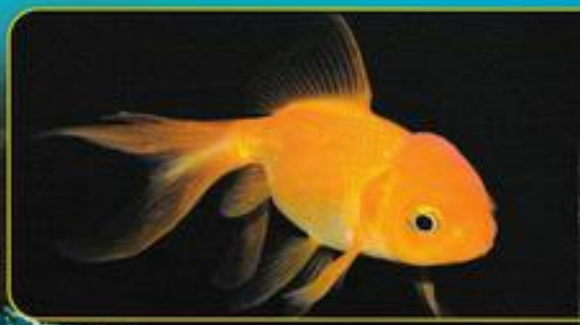
Go to page number 39 for more information!

Today's FishKeeper
Passionate About Fish

Bright Throat ~ Firemouth.



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Plecos are booming. PAGE 28

STARTING POINT WITH PAT LAMBERT

Some tropical fish rooms use chillers but for the majority of tropical and coldwater fishkeepers who have community tanks within their homes just ensure there is a good flow-through of air on a hot day. SEE PAGE 6

SHOW REPORT – YORKSHIRE ASSOCIATION OF AQUARIST SOCIETIES

TODAY'S FISHKEEPER (formerly Aquarist & Pondkeeper) – THE UK's OLDEST FISHKEEPING MAGAZINE

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AND POND KEEPER

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Tel: 01254 236380
Fax: 01254 239885
E-mail: liz@valleypublishing.org

Editor, Subscriptions
Liz Donlan
Advertising
Niall McConachie (Broadcast Medium)
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E-mail: shout@broadcastmedium.co.uk
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Dave Bevan, Bernice Brewster, Anthony Calfo, Val Davies, John Dawes, Ben Hahn, Peter Hiscock, Kathy Jinkings, Pat Lambert, Alf Jacob Nilsen, Roy Osmond, John Rundle, Erwin Schraml, Paul Skinner, Iggy Tavares,

Additional photographs:
Iggy Tavares

August issue
Due out 29th August

Welcome

It doesn't seem more than five minutes since I put my first issue of *Today's Fishkeeper* together – hence time has overtaken me and, at the time of writing, I suspect that this issue may be a few days late. Hopefully, I'm now beginning to get into the routine of a monthly publication (our sister publication *Marine World* is bi-monthly so it's taking some adjusting on my behalf) and should be back on track for the next issue.

As frustrating as it can be it was inevitable that the gremlins crept in on the last issue:

- Firstly, the article *Mad Adventures* was in fact written by David Armitage and not David Armstrong.

- Secondly, the contents pages were completely up the shoot so no doubt you all had fun trying to find the articles you were interested in!

- Finally, John Dawes has pointed out that in his article *Bruce & Friends* under the sub-heading of 'Baiyun Bonus' he states that "Albonubes" means "white mountain". It should in fact be "white cloud".

Talking of John Dawes, in addition to his regular columns of *Brief Encounters* and *The Survival Game* he's now starting a coldwater section and my thanks go to him for producing the first article at extremely short notice.

Apart from that the magazine seems to have been quite well received and I have no doubt that it will go from strength to strength over the next few months. Questions & Answers have been a little thin on the ground so please start sending them in so we can give our panel something to do! Additionally please send in your letters – whether you've got a gripe, wish to pay a compliment or have some startling observations to make we'd love to hear from you.

If you have a tropical freshwater tank that you're particularly proud of and would like to share it with other readers of *Today's Fishkeeper* then please e-mail your photos (info@valleypublishing.org) together with some information about the tank itself.

Cheers for now,
Liz Donlan

Inside this

TODAY'S FISHKEEPER – AUGUST 2005

TROPICAL/MARINE/COLDWATER

MARINE

PONDS & COLDWATER

issue...

Front Cover:
Main Photo & Inset top: Iggy Tavares
Inset bottom: Alf J Nilsen
Cover Design: D&M Creative 01254 235000 www.dandmcreative.com

Advertisers

LOST FOR WORDS


Ioan Tawse

Aeration tanks
Good water circulation that is usually provided via the filter. The outflow from the filter creates the water movement that ensures that the water is well oxygenated. A venturi is sometimes fitted to the outflow to speed up the movement but this is not usually needed for most community set-ups. Air stones powered by an air pump provide additional aeration if required.

Bubble bead filters
In these water is pumped from the pond into the bottom of the filter vessel which contains plastic beads packed in as the biological and mechanical media. In some filters the beads float on top of the water and trap the solids as the water passes through. In others two types of beads are used one set lighter and another heavier than water. The lighter beads float on top, heavier beads are moved around by the water flow acting as fluidized bed filters. A heavy duty pump is required.

Chromatophores
These are pigment cells found in the skin which give the fish its different colours. For example melanophores produce black, others give the fish its iridescence through reflection and refraction of light.

Coral Sand
This is sand originating from coral rubble that has been broken down by burrowing animals and wave action to form fine sandy particles. It is widely used as a substrate by fishkeepers who live in soft water areas and need to harden the water.

Husbandry
This is the routine inspection and carrying out of the regular maintenance that leads to successful fishkeeping. A regular routine of feeding, water changes, cleaning, water testing should be carried out. A record should be kept of when these occur and results noted so that fish can be monitored properly. Notes should be made when chemical medications are used and when a quarantine period for new purchases begins. In busy lives it's very easy to forget.

Paternal-maternal family
The eggs are the sole responsibility of the female and are cared for solely by her, unlike in the nuclear family where the eggs are guarded by both parents. When the young are free-swimming both parents herd their young family around the tank.

Silversides
The family of Silverside fishes contains about 165 species. About 50 species occur in freshwater habitats but most are marines; they are quite well spread as some occur in Mexico and others in Australia and New Guinea. They possess the double dorsal associated with rainbowfishes. The Madagascan rainbowfish *Bedotia Geayi* is a silverside.


Ioan Tawse

Stocking density
Gases are exchanged at the water surface, so the surface area is important when considering the number of fish that will live comfortably in a tank. For tropicals this is 2.5cm long of fish (excluding the tail) to every 72cm squared of surface area. For goldfish allow 144cm squared for every 2.5cm of fish.

Today's news

All the latest news and products from the world of aquatics

Ornamental Fish International (OFI) honours four with first OFI Award

On the 28th of May at a dinner celebrating the 25th Anniversary of Ornamental Fish International (OFI), the worldwide trade association representing all sectors in the aquatic ornamental industry, OFI presented the first OFI Awards. The OFI Award has been created to honour persons or organisations who have made a significant contribution to the development of the ornamental aquatic industry and/or to improving its reputation.

The intention in future is for only one winner to be selected, based in particular on contributions made during the previous year. However, in this special 25th Anniversary year, OFI also would like to pay its respects to the people who have made significant contributions to our industry over the last several years.

Laureates of the first OFI Award are:

- John & Vivian Dawes (Spain);
- Mick Seaby (United Kingdom);
- Ornamental Aquatic Trade Association - OATA (United Kingdom); and
- Dr. Ngiam Tong Tau (Singapore).

Former OFI Chairman Mick Seaby and OFI Secretary General and Administrator John & Vivian Dawes brought stability and growth to OFI's organisation in a turbulent time in its existence. Through joint efforts exerted over an entire decade, they succeeded in putting OFI on the map and contributed substantially to making it the international association for all sectors of the ornamental aquatic industry. With this award, OFI would like to honour their contributions in the decade that they were the faces of OFI.

During that same period, the Ornamental Aquatic Trade Association (OATA), a UK-based national trade association in the ornamental aquatic founded. Although working specifically for the interests of the UK trade, OATA has contributed immensely to the industry on an international scale as well. OFI is very pleased with its good relationship with OATA, which resulted in an official memorandum of understanding earlier this year. The cooperation was clearly demonstrated by its assistance in obtaining the proper contacts in Brussels and the continuous and valuable exchange of ideas on many relevant topics. OFI is looking forward to a continued cooperation with OATA.

Dr Ngiam Tong Tau, CEO, Agri-Food & Veterinary Authority of Singapore has contributed considerably to the development of the ornamental fish industry in Singapore over the last twenty years. Dr Ngiam has provided leadership and direction and facilitated the development of the industry through the vehicle of the Agri-Food & Veterinary Authority (AVA) [also known as Primary Production Department prior to 1999]. Dr Ngiam led a team of aquaculturists and veterinarians who helped the ornamental fish industry to grow over the years. The AVA team's contributions were made in the areas of production, quality control, packaging and logistics, disease prevention and control, health certification, quarantine, and promotion of ornamental fish trade. So by honouring Dr. Ngiam Tong Tau, OFI is of course also recognising the AVA's work.

TetraMin Celebrates 50th Anniversary

Tetra, the leading fish foods and treatments supplier, celebrates 50 years of its pioneering fish food TetraMin Flake.

Now universally recognised as a flake food of exceptional standard, TetraMin was pioneered by Tetra as the first complete fish food in a flake format 50 years ago. Chris Nickson comments "The development of TetraMin was an enourmous step in making tropical fishkeeping more accessible to thousands of people. It set the agenda for Tetra's philosophy of bringing more people into the hobby and keeping them there. 50 years of continued development has kept TetraMin in the position of the world's best selling flake food for ornamental fish".

Plant keeping made easy!! – No. 1

Feeding your plants is essential to their well-being and growth. Plants require a plentiful supply of Carbon Dioxide (CO_2) during daylight hours to photosynthesis and grow. However, the natural level of CO_2 in a well-planted aquarium is insufficient to maintain good plant health, and therefore CO_2 must be added.

In the past the only method of introducing CO_2 was via a pressurised gas cylinder, using expensive control valves. Red Sea has introduced a far simpler yet highly effective system, using fermentation. This system is safe, easy to install and inexpensive. For aquariums up to 150 litres Red Sea's Turbo CO_2 Bio System will provide a well planted aquarium with all the CO_2 it requires.

The Turbo CO_2 Bio System works by diffusing the CO_2 into the aquarium with a venturi pump injector that breaks it up into very fine bubbles. These bubbles dissolve into the water and allow the plants to use the CO_2 to grow. The advanced design of Red Sea's venturi allows the pump to be placed at the bottom of most aquariums providing the full depth of the aquarium for diffusion of the CO_2 in the water.

Unlike most other CO_2 fermentation systems, the Turbo CO_2 Bio System is supplied with a pump which drives the CO_2 around the aquarium; this is the most effective way of ensuring maximum saturation. At night this pump can be switched off either manually or via a timer – this is crucial because plants start to release CO_2 at night rather than use it. As a result the pH of the water may become acidic and this can be harmful to your fish.

The Red Turbo CO_2 Bio System is therefore the safest way to introduce CO_2 to the aquarium. Each media pack allows 30 days CO_2 production, and the refills are inexpensive to purchase.

Available at all good Aquatic retail outlets

Elite Bubble Discs
Introducing the new Elite Bubble Disc range from Rolf C. Hagen.

Although easily hidden under your substrate, these quality discs will still look good if left in full view. The air stone disc is housed in a sturdy plastic container with textured base to prevent movement. The ideal partner to an Elite air pump, the steady stream of bubbles produced helps oxygenation & water circulation as well as providing an attractive decorative feature.

These quality Bubble Discs are available in 3 sizes:
Bubble Disc 1 (7.5cm) RRP: £1.99
Bubble Disc 2 (10cm) RRP: £2.49
Bubble Disc 3 (12cm) RRP: £2.99
For more information contact Rolf C. Hagen (UK) Ltd on 01977 556622 or visit our website at www.hagen.com.

new AQUATRONICA controller system from Italy

ITC Aquatics have been appointed the UK distributors for Aquatronica's controller system from Italy.

It's a full system monitor and control unit, which can take upto 10 plug bars (with 6 outlets and 5 inputs on each).

pH, ORP temperature and level probes are available now, with conductivity, density and PC interface available in the next couple of weeks. In development for later this year is a SMS text alert system, for alarms to be sent to your mobile and a light dimmer unit.

Pre-programmed wave and tide simulations are available if required, or programme your own!

For details of your nearest stockist call 01279 321884 or e-mail itcaquatics@yahoo.com. Trade enquiries welcomed for exclusive areas. For more details, view the web site at www.aquatronica.com

Tetra Boosts its Investment into Information Centre with the Appointment of Dave Hulse

Tetra, the leading fish food and treatments supplier in the UK, strengthens its technical support services with the appointment of Dave Hulse, as a Consultant to the Tetra Information Centre.

