if I'm wrong – the largest Koi outside of Japan, is a large Matsuba (when purchased) – in fact it now looks like a Kigoi, as all the black on the scales has now gone. This Koi was purchased by Koi Water Barn Ltd. in November 2002 at 11 years of age, and weighing an estimated 80-100lbs, with a total length of 1.32m/4'3". This Koi hasn't put on any weight since being in the UK, and has spawned which has resulted in some of her girth and weight being lost, but in my opinion this is certainly the largest Koi outside of Japan. Before this Koi was imported the largest was once again to be found at Koi Water Barn and this was a Yamabuki Ogon, known as Audrey – she was just over 1 m/ 3'4" in length. Sadly Audrey died in 2000, at the age of approximately 55/56 years old! These are both single coloured Koi, and not Go-Sanke varieties i.e. Kohaku, Sanke, Showa. This is because single coloured varieties grow quicker, and obtain much larger sizes. Producing 1m plus Go-Sanke is the dream of many top breeders around the world.

What's the oldest Koi?

There are reports of a Koi living for over 100 years. A Koi in your pond at home in reality is unlikely to live this long and an age of anything from 15-30 years is perhaps more realistic (although if given the optimum environment there's nothing to say it couldn't live a lot longer). Unless you know the exact age of your fish when you purchase it, which most dealers should be able to tell you, the only other way of determining age is to view one of its scales under a microscope. By doing this it will show a number of lines, similar to those of a tree. These lines generally show a dark ring then a light ring, which shows a season's growth i.e. cold period and warm period. If these lines are counted it can give an idea of the actual age of the Koi. There is a problem with this however, in that more Koi are kept in warm water all year round, and so are constantly growing, so when viewing a scale it may be misleading because the fish has had a continual growth season. It is not advisable to remove scales from your Koi, and should only be considered once the fish has died.

One in a million!

While at your local Koi dealer's, selecting that new purchase, it's worth remembering that that one Koi was most likely from a spawning of millions of eggs. Around 70% of those would have hatched and then over days, weeks and months the number of Koi would have been reduced via rigorous and strict culling, resulting in only a fraction of those hatched being kept, depending on the strictness of the culling and the market which the Koi breeder is supplying. So that one Koi, be it a 10-12cm/4-5" one-year-old (tosai) or a 30-35cm/12-14" two-year-old (Nisai) has been selected time and time again and missed the cull to the point where it's considered ready for selling: a one in a million chance!

Flaming angels!

Bob Goemans explains why adding a Flame angel to his reef set-up turned out not to be such a good idea after all – and why removing it was easier said than done!

We all occasionally look back on past aquariums and compare them to our present set-ups. I did just this recently when discussing the purchase of a Flame angelfish, *Centropyge loricula*, with a reader. He wanted to add one to his 340 l/75 gal. reef system that contained a few other fish and a good crop of macroalgae. In fact, the macro was one of his 'accomplishments' as he'd had a difficult time finding *Caulerpa prolifera* and was really proud of the amount he now had in this aquarium. He trimmed it regularly and fed it to some tangs and larger angels in another much bigger system. Well, I just couldn't pass up relating an experience I had in an aquarium over 10 years ago! That 567 l/125 gal. system was maintained with a small animal load and also had a flourishing growth of *C. prolifera*. That system, with a deep sandbed directly on the aquarium bottom, was going very well with its various invertebrates collected from Mexico waters, macroalgae and four fish.

Part of my goal was to maintain an excellent growth of macroalgae to help keep nutrients low in the tank. What transpired, I can now look back on with amusement, but it wasn't how I felt at the time!

I've always been very partial to Flame angels and decided to add one to my system, especially after spotting one at a local shop in perfect health that was simply gorgeous. Although I knew it might browse on some forms of macroalgae, I had what looked like a sufficient growth in the aquarium to meet all my goals. And anyway, how much could one fish eat?

My new 7.5cm/3" angel stayed mostly out of sight at first, but as time went by it established itself as 'King' or 'Queen' of the aquarium. Prior to that, my little Blenny *Ecsenius bicolor*, was the bossy one, but now there was a new fish in charge. I didn't expect that!

Within a short time there were no new macroalgae runners in the aquarium and after a few more weeks, there were no new macroalgae leaves, either. Then the older macroalgae leaves started to get shorter, and in a timeframe of a few months, the Flame angel had polished off most of my existing macroalgae!

Decision time

Flame – or macroalgae? Actually, that wasn't so difficult because at that time, water quality was more important and a good growth of macro was considered the way to accomplish that. My Flame had to go, but how was I to get it out of a reef aquarium loaded with lots of hiding places?

At that time, many people were visiting my home for reef viewing sessions as we belonged to a local aquarium society, and some local shops sent their clients to me for learning the finer points of aquarium husbandry. We were all amazed as to just how much *Caulerpa* this little fish had consumed. Everybody thought it quite amusing (except me!) and offered various suggestions as to how to remove it from my aquarium, everything from a 'rod and reel', to placing a large glass bottle with the remaining macroalgae inside it. The glass bottle trick sounded pretty good to me, so I got a fairly large bottle, gathered up the last few pieces of remaining macroalgae and put

it in the bottle at the bottom of the aquarium, ready to haul out, complete with fish, as soon as it went inside for a snack. Then I sat back and waited ...and waited... and waited. For the first few days the angel didn't go near the bottle.

Then one day I found a lot less macroalgae in the bottle. This angel must have had great vision because it never went anywhere near the bottle while I was watching! After a week I considered the bottle trick a failure. Then a friend suggested catching the angel while it was sleeping. That sounded better than having to disassemble a portion of my reef aquarium.

A few days later I got up at 2am, armed with my flashlight in one hand and a small net in the other, and made my way to the aquarium. After a few minutes of searching I located the fish under the biggest rock in the aquarium – a rock that just happened to be holding up many smaller rocks! This fish not only had good vision, but was also very smart. No way was I going to move that many rocks to catch a fish at this hour! Anyway, I'd probably only have dropped the flashlight in the aquarium, as I really don't function too well at that time of the morning!

My aquarium was starting to look like a moonscape! Not only was my macroalgae gone, but most of the little animals like copepods, keyhole limpets, chitons, and Terebellid worms, seemed to be disappearing.

That was the last straw. If I had to disassemble a part of the reef aquarium to get the fish, so be it! I decided I might be able to coax it to one end of the aquarium after removing a portion of the rock in that end and baiting it with some fresh macroalgae. Then, while it was busy gorging itself on the new macroalgae, I would block off its return with some small mesh wire and scoop it out.

To do this, I moved all but three medium-sized rocks from one end of the aquarium to the other. I left the three rocks near the front of the glass to hide my approach to the aquarium. Such planning!

I then placed a few new strands of fresh macroalgae in the empty end behind the rocks and sat in the next room and waited. I knew the angel couldn't resist fresh macroalgae and, since he or she didn't own a set of binoculars, it couldn't see me in the next room! For the next few hours, the Flame stayed under and around the rocks in the opposite end of the aquarium. It wouldn't even come close to the empty end. Then, during the fifth and sixth hour it started to get near the edge of the empty end of the aquarium. When it did approach this 'border line' area, it would turn and shake its tail in anger, like it was really mad that someone had disturbed its home!

Finally, after I had sat and watched it for about seven hours, it swam into the empty end, but just as quickly as it got there, fled for the safety of the opposite end of the aquarium. It did this several times before it finally decided to give that nice bunch of macroalgae a try. It was just too tempting! That's when I made a mad dash to the aquarium and successfully slipped the wire mesh into place. I now had it trapped!

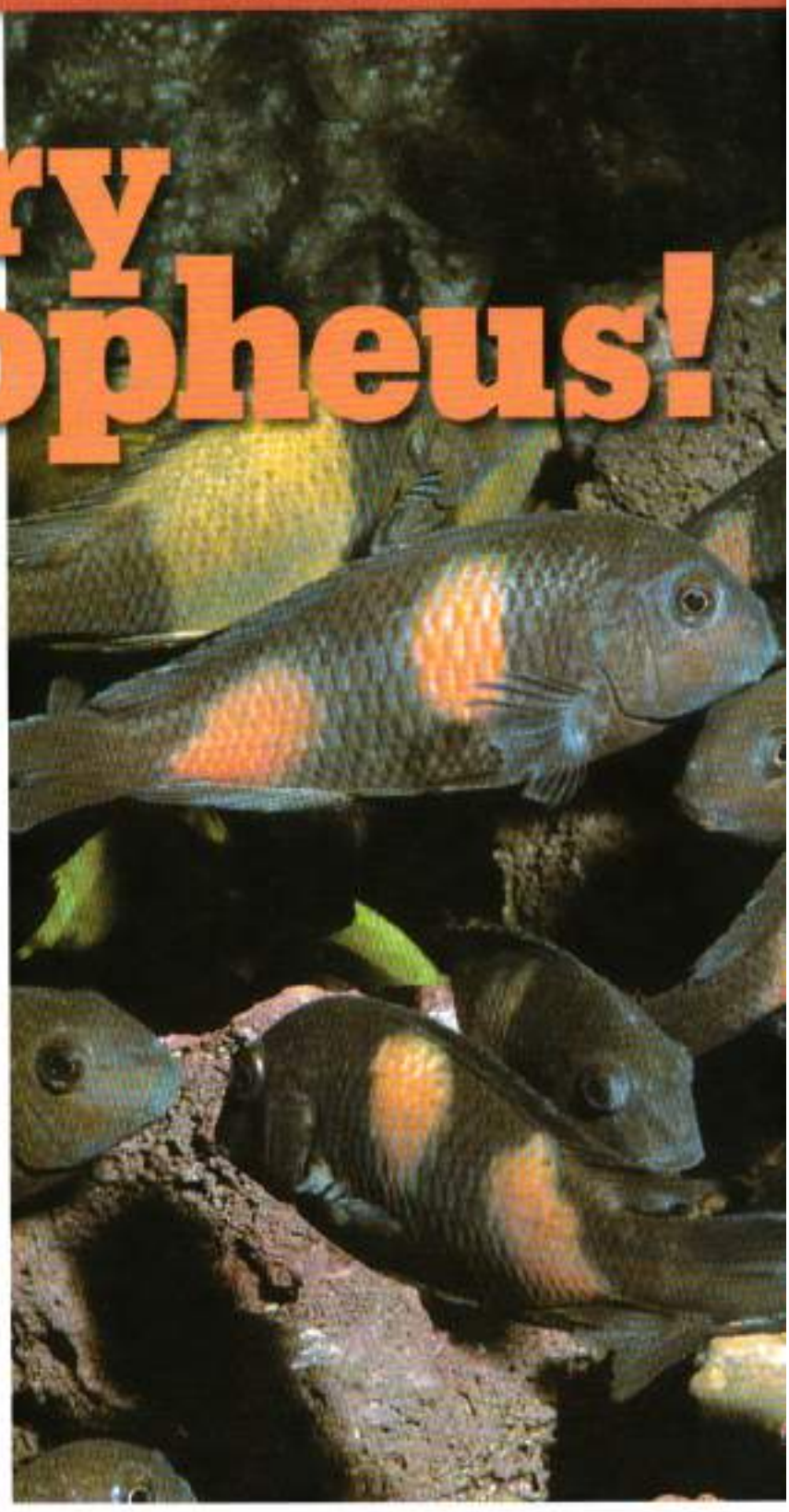
It took about five months for the system to recover and I still find it hard to believe that one small fish could eat so much macroalgae, but I guess you're never too old to learn something new!

And the moral of this story? "Think hard before you add 'just one more fish' to your reef aquarium." And yes, the reader said he would rethink adding a Flame angel to his current set-up – can you blame him?

LEFT
A good growth of macroalgae...

ABOVE
...but just how much can one Flame angel eat?

Try Tropheus!



They're a bit of a challenge, but the rewards are great! **Mary Bailey** spotlights the increasingly popular *Tropheus*.

Tropheus are among the most popular of all the cichlids from Lake Tanganyika. The variety of species and forms available, and the challenges they pose, are equal attractants.

More than *moorii*

When *Tropheus* first entered the aquarium hobby just two species were known to science, *T. moorii* and *T. duboisi*. A third species, *T. annectens*, had long been regarded as a synonym of *moorii*. *T. duboisi* is quite unmistakeable both as adults and juveniles, so the assumption was, not surprisingly, that the different *Tropheus* (black with a broad orange and yellow band) collected by Pierre Brichard, working out of Burundi in the north of the lake, must be *T. moorii*. Thus the situation in the early 1970s.

Then it all started to go wrong. Such was the enthusiasm for Tanganyikan cichlids that collectors explored further and further afield, and private aquarists mounted expeditions to catch their own. It soon became apparent that *T. moorii* (as then understood) was a highly variable species in its coloration. Some were brown with

yellow markings. Some were black with large amounts of red. And when collectors reached Zambia they found that the *Tropheus* there were multicoloured, no longer "black fish with bits of colour".

There were other differences. The original form, by now termed *T. moorii* "Brabant" as it was felt some additional identifier was desirable amid the confusion of moorii, was a nasty piece of work. By contrast the "rainbow" forms from Zambia were pussycats.

Eventually the penny dropped. There was no way all these forms could be one species, given that in some places two or three forms were found together, and that in some cases there were clear morphological differences, albeit slight. At this point things swung the other way. Perhaps all these different forms were distinct species (some workers still regard this as a possibility).

In time, three of the new forms were described – as *T. brichardi*, *T. kasabae*, and *T. polli* - but only the first remains valid. Meanwhile it turned out that *annectens* is a "good" species after all! In fact *annectens* is the only *Tropheus* with just four anal spines and a remarkable crescent-shaped tail, so, despite being regarded as a synonym for so long, is actually the most morphologically distinct species!

The question of how many of the multitude of forms are species remains open. Ad Konings has studied the problem in some detail and I've chosen to follow his view that there are eight species (four described) (Konings, 1998). These are summarised in the accompanying species data. However, others (eg. Schupke (2003) believe there are a few additional main lineages and that the forms within them may be species.

All this is very important – many aquarists like to keep a mixture of *Tropheus*, but this is not necessarily a good idea because of the temperament differences. However, if you are going to do it, don't keep more than one form of any species as the forms often hybridise (another reason for regarding them as just forms).

Why so many?

So, why are there so many different *Tropheus* species and forms? Well, fluctuations in lake level have undoubtedly played a part. After a major drop in level there is less habitat, some species may even go extinct (completely or in some areas), outcompeted by stronger or better-adapted rivals. When the lake level rises again the remaining populations spread outwards and upwards, and may become fragmented in the process. These fragments may (or not) then evolve into new species depending on circumstances and time span.

All *Tropheus* are obligatory rock-dwellers, and, like the Malawi mbuna, tend to stay where they are unless circumstances (lake level movements, storms) dictate otherwise. So, once a population has colonised rocky shoreline after a rise in lake level, it may be fragmented along a stretch of coast with river mouths and sandy beaches interrupting the rocky shore. Each of these populations then undergoes genetic drift which may throw up colour changes. Mate choice is by the female, and one male can fertilise countless females, so if the new colour (or some other feature of the male) appeals to the majority of females then the "new" male will make a disproportionate contribution to the gene pool of the next generation and males like him will become the norm. Meanwhile the female/juvenile coloration within the species generally remains relatively similar within those species which are sexually dichromatic.

It is possible that all such forms could eventually become species, but usually there is some exchange of genetic material at the boundaries between forms as individuals do get storm-washed away from "home"; or with a highly static species there may not even be any geographical barrier in the overall population and genetic changes still occur. In the latter case the species may change continuously along an unbroken rocky coastline. And intermediates do occur between neighbouring *Tropheus* forms in nature, confirming the theory. This is also how we know that where two or more distinctive forms, breeding true, occur at one site they are separate species.

Regardless of their origin, all *Tropheus* feed on aufwuchs (algae growing on rocks, and any life forms it contains). There are some variations in this ecology, often where two or more forms are found sympatric and occupy slightly different niches. For example, *T. duboisi* shares its habitat with the far more aggressive "Black", and as a result has been "pushed out" of the prime habitat near the surface and into deeper water where the algal growth is less verdant because of reduced light levels. This is reflected in its different, less specialised mouth form – more terminal and less slit-like – designed for collecting anything available rather than "mowing" the sheets of algae.

Aquarium maintenance

Tropheus need a large tank (120 x 45 x 45cm/48" x 18" x 18" minimum) which ideally will be devoted to a group of just one species or form. The group should comprise several males and as many

LEFT: *Tropheus* sp. "Black"

ABOVE: *Tropheus annectens*.

Factfiles

Tropheus annectens Boulenger, 1900
Common/trade names: Petit, Fork tail tropheus
Distribution: Western shore near Mtoto, eastern shore between Ikola and Bulu Point. Type locality given as Kalemie (in the Congo), but not now found there.
Distinguishing features: The crescent shaped tail is unique among *Tropheus*, and the species also has just 4 anal spines (5-7 in the other species).
Remarks: Long regarded as a synonym of *T. moorii*, but now accepted as distinct.

Tropheus brichardi Nelissen & Thys, 1975
Common/trade names: Chocolate moorii, Chocolate tropheus
Distribution: Found around the northern and central stores of the lake, but with a fragmented distribution and numerous different forms. Type locality Nyanza Lac in Burundi.
Distinguishing features: Brownish with yellowish markings. Juveniles striped – females retain stripes into adulthood. Males may retain parts of the stripes or lose them entirely.
Remarks: Sometimes confused with *Tropheus* sp. "Mpimbwe", the "Canary Cheek Tropheus".

Tropheus duboisi Marlier, 1959
Common/trade names: Typically the specific name alone, or with a variant name, eg "*duboisi* Yellow Band".
Distribution: Several scattered localities in the north of the lake.
Distinguishing features: Black with a white or pale yellow vertical bar which may partially or totally disappear with age. Juveniles are black with spots the colour of the adult band.
Remarks: Delightful young, but adults aren't that stunning. Usually one of the more peaceful *Tropheus*.

Tropheus moorii Boulenger, 1898
Common/trade names: Known by specific name alone or with variant name attached, eg. "Red rainbow moorii".
Distribution: Southern part of the lake. Type locality Kinyamkolo (= Mpulungu).
Distinguishing features: Usually multicoloured with narrow light vertical stripes (or residues of these), a large light area (colour varies) on the flank or belly, and light speckles on the head.
Remarks: Type species of the genus. *T. kasabae* Nelissen, 1977 ("Blue rainbow moorii") is a synonym. Numerous *Tropheus* that do not belong to this taxon are still labelled "*moorii*" in the trade. The true *moorii* is relatively peaceful.

Tropheus sp. "Black"
Common/trade names: Often still known as *moorii* plus a variant name, eg. "Moorii Brabant".
Distribution: Mainly in the extreme north of the lake, but with a totally separated group of populations along the central eastern shore.
Distinguishing features: Predominantly black with a yellow or orange (or both) vertical band, sometimes split into a saddle and belly spot, sometimes reduced to a large central patch with another on the lower posterior body (as in the Cherryspot).
Remarks: The Brabant form was probably the first *Tropheus* in the hobby but is rarely seen now. Some authors (eg. Schupke, 2003) regard the southern populations as a separate group.

Tropheus sp. "Red"
Common/trade names: Red moorii, but many variants are known by their own names, eg "Tailstripe moorii".
Distribution: the south-eastern shoreline of the lake.
Distinguishing features: Head and tail black (with red or yellow markings on the face in some forms), with more or less red (occasionally yellow) on the sides of the body and variable amounts of red in the fins.
Remarks: This species occupies a gap in the distribution of *T. moorii* but overlaps that species at both ends – the presence of the two sympatrically indicates they are distinct species.

Tropheus sp. "Mpimbwe"
Common/trade names: Chocolate moorii, Lemon cheek Tropheus.
Distribution: Several areas along a small stretch of east coast at/near Cape Mpimbwe.
Distinguishing features: Brown with a yellow or orange lower cheek in males; females and juveniles striped.
Remarks: Originally thought to be a form of *T. brichardi*. NB. The "Canary Cheek" is a form of *brichardi*, the yellow patch in that form is not actually on the cheek but on the gill cover.

Tropheus sp. "Ikola"
Common/trade names: Kaiser moorii
Distribution: A single population along a short stretch of shoreline near Ikola, Tanzania.
Distinguishing features: Black with a red iris and a very wide lemon yellow vertical band on the flank, sometimes occupying most of the side.
Remarks: It seems to be agreed that this is a distinct species and not part of the *Tropheus* sp. "Black" group.

females as possible, especially with the more aggressive species, as that way the males will keep each other busy and the number of females will share out any residual harassment. Reducing the expense of all this by putting a pair of *Tropheus* in an mbuna tank doesn't, in my experience, always work – if the male is inclined to harass the female he will hunt her relentlessly through the tank as if the mbuna didn't exist. But it does depend on the species – I have kept three *duboisi* among mbuna with no problems, but then I kept the same *duboisi* in a tank by themselves and there was still no problem as that species is generally not inclined to thuggery.

By the same token, *Tropheus* are generally out of place with Tanganyikan substrate-spawners and the less boisterous mouthbrooders such as cyprichromis, unless the tank is huge and the *Tropheus* peaceful, and outnumbered.

The tank should, of course, also be brim-full with rockwork.

Lake Tanganyika water is very hard (18 °dGH or more) and alkaline (pH 8.5 or higher), and although it seems hardness isn't critical, the pH must remain alkaline. This can be achieved by using crushed shell, dolomite chips, or coral sand (10-25% mixed into the substrate, or as a filter medium and/or limestone in the rockwork to buffer the acidifying effects of metabolic processes.

Tanganyikans react badly to measurable ammonia or nitrite, and the tank must be fully matured before any *Tropheus* are added. Effective biological filtration must be used, and mechanical efficiency is important.

too, as some *Tropheus* at least seem highly sensitive to suspended particles in the water. A high oxygen content is essential too. Because *Tropheus* tanks need to be fairly crowded all this is best achieved by a large external power filter or power-head driven undergravel (*Tropheus* don't tend to dig), in each case causing plenty of surface movement via the return(s), and this is one group of fishes where a little turbulence appears not to matter.

Tropheus are also sensitive to high levels of nitrate, which may cause a slow deterioration in health, increased susceptibility to disease (including, notably, "Bloat"), and reluctance to breed. Change 30% of the water weekly and monitor nitrate. If this level of water changing isn't sufficient then you are probably overfeeding!

A temperature around 27°C/80°F is suitable; some moorii variants look their best under moderate rather than bright illumination.

Thoughts for food

The diet should include plenty of "greens" (less so for *duboisi*) and live/frozen invertebrates such as Daphnia, mosquito larvae, Cyclops, and Artemia. Avoid live Tubifex because of the risk of disease, though the frozen form is thought to be safe. Whiteworms and chopped (or small whole) earthworms are enjoyed. Flake and granules should form only a small part of the diet, as again they have been associated with "Bloat". Beef heart is an absolute no-no!

I have found that some *Tropheus* go quite wild over blanketweed (and the live foods it often contains) and a good handful, in a "greens dip" or weighed down by a rock, is a good way of providing a natural diet. I've also used rocks with algae on from my "wild pond", and blanketweed from a friend's Koi pond.

Little *Tropheus*

All *Tropheus* are maternal mouthbrooders which form no pairs, the male's sole contribution to the species is sperm. The brooding period can be up to five weeks and this means the fry are larger than most mouthbrooder fry when they eventually emerge. This gives them an advantage over smaller fry, but because mouth-capacity is limited the trade-off is that there are fewer of them, and a dozen is a good sized brood. We do not know why *Tropheus* have taken this particular route – maybe at some time in the past there was a special advantage to producing fewer, larger, fry.

Sexing is a real problem in some species, including *duboisi* and "Black". In others, eg. the true *moorii* forms, the males and females are quite different though juveniles are unsexable. But, as you need a group rather than a pair anyway, it doesn't really matter.

As with most cichlids the route to breeding success is correct maintenance, which generally leads to the desired result in time. But in some species at least, males mature considerably later than females, so where young fishes are concerned the female may start spawning a year or more before the male is capable of fertilising the eggs. Clutch after clutch may come to nought, and great patience is required. But it's worth the wait!

References

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Schupke, P., 2003. *Aquatlog African Cichlids 2: Tanganyika I Tropheus*. ATZ, Germany. 192 pp.

(Both available from British Cichlid Association Sales, tel: 01303 850855 or visit www.britishcichlid.com for further details.)

ABOVE LEFT:
Tropheus need a high oxygen content in the water are sensitive to high levels of nitrate.

LEFT:
Tropheus sp. "Ikola".

BELOW:
Tropheus duboisi.

ABOVE: *Etroplus canarensis* are easy to keep, but to our knowledge, no one has managed to breed them in the aquarium.

Availability
At the end of 2004, the market became flooded with *canarensis* of all sizes, as wholesalers like Tom Halvorsen Ltd imported larger quantities of the fish than ever before. Oddly, for such an interesting, graceful and placid cichlid, it seems to have a rarity level off the threshold of most cichlidophiles, so some shops haven't sold the expensive specimens they imported because many cichlid keepers didn't know what the fish where. So you could pick up a bargain deal – I paid just under £40 each for mine, but I've heard of them changing hands for half that at smaller sizes.

an eye-catching golden base colour, with a series of distinctive marks on the flanks that look like the Roman numerals XVIII (the number 18, in case you're wondering). As they get older the markings do tend to fade a little, and the deep golden colour becomes paler, but the fish are still very pretty and they start to undergo much more striking colour changes when they're courting or fighting with each other.

As they grow larger they started to become more herbivorous. I had originally intended to keep my *canarensis* in a tank filled with twisted roots and a thicket of dense *Vallisneria*, but when the sub-adults were introduced to the matured tank they had other ideas and decided to rip most of the vallis apart. Java Fern is tough and unpalatable enough to be left alone, but anything softer may well be looked upon as food or entertainment.

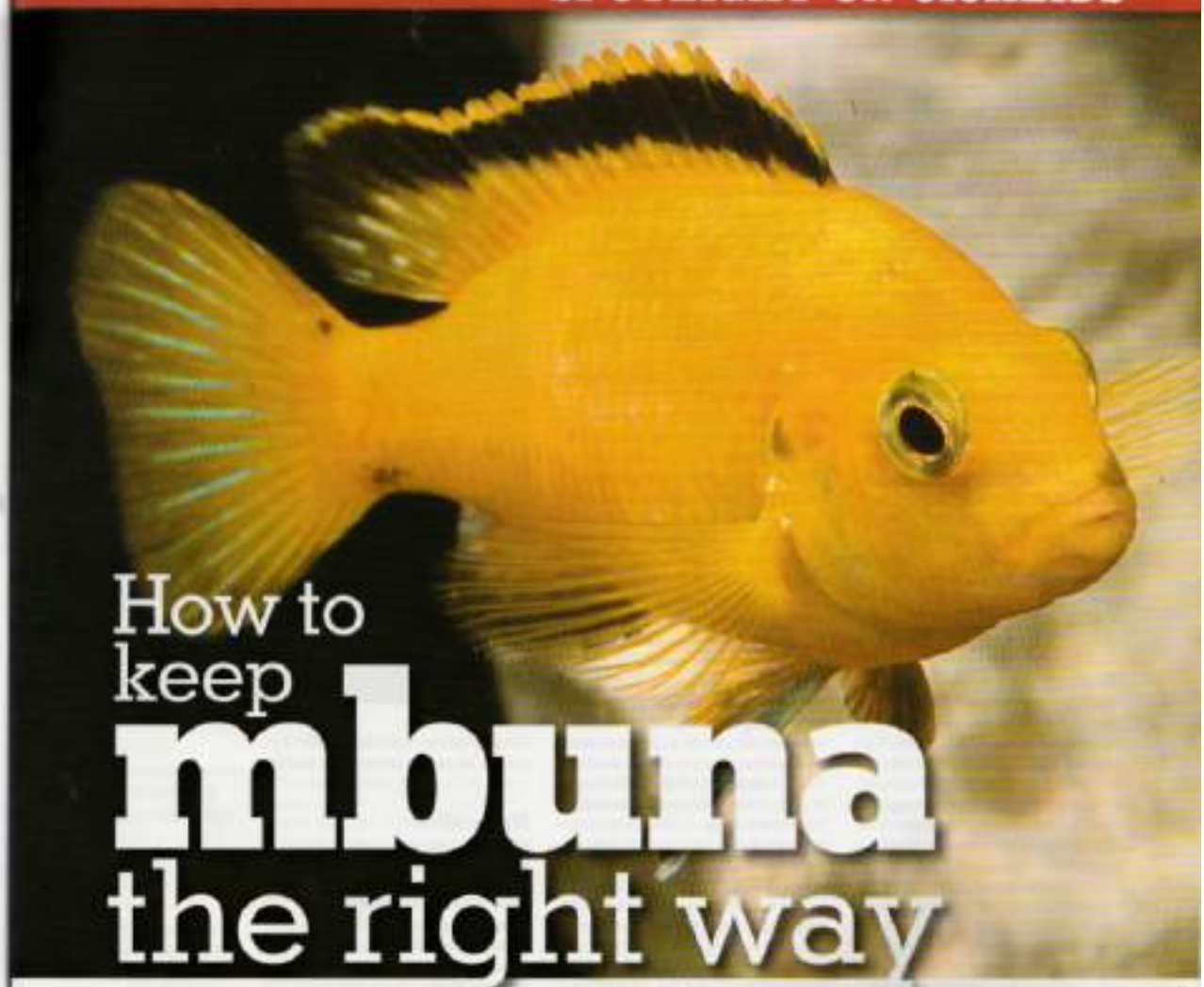
I found them dead easy to keep. The water in their native rivers in India is said to be soft and acidic, but mine and those of several other *canarensis* owners I know have done well in harder water.

How to breed it

Nothing has ever been written, to the best of my knowledge, on the breeding behaviour of *canarensis*. I know quite a few *canarensis* owners around the world, and as yet nobody has been lucky enough to persuade their fish to spawn. A few fishkeepers, including Arthur Heng and myself, have seen some of their fish colouring-up and apparently starting to pair off, but as far as I know, nobody's been rewarded with eggs yet. Exactly how they breed nobody knows. However, it's likely that there are some similarities with the other two *Etroplus* species. Both *E. suratensis* and *maculatus* have been bred in captivity and *maculatus* breeds fairly readily. I had a couple of wild-type *maculatus* as a teenager and these used to spawn repeatedly on the walls of a slate cave. The eggs are branched and look rather like those of developing clownfish. And, like Discus, *Etroplus* produce a special mucus during the brooding period so the fry can "glance" on the flanks to receive vital nutrients. In the wild, both these species live and spawn among beds of seagrass, *Halophila ovata*, which looks a bit like Giant vallis, and both have fairly protracted brood care, with *maculatus* looking after their young until they are a good few months old and fairly mature-looking.

It wasn't until mine were in their second year that they showed any signs of aggression or displaying towards each other, and even then I still haven't been able to work out which are males and which are females. If you want the best chances of breeding success you'll need to purchase a group of half a dozen *canarensis* and allow them to pair off naturally. Vinny Kutty, who's been to their habitat, says that temperature fluctuations might be the key to getting the fish to spawn. And, indeed, it was last summer's heatwave followed by a chilly water change that got my fish looking in the mood. Vinny says there are two temperature spikes in the *canarensis* habitat which coincide with the equinoxes. From January to May it's very hot and dry with water temperatures in the low to mid 30°Cs. Monsoons in June and July make the water cooler, murkier and very fast flowing. The water temperature rises in Autumn but drops again in December to around the low to mid 20°Cs, which is when the fish spawn.

If you fancy a crack at breeding something that nobody else has yet managed, these are well worth a try. And, if you manage to breed them, let us know how you did it!



How to keep mbuna the right way

Problems with mbuna? **Jeremy Gay** provides a set of guidelines to help keep your set-up hassle-free.

The past ten years or so have seen a massive invasion of African cichlids in the shops, but basic information on their keeping seems to be in short supply. Common knowledge is that they need to be crowded, but there is a lot more to it than that, and getting it wrong could spell disaster.

I class Malawi cichlids as one of my specialties, as when I worked in the trade I kept well over a hundred species in over fifty tanks including a 1300 l. / 286 gal. cube tank, containing about 200 fish. Over the years I tried all the different species combinations and developed a formula that I passed onto my customers. The formula, if followed correctly, led even to novice fish keepers succeeding with mbuna and in nearly all cases, successfully raising fry in the main aquarium.

Tank size

The first consideration is that of tank size. Adult mbuna need a tank that is a minimum of 120cm/48" in length. This is because fish need to be able to get out of each other's way, and the longer the tank the better. The tank should also be wider and taller than normal, as it will make the tank look more like part of a lake as opposed to a long, thin stream, but it will also provide crucial extra water volume and more floor space on which to pile rock.

If you are buying an all-glass tank, go for a 120 x 38 x 45cm/48 x 15 x 18" or larger. If it is a Juwel or its metric equivalents, go for a 240 l/52 gal. model or larger. Mbuna can be kept in smaller tanks when they are younger, but a 2"/5cm juvenile can become a 4"/10cm adult inside of twelve months so you may as well start them in a big tank in the first place.

Fish kept in small tanks will cause increased aggression.

Filtration

Filtration should be overkill, as you are not only going to overstock the

ABOVE: *Labidochromis caeruleus* is a popular species that is also one of the best choices for a mbuna tank – and they are really colourful too.

aquarium, but the fish may breed. Also, ammonia is more toxic in hard water, yet mbuna cannot tolerate it. The first sign of an ammonia presence in a Malawi tank is that the fish go off their food.

The logical off-the-shelf choice is an external filter, or better still, two. The advantage with externals is their large media capacity, allowing more space for mechanical, biological and chemical media. The need for lots of mechanical and biological media is obvious in a tank that is overstocked, but carbon is worth using to keep the water clear as spirulina-based foods turn the water green. Nitrate removers are worth adding as well, as nitrate levels can get sky-high once fully stocked, and too many water changes in one go may bring on an outbreak of Whitespot.

I recommend that an air pump is used in all situations as the fish and filter bacteria will benefit.

Heating and lighting

Heating is simple and can be provided by a single heater thermostat with a guard fitted. External heaters like those made by Hydor are an excellent choice as they remove the heating element from the aquarium altogether and can be fitted in-line to your external filter pipework. Eheim also produce an external thermofilter for freshwater use. In any case set the heater to 25°C/78°F.

Lighting isn't that important to the fish and you won't be growing any plants as they are not biotope correct and mbuna will eat them. It's all about the effect that you want the tank to have. Marine metal halide lighting can look very effective as it casts glitter lines through the tank and over the rockwork. But there is the question of budget, and fluorescent tubes are fine for all circumstances.

Again, for a freshwater lake effect of very clear, very blue water, one marine white tube at the front and one marine blue tube looks really good and it's a combination that I have used many times. Yes, marine lighting causes excess algae growth, but I encourage algae growth on the rocks as it provides grazing for the fish. If restricted to one tube then choose a good all-rounder that enhances the colours of the fish.

Decor

Tank décor can be simple but practical. You must decide whether or not you would like to replicate Lake Malawi's environment, or whether you will go along a more ornamental route. To replicate the actual environment is not that easy because the boulders that the fish inhabit are metres as opposed to centimetres across, so the fish can feed and breed on just one rock. We loosely imitate the rocky environment by making piles of rocks in the tank, with gaps in between them.