Dave will offer valuable support and advice on all topics surrounding fish health, care and nutrition, utilizing his expertise and resources to strengthen and expand the technical services already offered to retailers and consumers. Dave has many years of experience in the ornamental fish industry, having most recently been a lecturer at Sparsholt College Hampshire and has recently taken up a lecturing post at Reaseheath College in Cheshire.

Chris Nickson, UK Marketing Manager comments: "This is an important additional investment in the help and advice we offer fishkeepers. Dave is an already established and well respected industry figure. His appointment as consultant to the Tetra Information Centre is indicative of our commitment to making fishkeeping easier and more accessible to consumers, with a view to keeping them in the hobby for longer periods of time.".

Tetra Introduces New In Store Feeding Programme

Tetra, the leading fish food and treatments supplier in the UK, is introducing an in-store feeding programme to aquatic retail outlets across the UK. The programme offers a range of tropical and coldwater foods at discounted rates to retailers for use in store.

"The programme is offered to give retailers the opportunity to care for their stock using the best quality products without paying consumer prices. In return all we ask is verbal recommendation of Tetra products to consumers", comments Chris Nickson, UK Marketing Manager, Tetra. "With the outdoor aquatic season taking off in recent weeks, retailers can really use this as a platform to maximise their sales potential and keep there stock in the best of health. In-Store Feeding Programmes have already received a warm welcome by outlets who started the programme at the beginning of April".

Plant keeping made easy!! – No. 2

To achieve a magical display of healthy aquatic plants in your aquarium it is vital that their roots are kept warm. Just as tropical fish need warm water, tropical plants need a warm substrate. To do this, the temperature within the substrate needs to be slightly higher than the water in the aquarium. The effect stimulates gentle water circulation, which prevents the formulation of stagnant areas and the build up of undesirable by-products within the substrate while also providing the roots with a constant supply of the nutrients necessary for optimum plant growth and vitality.

Red Sea's new substrate warmer Root Therm maintains a positive temperature differential between the substrate and the water providing the plant roots with the nutrients they require to flourish and strengthen. The Root Therm heating system provides gentle warming which is suitable for planted aquarium set ups without the need for a temperature controller.

For aquariums up to 160 litres, the Root Therm heating system is ideal. The system is quick and simple to install and extremely safe because of its low voltage. For aquariums up to 400 litres a larger version (Root Therm 400) is available.

Available at all good Aquatic retail outlets

New Automatic Plankton Feeder

Reefworks is very pleased to announce the launch of it's new Automatic Plankton Feeder. For a long time now we have known that corals benefit from a constant supply of both zooplankton and phytoplankton to the aquarium but until now there has not been a device that can continually drip feed zooplankton and phytoplankton to our tanks. Now you can.

The Automatic Plankton Feeder hangs on the side of your aquarium or sump and draws water from your aquarium, mixes it with a solution of zooplankton and phytoplankton and drip feeds it back into your aquarium or sump. The plankton is kept in a suspended solution by means of an air inlet at the base of the reactor to prevent the food from settling at the bottom. The reactor can be run continuously and food is simply added via an easily removably cap at the top each day. Due to the slow water flow rates passing through the reactor plankton is continuously drip fed to your aquarium for up to 24 hours.

The reactor is manufactured to the highest standards in acrylic and comes with fitted taps at the bottom to control water and air inflow rates.

If you have a sump then the reactor can be connected directly to the return pump (or any other pump) by means of a straight connector and 6mm tubing inserted in the side of your return piping. Alternatively for ease of use the reactor can be connected to a peristaltic pump.

The Automatic Plankton Feeder can also be used as a Brine shrimp hatcher and then the newly hatched brine shrimp can be automatically dosed to your aquarium. Simply turn off the water supply to the reactor, add your decapsulated brine shrimp eggs, wait 24 hours for them to hatch and then turn the water flow to the reactor back on. This can also be done automatically with a peristaltic pump and a plug in timer.

Reefworks have been trialing this type of automatic feeding method on our coral farming facility for a long time now and the results have been amazing. We have used a number of different foodstuffs including live and dead phytoplankton, cyclopeze, rotifers, artemia and new freeze-dried calunus copepods powdered to roughly 200 microns which is around the size of an adult rotifer. These foods have produced excellent results in over 60 species of coral trialed when drip fed by this method. The Automatic Plankton Feeder can be used with numerous frozen, freeze dried and live food products.

The Automatic Plankton Feeder is available in two sizes, 200ml recomended for aquariums up to 300 litres and 500ml recomended for heavily stocked aquariums and those over 300 litres.

The reactors are available on their own or as a package with the new Williamson peristaltic pump.

The Automatic Plankton Feeder is ONLY available through Reefworks.

200ml reactor £39.95 500ml reactor £43.95

200ml reactor + Williamson 3ml/min peristaltic pump £86.95
500ml reactor + Williamson 6ml/min peristaltic pump £94.95

For further details please go to our website www.reefworks.co.uk or call Reefworks on 0208 290 4535 or 07930 357 995

Plant keeping made easy!! – No. 3

An aquarium becomes a truly beautiful underwater garden if you can successfully grow and maintain a healthy balance of fish and plants. Good plant growth in your aquarium provides much more of a natural home for your fish. They will become more confident, display brighter colours and are far more likely to breed. Red sea is proud to introduce a new generation of planted aquarium products to help you create that beautiful underwater garden. The 'Flora' program is a complete aquatic plant program consisting of four essential components. Each component is designed to address specific nutritional needs which are necessary for achieving optimum plant vitality:

Flora Gro is a comprehensive plant nutrient mix containing water-soluble nutrients and iron that are taken up directly through the plant leaf and stem structure.

Flora 24 is a complete water nutrient replenisher for the plants long term health. Many of the essential elements plants need to thrive are readily broken down or absorbed on a daily basis. Flora 24 is a daily additive that replenishes and replaces many of these sensitive elements. Added daily to the aquarium water flora 24 produces hardy, healthy aquatic plant health.

Flora Root is a hard granule, high in natural laterite that is designed to be mixed with aquarium gravel, replicating the natural substances in which aquatic plants flourish. In nature, bacteria that inhabit these substrates break down root acids, enabling the roots to take up the nutrients they need as required for maximum health. Flora Root comes with a packet of substrate bacteria, which become active after introduction into the aquarium.

Flora Dose is a convenient method of replenishing essential minerals in the aquarium substrate. Flora Dose is a tablet, which can be pushed into aquarium substrate where it will slowly release minerals and elements consumed by the plants. Flora dose is ideal for established aquariums that have already been set-up with a gravel bottom.

Red Sea's Flora program is a complete, easy to use, long term solution for outstanding aquatic plant success for aquarium's containing any amount of plants and fish.

Available at all good Aquatic retail outlets

Ryan turns Superstar!

End Point in the last issue of *Today's Fishkeeper* featured Ryan Shackleton, a 16 year old from Rawtenstall, Lancashire who had landed his dream job working at an aquatic store with assistance from Training 2000 – the largest independent training provider in the North West.

'Ryan's Story' has so impressed **Training 2000** that at the beginning of July they appointed BDP Media to make a short training video featuring Ryan in order to show to prospective companies willing to take part and/or youngsters who are apprehensive about joining the scheme. The training video, due to be released late November/early December focusses on the fact that Ryan nearly left his dream job at **Valley Aquatics** in Haslingden, Lancashire, due to not getting job satisfaction but, after discussions with the manager to sort out the problems/concerns, he saw the training through and was then offered a permanent post.

Plant keeping made easy!! – No. 4

For plants to really flourish and grow, they need a regular supply of minerals and organic substances. In nature the river or lake bottom provides this. To create natural conditions for lasting plant growth and development in aquariums Red Sea have brought out a patented, scientifically formulated substrate produced from natural volcanic ash-based soil, sintered with other materials into a soft, porous, granular structure.

The all-in-one plant aquarium substrate Flora Base contains all of the nutrients required by plants. Flora Base allows the root of the plant to penetrate, positively anchoring plants whilst allowing water and nutrients to flow freely past their roots. It is also an excellent filter media when combined with an under-gravel filter. The unique structure of the Flora Base granule enables it to actively absorb floating substances, removing cloudiness from aquarium water.

Flora Base will also act as a pH buffer, maintaining a stable pH between 6.5 and 7.00. This pH is ideal for almost all aquatic plants and will not affect the health of your fish.

Available at all good Aquatic retail outlets.

Roy Osmint

Bright Throat

"South of the border down Mexico way!" No – it's not intended as a cue for a song. But then again, if that's how you feel, why not! It is in fact a slightly cryptic geographical indicator towards Yucatan and Guatamala, the natural home of that lovely medium sized Cichlid popularly known as the Firemouth.

When some years ago I first produced a feature on this fascinating fish its scientific classification was *Cichlasoma meeki*. Since then it has been re-designated and now belongs to the genus *Thorichthys*. But although the name may have changed the fish, of course, remains the same - and what a beauty it is!

As a member of the family Cichlidae the Firemouth is part of one of the largest groups in the order Perciformes containing something around 1,300 species currently assembled into about 100 genera; only the Gobidae exceeding this with family members in excess of 1,800 species.

Cichlids are widely distributed in tropical and sub-tropical fresh waters in various regions across the globe.

Our subject, however, comes from Mexico where it tends to live in large expanses of open water. Also in certain cases in and around underground channels linking natural springs. In size the fish reaches up to about 15cm for male specimens, with females often 3-4 cm less than this.

In captivity, of course, ultimate size will, to a large extent, be dependent upon the circumstances in which it is housed. But fine specimens can certainly be raised in aquaria of suitable dimensions.

Apart from the Firemouth's strikingly attractive appearance and somewhat noble demeanour, another reason it has long enjoyed great popularity among fishkeepers is that it provides an excellent "size bridge" between the dwarf *Apistogramma* forms and the real giant heavyweight Cichlid species.

These together with other favourable attributes have given the fish desirable status, even among aquarists who would not perhaps normally consider themselves Cichlid enthusiasts.

Unmistakable appearance

In terms of appearance the Firemouth is unmistakable. Overall body colouration is greenish-grey with a lovely subtle violet lustre. The flanks of well developed specimens are adorned by five darkish vertical bars, whilst another runs horizontally from the gill covers to the root of the caudal fin.

Although these markings are often well defined and can appear at a glance to be continuous, closer examination reveals that they are constructed of a series of blotches, rather than lines, without clear delineation. The gill cover itself sports a conspicuous black spot of similar composition framed by metallic green. This shimmering hue is also often apparent on other areas of the head and body.

Firemouth finnage is frequently magnificent in both size and shape, not to mention posture. The posterior section of the large dorsal and anal fins are fashioned into beautifully sharp points, sometimes developed into lyre-configuration in adult males. The whole thing bordered with a blue-green to deep red colour.

But without doubt, the Firemouth's most distinguishing characteristic, and feature from which it derives its popular name is the brilliant fiery red of the throat area and lower jaw. In many specimens this vibrant colouration extends to the fish's chest and further onto the underbelly, though with lessening intensity. Early aquarists in fact often used the name Red-Breasted Cichlid as an alternative, a title which, in more recent times, has fallen into disuse.

Even during normal periods this bright throat is highly evident and is effectively the fish's crowning glory. But it is when the Firemouth becomes agitated, angry or when endeavouring to impress a partner with a view to mating that it is seen at its most distinctive.

The actual structure of the throat comprises of folds of loose skin below the lower jaw. When necessary the fish is able to puff it out, at the same time producing significantly heightened colour intensity. This effectively creates a fiery red ball of skin which, undoubtedly, has the ability to both attract members of the opposite sex, and to warn off other fishes who stray into the Firemouth's territory.

Whilst on the subject of territory, it should be borne in mind that this fish is a Cichlid and in character with this family has highly developed territorial instincts. That said, in my experience Firemouths do not generally exercise this instinct with the same determination or as aggressively as many of their close relatives. At least not until the time comes to mate!

In this respect they are very much "Jekyll and Hyde" characters. I have kept Firemouths in a large community aquarium of other similarly sized fishes with whom they have lived for long periods in comparative harmony. They tend, however, to be intolerant towards smaller members of their own species. These are likely to be at risk!

Apart from occasional demonstrations of defiance towards other inmates, which although apparently sometimes threatening, did not result in injury, everything remained generally peaceful. In most cases a puffing up of the bright throat being sufficient to deter unwelcome interlopers!