There are two rock pile styles than you can approach. The first is to pile rocks all along the back of the tank to the point where they nearly reach the surface. This offers lots of caves and a three dimensional backdrop. The other style is to make piles of rocks in the shape of pyramids. The idea with this is that a territorial male will take over just one pyramid in the tank instead of the whole tank, and it's an idea that works very well with Tanganyikan *Tropheus*.

Which rock you use is a matter of whether you have hard water or not. Calcareous rocks that contribute positively to the hardness include tufa, ocean rock, limestone and cavitite, also known as skull rock. They are all bright white first of all but will quickly get covered in thick green algae, upon which the fish can graze. Tufa is revered by some, as it is crumbly and has rough edges. The tufa that I have used over the past few years comes from Tritot and is much harder and less crumbly, coming with an option of being drilled in several places. I find it easy to stack and the extra holes provide a myriad of hideaways for young fry.

My point about the large, natural rocks earlier is that the fish use them to breed on. It is said that the fish cannot use tufa to spawn on, but in my tanks they didn't use smooth rocks either, preferring just to spawn on the substrate. So I think that it isn't what the rocks are made from, it's just that they are too small. But any rocks will do with the exception of lava rock, which really is too sharp and will scrape the fish's lips. Pile the rock carefully and give it a shake to make sure that it is secure. I always tend to add sand afterwards to prevent the fish from undermining the structure. If you are worried about the stability of a structure, you can glue it together by using silicone or marine putty.

The ornamental route is to use resin ornaments, flowerpots and bits of clay pipe. These can work just as well but you will need to use

lots of them in order to provide a refuge for subdominant fish and fry.

Maturation

It is important to consider just how and when you are going to overstock the tank. By this, I mean that the fish need to be overcrowded, but the filter needs to be mature. The ideal is to move a mature filter from an existing tank, but failing this add lots of maturation fluids and leave the tank with no fish for several weeks.

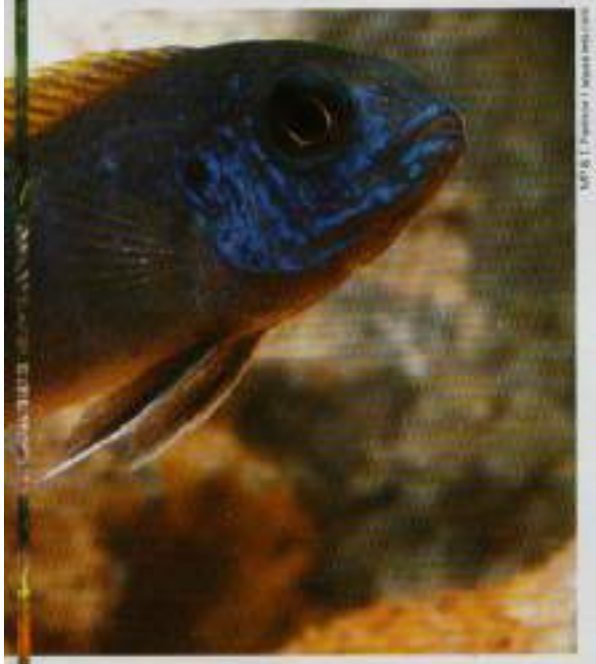
Always test the water to find out how the tank is maturing. What you don't want is to add fish and then find that you have levels of nitrite within days of adding them. This will cause stress to the fish, and to you, while you try desperately to remedy it.

Stocking

Compared with community fish, Malawi mbuna are all aggressive and territorial, but there are different levels of aggression between different species, males and females, and adults and juveniles. Adult males of most species are the most aggressive, with females and then juveniles being less aggressive still. Males also need to be stocked with more females than males and a good ratio is that of two females to one

TIP

Don't introduce a similar looking male mbuna to your tank. The resident male will attack him within seconds and try to kill him. Instead, keep your species' patterns varied so that males don't compete directly with each other.



ABOVE: *Pseudotropheus acei* is rarely aggressive and makes a good choice.

BELOW: *Melanochromis auratus* should be one of the last fish to go in because of its territorial tendencies.

male. The ideaology behind that is that no male can chase two females at the same time, giving each one a rest.

So if you add fish at the rate of two females to one male, and add them as juvenile fish that aren't sexually mature, then aggression will be less from the off. The species that I recommend as first fish are *Labidochromis caeruleus* "yellow" and *Pseudotrophous acei*. Both are colourful and widely available, with *P.acei* rarely becoming territorial throughout its whole life.

In a mature tank, add six of each at 5cm/2" long or smaller. You will find that they get on with no trouble at all. Next add some *Metriaclima* to make up the numbers. *M. estherae* and *M. callainos* are suitable in any of their colours morphs and before you know it, you will be approaching my magic number of 20 fish – I have found that 20 is the number of fish necessary to keep aggression under control, and a long period spent with fewer adult fish may result in them killing each other, resulting in numbers dropping yet further.

> "I have found that 20 is the number of fish necessary to keep aggression under control."

Once you have got to 20 or more fish you can consider the more aggressive species such as *Melanochromis* spp., *Labeotropheus* spp., and some of the more aggressive *Metriaclima* and *Pseudotropheus* like *M. lombardoi*, and *Pseudotropheus socolofi*. At that point you can also consider some of the vertically-barred fish like most *Cynotilapia* and *Pseudotropheus elongatus* species.

Feeding

The fish should be fed twice a day on a staple dry food that contains lots of vegetable matter. Check protein levels on the packaging as levels of 40% or more are too high for these naturally herbivorous fish. I used goldfish foods for years with great success, and they can be mixed with spirulina flakes and sticks to making them even higher in vegetable content.

Frozen and live foods can be fed but in small quantities, and perhaps just every other day. Many mbuna species do eat aquatic invertebrates in the wild as they are present in filamentous algae growing on the rocks and in yearly plankton blooms in open water. Occasional feeds of Mysis, Krill and brineshrimp are OK, but avoid bloodworm as it is linked to causing bloat in mbuna.

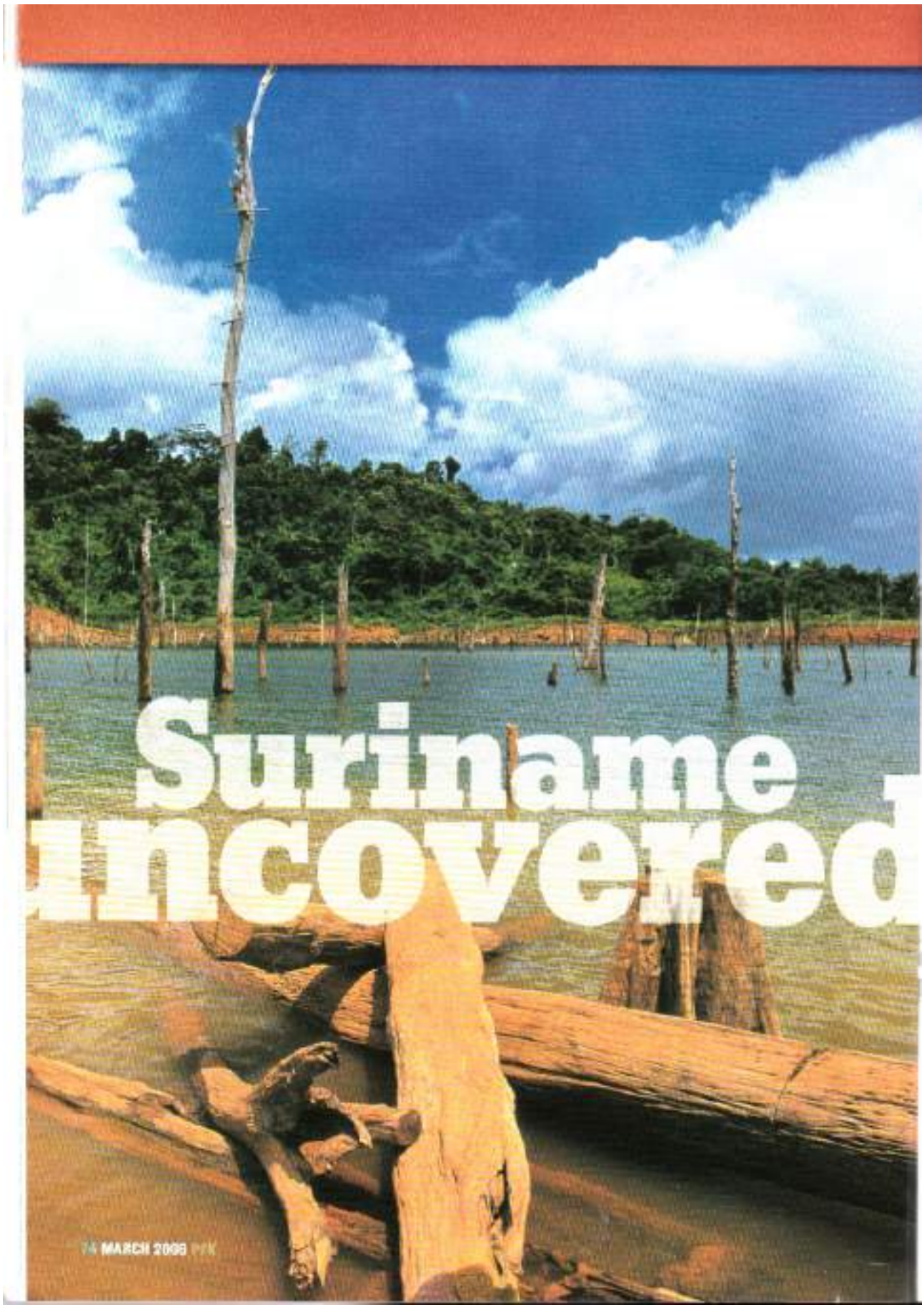
You can starve the fish for one day per week in an effort to make them graze algae from the rocks. It will do them good as the proprietry foods that we feed them are still far richer than their natural diet and most mbuna are overweight.

Breeding

Breeding occurs naturally with no intervention on your part. Males clear an area, then attract a female over by swimming erratically and flashing their egg spots. When a female comes over, the two spin around with the female placing an egg on the floor, then quickly doubling back on it and taking it into her mouth. She then instinctively tries to ingest one of the males egg spots, but instead takes in sperm. The egg spots are used as egg dummies, and it's the males way of fertilising the eggs in her mouth.

Females carry eggs for about 25 days with the fry being visible in the mother's mouth in the last week. Females are conspicuous when carrying, as their mouths look visibly full and they won't eat. When they do release the fry, the females find a spot out of the way in the rocks, and show them no further parental care.

The more hiding places that you provide, the more chances the fry will have to survive, and in a busy tank you may have six or more females carrying at any one time, increasing the chances for all of them as hundreds may be released over the course of a week. Mbuna aren't actively predatory of fry and get used to even quite small fry swimming around at the bottom. Problems would occur however if you introduced small fry to an existing tank filled with adults or if you decided to move the rocks, because the fry would be exposed and quickly gobbled up.


Suriname
Uncovered

Lee Newman endures bug-infested swamps, primitive roads, and an air-conditioned hotel room as he casts his net in a quest to sample cichlids in tropical Suriname.

In Suriname there are really only two roads; a paved highway that traverses the northern part of the country from east to west, and an unpaved road that connects the capital city of Paramaribo in the northeast with the border town of Blanche Marie Val in the southwest. While the paved road allows for typical highway speeds, the unpaved road, critical for in-country exploration, is pitted with potholes, washouts and at times, fallen trees.

Having only gained its independence from Holland in 1975, Suriname is a pleasant blend of the exotic environment of tropical South America and the civility of modern Europe. In many of the towns throughout the northern part of the country, which houses the majority of Suriname's half-million population, you'll find the usual amenities you would expect, such as hotels, restaurants, grocery stores and Internet cafes.

In 1989, Sven O. Kullander and Han Nijssen published a taxonomic review of the cichlids of Suriname. Included in their review was the description of three new genera and six new species, bringing the total to 12 genera and 26 species of cichlids native to Suriname. Despite the fact their work was based on preserved material and the fieldwork of others, and that the studied material neglected the southern half of the country, it stands as the best comprehension of Surinamese cichlids we currently have.

Situated between Guyana to the west and French Guiana to the east on the northeast coast of South America, Suriname is a little off the beaten track when it comes to collecting neotropical cichlids. Many cichlid keepers are unfamiliar with Suriname cichlids, despite the fact that the keyhole cichlid, *Clothriacara maronii*, and the namesake of many *Geophagus* offered in the trade, *Geophagus surinamensis*, hail from Suriname.

Must be flexible...

The trip took take place just before the start of the rainy season and we planned to camp in order to reach some of the more remote areas. However, given the time it took to get anywhere – particularly south of the paved road – we had to amend our plans; the average speed over the unpaved road in our four-wheel drive truck was 20 km per hour, barely 12.5 miles per hour! Such a slow rate of travel dampened our enthusiasm for exploring the more distant river systems to the west and south. That, combined with the fact that the rainy season had started a little early, prompted the decision to use our hotel in Lelydorp, a suburb of Paramaribo, as base camp and take day trips to the different collecting localities. Given the relative comfort of an air-conditioned room versus the prospect of sleeping in a hammock outdoors in the hot, humid jungle, with the added 'attraction' of the very determined population of winged hematophages (blood feeding insects), I was fine with the decision not to rough it!

Clear lake, oil swamp

The first two localities we visited were a very clear water lake and a swamp just off the paved road that leads north from Lelydorp. The lake had a fascinating littoral zone of tall grass, soft clay/mud substrate, and abundant cichlids, mostly *Krobia guianensis*. In the shallows and the deeper water just beyond the grasses, the *K. guianensis* could be seen feeding, courting and herding fry. The water was very clear with visibility of about 10m/30', a pH of 5.0, and a temperature of 30.3°C/86.5°F). Were it not for the fact that the lake was an abandoned open-pit bauxite mine and therefore contaminated, shown by the fin deformities in the cichlids, it would have been an ideal site to spend time exploring.

The oil swamp (named so as it left an oily film on our skin which was only removed via several applications of soap), was surrounded by forest and had large littoral areas of emergent grasses and lilies, such as *Nymphaea* sp. The water was relatively clear with a visibility of about 1m/3', a pH of 5.0, and was cooler than the clear water lake at a temperature of 26.7°C/80°F, due to shading by the surrounding forest. By snorkeling in the swamp, and being careful not to stir the bottom sediments, we could observe *K. guianensis*, *Crenicichla* sp., *Apistogramma* sp. (probably *steindachneri*) and a number of characins including *Astyanax* sp., *Hemigrammus rodwayi*, *Hyphessobrycon* sp. and *Priscella maxillaris*.

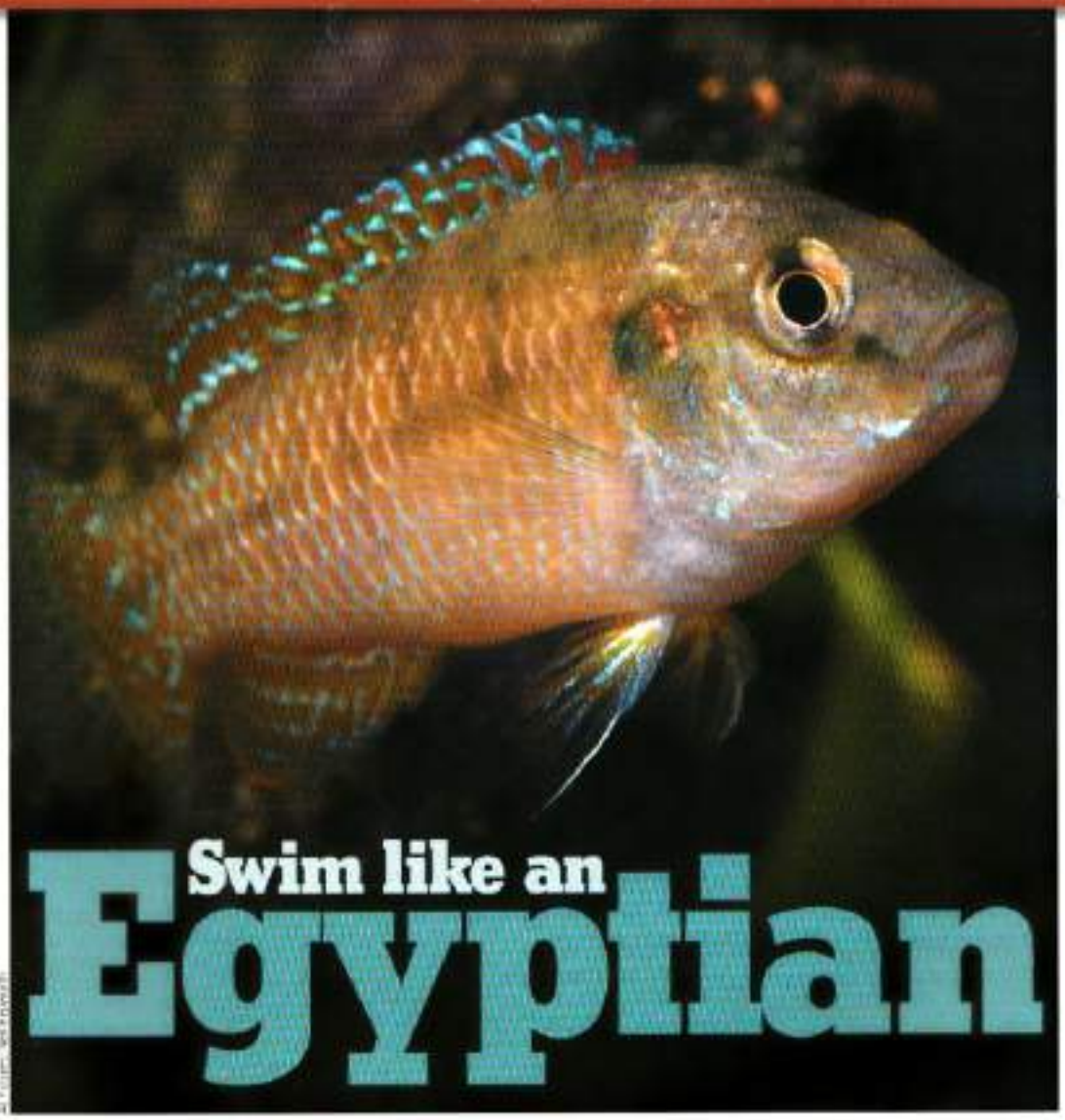
Unfortunately, also abundant in the swamp were the predatory larval forms of various insects. Due to this and the unusual oil coating on the surface, we understandably opted not to return.