During courtship and mating, however, the situation becomes very different and the true Cichlid temperament becomes more evident. Other fishes that invade their space will be driven off aggressively. At this stage, if the aquarium is not of sufficient size and does not incorporate adequate retreats, murder and mayhem may result.

Another plus for this Cichlid is that outside the breeding period plants are likely to remain generally unmolested, although substrate excavation is, to some extent, to be expected.

Rogue fish can occur with almost any species, that is to say individuals that behave in a manner not normally associated with their kind. Firemouths, it

must be said, have gained something of a reputation in this respect. This is perhaps not surprising, after all they are Cichlids!

Careful monitoring, particularly of newly introduced specimens, is therefore necessary so that action can be taken where trouble is seen to be brewing. The best bet is to acquire juvenile fish of similar size so that they mature together. Watch out for slow developers, these are often targets for bullying.

The mating game

Breeding Firemouths is usually quite straightforward once a matched pair have become established. They do not, however, seem to appreciate "arranged marriages", preferring to select their own partners from a group.

A flat stone or terracotta flower pot positioned on its side is likely to be chosen as an initial nesting site. These should, therefore, be included in the breeding tank set-up. A rise in water temperature will often stimulate a matched pair into spawning.

To start with both partners will commence cleaning the chosen site until they are satisfied that it is spotless. When all is ready the female fish slowly passes over the prepared area and gently deposits a quantity of adhesive eggs. The male follows close behind to ensure fertilization.

This procedure is likely to be repeated several times until up to 500 eggs have been laid. "Mouthing" then occurs with the parent fish sucking eggs into their mouths and rolling them around before ejecting them back into the nest.

Any found to be infertile or showing signs of fungal infection are destroyed. To ensure a good circulation of well oxygenated water continually surrounds the eggs the parents use their pectoral fins in a perpetual fanning action.

It is quite common with these fishes for a "house moving" operation to take place. Where this occurs a completely new site may be selected, prepared and the whole family transferred across. Firemouths make excellent parents and during all phases of the breeding operation tend their offspring diligently.

It is, in my opinion, a truly wonderful sight to see a cloud of newly hatched fry being shepherded in tight formation by the parent fish. Watchful eyes constantly alert to the possibility of predatory attack upon the brood!

Raising fry to maturity should not normally present too many problems. It must always be remembered, however, that adequate space is needed to ensure the young fishes get a proper chance to develop.

All too often, especially with newcomers to fish breeding, attempts are made to raise far too many of the fry, sometimes even the complete brood, in what effectively is impossibly confined circumstances. The result being that the development of each fish is seriously inhibited.

Concentrate on raising to maturity only the number of fry that your rearing tanks will comfortably accommodate, taking into account future growth. As the young Firemouths grow, more space will be required as not all develop at the same rate and, as previously mentioned with this species, the larger specimens tend to be aggressive towards the smaller.

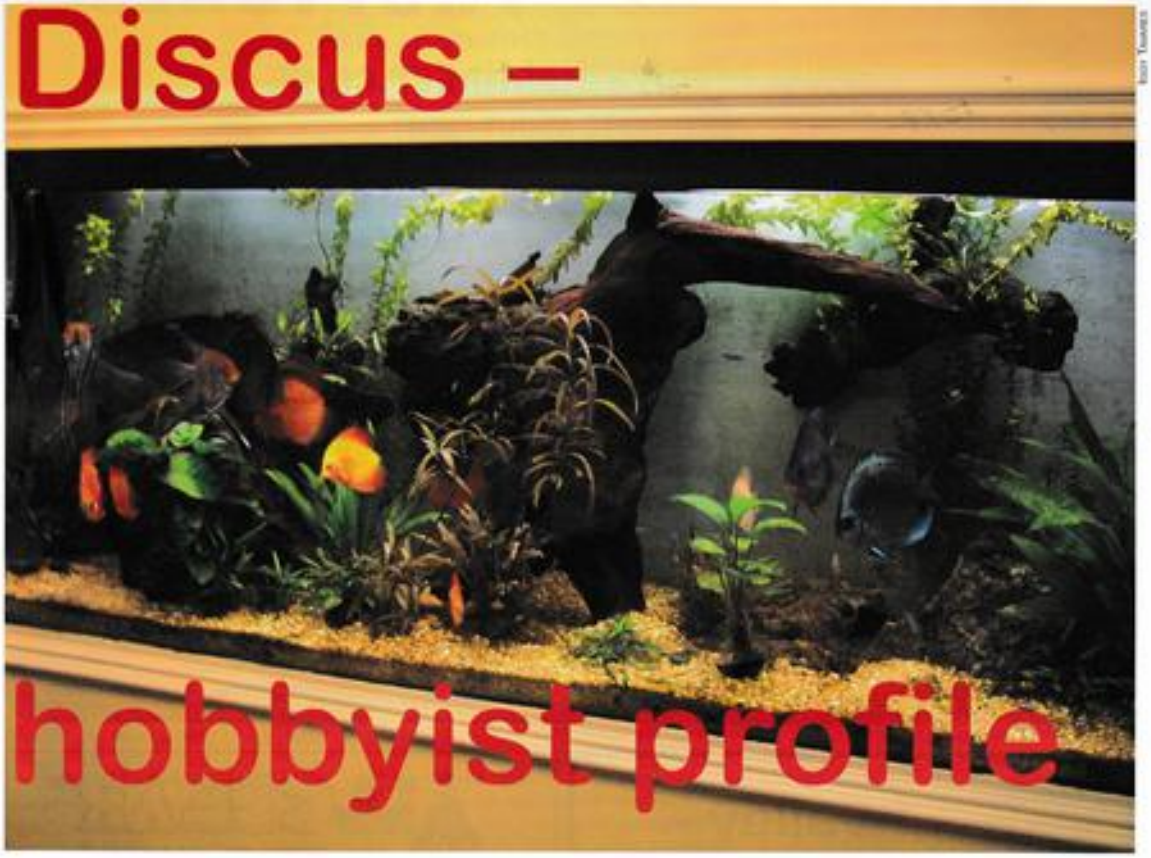
Conclusion

These are interesting and attractive fishes which, with reservations, can be regarded as generally peaceful and tolerant to a wide range of conditions.

For those, perhaps for the first time, wishing to keep a medium sized Cichlid, the Firemouth could be a favourable choice.

Iggy Tavares

Discus – hobbyist profile

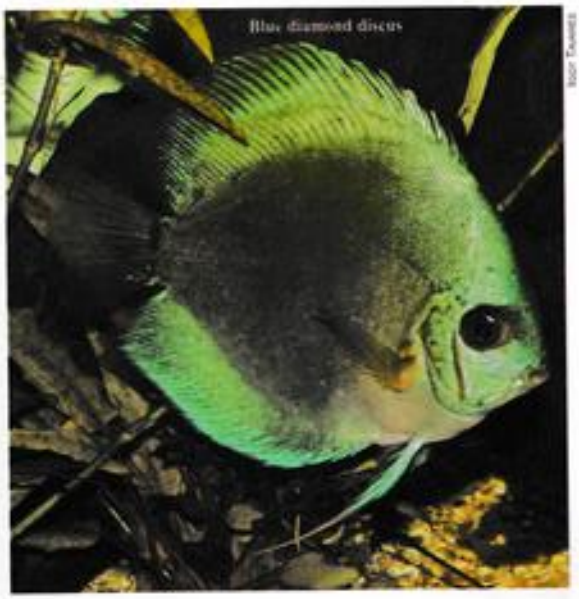


Carol and George Scarrott of Isleworth, Middlesex, have been keeping fish for a long time but developed a special interest in discus five years ago. At that time their main interest was to have a community tank that would provide a lot of colour and movement in their dining room without actually intruding into the room. Space is always at a premium these days and the ideal answer was to have an aquarium in the wall that did not protrude into the dining room. Today's aquarium was built in three years ago and replaced a smaller tank. The tank is about two metres long, 45 cm deep and 55 cm high with a volume of approximately 500 litres. This long tank is in many ways an ideal community tank as it can hold a lot of fish if need be.

Five years ago, following Kitti Phanaitthi's Pigeon blood discus revolution at the beginning of the 1990's, many very colourful discus were available in London. No longer was one confined to Blue diamonds and Red turquoise – very pretty in their own right. There was an explosion of colourful bright red, yellow and white discus that are available today. Carol and George decided to go for a mix

Bleached white discus


Peach passion pigeon blood discus


Blue diamond discus

of bold coloured discus. So today their aquarium is home to a colourful assortment of fourteen discus that include three Blue diamonds, three Red melons, two Peach passion pigeon bloods, two Bleached whites, a Red turquoise and two wild Green discus.

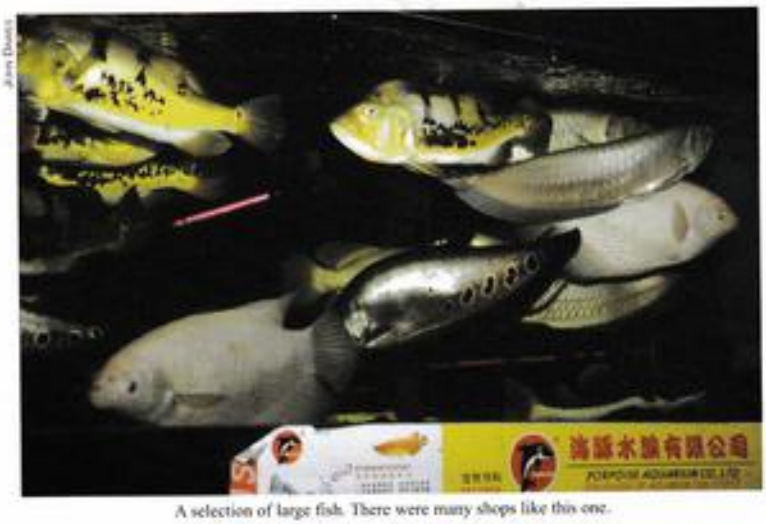
Discus, apart from feeding times can be sedate. So to add more colour and motion, the tank now houses a nice shoal of Cardinal tetras and another of Blue mollies. Discus purist will certainly not be happy that a beautiful pair of very large Veiltail angelfish also live happily in this tank. There is the suggestion that having angelfish in the same tank as discus can lead to disease outbreaks among the discus, but this has not proved to be the case here. The angelfish were bought as youngsters two and a half years ago and have developed into beautiful adults. They could well be a pair as one of the angels has a pronounced nuchal hump although there have been no breeding attempts as yet.

This aquarium has a 5cm layer of sand on the bottom and is nicely decorated with two contrasting pieces of bogwood, one which is wide and flat and covered in moss and the other that is nicely branching, through which the fish can swim. A large selection of plants decorate the tank including nice healthy growths of Amazon swords, Cryptocorynes, a large Anubias, Bacopa and Hygrophilia. The aquarium water is mainly reverse osmosis water with some tap water and other additives added to stabilize the pH. George has cleverly devised a system for changing water in this tank which ensures that not a drop of water is spilt in the dining room during this procedure. The aquarium is linked to two pipes fitted with valves – one to take waste water directly to the drains and the


Young Red melon discus


Breeding pair of Leopard discus

The China Experience – Part 2



A selection of large fish. There were many shops like this one.

There are markets...and markets!

Getting up at 5.30 in the morning to go to market is not something that I am in the habit of doing. However, when the market in question is exclusively dedicated to ornamental fish, aquatic plants, shrimps, crabs, amphibians, turtles and aquatic products...and when the fish shops begin to close at 8.00a.m....you have very little choice. Either you get up...or you miss out on an incredible experience.

It was, thus, in a glassy-eyed, less-than-awake state of mind and body that I met up with three equally 'energetic' friends and colleagues in the foyer of our hotel in Guangzhou to visit the city's justifiably famous Fangcun Fish Market.

Awe-inspiring Market

Often, a place that is reported to be exceptional for one reason or another, or that is supposed to be absolutely unmissable, turns out to be a disappointment. This is not, however, the case with the Fangcun Fish Market. It was everything I had been led to expect...and a little more besides.

Spread out over an area of 100,000 square metres (yes – over 1 million square feet!), this market is much more than a market. It's almost like a small town, but one in which every street on one side of the main road is lined with fish shops...over 600, in fact. Birds and flowers have their own, smaller, market in the opposite side.