MAIN PIC: **Lake Brokopondo.**

BELOW: ***Geophagus brachybranchus.***

BOTTOM: **Rio Para.**

All pictures Lee Newman



Swim like an Egyptian

Jeremy Gay explains why he's such a big fan of the Egyptian mouthbrooder.

The Egyptian mouthbrooder, *Pseudocrenilabrus multicolour multicolour* has fallen from the popularity stakes of late, which is a shame. These days, fishkeepers wishing to keep colourful, mouthbrooding African cichlids may well choose Malawis, or Victorians – or if they do decide on non-rift lake, softer water African mouthbrooders they tend to go for the Egyptian's own relatives from the genus *Pseudocrenilabrus*, on the grounds of them being more colourful.

But the Egyptian mouthbrooder is still subtly coloured, with males displaying a green metallic sheen over a gold body with red edging to the fins, and a black crest on the dorsal fin when mature. Females are gold all over.

True, *Pseudocrenilabrus nicholsi* males are stunning with more elaborate colour and fins than *P. multicolour multicolour*. But, through experience of keeping both species I feel that *P. nicholsi* does have some drawbacks. It is larger and much more aggressive, needing a larger tank and a more experienced owner.

Egyptian mouthbrooders are easy to keep and can be kept in tanks as small as 60cm/24" long, and can be kept even with small fish like guppies or tetras. They are unfussy with regard to pH and hardness and are easy to feed. They're plant friendly and make a good choice for the beginner too.

Origin

Although they are called Egyptian mouthbrooders, they occur all along the path of the river Nile from Lake Victoria northwards, and that habitat includes some of the huge satellite lakes around Victoria including Lakes Albert, George, Kyoga and Lake Victoria itself.

ABOVE: More subtly coloured than its cousins, but the Egyptian mouthbrooder is more peaceful and easier to keep.

Feeding
Feeding adult Egyptians is easy and they are fed on a combination of tropical flakes, vegetable crisps and frozen foods like bloodworm. I feed mine twice a day.

RIGHT
The male Egyptian turned out to be a true gentleman, and didn't harass his females or any other fish.

BELOW
A juvenile at four weeks old. The fry are much smaller than other African cichlids like Malawis.

right through to swamps, streams, the White Nile and the Nile River proper. This means that its actual distribution includes Rwanda, most of Sudan, Tanzania and Kenya.

Its varied distribution and habitat means that it will tolerate a wide range of water conditions and will be happy in still or flowing water, with some of its natural habitat even being low in dissolved oxygen. It prefers cooler water from 20-26°C/68-78°F but higher fluctuations in summertime should be OK. Their natural diet includes insects, detritus, fry, algae, worms and some plant matter.

Obtaining stock

I spotted some Egyptian mouthbrooders in my local aquatic shop. There were two definite males and lots of obvious females with none carrying eggs or fry at that point. But the question was how many males and females to get? I had a 36"/90cm long tank and the gamble was whether or not more than one male would tolerate each other in that space.

A bare tank containing cichlids in a shop tends to have less aggression because there are no objects in the form of tank décor that the males can stake a claim on. When presented with your more furnished set-up at home, the males have everything to fight for and can become more aggressive towards each other.

Something else to bear in mind when purchasing, is that Egyptians are polygamous mouthbrooders, meaning that pair bonding does not occur and spawning takes just seconds before the female is promptly chased away. If you don't have enough females to divert aggression from an individual, she may be killed by the male. Egyptians are more peaceful than most but I still chose three female Egyptians and one male, to air on the side of caution, with a view to getting more females if necessary.

The set up

I added the fish to a mature tank that already contained small fish that I had collected on my travels. These included some juvenile Upside down catfish, *Synodontis nigriventris*, some rare Blockhead cichlids called *Steatocranus* sp. 'Kwango,' and some wild guppies.

The water had a pH of about 7.6 and a temperature of 24°C/75°F. The tank itself was filled with dechlorinated tapwater that was rather hard and alkaline. I decided to monitor the Egyptians' progress in the hard water and to change it if I felt that the parameters were proving less than ideal for them, and if it prevented them from spawning, but it proved to be fine.

The tank was filtered by an internal power filter, and an air powered foam filter. The idea with the foam filter was that I could transfer it plus a brooding female or fry to another tank for rearing.

The décor consisted of smooth boulders and some bogwood over 5cm/2" of coarse sand. I added Java fern, giant Vallis, and Red cabomba to provide some cover for the females if they needed it. Lighting was in the form of two fluorescent tubes, and was plugged into a timer for 12 hours per day.

Spawning

The male didn't really show the females much attention for the first week and all were quite shy. I observed some spawning behaviour in the second week, as the male made a small pit under the power filter, and a couple of days later I observed that one of the females was carrying eggs in her mouth. Carrying females are quite easy to spot as the throat protrudes and they stop eating.

On the third week the male spawned with another female and I realised that they were only spawning when I wasn't in the room, even if I stayed quiet for over an hour.

The female only carries for 14 days before spitting out fully-formed fry and when the first female spat I missed it. The fry were presumably eaten by the catfish and the Egyptians themselves, as a detailed search of the tank produced no survivors. With the second female, I waited until she was nearly ready to spit the fry out and then did something called stripping.

To strip a female mouthbrooder is to remove the eggs or fry from the mother's mouth prior to her doing it herself. The time got close to 14 days, so I caught her in a net, put another net into a bucket a tank of water and held her at an angle of about 45°. I kept her head underwater and gently prised her mouth open so that she released the fry into the other net. I then placed her back into the main tank where she fully recovered after just a few minutes.

There were about 40 small fry in the net which I then transferred to a separate tank. The fry are much smaller than the fry of rift lake cichlids, and proved to be more delicate for the first week or so. The fry of other mouthbrooder fry

TIP

Females differ in body shape depending on what stage of breeding they are at. When I purchased the females they were full-bodied and presumably full of eggs. When they spawn and then carry for two weeks, they lose the bulk and become quite emaciated, with a body shape that tapers from the head down to the tail. Watch the weight of females that are constantly breeding because they may get progressively thinner and become weak. If this occurs, remove her from the main tank for a few weeks and place her on her own to recuperate.

like mbuna, will take crushed flake straight away but these fry needed smaller foods and through trial and error I got them to accept a combination of Interpet's Liquifry No. 2 and 3. I lost about ten fry for no apparent reason, but at the time of writing the remaining fry are now exclusively feeding on Liquifry No.3 and I will soon try them on baby brineshrimp.

My male proved to be the most peaceful mouthbrooding African cichlid I have ever kept, and is not aggressive to his females or any other fish in the tank. They've made an interesting breeding project and demonstrated perfectly how they've adapted to spawn, pick up their eggs, and then move on to new areas from rivers to lakes to swamps, and how that method of colonisation has dominated bodies of freshwater throughout Africa.

Discus question time

Chris Ingham of Plymouth Discus answers some of the questions most frequently asked by his customers.

Q Is keeping Discus as difficult as people say? If not what is the best variety to start with and what tips can you give me for a good start?

A Discus are not hard to keep, just very misunderstood. The first common mistake hobbyists make is providing a temperature that's too low. Discus need to be kept at a temperature of at least 30°C/86°F – they can survive lower temperatures temporarily, but can suffer health problems as a result. If kept at higher temperatures, the parasites, viruses and harmful bacteria that can affect these fish find it hard to survive and should pose no problem to your Discus. Another common problem is tankmates – I have seen Frontosa, Tinfoil barbs and even a goldfish kept with Discus! In such cases the owner doesn't understand why his Discus are hiding, not feeding and going black! But if Discus are given the correct water parameters, correct tank size, proper diet and the right tankmates they are not hard to keep at all. Try the traditional types of Discus first, eg. red turquoise, royal blues and browns. Then after a reasonable amount of time you could try blue diamonds, leopards and so on, which are a little more challenging to keep, but certainly not impossible.

Q I want to set up a Discus tank. How long should I run it before adding Discus and are there any tips you can give me on maturing it?

A The first thing I would say is, don't rush it. I had a customer in my shop the other day that set his tank up on a Saturday night and was here on the Monday wanting to buy six 12.5cm/5" Discus and a stingray to put in it, all in one go. This would have been certain death for all the fish if I had sold them to him. Any tank that is being set-up for Discus must be matured properly. One way is to set up and run the new tank for 2-3 days. If temperature checks and so on are fine, add some Stress-zyme or similar to help the biological filter. If you have another aquarium that is mature, or know a fishkeeping friend, or a good retailer, get some of the dirty water or gunge from a mature sponge filter and add it to the new tank. It will make the nice new tank look mucky, but it will soon clear and all the beneficial bacteria that comes out of the mature sponges will be swallowed up by your new filters. This will help to colonise your new system and speed up the maturing process. This is the way I 'seed' a new system and I never see an ammonia reading. But remember, for the beneficial bacteria to reach full strength in numbers and be strong enough to take the full stocking load, it can take six months. I recommend adding some Cardinal tetras or similar Discus-friendly species to the tank after it has been 'seeded', and then maybe some Corydoras after 2-3 weeks. Run the tank with these

All pictures Ian Rogers

fish for at least six weeks before adding any Discus. If you can wait longer, all the better. When you do add the Discus, try to buy 7.5-10cm/3-4" specimens. These will grow in time and will slowly build up the load on the filter, increasing the numbers of friendly bacteria in the filter in line with the fish.

Q None of the shops in my area have Discus for sale, so the only option I can see is to get some by mail order, but I'm a little nervous of trying it out. Is it fair on the fish and how do I go about finding a reputable company?

A Unfortunately, some hobbyists are trading unlicensed, uninsured, unregistered and

sending Discus without the proper equipment, knowledge and correct transport carriers. This has given the 'real' Discus companies a tough time. Because of bad packing and water running out of the boxes all over other parcels on the vehicles, many courier companies have made it a policy not to carry live fish, so some people who wish to send Discus using a carrier company have found it hard to find one that will.

Find a Discus company that has a good name or has been recommended by someone who has used them. Look for one who offers a guarantee that your fish will be alive and healthy on arrival. If a company has been trading for some time, this is also a good indication that they have been treating customers fairly and obviously sending their Discus in the correct way – although a newer company may be just as good, after all, everyone has to start somewhere, and you might be their first customer!

When Discus, or any fish, are shipped by overnight carrier in this country, they are normally packed for no longer than 16 -18 hours maximum. Remember that when they come into this country, it takes 48 hours for them to get here, there are usually far more to a box, and nobody bats an eyelid. When we ship to our customers overnight, only a few or half a dozen Discus are ordered normally at a time, so the fish have more room in the box, less time to travel and, providing they have been packed properly, arrive at your door often in better condition than when they arrived at the dealer's!

If you are still concerned, but wish to try it, order one low cost Discus (delivery is normally around £15) and see how you get on.

Q My Discus will not eat anything else but frozen bloodworm. Will this harm them?

A Frozen bloodworm on its own contains very little or no protein, so has little benefit to your fish. Proprietary or man-made foods are the best and, if kept dry and cool, are much safer than live or frozen foods which can harbour bacteria or viruses. Sometimes frozen foods are defrosted and refrozen two or three times before the customer gets them – we

wouldn't do this to chicken and then eat it, and Discus can get food poisoning the same as us.

The problem is that your Discus will be difficult to change onto flake or freeze-dried foods if they have only been eating bloodworm. They may not try these 'new' foods for up to two weeks, but persevere and they will eat it when they get hungry. Once they start to take it, keep them off the frozen bloodworm completely – any slight taste of it and you will be back to square one.

Q Two of my 11cm/4½" Discus have been laying eggs on a piece of slate in my community tank. After a day or so they eat them. How can I stop this so that they raise the young?

A If 11cm/4½" is the total length from nose to tip of tail, they are still quite young fish to breed. This could well be one of the reasons they are eating the eggs. If you are serious about breeding them, you will need a separate breeding tank just for the pair, furnished with a breeding cone, sponge filter and a heaterstat. You will find once the young pair has settled in the new breeding tank and had a few goes at laying eggs, they should get the hang of it.

You'll also need at least two 120cm/48" tanks to grow on the youngsters. Brine shrimp eggs will need to be hatched to feed the fry, and you'll have to carry out plenty of water changes to grow them on as quickly as possible.

LEFT:
Discus pairs are best kept in a separate breeding tank for spawning.

ABOVE:
7.5-10cm/3-4" specimens are the best size to add to a new tank.

Join the club

If you can get online, why not join the UK Discus Association, which is a dedicated club for Discus keepers in the UK? Many hobbyists, breeders and traders are members and will help any other members with tips, advice or just a friendly bit of banter. You can find the website at **www.ukdiscus.co.uk**

Taxonomy

To science, the genus *Thorichthys* was erected by Seth Eugene Meek in 1904 (Meek, 1904) for grouping some small (no longer than 15cm/6") Central American cichlids. Diagnosis included: "Body deep, much compressed; mouth rather small; caudal fin lunate, its outer rays produced into a filament; pectoral fin long and pointed, about as long or longer than head; subopercle with a black blotch; (otherwise as in *Cichlasoma*". Additional traits also mentioned referred to an absence of a nuchal hump and a large variability of the populations.

As distinctive trait of this genus is the presence of a black ocellated blotch in the sub-opercular area, a common feature now we know absent in one of the representatives of the genus, *Thorichthys callolepis* (Regan, 1905) from the upper reaches of Rio Coatzacoalcos, Mexico.

The type species of the genus was designated by Meek as *Thorichthys ellioti* named after Professor D.G. Elliot, Curator of the Department Zoology, Field Columbian Museum. It happens however that *Thorichthys ellioti* seems to be a junior synonym of *Thorichthys maculipinnis* (Steindachner, 1864) (Artigas Azas, 1998). Type locality of *Thorichthys maculipinnis* is Rio Jamapa in the state of Veracruz, not far from that of Meek's. *Thorichthys ellioti* located in Motzorongo, Veracruz (N. Lat 18°15', W. Lon 96°42') (Field Columbian Museum, 4727).

Species listed by Meek apparently included in the genus *Thorichthys* were: *aureus* (Günther, 1862), *affinis* (Günther, 1862), *friedrichsthali* (Heckel, 1840), *nasutus* (Gill & Bransford, 1877) and *longimanus* (Günther, 1867). Although he officially only recognized two species, *Thorichthys helleri* (Steindachner 1864) and *Thorichthys ellioti* Meek 1904.

Thorichthys as a genus was dumped into a section of the big and powerful *Cichlasoma* genus by Regan in 1905 (Regan, 1905, 1906-1908). Regan recognized three species in his section, *C. aureum* Günther, 1862; *C. affine* Günther, 1862 and *C. callolepis* Regan, 1904. *Thorichthys ellioti* was considered a junior synonym of *Thorichthys aureus*, together with *Thorichthys helleri* and *Thorichthys maculipinnis* (considered all as *Cichlasoma*).

Meek later in 1907 (Meek, 1907), recognized *Thorichthys* as a subgenus of *Cichlasoma*. *Thorichthys ellioti* and *Thorichthys helleri* were again considered distinctive species by Newton Miller (Miller N., 1907) and Carl L. Hubbs (Hubbs, 1936). Later followed by Robert Rush Miller (Miller, 1961), who also gave additional traits to differentiate the then *Cichlasoma* genus *Thorichthys* section.

Cichlasoma was restricted in 1983 by the renowned Swedish ichthyologist Sven Kullander (Kullander, 1983) to some South American relatives to the type species *Cichlasoma bimaculatum*. Robert Rush Miller again in 1986 (Miller, 1986) expressed "At present we can feel confident that *Thorichthys* Meek, 1904 (Miller and Taylor 1984, Staeck and Linke, 1985:157-159) and *Archocentrus* Gill and Bransford 1877, are valid, monophyletic genera". The use of *Thorichthys* has also been suggested by Kullander (Kullander, 1986) and its use has been adopted by several reputable cichlid specialised publications (e.g. The Cichlids Yearbook).

Eight species are recognised as part of the *Thorichthys* genus, and we can split them in two groups (Miller, 1986): one group with a slightly rounded head profile, isognathous jaws and the presence of a black dorsal blotch normally held by the females. They are *aureus* (Günther, 1862), *callolepis* (Regan, 1904), *helleri* (Steindachner, 1864), *maculipinnis* (Steindachner, 1864) (*ellioti*), and *socolofi* (Miller, 1984). The second group includes three species with a characteristic straight frontal profile, a longer snout, prognathous jaws and the absence of the black dorsal blotch, these include: *affinis* (Günther 1862), *meeki* (Brind 1918) and *pasionis* (Rivas 1962). Future studies may yield at least one new species to the genus.

range. Muddy bottoms characterise these habitats where water visibility is low to none. Some of the lagoons in this range hold incredible fish densities. Not all the habitats are like this – the Yucatan peninsula cenotes and the Bacalar lagoon in Mexico near and border with Belize have crystal clear water with good populations of *T. meeki*.

Thorichthys are normally found in groups (although they don't school) wandering through the shallow edges of their habitat in search of food. Beds of fallen leaves, immersed logs and branches are a common and appreciated feature.

Thorichthys species in the wild exhibit a good deal of geographical variation. Take for instance the Firemouth, *Thorichthys meeki* – the variety we have kept in aquariums for many years derives from a population in the northwestern part of the Yucatan peninsula and although beautiful (no *Thorichthys* can be considered ugly) is not the most colourful variety. Firemouths from the lagoons in the lower Grijalva east of the city of Villahermosa show an intense red that it is found high in the body and is even present in the unpaired fins.

Thorichthys are social cichlids of interesting habits; they have eyes placed high in the head and long snouts designed to allow them to shovel in the soft substrate in search of invertebrates. Those, taken together with inert materials, are filtered in their mouths, the non-edible substrate expelled through their gills and mouths. *Thorichthys* are strictly carnivorous fish. They nevertheless ignore other smaller fishes.

During the dry season from January to May, males of *Thorichthys* establish territories generally around protected areas like entangled driftwood (when it

"The gills extended forwards are used by the fish to deceive potential enemies"

is available). They then protect their territories against other cichlids, assuming an approximately 30° head-standing position and a threatening pose. Females are left unmolested to stroll through their domains. Females, which are normally smaller, court males who respond readily, extending their gular pouches and shaking their bodies from side to side to push water against the female's flanks, hard enough to convince them of their strength. Females follow the same pattern and after a while most leave – they may later come back if interested in the male. In some fewer cases the pairs form prior to the establishment of territories, subsequently wandering together though the habitat in search of a suitable place to establish one. This behaviour however is more frequently observed in other Central American cichlid species.

Once a female has been chosen and a territory established, pairs clean a small area together. Some species normally choose large immersed leaves; others small rocks. The female places her adhesive eggs, averaging a couple of hundred in number, generally in the early morning. They are laid on the pre-cleaned surfaces forming

BOTTOM LEFT
Oxygenated rivers like this upper area of Rio Candelaria are favourite places for *Thorichthys* of the *T. helleri* group.
LEFT
T. meeki in Rio Belize, guard their babies.
BELOW
T. aureus female.

circular rows. Males closely follow females, fertilising the eggs. Eggs are normally placed so they are well separated from each other, I believe this is to provide enough oxygen for them to properly develop.

Both parents closely guard their eggs and together threaten neighbouring pairs, extending their gular pouches – the gills, now extended forwards, are used by the fish to deceive potential enemies into believing they are much larger than they actually are, and the ocellated blotches give the appearance of more separated and bigger eyes.

Pairs normally group in colonies, separated from each other by no more than 50cm/20" in many cases. Aggressive interactions have never resulted in injury to any of the fish in my experience. Although sudden bursts from facing males may give the appearance of a fight encounter, never a mark is left on any of the fish. The constant forward and backward movements of threatening pairs give the appearance of a bull ready to attack, and so in some areas of Mexico *Thorichthys* are referred to as "Toritos" (Little bulls).

Parents, with the help of their pectoral fins, fan the eggs to oxygenate them. Unfertilised eggs are eaten to avoid spreading of any fungus growing on dead ones. Once the babies hatch (after about two days), the pairs, using their mouths, place them in pre-dug small pits around the spawning site – they normally dig several, perhaps as a means of fooling any predator catfish which may be looking for them. After generally five days, the wrigglers have consumed their yolk and are now strong and light enough to start swimming in a packed herd. The parents lead the babies through the habitat in search of food, with spasmodic movements and opening and closing of their fins. The pair never go far away from the spawning site. They help the fry in their search for food by chewing edible matter and throwing it back, pulverised, to the cloud of fry. After several weeks to three months, the fry stop responding to pair calls and start

DID YOU KNOW?

The meaning of the word *Thorichthys* is defined by Meek (from Greek) as a leaping fish. Meek's account on the matter goes as follows: "These little fish (i.e. *Cichlasoma helleri* are exceedingly numerous in small isolated ponds, especially where there is a considerable amount of vegetation. They are attracted by anything which enters the water and will jump out of it in an apparently playful mood. When observed they are easily caught, for as soon as your finger touches the water, they will come leaping towards you". I must confess on the many occasions I have been around this fish, I have never see them leaping. Meek's account must have had more to do with hungry isolated fish, probably in a small pool after the rainy season, than with a joyful attitude on the fishes' part.

searching for shallow and protected areas of the habitat. Soon the rains will come.

In the aquarium

Thorichthys are not very aggressive and can be easily kept in the home aquarium. A tank of 250 l/55 gal. at least 120cm/48" long is usually big enough for a group of them – a larger surface area is always a better choice than height when it comes to choosing an aquarium for these fish. Try to aquascape it to match their natural habitat, as described above – fine substrate and plenty of cover are important. These fish do much better when kept in groups as it's better for them to look a little (just a little!) crowded to distribute their aggressiveness and enhance a more natural behaviour. Other fish are also an important part of the environment and should be provided. *Thorichthys* do well with large poecilids (very small ones are eaten in aquarium conditions) as well as with many other similar non-aggressive but fast-moving fishes. In spite of their cichlid aggressiveness, given the right size aquarium, *Thorichthys* ignore fishes that do not pose direct competition to them.

Species of *Thorichthys* show different degrees of aggressiveness. In my opinion the more aggressive species through to the more peaceful are: *meeki*, *pasionis*, *aureus*, *affinis*, *maculipinnis*, *callolepis*, *helleri* and *socolofi*. They greedily eat most food offered, but although they are carnivorous, do not to offer them warm-blooded animal meat (eg beef) as this can usually cause them digestion problems which can lead to death.

One important aspect with *Thorichthys* is water temperature. *Thorichthys* in my experience seem to be just as prone to suffer from too warm water as they are to water that's too cold. With the *T. helleri* group – longer exposure to water temperatures of 28°C/82°F or warmer leads to crooked fins and eventually death. Species in the *T. meeki* group withstand these conditions better.

Thorichthys in the *T. helleri* group are also particularly susceptible to bad water quality, so constant water changes and good filtration are essential, and results in more colourful, healthier and outgoing *Thorichthys* that are delightful to watch.

So please try these jewels from Central American waters – they have a plethora of beautiful colours and interesting behaviour, they are responsible parents and are relatively peaceful. I can assure you that you won't be disappointed!

BELOW
Neighbouring breeding pairs like these *T. pasionis*, fight for control of territory borders. Male and female take part in the fights, which are mostly display, and rarely result in injury.

ABOVE
***Thorichthys* sp., "Rio Coatzacoalcos" female escorts a male guarding a territory in Rio Grande, Coatzacoalcos drainage in Oaxaca, México. If the female gets convinced the territory is safe and the male strong enough to guard it she may stay for breeding.**

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Eggs on the menu

Paul Jordan explains how he bred his snakeheads – and sees for himself how the female supplies food to her growing fry...

A year ago I purchased ten *Channa gachua* from Holland, varying in size between 7.5cm/3" and 10cm/4". They were housed in a 120 x 38 x 30cm/4' x 15" x 12" tank with sponge and home made gravel filters, Java moss, Java fern, bogwood and plastic tubes. I predicted that they would scrap, fight and jump but, apart from once finding one in a bucket of water, they behaved well. There was a sense of mutual respect between the larger and smaller specimens and they kept their distance, apart from feeding time when they all came together for the offerings of maggots, earthworms and bloodworms.

The larger fish showed more colour – steel blue anal fins, orange-edged caudal fins and greenish grey bodies. The most interesting colouration was the diagonal "smudge-like" chevrons, running from the dorsal to the mid body. I later learned that this form was thought to be less aggressive than others and this proved to be true. I used the cichlid theory that if you keep a large number of aggressive, territorial fish together, peace will reign because there are no available territories to fight over!

I planned to rebuild my fish house and had reduced my fish stocks. I had the chance to sell my remaining fish at the AAGB Members' Day and on the morning of the auction I intended to bag all my fish, including the *gachua*. However, time ran out and six *gachua* remained behind.

Perhaps this releasing of territory was what triggered two of the larger fish to take over about 45cm/18" at one end of the tank. The remaining fish seemed more edgy and, when I entered the fish house, if any fish shot into the "forbidden zone", they would scuttle out again quickly, obviously less wary of me than of the two dominant fish.

Spawning triggers

I read reports and consulted several experts on breeding different *Channa* species. Kevin Webb said that *C.* sp. "Assam" could be triggered to spawn if you imitated their habitat's seasonal changes, which I decided to try. I lowered the water level to 7.5cm/3" and increased the fish-house temperature, thereby creating drought conditions. It was necessary to feed carefully, to avoid polluting the smaller amount of water.

After a few weeks, I topped up to 30cm/12" with hard, cold water. The heating was also turned off in the fish house. The fish seemed to enjoy the cold fresh water, swimming animatedly compared to almost hibernating in the warm shallows. I noticed that Java fern was being shredded into small, 2.5cm/1" pieces, and allowed to float over the dominant fishes' territory. Reports that some *Channa* species build rafts of plants and bubbles to house their eggs or offspring gave me cause for hope.

Dirt...or fry?

The first time I knew I had a pair was when I noticed the four remaining fish cowering in a corner and looking sorry for themselves. I saw what I thought were dirt

BELOW INC. *Channa gachua*.

BELOW LEFT. Paul had an incredible 182 baby gachua from his fishes' spawning.

particles being fanned around by the pair. Closer inspection showed small black tadpole-like fry with enormous pectoral fins!

Some reports say that the parents look after their brood and actually feed the fry on unfertilised eggs. Should I remove the other tank inhabitants? I re-read all the articles, rang my Dad, rang Kevin Webb and finally decided to remove the other fish, as much for their own safety as that of the 100 + fry. Luckily *Channa* are relatively easy to catch but a *M. ansorgii* evaded me and I didn't think the few *B. imbellis* posed a threat. I immediately started incubating some brine shrimp eggs.

The fry seemed healthy, lively and still appeared to have their egg sacs. One of the parents' tails seemed to be the focal point, possibly the colouration giving them guidance. I haven't mentioned sexing the parents because I am still not 100% sure – one fish seemed to be quite slender and pinched – I presume this fish had the brooding duties (the male – I think). He also seemed less colourful at this stage. Both fish seemed to have grown considerably in the short time they were courting. The "female" was now portly and in very good condition – positively glowing. She had developed an iridescent blue cheek and a blue ring around the eye and pectoral muscle. There was not a ripped fin or missing scale to be seen, so I assume the spawning embrace was not a violent affair. I did not see the courting or spawning process but have been reliably informed that an almost anabantoid-like embrace occurs, resulting in eggs being spread in the open. The male then gathers or scoops up the 100+ eggs in his mouth wherein, I assume, he incubates them.

The next day the fry had developed a lighter top half to their bodies and were beginning to rise to the surface for air. This soon turned into a continual column of rising and falling fry, so the labyrinth was obviously developed. The pink bellies of the fry were evidence that brine shrimp were being taken. At this stage the parents were aware of me,but not too bothered by my presence. This was to change considerably over the next couple of days – both male and female demonstrated considerable aggression towards anybody entering the room, leaving their cover and thrashing against the glass. Day by day they became more possessive of their brood. The female had a voracious appetite, eating copious amounts of maggots and frozen turkey-heart mix. Her swollen abdomen led me to believe she was possibly feeding the young with eggs. Sexing the two fish is far easier now than when they were courting – the female having a much larger girth.

After a week the fry were 8-10mm long and were eating brine shrimp, 'Aquarian' Growth Flake, squashed maggots, small daphnia and frozen Bioleaf turkey-heart mix. At three weeks old they were 12-15mm long and began to show the chevron bands and a spot at the rear of the dorsal.

After four weeks I witnessed what I had suspected – the female was indeed feeding the fry with "dummy eggs". I had seen small, white, 1mm-sized eggs down the side of a plastic tube, which the fry could not get at. I had, at one point, fed frozen fish eggs, so there was still some doubt in my mind. However, I entered the fish house one evening to see the female, in full colour, with her body arched, laying these small eggs. The fry were in a frenzy – some were catching the eggs as they fell and others were scouring the bottom, but the whole shoal was in close proximity to the female. The water was cloudy and I noticed that the female had an egg spot like a female Betta.

I planned to leave the young with their parents as long as possible and the adults showed no intent whatsoever to harm them. However, at about 6-7 weeks old, the fry were attempting to eat food meant for the parent fish and one actually choked on a piece of beefheart. So I decided to move the youngsters to three tanks that I had been preparing. Half an hour later I had transferred an incredible 182 baby gachua! At three months old they are 5cm/2" long and showing beautiful colour. Food is still consumed in large amounts so water changes and sponge filter cleanings need to be carried out every other day.

The adult male has had several broods of eggs since but so far has failed to keep them full term. In fact I clean the power filter out every week and the sponge is laced with eggs. I'm wondering if the male uses these as a conditioning food, to prepare himself for physically for the next succesful brood.

The two terrors

Jeffrey Walmsley takes a look at nitrate and phosphate – two of the the most common fuels for algae.

BELOW
Aquarium equipment is improved by a coating of algae – which also serves a useful biological purpose.

RIGHT
Your fish will provide your plants with all the nitrate and phosphate they require – with plenty left over for the algae, too.

FAR RIGHT
The "Red" *Rotala macrandra* is the best indicator of whether your tank needs more iron.

Whilst your plants are the first line of defence in the battle against algae, they cannot cope unaided with the veritable flood of nitrate and phosphate that your aquarium generates, especially at start-up. So assuming you have no more room for fast-growing plants, here is what you have to do.

Nitrate

The choice for removing surplus nitrate lies between artificial removal media and nitrate-consuming bacteria. The latter need the right conditions to work, and you can buy special canister filter media, from Seachem and Kent, for example, to promote their development and sustenance. However, they don't like oxygen; so a hardworking filter pumping large quantities of oxygen-rich water won't suit. According to Seachem, a flow rate of less than 200 l./44 gal. an hour is best, and for this, you may need a filter with a controllable flow rate. It's quite easy to measure; just see how long your filter takes to fill a 1 l./0.45 gal. jug, and then adjust the taps until it takes 20 seconds or so.

You could, of course, have a conflict here between the needs of your fish and the needs of your plants. Too many fish, and you will need a large, rapid filter; the only solution then is two filters, one for the fish and one for the nitrate.

Be aware also that if you partially shut down the taps, some filters can become noisy.

Tetra make a very convenient liquid de-nitrator also based on bacterial action: NitrateMinus, and yet another helpful option is their Easy Balance which not only contains similar anti-nitrate material, but also anti-phosphate qualities as well, plus constituents which help to maintain KH and supply micro-nutrients. This latter product is as good as anything when your nitrate levels are of a low order – say 1-2 mg/l. or less - and in some aquaria will even provide all the plant food needed.

As for straightforward nitrate removal media, there are many on the market, and in my experience, they all work quite well. You need to check costs, however, and for that you need to work out how much nitrate you have. "Milligrams per litre" is the same as "parts per million", so whatever the test kit shows, multiply by the water volume in litres to arrive at the total weight of nitrate. Thus, 3ppm or 3mg/l in a 100 l./22 gal. tank means you've got 300mg of nitrate dissolved in your water. Bear in

mind that you are measuring only the surplus nitrate – that which is not being consumed by your plants by the minute. It will only be an approximation, of course, but it's a guide to how much nitrate remover you need. You can then compare the running costs of different makes.

"Amquel +" by Kordon is a totally different kind of de-nitrate product, a very economical liquid, multi-purpose conditioner, simply added to the water in small amounts. It works very rapidly, but depletes oxygen and so requires care in use, especially in marginal conditions. However, it is ideal for removing moderate nitrate from tapwater, or for dealing with a temporary nitrate spike whilst your plants are getting established. It removes chlorine, chloramine, nitrite and ammonia, too. I use all of the products mentioned in different circumstances.

Phosphate

Phosphate is without doubt the worst culprit when it comes to causing algae problems. Water-borne phosphate levels in the unpolluted wild where our plants are found are rarely more than 0.001ppm; and if you have a nutritious substrate, your plants will not even need that level if you have only the well-rooted kind. The more fish you have the more phosphate you will have, and there's currently no choice of method for dealing with it, it's removal media or nothing. As with nitrate, there are apparently bacteria which eat phosphate, but seemingly no useful way of employing them in the aquarium eco-system has so far been devised.

Exactly the same considerations apply to phosphate media as to the nitrate media. There are yet again plenty on the market, and more are arriving, so cost-effectiveness is really the main criterion as far as I can see, but I use Rowaphos simply because it doesn't take up very much room in the filter, thus leaving plenty of space for the more bulky anti-nitrate media. There are now alternatives on offer, but I haven't tried them yet.

Iron

Iron is another renowned algae-food; the services it provides to the algal metabolism are numerous, and include facilitating the uptake of nitrate; and algae have the ability to take iron that is oxidised (ie. unusable to plants) and convert it to usable iron by a process known as photo-reduction, which requires the use of ultra-violet light; which is why daylight, and particularly direct sunlight, so readily promotes algae – a rare occasion when a large water change is indicated.

Take no notice of those who say that special plant lights with high UV values cause algae; use them for your plants' sake if you want to (I do), control the nitrate and phosphate and get rid of the oxidised iron.

Because of the rapidity with which iron becomes unusable to plants, daily dosing is often recommended. However, strictly

Apart from the red *Rotala macrandra* and the yellow *Limnophila rotundifolia* "variegata" to the lower right, none of the plants in this illustration require extra water-borne nutrients if the roots are well-fed.

speaking daily dosing is unnecessary because plants (and algae !) will store more than they need for daily growth. Moreover, manufacturers always supply chelated iron, which, in simple terms, is iron with a few more molecules added which delay the process of oxidisation. This means dosing can be bi-weekly, weekly or even monthly. Rooted plants will also take iron from a suitably enriched substrate if there is none in the water.

Remember, however, that, just like phosphate and nitrate, the ideal reading at the end of the day is nil; you don't want any left over after your plants have had their fill.