According to some publicity literature that was available, the Fangcun Fish Market, which is part of the Yue He Flower, Bird and Fish Art World, is the largest market of its kind in the world. I have not seen documented proof of this, but, after visiting it, find it difficult to believe that there could be a larger fish market anywhere else. Beijing and Shanghai do have large markets of this type, but all the reports I picked up suggest that Guangzhou's is the

How about this for a rarely seen spectacle? These are Idochina featherfins (*Chitala blanci*)

This small stall sold only discus – all of them extremely healthy

A shop specialising exclusively in fancy varieties of goldfish

largest...and by a considerable margin. Certainly, none of the other equivalent markets I've visited in other countries – even the large ones, such as Mexico City's – pale into insignificance, i.e. size-wise, compared to the truly awe-inspiring spectacle awaiting the fish enthusiast in Guangzhou.

Quality, Price and Size

We were like children in a toy shop. Everywhere we looked, there was something fascinating, but what struck us, perhaps above everything else, was the quality of the fish. It was outstanding.

Although there was little time at our disposal, owing to the early closing of the fish shops and stalls, and although the pictures I took were either under shop conditions in which the glass fronts of the tanks were not always spotlessly shiny, or of fish in plastic bags, the selection I've included in this article shows that the health status of the fish was, indeed, very good. As one of my friends (from Holland) remarked, "You can't get better fish than this in the shops in Amsterdam". I tend to agree.

Another surprising fact related to the prices, with 30cm silver arowana (*Osteoglossum bicirrhosum*) and Chinese hi-fin suckers (*Myxocyprinus asiaticus*) costing no more than two US dollars! Applying this across the vast range of species available, we came to the conclusion that some of the smaller, easy-to-breed species were being offered at real give-away prices – at least, by European standards.

There are other interesting differences, too, for example, relating to the Chinese (and, on a more general basis, Oriental) love of large fish. A very high percentage of shops had either numerous small specimens of large species, including clown knifefish (*Chitala chitala*), peacock cichlid or tucunaré (*Cichla ocellaris*), the above mentioned silver arowana and highfin sucker, giant gourami (*Osphronemus goramy*), plain-body prochilodus (*Semaprochilodus taeniurus*), red snakehead (*Channa micropeltes*), red-tailed catfish (*Phractocephalus hemioliopterus*), garfish (they looked like juvenile spotted gars, *Lepisosteus oculatus*) and, even, the gigantic arapaima or pirarucu (*Arapaima gigas*).

Reeve's turtle (*Chinemys reevesi*) – one of three species available on the morning of my visit

African rift lake cichlids were available in a number of shops and stalls

In some countries, often those where such species occur in nature, large fish are frequently collected, not for aquaria, but for human consumption. In Europe and the US, a minority of these fish is also destined for public aquariums or other types of public exhibits. However, I was repeatedly informed that the vast majority of large fish being sold at Fangcun were destined for home aquaria.

While, at first, I found this a little surprising, since the approach in the West is quite different, the more I thought about it, the more I realised that this is quite true. In the West, few shops sell large fish in any quantity and some only rarely stock large fish at all. (Koi, of course, are a notable exception). In the

East, though, most have, at least, several tanks with large fish. The fact that the most legendary of all Eastern species, the dragon fish (*Scleropages formosus*), is large and highly sought after in the Orient, owing to its reputation for bringing luck, health and wealth to the owner, may well have something to do with this. There therefore appears to be an almost inbuilt positive predisposition towards large fish among our Eastern counterparts that we don't quite share to the same extent in the West.

Yet another striking feature of the Fangcun market is that some shops and stalls deal exclusively either in one type of fish, say, goldfish, or discus, or one size of fish, e.g. large.

Other Organisms

While the livestock component of the market was dominated by fish, some stalls specialised in other organisms as well.

A few sold turtles and nothing else. The vast majority of specimens were quite small, the sort of size that was common in imports of red-eared terrapins (*Trachemys scripta elegans*) into the EU until they were banned several years back. Sale of this species in the Far East is not, however, banned and a large percentage of those being offered at Fangcun were red-ears.

A second species I came across was one that I had actually seen hatching at a Malaysian turtle farm some years ago. At that time, I was staggered at the high level of aggression exhibited by the baby Chinese soft-shelled turtles (*Trionyx sinensis*) from the moment they struggled free of their egg shell. Straightaway, they were at each others' throats with the sort of blind viciousness that can only be 'ingrained' in the genes.

Somewhat more sedate were the subtly beautiful Reeve's turtle (*Chinemys reevesi*), hundreds of specimens of which were on sale. Growing to around 6in (15cm), this is perhaps the Asian terrapin most commonly seen within the hobby.

In terms of amphibians, I only came across one species...a stunning black newt with a very attractive tail that was spotted and had a lower orange edge. The closest I have come to in my identification of this species is the spot-tailed newt (*Pachytriton brevipes*) found in mountain streams in southeastern China. This attractive species grows to around 5-6in (13-15cm) and prefers cool water.

These beautiful amphibians are almost certainly Spot-tailed newts (*Pachytriton brevipes*)

Among the crustaceans, two types were available in much greater numbers than the others: the Louisiana red swamp crayfish or red lobster (*Procambarus clarkii*) and the most spectacular of all the crustaceans on show: the incredible watermelon fiddler crab (*Uca annulipes*). This really is a strikingly coloured species which, according to the gentleman who was selling them and who assured us that he was breeding them in their thousands, is an easy species to keep in captivity.

When asked how he could sex the crabs, he said that males have the left claw enlarged, while, in females, the right claw is the over-sized one. He said that this was the criterion he used in selecting his broodstock. This seemed most odd to me, since, in fiddlers, the sexes are traditionally identified by the fact that females do not possess enlarged claws at all. Since my return, I've tried repeatedly to find references to the male-female differences as described to us at Fangcun market, but can only find the small/large-claw criterion mentioned for this species. Perhaps some reader knows otherwise? If so, please let me know.

Finally, on the crustacean front, there were some hermit crabs with exceptionally attractive whelk shells and smaller ones in a selection of periwinkle shells, top shells and small whelk shells. I couldn't identify the species of crab in question but (again) perhaps one of our readers can enlighten me?

The 'Plant Street'

Among the packed streets of Fangcun Fish Market, there's a long street dedicated exclusively to plants. And what plants!

This was a truly mouth-watering experience for me, not just because I love

One of perhaps a hundred or more plant stalls

Watermelon fiddler crabs (*Uca annulipes*) are, according to one of the traders at Fangcun, being bred in quantity in the region

A novel way of selling aquarium plants and decorations simultaneously

aquatic plants, but because the range and health of the plants I saw was quite exceptional.

There's little point in enumerating all the species that were available, of course. The accompanying photographs will give readers an idea of what I mean. I will therefore restrict myself to mentioning just a few of the more unusual examples.

Among these were decorative items covered in plants. One of the photographs shows a boat – complete with fisherman! – coated in a plant that could be *Lindernia rotuntifolia*, *Hemianthus micranthemoides*, creeping jenny (*Lysimachia nummularia*)…or something else. I couldn't tell at a distance…and the photo hasn't helped me to track down the true identity of the species. Another species – a much shorter one, probably *Glossotigma elatinoides* was being sold as turfs, i.e. short lengths of aquarium 'lawn'.

The rose of Jericho or resurrection plant (*Selaginella lepidophylla*) is normally sold as dry rosettes which unfurl into impressive green plants when soaked. In the 'plant street', they were sold fully submerged and expanded – most impressive indeed. Not being a truly aquatic plant, my guess is that it won't last forever underwater, but, being a moss, it is likely to survive for quite some time.

Also impressive, but in a totally different way, were the superb tropical water lilies with their erect long-stalked blooms which can extend 30cm or more above the water surface. These colourful plants only survive during mild summer weather in most parts of northern Europe, requiring to be brought indoors during the colder months. However, in the extreme south of Europe, some varieties may well survive the winter, as long as they are kept at a suitable depth, or as long as the winter is not too severe.

Tropical lilies such as these are a common sight in the Far East, but much rarer in Europe owing to their rather delicate nature

Time Runs Out

It was only grudgingly that I was able to pull myself from the 'plant street'. There was so much to see that one could easily have spent many hours there. However, as all the plant and fish shops and stalls were closing down as 8.00a.m. approached, we had to move on.

Owing to other pressing engagements, we only had very limited time for the dry goods shops, but, from what we could see, they had every imaginable food and product available. This was often in large quantities, as in the case of bogwood/rock, aquarium gravel and media, free-standing ceramic fountains and small aquaria. There was even a shop selling tubifex worms (under the name of bloodworm) by the kilo.

The one type of shop that was significant by its almost total absence was that specialising in marines. We did find one, but even then, the fish (of very good quality) only formed a part of the shop's offerings. This was in keeping with the few marine set-ups that I had seen on display at Aquaria China '04 (see my report in the March issue of *Today's Fishkeeper*). Marine aquarium keeping is undoubtedly still lagging a long way behind the freshwater sector in China. I don't know if it will ever achieve a level of popularity equivalent with that which it enjoys in the West but, if it does, the Fangcun Fish Market will most certainly be the place to visit to see the best and latest fish, invertebrates and products. I look forward to that!

PHOTO NOTE

Although I was allowed to photograph individual shops, stalls and aquaria – having first obtained the approval of the respective owners, of course – the Fangcun security officers would not allow me to take shots of whole streets or rows of shops within the 'town' i.e. built up, part of the complex. Most unusual, but I'm sure there's a logical explanation… somewhere…

Aquarium gravel and other substrata in a bewildering array of sizes, colours and types

This has a most unusual and interesting selection of ceramic fountains which are hardly, if ever, seen in Europe

John Rundle

Looking Back

IGOR TAVARES

I have been lucky enough to have obtained beautiful bound volumes of the very first and early editions of the *Aquarist and Pondkeeper* magazines. From these early issues I will select a species of fish and compare how it was kept and bred then and now.

In my last 'Looking back' article I wrote about one of the earliest accounts of keeping in the Angelfish (*Pterophyllum scalare*) in this country. Now I will write about what must be one of if not the first account of a breeding record of these beautiful fish. It was written by the Rev. Bartram Stower with the title "Angel Fish and Their Breeding Habits" it was in the winter 1929 edition of *The Aquarist and Pondkeeper*. What follows is not the full text of his article only the relevant parts with the original wording that accounts for the style of writing found in 1929. This can be noted that at this time Angel Fish is two words, not as we now find it as one word, Angelfish.

The article starts with the sentence "The following account contains the history of twelve Angel Fish which were purchased from Messer's. L. Curra and Sons, Naturalists, two years ago."

The author went on to say. "The twelve fish that were the size of a shilling (the size of 10p) were held in a glass tank but did not appear to grow, so two of them was passed on to Mr. S. G. Brown of 'Brownlands', Shepperton, Middlesex. He placed them into a water-lily pond that was situated in a tropical conservatory.

This pond is some fifteen feet in diameter, three feet deep and heated by submerged pipes. At the time *Platypoecilus maculatus* (we now know it as *Xiphophorus maculatus*) was also in the pond. The experiment proved highly successful, and within a fortnight the two scalare had doubled in size. As a result the remaining ten were placed in the pond, where they throve in a surprising manner and in perfect harmony with its other denizens.

The pond abounds with a glutinous dark green algae which grows thickly on its sloping sides. It is also full of large tropical water lilies, and water hyacinths. The only artificial food provided is a daily handful of Spratt's fine fish rearing meat meal mixed with an equal quantity of their fine biscuit meal.

The temperature is maintained at between 70° and 80°F and about 20 gallons of water is run in daily.

On August 3rd last, the presence of a pair of scalare among the roots of a pink water lily, and their unwonted boldness in refusing to be frightened away even when an attempt was made to touch them, a brood of young fry clinging to the stem of one of the pink lily-leaves, like transparent flies and closely guarded by the parent fish.

A smaller brood was also discovered on another leaf and removed to a small aquarium, as according to writers on the habits of scalare the parent fishes usually devour their young after a few days solicitous attention. The fry all died in the aquarium died within a week.

August 4th. The brood in the pond was discovered to have migrated to a white water lily some six feet distant from their original home. Both parents were alert and guarding the young fish. Although a fair number of the youngsters clung to the stem of a lily leaf, many others were actively swimming around, evidently seeking Infusoriae, and it was observed that those strayed beyond the guarded areas were quietly collected by the parent fish in their mouths and gently ejected on to the lily stem. This charming evidence of parental care on the part of the angel fish was, however only

IGOR TAVARES


IGGY TAVARES

observed on this one occasion.