An iron test kit is obviously crucial. The maximum level that everyone recommends is 0.1mg/l., but you preferably need a kit which reads well below this level. (Algae will proliferate at 0.005mg/l. if other conditions are right). However, perhaps the best way to assess your iron needs is to grow a few iron-hungry plants like *Rotala macrandra* or *Ludwigia inclinata* – so long as they continue to look healthy, with nice large leaves, don't give iron, thus helping to suppress the algae.

"A true natural balance must always allow room for some algae... it only matters when it becomes either dangerous or seriously disfiguring."

Silica

Silica enables the growth of diatoms, those tiny, tough, tenacious, dot-like, green, brown or black encrustations on your aquarium glass and plants and indeed on anything else you have in there. No silica, no diatomaceous algae. So if you are bothered by diatoms, note that some phosphate removers also remove silicates – check the labels. It's also the one other occasion when a large water change or two, or three, is going to help. Just make sure your new water is not straight from the tap...

Water changing

You may often see water changing recommended as a way of reducing nitrate and phosphate. However, this is quite likely to prove useless as an algae-prevention measure in a planted aquarium except in one situation – when the concentrations are so high that it would be ludicrously expensive to remove them with filter media, and when you know with total certainty that the new water is phosphate and nitrate-free.

If your aquarium is in such a state, you should change half the water to reduce the concentrations by half – and do it again, if needs be – before tackling it with the more effective methods outlined above. (You also need to ask yourself why you have such high levels of pollution in the first place. The usual reason is too many fish, but unsuitable, and therefore decaying, plants is another cause, as is excess detritus.)

And in case you are wondering, it would take five, 50% water changes to reduce 3mg/l. of nitrate to an acceptable level for a planted aquarium, and eight to reduce that level of phosphate to an acceptable degree – and then only if the new water was totally free of these nutrients in the first place, and only if little or none was being produced within the aquarium itself between water changes... Think about it !

Vitamins

Some vitamins are known to promote algae, especially slime algae. There is no way of measuring for vitamins, but if you think they may be contributing to your problems, a good-quality activated carbon might remove them. A ready source of vitamins in the aquarium is, of course, dried food, and unless you have a well-documented requirement for vitamins for a particular purpose, there is no need to add them separately to the water.

The last word

In truth, an aquarium without algae is a most unnatural place, and certainly not one which fish from the wild would recognise. Its frequent occurrence in our aquaria shows just how difficult it is to maintain an algae-free balance – which would in fact be a completely artificial balance. A true natural balance must always allow room for some algae, and it is always present in my aquaria. It only matters when it becomes either dangerous or seriously disfiguring, when it can easily be dealt with – and I for one wouldn't like to be without it altogether.

Next issue

Choosing plants – not the kind of advice you might expect...

Reef ramblings

Tim Hayes of Midland Reefs discovers how much we owe to hobbyists in Germany, meets a breeder with a slightly different approach – and wonders why anemones put up with the ill-treatment often meted out by clownfish.

ABOVE: Unhappy anemones are famous for walking, and stinging their way through reef aquariums.

Another December, another trip to Germany to attend the Fisch and Reptil show and conference at Sindelfingen near Stuttgart. The show was slightly different this year with perhaps an increased presence of reptile exhibits, reflecting the increased popularity of reptiles and amphibians across the whole of Europe. I was particularly excited about this year's event, as it would give me a chance to meet up with Scott Michael again. Scott was attending the show to deliver the keynote talk at the big dinner on the Saturday night.

Although there seemed to be more reptile displays, the marine displays had increased in size rather than in number. Makes known in the UK: Ecosystem, Giesemann and Tunze, all had sizeable displays along with displays from many smaller, specialist German marine manufacturers. On the bookstores present there were many wonderful marine titles available – unfortunately all in German! I had a fascinating time talking with a seller of secondhand aquarium books; until this time I'd never really appreciated the debt we owe German aquarists when it comes to the development of our hobby. I was shown beautiful books dating back to the 1860s that dealt with keeping marine animals at home! One of the books I looked at was a real eye opener, it was published in 1938 and listed all the species of animals that had been imported for the aquarium trade (I'd guess during the preceding year). Remarkably it included Clownfish species along with a few other tropical marine species of fish and invertebrates!

Breeding Mandarins – and other fish!

Wolfgang Mai is a very well known German fish breeder and someone I'd love the opportunity to talk with at length – unfortunately he doesn't speak English and my German is limited to a few polite phrases. But I was able to enlist the help of a friend to translate the talk he gave at this year's show. Much of Wolfgang's presentation concerned his recent success in spawning and raising the Psychedelic mandarinfish, (*Synchiropus picturatus*). Now this is a fish that, when paired, will frequently exhibit spawning behaviour in captivity, yet as it's a pelagic spawner, few aquarists attempt to raise them.

Remarkably, all of his breeding pairs are maintained in his 3.2m/10' long reef tank. This is a completely different approach to that of most marine fish breeders. Usually broodstock are kept as pairs in separate aquaria that are solely furnished with whatever substrate is required for the fish to spawn on (or in). Nearly all the commonly bred marine species are egglayers. The fishes he's breeding and raising include Common clowns, Marine bettas, Neon dottybacks and Banggai cardinals, along with the Mandarins mentioned above. The parents are all kept living contented lives in his large reef.

We all know how difficult it is to extract a fish from a reef at the best of times, so how does he manage to retrieve the young he raises? Well most nights, particularly when he's expecting a hatching, or in the case of the Mandarins a spawning, Wolfgang fits a larval collection device into position on the reef. Next morning this is inspected then simply emptied of any larvae.

An interesting aspect of Wolfgang's methods is the way he mixes the different species he's raising together during the grow-out period. His reasoning being that the mix of fishes, plus a mix of foods, results in better nutrition and less waste as there is greater chance of the food being more thoroughly utilised.

Incidentally, while I was attending

Notes and observations

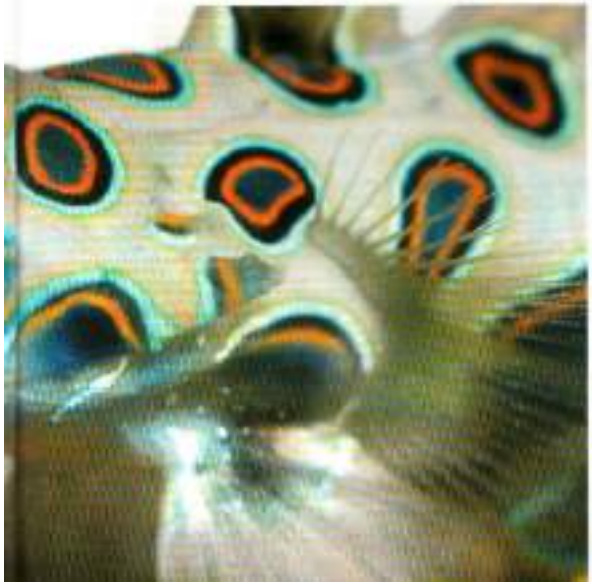
We all know that the various species of host anemones (the anemones that clownfishes associate with in the wild) can be remarkably fickle when it comes to their positioning in the reef aquarium. If conditions aren't to their liking then they'll move to a position more suited to their needs, their associated clowns following on behind. Yet even after an anemone appears to be settled, remaining in one place for what seems forever, if something changes or upsets it – perhaps something the aquarist isn't even aware of – it can suddenly decide to move to a new position.

Contrast that behaviour to an anemone living in symbiosis with a pair of clowns who are settled into a regular spawning cycle. Every 14 days or so, just before the clowns are ready to spawn, and again as the larvae are due to hatch, the anemone becomes a victim of what appears to be abuse on behalf of (usually) the female clown. This abuse consists of biting and butting at the tentacles in an effort to keep them from extending into the area where the eggs are to be laid. The same process is then repeated later in the week when it appears to be an effort to keep the way clear for the larvae to enter the water column.

So, the question I'm asking myself is, why does the anemone put up with the behaviour of its clowns and remain in the same spot? Presumably it must somehow benefit from its association with the clowns to the extent that it will put up with treatment that would, in other circumstances, lead to it relocating. But how? If any PFK readers have experienced similar behaviour from anemones and clownfishes I'd love to hear from you. Write in to the usual address.

this show I had a niggling feeling at the back of my mind that I'd read of the Mandarins being bred some time back. Sure enough, when I returned home I found that this is by no means the first time these fish have been successfully raised in the aquarium; I have references to this species being raised in Germany nearly 20 years ago.

BELOW: German reefkeeper Wolfgang Mai, has successfully spawned and raised Psychedelic mandarinfish.



Perfect

Dr. Karel Zahradka introduces what must surely be one of the most beautiful pencilfishes: *Nannostomus mortenhaleri*.

All pictures: Dr. Karel Zahradka

RIGHT:
A typical male – the rim of the anal fin is coloured darker red.

FAR RIGHT, TOP:
Laying eggs in the tangle of fine leaves is typical – here a female slowly enters the plants, followed by the male.

FAR RIGHT, BOTTOM:
Female – the rim of her anal fin is lighter.

Several years ago, the aquatic press reported on a fish called *Nannostomus* sp. "Peru" or "Peru Red", which was the name under which this species had been imported into Europe. Photographs caused great interest, and its arrival was eagerly awaited. Apparently, the fish was found in a remote area of the Peruvian forests, and transporting them to an export station in Lima was difficult. This probably explained why the fish supplied to the Czechoslovakian market were in poor condition and difficult to acclimatise. They were thin, eating only brineshrimp nauplii, and they seemed to die for no apparent reason. This, combined with a high price, accounted for the first reported breeding, by Bork, being only as recent as 2001.

Originally, the fish was thought to be the red form of *Nannostomus marginatus*. Paepke and Arendt described it in 2001 as *N. marginatus mortenthaleri* in honour of a Mr. Mortenthaler, fish hunter and exporter. However, it differs significantly from *N. marginatus*, compared to which it is bigger and more robust in general body shape. It shows less sexual dimorphism, apart from when in breeding condition, and is therefore very difficult to sex, except during the spawning period, whilst *N. marginatus* is relatively easy.

To add to the confusion, exporters started offering another fish under the name of *Nannostomus* "Peru Red", or *N. marginatus* "Red". Although the females of this other species are indistinguishable from *N. marginatus*, the males, although identical to *N. marginatus* in body shape, are coloured blood red from the middle of their body up to the caudal. I was even told by an importer that both varieties were offered under the name of "Peru Red" and, if ordered, either species might be supplied. However, it appeared not to matter, as there was a high demand for both species despite their high price!

Returning to *N. mortenhaleri*, they come from forest tributaries of middle and upstream reaches of the Rio Nanay in the northern part of Peru. The distance and difficult access to the locality explains the fishes' poor condition when first imported.

Watch the males...

I acquired the first ten imported specimens in 2002. The fish were thin, timid, and died one after another, but showed no symptoms of illness. Only now have I discovered my mistake – that the tank in which I had been keeping

pencils

them was too small. It was only when the last male remained that I realised that males are very aggressive towards each other and can kill each other if kept together within a restricted space. The last remaining male lived with me in solitude for another two years.

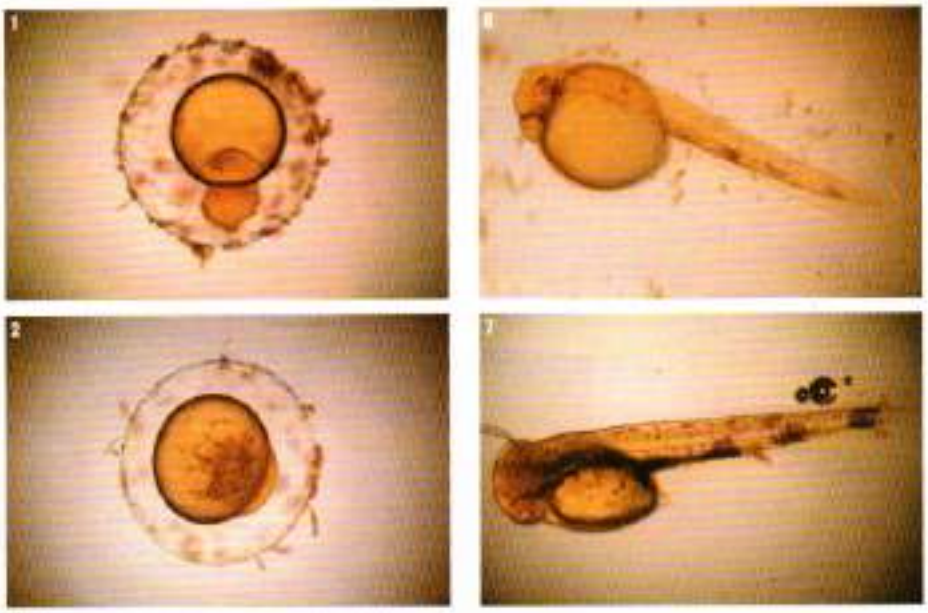
This might have been an end to my experiments with this fish had it not been for the fact that almost at the same time, a well-known aquarist living in the town of Pribram, a Mr. Martin Mates, purchased two pairs. Not only had he kept them alive, but bred them on a limited scale. Thus, it is thanks to him that I was able to own this beautiful species again, and this time it was an F1 generation and, therefore, the further details relate to F1 fish.

The young fish I bought were healthy and accepted brineshrimp, cyclops, gnat larvae and clean, fine tubifex. As a treat, they get Daphnia, which they hunt greedily, and "suck out" the contents, letting the remains fall to the bottom. I have found it wise to put a few live Daphnia in the breeding tank for food, as it reduces the risk of the adults eating their own eggs after spawning. Varying their food is important because what the fish eagerly consume one day will be rejected the next and they could starve. The only exception to this is brineshrimp, which they will happily consume every day, but this does not correspond to the physiological needs of a freshwater fish. Ordinary mains water with a pH of around 7.0 is acceptable. Intra-species aggressiveness of F1 generation fish is not so high as in wild caught specimens and usually stops short of actual killing.

Breeding

The fish reach sexual maturity at 6-7 months, at which age signs of sexual activity can be observed. Spawning is less frequent than *N. marginatus*, when it is often sufficient to put a couple into a breeding tank and wait for them to spawn. *N. mortenthaleri* is a timid fish and therefore the environment in which it spawns must be free of any sudden shocks or light changes. In normal conditions the sex of *N. mortenthaleri* can only be distinguished with difficulty. Males are usually more robust than females and they can eat so much that their bellies get even bigger than the bellies of females of the same age, for which they can easily be mistaken. However, the colour of the anal fin is a reliable distinguishing feature. While red in both sexes, in males, it has a dark red rim; in females the rim is lighter.

Males that are ready to spawn develop a fantastic purple colour, and this is a signal to place the pair into a basic tank with soft water, Java moss and importantly, a spawning grate. Place the pair in the tank in the evening and turn



DEVELOPMENT OF AN EGG AND EMBRYO
1. Fertile egg of *N. mertensbaleri* two hours after spawning, showing the embryonic thread below, and the nourishing yoke (deutoplasma) above.
2. 30 minutes after spawning, the embryonic thread turns into a cell.
3. The cell divides into 2- 4 cells.
4. Embryo at 18 hours.
5. At 30 hours, the egg case breaks and an embryo hatches.
6. At 48 hours, a newly hatched embryo.
7. At 73 hours, the embryo has almost digested its yoke pouch.

the lights off. Spawning usually occurs the following afternoon or evening, the males following the females with no aggression. From time to time the fish pause close to each other and the male demonstrates a swinging movement, bending the back part of his body up and down while his purple colour turns to carmine red. When the female is ready, she signals by reacting to the male's courtship in a similar way, and swims into the Java moss. The male follows, they adopt a side-by-side position and tremble convulsively, and one or two eggs are shed. Eggs stick to the plants for only a couple of minutes, after which they fall to the bottom where the spawning pair eat them avidly. The best method is to let the fish spawn in the moss above a spawning grate and to knock the moss with a glass stick every 20 minutes, so the eggs fall through the grate to the bottom where the adults cannot reach them. It gives the fish a fright for a couple of minutes, but they usually get back to spawning after a while. The moss must not be so dense that the eggs can fall through.

One spawning produces 20-50 tea-coloured, transparent eggs, but you may find some have disappeared a few hours later. Infertile eggs do not fungus; they just get seem to disintegrate without trace. The water quality is not the cause in every case and repeated spawnings at roughly ten-day intervals usually lead to an improvement, and fertilisation increases. Ideally, water for breeding tanks should be soft, slightly acidic, with a maximum general hardness of 2°, a maximum carbonate hardness of 0.2°, and a pH of 6.8. Optimum temperature for spawning and further development is 22-24°C/72-75°F.

The eggs hatch in 36 hours at a temperature of 23°C/73°F – it then takes the fry 4-5 days to reach full mobility after which they are able to take brineshrimp nauplii immediately. They are bigger than the fry of *N. marginatus*, compared to which they appear stronger and more resilient. When they are two weeks old it is a good idea to start adding hard mains water in small amounts so that at four weeks, they can be moved into a bigger tank with tapwater.

FIRST SIGHT

We take a look at some of the new products on the aquatic market.

Fish on DVD

Houndstar films have released three new aquatic DVDs. There is a marine reference guide, a tropical reference guide and a step-by-step tropical tank set up.

101 Tropical Freshwater Fish offers video profiles of 101 types of tropical fish. The fish are shown swimming in a video clip and are accompanied by an information bar showing the common name, scientific name, compatibility, tank level, distribution, diet and adult size. The information is backed up by a narrative, informing you of specific requirements for each species. There isn't quite 101 species of fish as some fish are shown in different colour variants e.g. Angelfish, and the information doesn't include minimum tank size for any species, which I think would be helpful. It does include some useful tips however, like the fact that Tiger barbs are fin nippers.