August 5th. A second brood was discovered which had evidently hatched at the same time as the other. Some of the fry were even observed to swim up to their parent's fishes and rest themselves for a moment on their bodies.

August 26th. Their overall measurement is fully _" from head to tail, there was about 200 fish. It is naturally disappointing that the spawn was not detected before they hatched; but it may here be said that, had the parent fish fanned and circulated the water around the spawn as it is said they do, this action would have at once attracted the attention of the writer, and would have been plainly visible as the lily stem on which the fry hatched was barely six inches beneath the water and close to the side of the pond.

It may thus be suggested that this so called "fanning" of the water around the spawn, presumably by the antennae, is no more than the threatening and pugilistic attitude previously mentioned and adopted by the parent fish in protecting their spawn and young.

At any rate, this peculiar and distinctly foreboding "sparring" with their "antennae" is still adopted by the angel fish here described, and have so far lived up to their name and altogether behaved in an exemplary and angelic manner.

J. RUNDLE'S COMMENTS

An interesting point at the end of the article was that Mr. E. G. Boulenger, F. Z. S. Director of the Aquarium of the Zoological Society of London a very famous aquarist visited the breeding site along with other prominent aquarist of the time confirmed that the angelfish Pterophyllum scalare had never been bred in this country before this time. While there were records of them being bred in the U.S.A. in 1921 but not on a regular basis. Mr. Boulenger took some of the angelfish with him for the London Zoo aquarium.

I have made some points from the article and compare it to what we know today.

1. Do we now take the breeding of angelfish for granted?

Answer: Yes in some ways we do, when you consider the many colour varieties and the large numbers of fish available to aquarist. I know that these fish can still be a bit unpredictable when we wish to breed them, but we do now have the knowledge to correct any problems.

2. The method of breeding in the pond and not in tanks.

Answer: It is interesting to read that in the beginning the angelfish did not appear to do well in a glass tank and it was the reason that they were moved to the large tropical pond. Now we do not have problems with keeping them in glass aquariums. I wonder that back in 1929 the equipment such as heating and filtration was not so good as it is today.

Having said this the large numbers of fish that survived proved that this method successful.

3. Choice of Foods.

Answer: What was obvious in the article that there was not the vast choice of dry foods we can feed to our fish now. It is not only range of foods that we have but the quality must be far superior to what was around then. This also may have been a reason for slow growth in the glass tank.

For feeding the new free swimming fry the breeder of the angelfish relied on natural infusoria that was in the pond and it looks like the Spratt's fine fish rearing meal. Now we know that angelfish fry will take live brine shrimp nauplii for their first meal. This excellent live food is a must to anyone breeding angelfish.

4. Parental Care.

Answer: It must have been wonderful for them to witness for what we now know was the first time in this country the parental care of the fry. Though it was interesting to read that they doubted that the parents fanned the eggs. They thought that it was a threatening behaviour pattern.

We now know that the angelfish parents do fan the eggs to help them with a supply of oxygen.

I am so glad that I have this article that records a step forward in the history of tropical fish breeding in this country and I hope that you found it interesting. Remember that *Today's Fishkeeper* was once called the Aquarists and Pondkeeper.


IGGY TAVARES

Erwin Schraml

Asian Plecs

"What is that catfish that I bought in my local pet store under the name 'Asian pleco'?" This is a frequently asked question that comes up in discussion forums like Planet catfish. Normally it is not a plated catfish bred in Southeast Asiatic ponds but a hillstream loach. I do not believe this mistake is only one of language because with "Hillstream Loaches" and "Suckerbelly Loaches" two suitable common names are available. I think it is possible, that this misnomer is desired by the trade because plecos are booming. Therefore everything that might be called "pleco" sells better and for a higher price.

A so-called "Asia Pleco", Aquarium-Atlas Vol. 5 recognize it as *Hemimyzon sinensis* (p. 88) and *Pseudogastromyzon fasciatus* (p. 98). Freybof (2004) illustrates a similar animal with larger dots at head and anterior body (a younger specimen?) under the name *Pseudogastromyzon changtingensis*

Evolution has helped this opportunity for confusion, because many hillstream loaches in Southeast Asia inhabit the same ecological niche, which are occupied in South America by plated catfishes. Through convergent evolution both groups have developed their body shape to the optimum for their given environmental factors. Similar bodies have thus emerged, completely independent of each other. In both cases they are greatly flattened, with pectoral and ventral fins, acting as spoilers and pressing the fish to the ground beneath the streaming water. In addition suction was developed, in plated catfishes the well-known suckermouth, in hillstream loaches a suction cup like area which is formed by the belly and the two paired fins.

Suckermouth (L147) and suckerbelly (*Pseudogastromyzon myersi*); two trends in the evolution of fish developed for the same reason: they serve for the suction of the animal to the ground

Oops! some say that this description is not correct for all hillstream loaches. In the family Balitoridae, as they are scientifically called, some big differences exist.

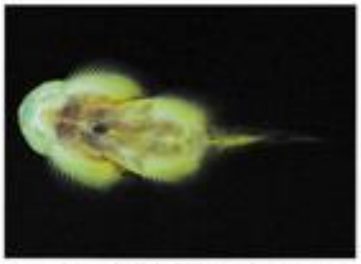
The relatives of the subfamily Nemacheilinae are the usually known loaches,the Cobitidae, even more so. Therefore hillstream loaches, in the more narrow sense, are those placed in the subfamily Balitorinae. But even here we still find differences, because only some of this group have the name "Flat Loaches" used in Germany for these really flat loaches. The degree of the deformity of the ventral fins proceeds mostly with the flattening. To avoid further confusion it is perhaps better to refer to those species from now on as suckerbelly loaches, a name which is already being used for them.

Even the suckerbelly loaches have developed a more perfect adjustment to fast streaming waters than the neotropic suckermouth catfishes. But if we think about *Chaetostoma* and about the little known *Astroblepus* (even if the latter are not plated catfishes, they can surely be referred to as "suckermouth catfishes") this is relativized a little because placed in those groups are species which live in the mountain regions of the New world.

The adaptations of the suckerbelly loaches create some problems for housing them in our aquarium. It starts with the right way to catch them in the pet shops. Because in contrast to the plated catfishes these animals aren't armoured, and additionally they are relatively small fish, so they are also relatively vulnerable. Particularly so because at each attempt to catch them, they mobilise whatever they can against to be picked off from the ground. Therefore it is almost impossible to get the net under such a fish – if it is healthy. The simplest way to catch them without injuring them is, in my opinion, to push them to the side glass of the tank (one without a strut), with the net upwards until the animal is lifted halfway over the edge of the tank where it can be flipped over with one finger of the other hand into the net.

Both are members of the family Balitoridae and therefore hillstream loaches. On the left hand side: a member of the subfamily Nemacheilinae, a not yet identified *Nemacheilus* or *Schistura* species, which was introduced via Hongkong; on the right hand side: from the same import a member of the subfamily Balitorinae and still not a real suckerbelly, probably a representative of the genus *Liniparhomaloptera*.

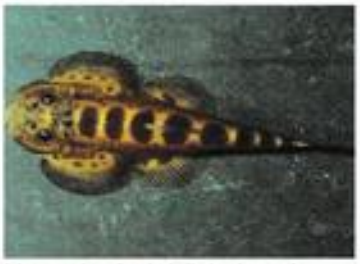
Chaetostoma (here *C. milesi*) and *Astroblepus* (in the picture *A. sabalo*) are the true pendants of the suckerbelly loaches which live in fast streaming waters.



At any danger the little fellows suck themselves to the underground with everything what they can mobilise, therefore they are not easy to catch in an aquarium

Another problem is created because these real hillstream loaches originate from areas which are normally extremely clean. Almost every aquarium is, because of its very limited space, an ideal breeding ground for bacteria. Robert Guggenbühl has presented this once very vividly on a DATZ - forum. Even samples from evidently dirty canals in nature showed in build up culture jars only a slighter increase of bacteria than those from an apparently clean aquarium. We should avoid, if possible, housing suckerbelly loaches in an overpopulated aquarium, which is purified only sloppily or overfeeding causing pollution. Because the animals need highly oxygenated water the temperature of the water should not be too high. Often for this fish temperatures of 18 – 22°C are enough (some not yet introduced species from China, are even coldwater fishes). It is advantageous if a strong water current is installed.

Beaufortia and also other species are algae-eaters, therefore one can leave the cleaning of the inside glass to the suckerbelly loaches and not scrape off their food. On the contrary it would be advantageous if one gave these animals an aquarium with strong growing algae. Additional food offered is not recognised by some species so it rots and pollutes the water. If we house such algae eating fish, it helps if the tank is exposed to a strong source of light to increase the production of algae. It would make sense to exchange algae rocks from other aquaria from time to time (in summertime the rocks could be placed outside in a tub). *Gastromyzon* and *Hemimyzon* species for instance are less problematic on their dietry requirements. If the animals are healthy, which they often show through an active search for food, all kinds of edibles can be offered for them to try, like algae wafers, food tablets, frozen bloodworms, brineshrimps, also blanched spinach and lettuce leaves. But everything in moderation and if it remains untouched one needs to remove it!



Many species of suckerbelly loaches prefer colder water temperatures, on the photograph *Sinogastromyzon wui*, which can be housed at 18 – 26°C, but not all the species are in this regard as tolerant

If the fish become sick, treatment is difficult because they do not tolerate various medications, particularly those that contain copper. This is a problem that friends of plated catfishes know. On the internet forum for loach lovers (Loaches Online: www.loaches.com/index.html) the medicines Marycyn-Two (active agent: Minocyclin) and Marycyn (active agent: Erythromycin) are referred to, which have helped in some cases. This is surely not the first time that aquarists have been advised to run a quarantine tank.

With suckerbelly loaches I have noticed that some species avoid the sandy soil (in my tanks this were *Beaufortia*). They preferred always a firm under surface like rocks or a side glass. Actually sand might be a rare component in the natural habitat of these fish, because it would be washed away immediately in the rapidly fluent stretches of water. Plants have therefore a predominantly decorative purpose in an aquarium for suckerbelly loaches. Because these animals are neither armoured nor well-fortified, it is very unwise to house them with species which bother them or even nibble at them.

Some suckerbelly loaches like *Beaufortia kweichowensis* avoid sitting on a sandy soil

Suckerbelly loaches have been bred repeatedly. Often this was unintentional and mostly triggered by an additionally installed power head. Martin Thoene reports in Loaches Online about his experiences with *Pseudogastromyzon cheni* (according to Freyhof (2004) probably *P. myersi*). According to the report this species only has small broods, however once they begin, they spawn every couple of weeks. The male digs a spawning-pit by adhering itself at a somewhat larger pebble and with side strokes of its tail fin pounds away the gravel under it. The mating is composed of a dance of the male with fluttering movements around the female. Normally males are very territorial (this is the case in many algae eating fishes, because their basis of food is not very rich, and therefore they must defend their "fields" against co-devourers) and chase away females. However when females are ready to spawn it is quite different. The

Pseudogastromyzon myersi, was already spawned in captivity. In the picture the fish has sucked itself at the tip of a finger. In the hobby literature this species is called *P. cheni*

males develop during the spawning season more greatly developed nasal tubercles. The spawning act itself was never observed and the fry were seen for the first time when they reached a size of about half a centimetre and were already grazing like their parents from the rocks. A special feeding of the juveniles therefore was not necessary.

Philipp Dickmann reported in the magazine "Das Aquarium" (9 and 10/2001) about his successes in the reproduction of *Gastromyzon punctulatus* and *G. monticola*. The interested reader may refer to the very detailed reports there. It remains to record, that these animals are evidently free spawners with sinking eggs which will not be placed in a prepared pit or any other breeding ground. He stimulated *G. punctulatus* to spawn when he lowered the tank temperature from 32 to 25°C, at the same time it was recorded that there was a sudden change to adverse weather with corresponding changes of the barometric pressure. The recorded very high temperatures at which the species were kept show that all suckerbelly loaches can't be lumped together, and these animals need pretty different husbandry requirements.