101 Tropical Marine Fish is made in the same format as the freshwater one but gives you details on their common name, scientific name, compatibility, tank level, distribution, diet, adult size and minimum tank size. The film includes some new varieties of fish like Snowflake clownfish, along with quite a few rarer finds and lots of large angelfish species. The narrator says whether fish are recommended for beginners and if they can be mixed with other individuals of the same species. The information bar could do with details of ease of keeping and reef/fish only compatibility but much is covered in the narration.

The Tropical Freshwater Tank Set-up DVD is their latest release and details a video step-by-step on setting up a planted tank. It includes lots of tips on tank positioning and what tools and equipment you will need if starting from scratch. It gives some good safety advice too, advising on the use of a power breaker and a drip loop in cables. The film explains water quality and advises on the use of water conditioners, along with plant foods and CO_2. It also recommends stocking slowly and the quarantine of all new purchases for at least 20 days. Brief fish profiles and a plant reference guide are added on at the end.

On the whole I think that the DVDs are a useful tool for anyone wishing to keep either tropical or marine fish, and can be used alongside books and magazines or played before you go to the fish shop, so that you will know exactly what you want before you get there. Pictures can tell a thousand words but video clips of actual fish species swimming in an aquarium situation can tell even more, and lets you know straight away how active they are and whether or not the fish will suit you.

These DVDs will be useful to beginners and established hobbyists, and these films pave the way for a whole host of future opportunities.

Prices: £9.99 each

More info:
www.houndstarfilms.com

BCUK tropical foods

BCUK has been trading for one year and supply aquarium fish foods, frozen foods and fishing baits, along with some Koi foods that are also in the pipeline for the future. The tropical foods come in bold packaging that will stand out on the shelves, with a union jack adorning the BCUK label.

■ **Tropical micro pellet**

The micro pellets are aimed at feeding small tropical fish like tetras and are packed full of an astonishing 56% protein, a figure that may well be one of the highest on the market. The pellets themselves are a mixture of two granular sizes that range in size from just over a millimetre to about half a millimetre in diameter. They are mainly red in colour so should help with your fish colour, and are boosted with vit-immune complex A, D3, E and C.

■ **Tropical feast**

The tropical feast has a variety of dry foods within it including flakes, small floating pellets and small floating sticks. It is a complete food aimed at all tropical fish and should be ideal for cichlids and other medium to large tropical fish. It too contains vit-immune complex A, D3, E and C.

■ **Catfish pellet**

The outstanding feature with the catfish pellet is its low price. The 60g pot retails at just £2.10, and consists of tiny, sinking pellets of about one millimetre in diameter. We tried it out on our *Corydoras* catfish and they readily accepted it. It should be fed along with other floating foods to a mixed community of fish, and will appeal to all catfish, loaches and bottom-dwelling fish.

Price: Tropical micro pellet 60g, £4.99. Tropical feast 60g, £4.99. Catfish pellet 60g, £2.10

More info: BCUK Aquatics, 01507 600477

Real wood aquarium furniture

B.O.S.S. has recently acquired new premises and expertise to manufacture real wood cabinets to compliment its long-established range of fish tanks.

The new Ocean Wave range of cabinets are manufactured from solid pine and designed to fit most room settings. They come in a choice of six styles, with matching hoods, designed to hide away the clutter that can be associated with fishkeeping. They are available in sizes to accommodate a 60cm/24" aquarium, up to a large 180cm/6' size. There is a choice of six colour finishes: Yew, Antique Pine, Mid Oak, Mahogany, Natural and Mediterranean Pine.

More info: B.O.S.S. Aquariums on 01324 618600.

Win a B.O.S.S. tank and cabinet!

B.O.S.S. is giving away the tank and cabinet pictured here, called The Adriatic, to one lucky winner in a special giveaway. The aquarium is 90cm/36" in length and features two doors, two drawers and three shelves. The package has an RRP of around £500.

To enter the draw for the tank, just fill in your name and address on the form to the right (photocopies will be accepted) and send it to: B.O.S.S. Giveaway, Practical Fishkeeping, Bretton Court, Bretton, Peterborough, PE3 8DZ. The closing date is March 21 2006. All the entries will be placed into a draw and the sender of the first entry pulled from the bag will win the aquarium and cabinet.

B.O.S.S. giveaway entry form

Name .....

Address .....

.....

.....

Postcode .....

Email .....

If you are happy to be contacted by Practical Fishkeeping by email in the future, please tick the box ☐

EMAP Active Ltd, publishers of Practical Fishkeeping, also uses selected information about you with our sister companies within the EMAP Plc Group and with other reputable companies who may contact you with details of products or services that may be of interest to you. If you do NOT wish to be informed of future offers, please tick the box ☐

How to send for a reader giveaway

To be in with a chance of winning the giveaway on this page, fill in the form above and send it to: **B.O.S.S. Giveaway, Practical Fishkeeping, Bretton Court, Bretton, Peterborough PE3 8DZ**, to arrive before March 21, 2006. Photocopies of the form are acceptable, but only one giveaway entry per envelope, please. All entries will be placed into a draw. The first name drawn win the B.O.S.S. tank, cabinet and filter. No correspondence can be entered into, and there are no cash equivalents.

Down & out!

Get all of your equipment out of the main tank and improve its efficiency, with the help of the humble sump. **Philip Hunt** extols its virtues...

The sump is an extremely versatile tool that can improve everything from the appearance of your tank to the efficiency of the filtration system.

At a basic level, it is no more than a separate tank connected to the main display aquarium, with water pumped between the two. It's usual to have the sump beneath the main tank, usually in a cabinet, with water fed into the sump by gravity and pumped back to the aquarium.

Other possible arrangements include a sump in a cellar or basement beneath the room housing the aquarium, or a sump housed next to the main tank or in an adjacent room – or even out in a shed or garage. Sumps can even be above the main tank, fed by a pump and draining back into the display aquarium.

Choose your sump

A basic sump can be no more than a container made of some saltwater-safe material. In the UK, glass tanks tend to be the norm, but in the USA large food-grade plastic containers are often used.

The size of a sump can vary according to its purpose. If you want to use it primarily to increase the system volume, you could have one as large or larger than the display tank. If the sump will be used mainly to take the equipment out of the main tank, it can be just big enough to accommodate all the gear and maintain an adequate water level.

Any sump that is gravity-fed, either from a drilled tank with a weir or via an overflow siphon, also needs to have sufficient capacity (over and above the volume of water it usually holds) to take the water that will drain down into

the sump when the return pump is switched off, or during a power failure.

For a simple sump, a plain glass or plastic tank is fine. If you want to have separate compartments within the sump, such as a skimmer in one section, and a refugium in another, downstream of the skimmer, or to have a chamber that must be kept separate from the return pump (e.g. an ecosystem mud filter), then one or more overflow weirs can be added within the sump.

Going down...

If you use an under-tank sump, the best way to get water down to it is to have a hole drilled in the main tank. Ideally, this should be done during tank building – you will find it very hard to get a guarantee on a finished tank that you've had drilled. You can have holes in the base, or in the back or sides of the tank. Holes through the base of the tank are fitted with standpipes on bulkhead fittings, usually with a bend or T-piece at the top to minimise the 'water running down a drain' noise. Holes through back or side panels generally lead to quieter drainage, but you need space for the exterior pipework, making it difficult to get the tank close to a wall. Err on the large side for the holes when ordering the tank.

An overflow weir is fitted in front of the hole or standpipe, to prevent livestock being sucked down. This can be a simple glass or acrylic panel siliconed into position to give a watertight compartment behind the weir. The height of the weir determines the depth of water in the tank. Acrylic weirs usually have a toothed or slotted top edge, intended to prevent fish going over the top. With glass weirs it is common to fit a plastic or thin acrylic panel, again with a toothed or slotted top, in front of the true weir. Some of these, which are fitted 2-3cm/¾-1¼" in front of a glass weir, are slotted at both top and bottom, the theory being that water going over the weir is drawn from both the surface and the depths of the tank.

Using a weir means that water is always drawn off from the surface, taking with it organic waste products, bacteria and algae. This surface layer is continuously removed, making for more efficient processing of wastes (by a skimmer in the sump) and better gas exchange as the water surface is always 'clean'.

If you can't use a drilled tank, such as when adding a sump to an established system, then to get water to an under-tank sump you need an overflow syphon box. Modern versions of these are better than the old ones, but they are still not as good as a drilled tank.

Coming up...

In a typical system, water must be pumped back from the sump to the display tank. The pump chosen needs to be reliable, and must be capable of lifting water to the required height (the so-called 'head') while providing an adequate flow rate. The maximum flow rate depends on the diameter of the pipes delivering water to the sump (how much flow they can handle) hence the need to be generous with hole diameters when getting tanks drilled. If you don't have additional circulation pumps or other means of 'making waves', you'll need a higher flow rate from the return pump(s). Having twin or multiple return pumps is a good idea, to maintain some flow if one pump fails.

Water is usually returned to the tank via a pipe fitted with either a simple rigid plastic outlet, as used on canister filters. (manufacturers sell these as accessories or spares) or a more complex flexible unit that can be angled as required. It's useful to drill a small, 2mm hole in the return pipe just below the water surface. When the pump is switched off, this hole will let in air and break the syphon through the pump, preventing the water draining down to the level of the actual outlet.

Calculating overflow volume

To get the overflow volume (the additional volume of water that needs to be held by the sump when the return pump is switched off), measure the surface area of the tank (length x front-to-back depth, measured in cm). Now look at the outlet from the return pump – how far below the water surface is the outlet? Or how far below is the syphon break hole if you have been wise enough to have one? This is the depth to which the tank will drain when the return pump stops.

In the unusual situation where the water return is above the water level of the tank, the depth from the surface to the lip of the overflow weir should be determined – in this case, this is the level to which the water will drain. Multiply the relevant depth (in cm) by the surface area, and you will get the overflow volume in cubic centimetres. Divide by 1000 to get it in litres, and this by 4.5 to get the volume in imperial gallons if you prefer. Now multiply by 1.5 (to give you a safety factor) and you have the volume the sump needs to hold.

LEFT:
By fitting a sump to your aquarium, all unsightly equipment can be hidden away beneath the tank.

Hey, good looking!

Your aquarium will look better if you can get the equipment out of the tank, so that all you see is fish and/or invertebrates and rock. Heaters, skimmers, top-up units, calcium reactors and even thermometers, can all be set up in or around the sump, rather than in the aquarium.

Having a sump can also help make the aquarium quieter – having noisier items such as skimmers in an under-tank cabinet deadens the sound to some degree and a more remote sump diminishes noise even more.

Indirectly, a sump increases the total water volume of the system, allowing you to keep more fish. Don't be tempted to keep larger fish than the size of the main tank dictates, though – using a sump increases the water volume but doesn't affect the available swimming space of the display aquarium.

Filter it!

Sumps can be used to improve filtration in a number of ways beyond housing skimmers and

Water levels

There is no 'right' water level for a sump – it all depends on what is happening in there. Obviously, the depth must be sufficient to cover the intakes of any pumps (return pumps and skimmer pumps, for example), and if your sump is used to house living rock, a sand bed, an algae refugium, etc, this must be kept covered. One thing to bear in mind is not to have so much water in the sump when the return pump is running that there isn't enough space to accommodate the water that will collect when the pump is switched off (the overflow volume).

If the water level in the sump drops, this suggests either:

- Evaporation losses have gone unnoticed and uncorrected, and so salinity will increase.
- A leak, in which case the salinity will remain constant or decrease if the tank has an automatic top-up system.
- Clogging of the overflow weir, when the salinity will remain constant, but the level of water in the main tank will rise.

LEFT TO RIGHT: If you can't fit any type of sump to your tank, you can simply create a compartment in the corner to house your equipment – then hide it with some decor.

other equipment.

■ Rock and sand

A simple way to use a sump to enhance biological filtration is to put some living rock in it, thereby increasing the quantity in the system without cluttering up the display tank. A sump can also be used to house a deep sand bed without needing to use up a lot of display tank depth. A variation on this is to use a Jaubert-style plenum system within the sump. In both cases, a weir in the sump must be used to keep sand away from return pumps, to avoid clogging or damage to impellers.

With both living rock and sand in the sump, the sump can either be kept dark, or lit. If you light it, algae of various kinds will grow, and these will also contribute to biological filtration – something that you can exploit as well as enjoy.

■ Algae and mud

Algae-based filtration uses deliberately planted algae in the sump, typically fast-growing *Caulerpa* species. These absorb nitrogenous wastes, phosphates and dissolved organics to fuel their growth. Regular harvesting of the algae removes these wastes from the system permanently. The sump needs to be brightly lit for this to work; lights can be run 24 hours a day, or switched on when the main tank lights are off. Either approach leads to the tank maintaining a constant pH, avoiding the day-night fluctuations that usually occur in reef tanks (and on the reef).

Other benefits include a steady supply of small invertebrates (in this way the sump is acting as a refugium) that provide living food for fish and filter-feeding invertebrates, as well as aiding biological filtration by helping to consume waste food and detritus. *Caulerpa* are so good at absorbing organic wastes, there may be no need for skimming.

A variation on growing algae in the sump is the Ecosystem method. This, developed by American fishkeeper Leng Sy, uses a patented substrate known as 'Miracle Mud' in which the *Caulerpa* grow. This has a specific mineral composition which is claimed to offer advantages over simpler algae-based systems. The mud is believed to provide a place for bacterial activity to break down organic wastes and to create an environment for the development of a wide range of microfauna, as well as leaching beneficial minerals into the tank water, either directly or via the algae. This system is also claimed not to need chemical filtration.

One thing to watch out for with all algae-based refugia or filtration systems is fouling of pumps by algae. Under the right conditions, macroalgae can grow extremely quickly so watch out for them going right over weirs and into pump intakes. Remember, to get the best out of algae systems you need to harvest regularly.

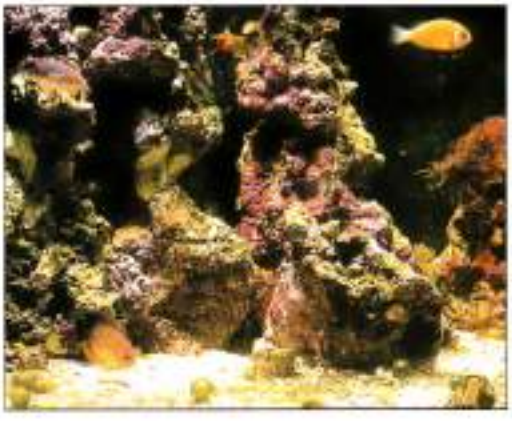
■ Animal filtration

Some fishkeepers with sand beds in the sump keep a variety of animals, from sea cucumbers, sand-sifting starfish and even gobies, to maintain the beds in optimal conditions, to brittle stars and hermit crabs which eat fish food and detritus entering the sump with the water from the main tank. These animals must obviously be kept away from pump intakes so again, the use of an overflow weir is a must.

An interesting variation on biological filtration in the sump, practised by some US fishkeepers, is keeping fast-growing tridacnid clams (usually *Tridacna derasa* or *T. gigas*) in it. Tridacnid clams absorb nitrogenous compounds from the water as they grow, providing a very unusual type of biological filtration. The clams need very bright light however, and, as with algae-based sumps, the heat generated by the lighting needs to be dealt with.

No room for a sump?

If you can't fit a sump onto your aquarium, you can partition off one corner of your tank, using eggcrate or similar, and use this corner to house all the technology (pumps, heaterstats, the intakes of hang-on skimmers, etc). Some hang-on skimmers and power filters have enough space to accommodate heaterstats and/or chemical filtration media. This way, although you can't really take advantage of the biofiltration opportunities of a sump, you can at least keep your equipment out of sight!



STAGES OF LIFE

Dr Peter Burgess of the AQUARIAN Advisory Service, takes a look at the problems that can affect juvenile fishes.

RIGHT: **Feed a well balanced diet and choose a good brand of fish food to prevent nutritional problems.**

Following on from the fry stage, young fish continue to grow rapidly towards adulthood. Good water quality and a balanced diet are crucial for normal development into healthy adult fish.

Nutritional deficiencies

Feeding a properly balanced diet is especially important during the fish's growth phase. A 'balanced' diet is one that contains all the essential ingredients (such as proteins, lipids, vitamins and minerals) in the correct quantities.

The young fish require food not only as an energy source, but also to manufacture new tissues for bodily growth. The quality of the diet will, therefore, have a big influence on the fish's adult condition. Diets that lack one or more essential nutrients will cause

TIPS

- Even tiny amounts of toxic heavy metals (such as copper and zinc) in the water can lead to developmental problems in young fish. Some proprietary makes of tapwater conditioner (dechlorinator) contain reagents that detoxify heavy metals, making them safe to fish.
- For those fish that accept only live foods (e.g. *Daphnia*, bloodworm, brineshrimp) it is essential to feed a mixed live-food diet. This is because no single live food species can provide the fish with all its nutritional requirements.

Separating the sexes

It may be desirable to separate the males from the females before the young fish reach sexual maturity. This prevents undesirable matings between siblings which could otherwise lead to genetic 'in-breeding' defects in subsequent generations. Many aquarium fish books explain how to sex various types of fish, although some species show no outward sexual differences. For a few species like the Siamese fighter, (*Betta splendens*) it is important not only to split up the sexes but to isolate individual males. This avoids the inevitable fighting between adult male Betta which frequently leads to the loser dying. The less aggressive female fighters can safely be reared together.

Both pictures: Neil Hayward

restricted growth and/or abnormal tissue development, resulting in stunted, weakened adults. A dietary lack of the amino acid lysine leads to fin erosion. Insufficient vitamin A causes fin and skin bruising (haemorrhaging) as well as eye problems and nervous disorders. Minerals are important too: a lack of phosphorous results in bone problems like curvature of the spine and demineralisation ('fragile bones'). A lack of manganese causes dwarfism.

Symptoms: Vary considerably depending on which nutrients are lacking.

Causes: Nutritional deficiency.