Gastromyzon punctulatus could be spawned in an aquarium

Finally Hans Beiderbeck characterised chiefly in "BSSW Report" his experiences with a *Beaufortia* species (he supposed that it was *B. leveretti*) and pointed out that this species is much more delicate in its food preferences than *Gastromyzon*. His specimens have never devoured algae (my ones did and even predominantly) but preferred frozen bloodworms, FD Tips, PlecoMin and Viformo. His specimen left the side glass only for a short-term (like mine) and had difficulty in locating offered food. Firmly arranged feeding grounds was the remedy. Still he could not keep his fish alive for longer than six months. He supposes, that the fish were kept too warm despite a water temperature of only 22°C, because this species originates from South China, where the air temperature can sink to freezing point. He supposes furthermore that this led to fast metabolism, which the animals could not equalize through food assimilation. Even if doubts exist if his animals are *B. leveretti* and not *B. kweichowensis*, his arguments might count for both species.

Beaufortia kweichowensis, in the trade it is mostly called *B. leveretti*

The problem of the right species identification is raised yet again. It is normally only with the right determination that one can suggest the natural living spaces of the acquired fish, and so for the requirements of housing regarding the temperature. This is not simple at all. Jörg Freyhof recently has characterised in DATZ (12/2004) the differences of the frequently confused species *Beaufortia leveretti* and *B. kweichowensis*. According to him the dotted animals, which we normally keep in our aquaria, are always *B. kweichowensis* from South China, while it is more unusual, for *B. leveretti*, an endemic fish from Hainan island, to be imported. This problem appears to be the same for many other species. In fact even if mostly the same species are introduced, which can be determined by using the relevant reference books (in this case the Photo Index of the Aquarium Atlas is pretty useful), but again and again there are new species, about which nothing has yet been published in the aquarium literature. Especially the family Balitoridae, which should comprise, according to the Photo Index, about 470 species, with this high number one can see they are only inadequately known in the hobby. In diverse online forums, however, there is the possibility to shift a determination problem to a larger number of interested people. This is most effective, if a photo of the specimen can be taken and posted on several forums. Perhaps, there one can meet others who have already successfully housed this species and can give valuable tips. Because these species cost in the trade comparatively little, it is to be dreaded, that a large number fall into the hands of laymen, who do not ask for the details of the fishes needs. Seeing it this way it is a bummer that "Asian Plecos" aren't as expensive as their South American counterparts, for which many, for monetary reasons, are poised to house them under optimal conditions.

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Two undetermined suckerbelly loaches, which were introduced to us via Hongkong, and which have not yet been mentioned in any aquaristic reference. The species on the left side could be named Ruststripe Suckerbelly Loach (a bycatch amongst *Beaufortia kweichowensis*) and the little fishy at the right hand side could be called Reddot Suckerbelly Loach, because of the big, dark red dots, which it has along the middle axis within the pale bars

Alf Jacob Nilsen

Frogfishes

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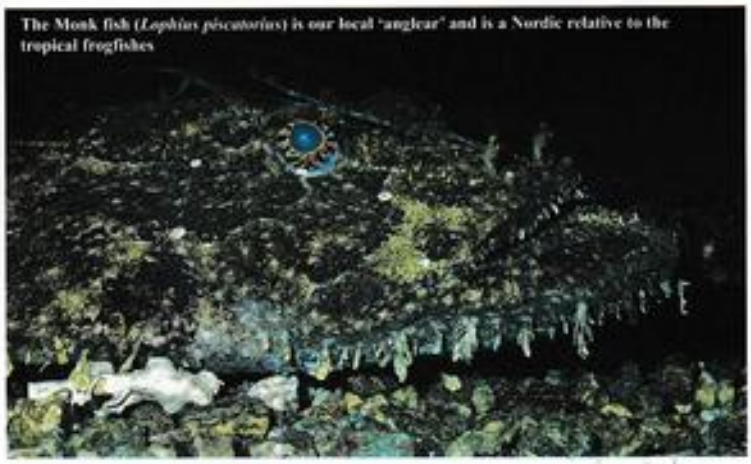
"This fish is beautiful because it is so ugly" (Axelrod & al., 1975)

Today the community coral reef aquarium has become very popular. Aquarists want to keep corals, other invertebrates together with small, relatively harmless fishes in a colourful display. The "fish only aquariums", which were common in the sixties and seventies have nearly vanished, or at least become much less frequent among marine aquarium enthusiasts. We should, however, not forget that there are a number of most interesting fishes to be kept in selected fish-tank, fishes that show a remarkable behaviour and that look almost bizarre. The "frogfishes" are an example of such.

The Frogfishes belong in family Antennaridae, which is a member of the order Lophiformes or "Angler-fishes" in common language. The most common "Angler-fish" in our own waters is the "Monk fish", *Lophius piscatorius*, which is commonly found along the coast of Norway and the British Isles. The Monk Fish has become a delicatessen lately. When I was a kid, local fisherman threw the fish overboard, but these days it is beloved and sold to a high price. Like its tropical relatives the anterior-most dorsal fin-ray is long and slender and has a terminal flap that resembles a bait.

My first encounter with frogfishes was in the Maldives back in 1980 when I met this pair of *A. commersoni* at 20 metres deep. The fishes rested in a branching sponge on top of the boulder and remained there three months later when a friend of mine dived the same location!



The Monk fish (*Lophius piscatorius*) is our local 'anglear' and is a Nordic relative to the tropical frogfishes

OK... back to the Monk-fish' tropical relatives. There are 12 different genera of Frogfishes, but aquarists usually come in contact with specie belonging to the genera *Antennarius* and *Histrio*. We shall deal briefly with some of the species later on.

The first time I ever saw a frogfish was on a dive in the Maldives back in December 1980. We had spent 2 weeks on the beautiful island of 'Kurumba', not far from the airport-island and did two dives daily. At one of our last days we ended up at a sand flat at about 20 metres depth. Although we looked carefully around on all life close to us, it was not until several minutes had passed that we discovered that two large frogfishes – one beige and one black – rested in a branching sponge that grew on a boulder lying in the sand. Indeed an exciting sight! The fishes could be approached up close and did not move although we were at a distance of only a

few inches. I assumed the fishes, although having opposite colours, were the same species and probably a pair. Colour variation is in fact very common among frogfishes, both between species as well as individuals.

Now the remarkable thing about this story is that when a friend of mine dived the same spot three months later, the pair of frogfishes remained in the same sponge on the same boulder! Frogfishes do not move around a lot, but remain still relying on their perfect camouflage and stay on the same spot for a long time if food is available.

Peculiar shapes

In contrary to the European 'Monk Fish, which are flattened dorsally, the Frogfishes are flattened laterally. The body of frogfishes is mildly expressed 'clumpy', almost without a particular shape at all. The pectoral fins are modified to look leg-like with feet and toes. The fish has quite often several patches, warts and hairy-like or bushy structures unevenly distributed over the body surface, while the thick skin lack scales and is somewhat loosely attached to the body. The gill opening is shaped like a tubular siphon and is placed behind the pectoral fins, not in front of them as in nearly all other fish types.

A spineless and loose skin, lack of poisonous slime and no long sharp teeth, give the frogfishes little protection to enemies. Instead of relying on such features, the frogfishes rely on camouflage and mimicry. They mimic invertebrates and can change colours to adapt to their surroundings and do in these ways become nearly invisible. This also explains why Frogfishes are very stationary. If they are moved to different habitats, they will change colours over time, which will also happen in aquariums. To prevent color changes from happening in captivity the decoration should have more or less the same colors as the frogfish.

Feeding

Frogfishes are fishermen. They have the first dorsal spine (known as 'illicium') modified to resemble a bait, most often a worm. The shape of 'illicium' varies from species to species. By waving the fake bait they allure other fishes to come close. Not only "fishing" or "luring" are used for catching suitable preys. Frogfishes can also sneak up to their prey by "walking" over the bottom layer on their modified fins.

The shapes of 'illicium' of three different frogfishes: A) *Antennarius randalli*, B) *Antennarius pauciradiatus* and C) *Antennarius maai*. Drawing by S. Fossá in Fossá (1982) but based on Allen (1970)

considerably bigger than the frogfish itself and even fishes that contain heavy poison can be eaten. Michael (1998), who is an excellent source on reef fishes and also giving details on the biology of Frogfishes, mentions that fishes like Spotfin Lionfish (*Pterois antennata*) and Mushroom Scorpionfiosh (*Scorpaena inermis*) have been observed eaten by frogfishes.

Reproduction

The reproductive behaviour of frogfishes is interesting. Also the fact that the Frogfishes have the potential to spawn and be raised in captivity – although the latter is a huge challenge – appeals to aquarists.

When the female becomes mature, her abdomen swells. The male now begins to visit her, a behaviour that is often nocturnal, and curtsies her by spreading his fins and touching her with his "hands" (pectoral fins). If the spawning is near, the female respond by spreading her fins and shaking her body. As she swaggers along the bottom with her tail lifted and abdomen exposed, the male follows her. Within a second the female shoots up into the water column and is followed by the male. She now ejects a large egg mass, which is fertilized by the male immediately.

The frogfishes have the first dorsal fin ray modified to a structure known as "illicium" which they use to attract suitable preys. This particular 'illicium' is ball-shaped, but the shapes vary among the species. If the organ is damaged, a new one can be regenerated.

Close enough the frogfish opens the mouth so fast that a vacuum is created sucking the helpless prey into the mouth within a fraction of a second. In as little as a few milliseconds the jaws can project forward and engulf the prey. At the same time the mouth opening and cavity is expanded up to 12 times the original size. The prey is gone without surrounding animals even noticing!

Frogfishes feed on a variety of preys. Fishes are often taken, and specimens

The extruded eggs are encapsulated in a ribbon-like buoyant mass of mucus, called an "egg raft", which may serve as a means of transporting a large number of eggs over large distances. The frogfish may spawn several times during a period of a few weeks. An "egg-raft" contains from everything 48,000 to 280,000 eggs. Depending on the water temperature the eggs hatch after 2-5 days and the tiny larvae spends 1-2 months in a planktonic stage before settling.

Among some species of frogfishes, the male look after the eggs while hatching. Sometimes the eggs are even attached to the male's body.

Frogfishes have been observed to lay egg rafts in captivity several times, but often the eggs are infertile, though. There are several challenges to overcome if one wants to breed frogfishes in captivity. The major problem is not that the fishes do not spawn, but to find a matching pair. There is very little sexual dimorphism among the species, which rules out that a pair can be "bought ready to go" in the pet shop. The Frogfishes do furthermore not avoid cannibalism and easily prey on their mate if needed. Putting two specimens together may therefore very well result in one being eaten.

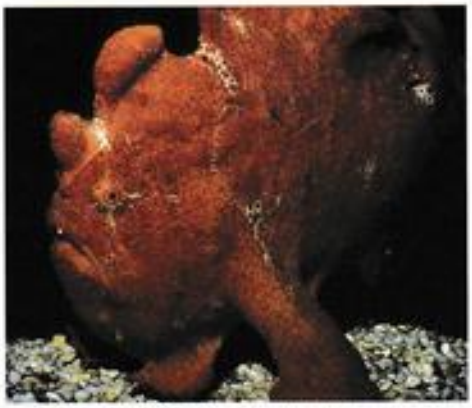
If you want to try getting a breeding pair of Frogfishes anyway, do separate the aquarium by a perforated acrylic plate and place one specimen of "frogs" on ether side of it, and ensure that there is a weak, but steady flow of water between the two halves of your tank. Then observe what happens. If you see that the abdomen of one fish swells, indicating that it is a female and that eggs are maturing inside her, observe the reaction of the other fish. Try removing the separating wall and hope for the best.

Another challenge includes avoiding cross breeding, in other words you need to make sure that you are dealing with specimens of the same species. You also need to have suitable cultures of minute plankton (such as enriched rotifers) available to have the slightest chance of keeping the tiny larvae alive. The raising of marine fish larvae is a very difficult and demanding challenge!

The Species

The genus *Antennarius* contains 24 valid species (Michael, 1998) but there are so many colour variations among the frogfishes that what is a true species and what is a colour form has been and still is confusing. In this section we shall deal with a few species of *Antennarius*, but start out with the only member of the genus *Histrio*, the 'Sargassun Frogfish' – *Histrio histrio*.

Histrio histrio does, as the popular name indicates, live between floating Sargasso seaweed. It is found in all tropical sea except in the Eastern Pacific Ocean. In the Atlantic the fish feeds mainly from Sargasso shrimps, but do take other prey – such as fishes – also. In the Indo-Pacific fish seems to be its main diet. The adult fish spend nearly all its time in the seaweed close to the surface where it lives well protected. *Histrio histrio*, which grows to about 20 cm, is a very aggressive and predatory species that has been observed to take in prey twice as big as itself. If threatened by larger fishes, such as sharks, the Sargassum frogfish can climb out of the water and remain on top of the seaweed for a while! Although the floating alga is essential to the fish in nature, it can be kept in an aquarium not containing this kind of seaweed. Decorate your tank with that which grows to the surface. This makes a good replacement for the Sargassum. The species has been reported to breed in captivity, but obtaining a mating pair is risky and difficult.

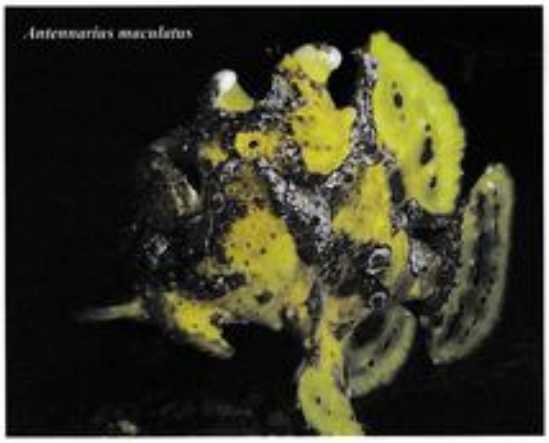


A red specimen of Giant frogfish, *Antennarius commersoni*

Sargassum frogfish, *Histrio histrio*, photographed at Waikiki Aquarium, Hawaii. Note the enormous throat.

The largest of the frogfishes, and one of the most common species on tropical coral reefs is *Antennarius commersoni*, also known as 'Giant Frogfish'. It is widely distributed all over Indo-Pacific, from East Africa and the Red Sea in the west, to Japan in the north, Eastern Pacific in the east and south to Lord Howe Island. The species is often found in association with sponges, and it was this species that I spotted in the Maldives 25 years ago when I first met with the frogfishes. Michael (1998) suggests that this species forms long-term pair bonds, if correct, a habit that might be beneficial for locating a breeding pair. The colour of *A. commersoni* is highly variable, white, yellow, red, with or without spots or patches – you name it! The species is often seen in the trade and can be kept in aquariums. It exposes itself rather than hiding and with its greater size it can become a real attraction and pet.

A much smaller species is the 'Warty



Frogfish', *Antennarius maculatus*, which does not grow bigger than 10 cm. It is found from Mauritius through the Indian Ocean and the central Indo Pacific to Ryukyu Island and the Great Barrier Reef. It is a shallow water species and is often caught for the trade and one of the best suited frogfishes for the aquarium. The colour is often yellowish with dark red patches, but like for other species the colours vary. The species can be confused with *A. picus* (see below).

The 'Painted Frogfish' (*Antennarius picus)* is another small species, reaching 10 cm in length and widely distributed in the Indo Pacific. It resembles *A. maculatus* a lot and it can be hard to separate the two species. *A. picus* usually have smaller and much less conspicuous warts than *A. maculatus*. There is also a difference in the shape of the second dorsal spine, which is more club-shaped in *A. maculatus* while more pointed in *A. picus*. Like for *A. maculatus* the 'Painted Frogfish' is common in the trade and among the most suited species for aquarium keeping.

Antennarius nummifer – 'Coinbearing Frogfish' – has about the same geographical distribution as the 'Warty Frogfish', but occurs in the Red Sea and along the eastern coast of Africa also. It is a smaller species, reaching a maximum length of 13 cm. The colours are usually duller than for other species, but like the picture shows, it is still beautiful. The species can be confused with other species in the genus, but lacks a caudal peduncle and usually has a well developed ocellus at the base of its dorsal fin. The species is quite common in the trade.

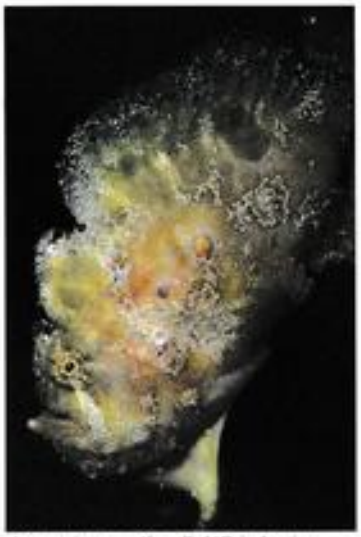
Antennarius striatus – or 'Striped Frogfish' – is, like its popular name tells us – striped. It has a very wide distribution from Western Atlantic (New Jersey to Brazil), Eastern Atlantic and across the Indo-Pacific, north to Japan and south to New Zealand. It has several ways to attract suitable preys including secretion of olfactory odour that attract other fishes. The species reaches 22 cm in length and has been reported to spawn several times in captivity. However, as it usually is found in deeper waters it is not very common in the trade.

Keeping frogfishes

Frogfishes are best kept in special selected aquariums, although they can be kept together with other big fishes such as Soildierfishes, Squirrelfishes and Scorpionfishes – specimens that are a lot larger than the frogfish – in a fish tank. They can also be kept with corals and other invertebrates, but do have the habit to stamp on the corals preventing them from expanding their polyps. Smaller fishes and shrimps will not survive in the presence of a frogfish, though, but will be the perfect prey. A frogfish in the reef tanks is indeed an attraction and can be just as decorative as the usual bunch of smaller fishes so commonly kept in the community tanks.

The selected frogfish aquarium need not be very big, 60 litres and up should do fine. Although the fishes are highly predatory they do not have to be fed daily. They have an efficient metabolism and feeding 2-4 times weekly is enough. However, still they produce many waste products, so a proper filter is needed. On the other hand, the frogfishes do not like strong current, so keep the water motion steady but slow.

In a special selected aquarium you have the potential to study the biology and feeding behaviour of these interesting fishes up close. Feed them with marine organisms, such as opossum shrimps, other smaller shrimps or small fishes, but



Antennarius nummifer called 'Coingbearing frogfish' due to the large ocellus at the base of the dorsal fin

according to Michael (1998) it is very important not to feed them with organisms that are more than half the size of the frogfish! Larger preys may decay faster than it can be digested and resulting in killing the frogfish. Feed more small preys rather than one large!

If you live close to the sea, like I do, you can catch 'opossum shrimps' and keep these live in a net inside the frogfish tank. Release a few now and then and let the angler hunt! Dead food, fresh or frozen, can be used for hand-feeding. Use a stick and simulate the movements of a living prey. Occasionally a frogfish can be converted into feeing on "dry food", but this will not stimulate the luring activity as live food does.

These days I am refurnishing my aquarium room and laboratory. Here comes a new shelf with a few smaller aquariums designed for selected organisms. Frogfishes will for sure occupy some of these!

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Peter Hiscock

Plant lighting

If there is one thing everyone does know about plants it is that they need light, and most of us still remember the basics of photosynthesis from school. What is not so clear is that more light is not a cure-all solution, and the effect of light levels on plant health is a subject with many sides. Careful light management based on some clues provided by the plants themselves will ensure your plants get the best out of whatever source of light you employ in the aquarium.

Why plants need light

Light is employed by a plants chloroplast cell components to break down water (H^1O) and carbon dioxide (CO_2) to create glucose, a form of sugar and storable energy. The photosynthetic process is vital because most plants, being largely immobile, are unable to hunt sources of food. Through photosynthesis they can, with a little help from some key nutrients, create their own food from three basic elements; carbon, oxygen, and hydrogen and with a little light they can grow, spread and reproduce. Without plants, or algae, harnessing these basic abundant elements, there would be little else alive on the planet, since there would be nothing to feed upon. Plants have developed and evolved different techniques for harnessing light based on the particular environment they find themselves in. Whilst these adaptations may make a plant well suited to its particular natural environment, it does not help when we try to mix several different species in the aquarium environment

Peter Hiscock

With a good nutrient rich substrate, Cryptocorynes will thrive under fluorescent lighting

To grow plants close together in dense groups you will need a very intense lighting level

Greener on the other side

Light is one of the three main limiting factors of plant health and growth; the other two are carbon dioxide and nutrients. Depending on the situation a plant finds itself in, it will have evolved to be particularly good at coping with a limited amount of one or more of these factors. Floating plants for instance, generally occur in slow moving waters or they would end up being swept away, which usually means in lakes, ponds, and open waters. In this environment, because the plants are situated above the water with little overhead cover, they receive plenty of light and carbon dioxide, so they have evolved a particularly efficient method of obtaining nutrients. Many Cryptocorynes, in contrast, occur in shallow streams and banks with lots of overhead vegetation, so whilst nutrients

Floating plants should be protected from the heat of strong light by good ventilation

are provided by rich substrates seeded from land runoff, and carbon dioxide is provided by a constant flow and surface gas exchange, light is in limited supply. These plants cope by producing more chloroplast cells than normal, in order to make better use of the available light. You can often tell a plants light requirements by looking at the colour of its leaves, if it has a higher concentration of chloroplasts, it will appear a darker green, and a lower concentration will produce a lighter green. So dark green plants such as some Cryptocorynes, Anubias, and Java Ferns do well in low light, whilst lighter green plants such as Amazon Swords, Hairgrass, and Cabomba will do best in bright light. Red leaved plants however, are a different story altogether, and these often need the most light.

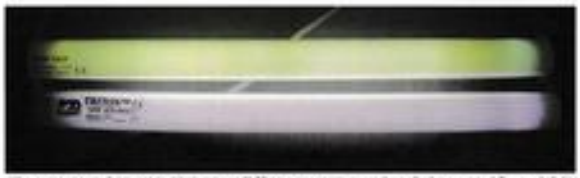
Too much of a good thing

The process of photosynthesis occurs automatically within the cells of the plant, so plants have little control over the rate at which they photosynthesise. Given a constant temperature and available carbon dioxide, an increase in light will create a direct increase in photosynthesis. Whilst this might seem a good thing, a plant can 'wear itself out' by over photosynthesising. In a similar fashion, if we eat too much, rather than gaining energy, we become tired and lethargic. Some plants, which naturally occur in high light environments but are unable to match a high photosynthetic rate with fast growth due to other limiting factors, have developed different pigments (other than chlorophyll) to carry out photosynthesis at a much less effective rate. These plants are often red in colour, or may utilise both pigments, in which case they usually have green leaves at the lower levels (where light is low) and red leaves towards the surface (where light is high). Plants that have both pigments generally do fairly well under medium to bright light in the aquarium whilst those with just red leaves will need very bright light because they will be very inefficient at utilising it.

The 'wear-out' factor also applies to light duration and plants have an essential need for a dark period, not only as a rest period from photosynthesis but also as a natural trigger for hormones and chemicals which control and induce correct growth and reproduction cycles.

Making best use of budget lighting

Keeping plants successfully and creating a worthy planted aquarium does not always require a great expense and you can tailor a planted aquarium to any budget. For many fish keepers, high-powered lighting may be too high budget, or impractical given the space and open hood requirements. In these cases, we are left with the standard fluorescent lights, which with a little tweaking and careful selection of plants, can be more than adequate. The first thing to do is to replace any 'standard' tubes you may have bought or which came with the aquarium and replace them with a combination of full spectrum tubes and specific plant growth tubes. The full spectrum tubes will give a balanced



Fluorescent tubes come in many different types – a mix of plant specific and full spectrum tubes are best for plants

In shallow aquariums, light has less distance to travel so will retain more intensity when it reaches the plants leaves

Bernice Brewster

Koi World

A Little Bit of Dirt.....

In the last thirty years or so, the developed world has seen a massive increase in the number of people suffering from allergies from pollen to nuts – the effects of which may be quite mild or so severe as to be life threatening. The significant point in this sentence is the 'developed world', as countries become more affluent, something changes which renders us more susceptible to these allergies. An allergy is actually an over-reaction of the immune system to a harmless, naturally occurring, foreign body or substance such as pollen, nuts or even a protein. Sometimes this over-reaction of the immune system causes it to become activated against the body itself, leading to what have been described as autoimmune diseases such as multiple sclerosis and type 1 diabetes.