Treatment: Feed a well-balanced diet and choose a quality brand of fish food. Store opened containers of dry foods (e.g. flakes, pellets) under cool, dry conditions in order to preserve their nutrient content.

Infectious diseases

Young fish are highly susceptible to infectious diseases, such as caused by bacteria, parasites and the like. Even though their immune systems are developed, young fish lack the very effective form of immunity known as 'acquired immunity'. It is only after the fish first encounters a particular pathogen or parasite that its acquired immune system is primed into action. The first exposure to the disease-causing organism is therefore the most dangerous. Those youngsters that survive the initial infection will develop acquired immunity that helps protect them against subsequent exposures to the same organism. When a disease outbreak (such as whitespot) occurs, the immunologically naive youngsters that suffer the most.

Symptoms: Wide spectrum of symptoms, depending on the cause and severity of infection.

Causes: Various bacteria, viruses, fungi and parasites.

Treatment: Using the fish's symptoms as clues, try to identify the type of disease-causing organism involved. This will enable you to select an appropriate chemical remedy. If in doubt, seek advice or consult a good fish health book. Never delay treatment.

Developmental disorders

In addition to affecting eggs and fry, developmental disorders can also arise during later life.

Symptoms: Varied. In some cases the disorder affects an internal organ and produces no specific symptoms. Far more obvious are skeletal disorders, such as curvature of the backbone.

Causes: Major factors are: unsuitable water conditions; exposure to certain pollutants (e.g. heavy metals such as cadmium); poor nutrition.

Treatment: Bone deformities are generally irreversible. Prevention lies in providing good water quality and feeding a quality diet.

Stunting

Symptoms: Restricted growth.

Causes: Several possibilities including: poor diet; chronic stress; disease; genetic deficiency; low temperatures; overcrowding. Poor water quality, including high levels of nitrates, can also restrict growth.

Treatment: Outward symptoms rarely give clues as to the underlying cause. Instead, review all aspects of rearing, including diet, water quality, and aquarium space. Rectifying the problem may improve the growth performance of stunted individuals, however some forms of stunting, such as caused by genetic defects, are irreversible. The provision of good food, plenty of growing space and frequent partial water changes will all help prevent stunting.

ABOVE: **Poor water quality and poor nutrition can affect the development of young fish.**

Protein levels and growth

The protein requirements of young fish are much higher than those of fully grown adults. This is because dietary protein is needed for building the growing muscles and other tissues. Fish food manufacturers take these different protein requirements into account. For example, a 'growth' flake food may contain around 45% protein whereas a flake food for adult fish contains much less, around 35%. The quality of the protein ingredients that are used to make the food is equally important, and the quality has a lot to do with the protein's amino acid content. Amino acids are the building blocks of proteins. Several different amino acids are needed by fish, of which ten are termed 'essential', so called because fish cannot make these themselves and instead must obtain them directly from the diet. Examples of essential amino acids are isoleucine, histidine and tryptophan. The various amino acids are required in different quantities, hence a high quality fish food will contain all ten essential amino acids in the correct proportions. If any essential amino acids are lacking then normal tissue growth may be severely affected.

RIGHT: Since 2002, the tank has changed from mainly cream and brown soft corals to multicoloured hard corals.

and the aquarium water reflects more closely the natural components that are found in waters surrounding natural reefs." There is also an increasing number of reef aquarists who are converting to the EcoSystem method, as well as those who run hybrid systems.

Seeing is believing

It was time to take a look at Underworld's reef display tank. First impressions were that the 1600 L/332 gal. reef system had been transformed from a tank mainly relying on thriving cream and brown soft corals into a multi-coloured reef of dazzling shades of red, purple, orange and green. SPS corals that were tiny on my first visit now dominated the reef slope and competed for space. A huge *Caulastrea furcata* colony indicated favourable conditions for LPS species endorsed by an equally healthy, red

WATER PARAMETERS	
Temperature	22-24°C (winter) 24-27°C (summer)
pH	8.0-8.3
Salinity	30ppt/S.G. 1.022
Nitrite	Not detectable
Nitrate	Trace
Phosphate	up to 0.2 ppm
Calcium	340-380 ppm
Alkalinity	2-3 mg/ltr
ORP	Not measured

QUICK REFERENCE CHART	
Filtration	Ecosystem
Extensive constant skimming?	No
CO_2 reactor/separate kalkwasser delivery	No
Light intensity (w/m²)	400W/m, plus
% water change	25-30%
Phosphate remover	Yes
Regular feeding?	Yes
Regular use of additives?	No
Regular maintenance?	Yes

Goniopora (unidentified) and a *Lobophyllia hemprichii* at an early stage in colony formation. Both a *Duncanopsammia* species I remembered from my earlier visit and an equally proportioned *Hydnophora* appeared to have doubled in size, despite being regarded as slow growers, as had a burnt orange-coloured *Turbinaria* colony. Polyp extension was very evident over a wide range of hard coral species and, as we know, corals capture microorganisms as food when the polyps are extended. This was clear evidence that these corals were consuming the plankton material usually found to be rich in tanks incorporating the EcoSystem method.

The fish populations were equally eye-catching, spanning the whole colour spectrum from the blues of the Regal tang to the yellows of the Yellow tang and bright orange of the *Anthias*. Apart from *Pseudanthias bicolour*, none of the fish occupying the tank could be regarded sensitive or difficult to keep, but what was outstanding was their healthy appearance and vivid colouration. This tank endorses the claim that fish are more vividly coloured in EcoSystem aquariums!

Another advantage of running the system on a natural basis is the fact it will support a much wider range of reef forms. Berlin systems soon lead to a reduction in diversity as many of the small reef forms first introduced on the live rock to set up the system fail to succeed. Filter feeders like sponges, colonial ascidians and tube worms often completely disappear under such conditions, while in the Underworld tank they proliferate, as do a whole range of other tiny mobile creatures which are constantly imported from the refugium.

Back to the future

Des and Jane had initially been concerned about the size of this aquarium because of the time required to maintain it. "Due to our very busy office environment, we wanted something that was low in maintenance and biologically balanced," Des remarked, "but there was no need to worry as the tank requires minimal maintenance."

I wondered whether any changes had been required to develop and run the reef system and Des explained that the tank had been set up strictly on EcoSystem principles and Long Sy's recommendations.

One small modification was in the lighting over the sump. Long Sy recommends four fluorescent tubes over the sump, but these were a little inadequate and were substituted for a 150W, 10000K metal halide.

Des believes the tank is becoming overcrowded due to the prolific coral growth. Small frags have developed into dinner plate-sized colonies and a huge *Hydnophora* has claimed substantial areas of the reef slope.

Des intends to remove many of the small coral colonies and rebuild the reef slope using the larger specimens only to give a more natural look. "In Nature, such a wide diversity of corals seldom occurs in the small area the tank represents, so there should be less species and greater cover by each of the species remaining."

Factfile

Essential statistics
The main display tank measures 1.5m x 1.0m x 1.0m and has a capacity of around 1470 L/324 gal. before displacement. The sump and refugium measure 100 x 65 x 50cm/40" x 54" x 20" (water level 35cm/14") which adds a further 296 L/65 gal. approximately. Total water capacity after displacement = approximately 1590 l/350 gal.

Biological filtration
The Leng Sy EcoSystem filtration method relies on an algal scrubbing refugium with a substrate of Leng Sy patented Miracle Mud. The proportion of the sump devoted to the filter bed measures 67 x 69 x 45cm/27" x 28" x 18" (water level 35cm/14") and contains *Caulerpa* and small amounts of live rock. Approximately 25% volume of the display tank is taken up by live rock, providing a substantial contribution towards biological filtration.

Chemical filtration
Occasional use of Phos Ban (phosphate remover) and Polyfilters (adsorption pads).

Water changes
Partial water changes of 20-30% at 6 to 8 week intervals using Instant Ocean and Reef Crystals, plus RO water.

Skimming
No skimming in line with EcoSystem filtration method.

Calcium and carbonate hardness management
Calcium reactor employed, plus periodic top-ups with calcium chloride.

Water Circulation
2 x 9000 lph pumps used for filter turnover
3 x 6000 lph pumps used solely for water movements

This gives a theoretical total water movement of 36000 lph (actual 29-30000 lph). Total tank turnover is 10-20 times per hour.

Lighting
Display area:
3 x 400W metal halide lamps in a mix of 14000K and 20000K bulbs
4 x 30W standard output Actinic fluorescent tubes (height above water 35cm/14")

Refugium:
1 x 150W metal halide

Photoperiod
Display area:
Total photoperiod 10 hours with 8 hours of full lighting (all units on).

Refugium:
Lit permanently on a continual basis.

Cooling
Chiller rated for a 1590 L/350 gal. capacity system

PFK RETAIL GUIDE

Retail news, interesting fish in the shops and our monthly shoptour.

INCLUDING

goshopping

Your guide to the aquatic specialists near you, internet shopping and much more.

Readers' TOP SHOPS

These are the top aquatic retailers as voted for by readers of Practical Fishkeeping in our 2005 readers' poll.

* Denotes category winner

TOP 20 SHOPS
(in alphabetical order)

1 **The Aquatic Centre**
Bulcote, Notts 0115 931 2986
2 **The Aquatic Habitat**
Gloucester 01452 864502
3 **The Goldfish Bowl**
Oxford 01865 241825
4 **Maidenhead Aquatics**
@ Enfield 0208 364 8617
5 **Maidenhead Aquatics**
@ Harlestone Heath
01604 592044
6 **Maidenhead Aquatics**
@ Hereford
01432 344887
7 **Maidenhead Aquatics**
@ Ivel 01767 600130
8 **Maidenhead Aquatics**
@ Peterborough
01733 211825
9 **Maidenhead Aquatics**
@ Swansea
01792 892287
10 **Maidenhead Aquatics**
@ Swindon North
01793 700444
11 **Parton Pet and Aquatic Centre**
Salisbury 08707 701011
12 **Shirley Aquatics**
Birmingham 0 121 744 1300
13 **Swallow Aquatics**
Rayleigh, Essex
01268 781200
14 **Swallow Aquatics**
@ East Harling, Norfolk
01953 718184
15 **Tri-Mar**
Tuckingmill, Cornwall
01209 713639
16 **Ultimate Aquatics**
Fife 01334 656868
17 **Wetpets**
Romford, Essex 01708 744880
18 **Wharf Aquatics**
Pinxton, Notts 01773 861255
19 **Wholesale Tropicals**
Bethnal Green, London
0207 739 5356
20 * **Wildwoods**
Enfield 0208 366 0243

Full details on these shops are available on the Practical Fishkeeping website's Fish Shop Finder

TROPICAL FRESHWATER
(in alphabetical order)

The Goldfish Bowl
Oxford 01865 241825
Tri-Mar
Tuckingmill, Cornwall
01209 713639
Wharf Aquatics
Pinxton, Notts
01773 861255
Wholesale Tropicals
Bethnal Green, London
0207 739 5356 *
* **Wildwoods**
Enfield 0208 366 0243

MARINE
(in alphabetical order)

Calico
Penrith 01768 864366
Fit Filtration
Derbyshire 01332 850345
Home Marine
Enfield 0208 367 4191
* **STM**
Swanscake Kent
01732 454190
Swallow
@ East Harling, Norfolk
01953 718184
Wetpets
Romford 01708 744880

CICHLIDS
(in alphabetical order)

Aqua Blue Zaire
Co. Durham,
0191 587 3000
* **Maidenhead Aquatics**
@ Harlestone Heath
01604 592044
Maidenhead Aquatics
@ Hereford 01432 344887
Wholesale Tropicals
Bethnal Green, London
0207 739 5356
Wildwoods
Enfield 0208 366 0243

DISCUS
(in alphabetical order)

Devotedly Discus
Polegate, East Sussex
01323 489389
Discus South
Southampton
02380 861631
Just Discus
Bedford 01234 3511 8651
Leicester Discus
Leicester 07952 594310
* **Royal Discus**
St Helens
01744 630599

POND
(in alphabetical order)

Aquatic Habitat
Gloucester
01452 864502
Blagdon Water Gardens
North Somerset
01934 852873
Cuddra Aquatics
St Austell, Cornwall
01726 76686
Koi Water Barn
Kent 01689 878181
* **Wildwoods**
Enfield 0208 366 0243

Interesting IMPORTS

Matt Clarke looks at some of the new and unusual fish currently on sale in the UK's shops.

Factfile

Common name: Saddle cichlid
Scientific name: *Aequidens tetramerus* (Heckel, 1840)
Origin: One of the most widespread South American cichlids. It is found in the Amazon, Tocatins and Orinoco basins and has been recorded in Peru, Colombia, Ecuador, Bolivia, Suriname, Guyana, French Guiana, Venezuela and Brazil.
Size: Museum data says up to 25cm/10", but most aquarium literature says it tops out at 15cm/6".
Diet: An omnivore. Stomach analyses of wild fish have revealed a diet of insects, vegetable matter and small fish. Aquarium fish take pellets, flakes and most frozen foods readily.
Water: Widespread and found in various types of water, so probably very adaptable. According to Kullander and Nijssen (1989) the pH ranges from 4.5 to 7.5, GH 1-13.5, temperature 24-26°C/75-79°F.
Aquarium: I kept a small group of subadult *tetramerus* a few years ago and found them quite aggressive and territorial with each other. I'd recommend getting a small group of young fish and growing them on together in a fairly spacious tank (120 x 60cm/4' x 2' would be good) and letting them pair off naturally. They're said to lay about 1000 eggs on submerged objects, such as rocks or wood. You'll need to provide quite a bit of decor for shelter, as dominant fish can be quite nasty to submissive specimens. While juvenile they should mix OK with most South American cichlids of comparable size, but I'd opt to keep them with cichlids larger than themselves (or alone) when adult and courting.
Notes: *Aequidens tetramerus* is the type species for the *Aequidens* genus. Although originally described by Heckel in 1840 as *Acara tetramerus*, it's subsequently redescribed by Dr Sven Kullander in 1986 using specimens from the west of Amazonia, and before that by Kullander in 1980 from fish collected in the Anipuanu drainage, and Kullander and Nijssen in 1989 from Surinamese fish. Since it's so widespread, it's a common species in the wild, but it's rarely imported into the aquarium hobby. It's said to be most abundant in the floating rafts of aquatic vegetation that form in floodplain rivers.
Identification: *Aequidens* are tricky to identify because there is no recent key to the group and at least half a dozen undescribed species are known, for which there is currently no reliable identification data. The Aqualog Southamerican Cichlids II guide suggests that the species shows some variability in colour across the range.
Availability: Surprisingly, these specimens were actually captive-bred fish from the Czech Republic, so they should be easy to obtain for larger specialists who import their own fish. We spotted those at Hobby Fish in Bucks (01908 543210).
Price: Reasonable at £5.99 each.

Tailpiece

News and views from the PFK office - and what's happening in our own tanks

"I've spoken to a number of retailers over the years who have had to virtually "escort" people off the premises for kicking up a huge fuss over a fish that they're being told they can't buy..."

RIGHT
A great shop often goes hand-in-hand with friendly, experienced and enthusiastic staff.

It must be wonderful to have a successful and well-respected shop that fishkeepers will travel a long way to visit (see page 127 for some of the top shops as voted by PFK readers). Quite often a great shop goes hand-in-hand with experienced and enthusiastic owners/staff who happily pass their advice and expertise onto customers. But I've recently spoken to two very dedicated and knowledgeable fishkeepers who both work in a shop (not the same shop, I hasten to add) and it seems that word soon gets around if you really do know your stuff, with customers literally forming a queue to talk to them at weekends – some willingly standing around for couple of hours, just for that bit of advice. A drawback? Perhaps, because that assistant is likely to get very little work done while he or she is chatting to customers all day. But it doubtless has plenty of advantages in drawing customers into the shop in the first place and is probably priceless in the customer care category as it gives them the feelgood factor that someone so experienced is happy to share their advice and time. Not to mention the dry goods and fish that the customer might spot during the wait, and buy as a result! Knowledgeable and enthusiastic owners and staff are often the makings of a shop – and it can affect not only their reputation among fishkeepers, but is also often reflected in the quality and even variety of the fish they sell.

Does your local shop have an owner or member of staff that you consider is an unsung hero of the fishkeeping world? If so, why not let us know?

Incidentally, if there was one area of the retail industry that the old saying "the customer is always right" shouldn't apply to, then it has to be the aquatic trade. Unfortunately there will always be customers who ignore good advice. I've spoken to a number of retailers over the years who have had to virtually "escort" people off the premises for kicking up a huge fuss over a fish that they're being told they can't buy because the staff don't feel they have the right facilities, tankmates or knowledge, or because the customer wants to fully stock their new tank and can't see why the assistant won't sell them all the fish on day one. If customers were always right, under these circumstances, there would be a lot of casualties. Fortunately (hopefully!) most of us appreciate the advice, listen, learn and become better fishkeepers in the process.

Paul Hagenaars

■ Our PFK Fish Photographer of the Year competition begins this month, with some great prizes up for grabs. In addition to the possibility of winning one of the top prizes on offer, there's also the opportunity to grab one of the smaller prizes that we'll be giving out on a monthly basis if we print your photo in the magazine or on the website. The competition runs from now until September – and there are prizes to be won each month right up until we announce the overall winners of the big prizes in October. So why not get snapping – there are three categories: Professional, Amateur and Junior. You'll find full details on pages 50-51.

■ Don't forget that if you have a comment about PFK (either praise or criticism) you are always welcome to contact us at the office or by email (see page 2 for contact details). But next month you'll have the chance to let us know what you think about PFK – what you like, don't like and what you'd like to see more of in a special questionnaire. All the questionnaires we receive will be placed into a draw – and there are some great prizes up for grabs!

April's PFK also comes with a FREE pull-out health special.

■ Congratulations to PFK's sub-editor Sandra Pearce and hubby Alan, whose baby daughter, Alex, was born last month.