It seems that this surge in allergy rates is linked to micro-organisms, which we euphemistically lump together under the term 'germs'. Actually, not all micro-organisms are harmful; in fact the majority are perfectly harmless. Not only are they perfectly harmless but it seems that some of them are needed to prime and fine tune the immune system and in our strive for cleanliness and a germ free zone, using the soaps and disinfectants which kill the known and unknown germs, our allergies are evidently self inflicted. Additionally, the use of vaccines has significantly reduced the number and severity of childhood infections. The end result is this has rather left the immune system underemployed and it is demonstrably more complex than we imagined, with special cells whose function is to direct the different types of immune response. When these cells encounter a foreign body, for example in the case of our koi a parasitic worm in the gut, they release chemicals which cause muscle contraction and excess mucus production. The result for our koi is that it triggers a bout of diarrhoea which helps to void the unwanted worm. These same cells also trigger the immune system to produce the necessary antibodies to invading bacteria and viruses, when they infect a cell.

Apart from stating the obvious, which is that many of us are too clean for our own good, where am I taking this with regard to koi keeping? There are a couple of issues which cross my mind. Carp living in the wild forage amongst the sediment of the lake, where they feed on bits of detritus, bacteria, plants, plant roots and a variety of aquatic animal life. On the whole, most koi ponds are devoid of any plant life, other than blanket weed and there certainly isn't any sediment on the bottom. We feed the koi with a manufactured diet which contains all their nutrient requirements but perhaps they also need something else in the form of a bit of good wholesome dirt! I'm not suggesting that either the koi suffer from allergies (although they might and how would we know?) neither am I suggesting the koi pond is a sterile environment. Certainly the koi pond is not sterile, it is an open system and there will always be bacteria associated with such an aquatic environment but maybe, just maybe, they need a bit more. After all, I could comfortably retire if I had £5 for every

Mud ponds in Niigata, Japan

time I heard a koi keeper complain of the lengths they go to in filtering, testing the water and cosseting their koi but they still get sick and yet the neighbour has a neglected pond and their koi thrive!

Traditionally in Japan, koi are returned to earth ponds, those which are due to appear in the all Japan Show, if only to enhance the colour. Having witnessed the harvesting of these koi, usually they come out in the peak of condition, perhaps it's more than just the colour which gets enhanced.

Whilst on the subject of earth ponds, I was recently strolling through a local wildlife reserve and met up with the warden and we continued together as we made our way towards the pond on the edge of the wood. I think we were both stunned by the sight that greeted us as a koi of about 60cm (24in) leisurely swam past us. After recovering from the shock, the warden fell into a tirade of expletives and I certainly didn't blame him. Probably this koi couldn't believe it's luck to be put into this pond with an assortment of plants on which to feed, never mind the frog and toad tadpoles or great crested newt larvae, pure ambrosia! I was/am extremely angry with the person who misguidedly put a koi into this delightful little pond which had been home to such a variety of our declining wildlife. When I left the warden was preparing to remove the koi and I will leave you to imagine the ultimate fate of this koi, suffice it to say the owner has done it no favours by putting it into this pond.

Apart from a misguided deed, the stocking of the koi into this pond was illegal on several counts. Under the Wildlife and Countryside Act of 1981, the introduction of ornamental fish into such a wildlife pond is illegal. Secondly, the introduction of fish into any habitat in England and Wales is tightly controlled by the Environment Agency and stocking of any fish into the wild can only be with their written permission and in this instance, it would never have been granted.

If you do have koi that are surplus to requirement or for whatever reason are no longer wanted and it proves impossible to find a suitable home for them, then the only answer is to euthanase them. Most koi keepers are responsible and their koi are treasured pets and it just would never occur to them to get rid of them, never mind putting them into a woodland pond.

A mud pond in Japan being harvested – the stunning colours of the Kohaku at the back of the net speak for themselves.

John Dawes

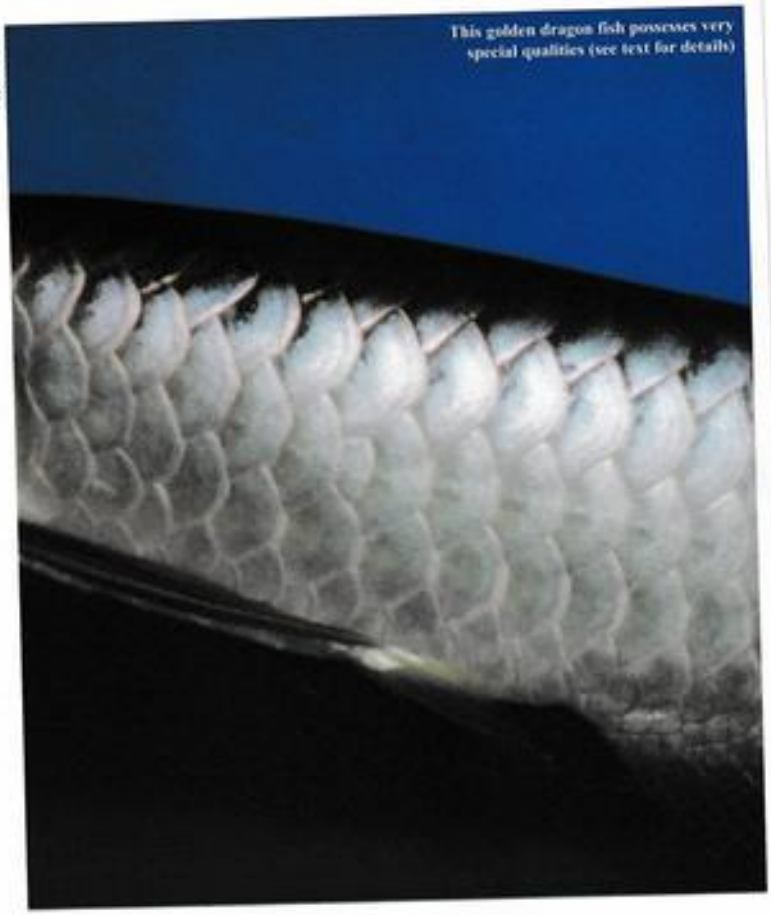
Brief Encounters

What a difference a scale makes

Take a close look at the accompanying picture of a golden dragon fish (*Scleropages formosus*). Notice anything unusual? Look again, but this time focus on the scales running along the midline of the body.

One of them is much smaller than the rest. However, it is perfect in every detail, only built on a smaller scale (forgive the pun!) than normal.

The interesting thing is that this is not a scale that is in the process of re-growing in place of a scale that's been knocked off or otherwise damaged. This is a perfectly healthy scale. I suppose that, strictly speaking, it is an abnormality but, in the world of the dragon fish, it is a very highly esteemed characteristic...one that endows the fish with extra-special qualities.



John Dawes

This golden dragon fish possesses very special qualities (see text for details)

All dragon fish are deemed special in the Far East (and among ex-patriate Far Eastern communities worldwide) in that they are believed to bring luck, wealth and health to their owners. However, if a fish develops one or more miniature, but perfectly-shaped, scales, then its life-enhancing qualities are believed to be even higher than those possessed by their normally-scaled counterparts.

The fish in the photo only has one such special scale and was the only specimen exhibiting this characteristic in the dragon fish category at the Aquaria China 2004 competition held in Guangzhou, China, last September. It was not the largest fish in the competition, but when we took all its features into consideration: its body shape, depth of colour, quality of the chin barbels, clarity of the eyes, smoothness of the gill covers, quality of the scales, jaw characteristics, etc.,...and then added the uniqueness of the scale, it 'swam away' with the top prize.

Although I have seen other dragon fish with the odd small scale, I have yet to come across one with more than two on its body. For a moment, I thought I had during my latest judging stint at Aquarama 2005... but the three scales in question were replacement scales. I therefore still dream of the day when I can see with my own eyes one of those extremely rare specimens which are reported to exist with eight, or even nine, special miniature scales. And... if I do... so will you!

New website aims at fostering a balanced 'habitattitude'

JOHN DAVIES

The Bluestripe snapper (*Lutjanus kasmira*) was introduced from the Marquesas Islands into Hawaiian waters (where these specimens were photographed) as a potential foodfish in 1958, but never became popular. It is now regarded as a pest by local fishermen.

I have recently come across a new website that – in my opinion – is long overdue. The Habitattitude ™ website (www.habitattitude.net) has been set up by the US Fish and Wildlife Service, the National Oceanic and Atmospheric Administration Sea Grant Program and – most relevantly for the ornamental aquatic industry and hobby – the Pet Industry Joint Advisory Council (PIJAC). Its main aim is to raise awareness among American aquarists and pond keepers with regard to their responsibilities as pet owners and the damage they can cause to American native aquatic species by releasing their unwanted fish and aquatic plants into the wild.

Talking direct to hobbyists, it includes advice, such as: "If you have acquired an undesirable aquatic plant or fish species for your aquarium or water garden, it is important not to release these plants or animals into the environment. While most of these organisms will die, some may be able to survive. And a smaller number of those that do survive have the potential to create negative impacts on our national environment and our wallets and misperceptions about our hobbies."

What I like about statements like this is that they are level-headed and maintain matters in perspective, quite unlike some of the headline-seeking, alarmist headlines we tend to see and read elsewhere. Maintaining a responsible and professionally balanced approach not only makes the information genuinely valuable and commendably reliable, but also significantly enhances the stature of the people and organisations behind the statements.

Take the following guidelines given to visitors to the website:

* Educate yourself about your hobby's potential environmental consequences
* Adopt these 'Alternatives to Release' as responsible consumer behavio(u)rs
  - Contact (your) retailer for proper handling advice or for possible returns
  - Give/trade with another aquarist, pond owner, or water gardener
  - Donate to a local aquarium, society, school, or aquatic business
  - Seal aquatic plants in plastic bags and dispose (of them) in (the) trash
  - Contact veterinarian or pet retailer for guidance about (the) humane disposal of animals
* Model and promote these behavio(u)rs within your peer groups as ways for aquarium hobbyists and water gardeners to show our environmental values
* Become involved with policy solutions

It then goes on to provide extremely valuable links to other sites where news stories or information on exotic and invasive species are available. This particular link section aims to educate visitors regarding the wider issues involving such species. It therefore leads to pages that will help readers "...learn about...potential impacts (of exotics), particularly the risks associated with released or escaped aquatic plants and animals." It does so under the following headings:

* The latest news about the growing invasive species problem
* Alternatives to releasing unwanted aquatic plants and animals
* Impacts caused by these species
* Facts about the more common escapees or unintentionally released species
* Resources and ideas for you or your club to get involved with prevention efforts
* Support materials to help you understand and get involved with modelling and promoting responsible behavio(u)rs

Under the part dealing with the impacts of invasive species, it provides information on a whole host of topics, ranging from the effects on native biodiversity, to degradation of ecosystems; damage to commercial and recreational equipment; increase in the running costs of power stations, drinking water operations, dam maintenance, etc., along with their effects on human health, property values and local economies.

I spent about an hour navigating the Habitattitude website, even though it was not yet fully operational, and found the exercise quite absorbing and educational. Perhaps other countries and/or leading hobby, ornamental aquatic industry organisations and relevant government departments could take a lead from this American model? Such a venture would not only enlighten us all, but would also redress some of the damage that the unwarranted, over-the-top, sensationalised reporting that we've come to see (and expect) over the years has done...and continues to do. It could also prove to be a vitally important means of fostering understanding and cooperation between all the many parties involved in one way or another in aquatics. Is this too idealistic? Perhaps...perhaps not.

Paul Skinner

Not the best community fish but...

The Elephantnose

Scientific Name:	*Gnathonemus petersii*
Family:	Mormyridae
Distribution:	West Africa: from Niger to Congo River Basins.
Size:	9" (22.5cm)
Temperature:	73°F – 84°F
pH:	6 - 7.5
GH:	5 - 19 degrees

I know of no other fish with which the members of the family Mormyridae can be confused with. Some members have a moveable trunk-like extension on the lower jaw, from which they get the common name of Elephantnoses. Some are lacking in these extensions and are usually called Baby Whales in the trade. The most commonly available species is *G. petersii* and it is usually sold as The Elephantnose or Peters Elephantnose.

Many of these fascinating African fishes are imported each year and usually prove to be good sellers due to their interesting and definitely cute appearance. However, there are several reasons why these are not the best choice for membership of an average community tank. Firstly, they are nocturnal in habit and often prove to be very nervous fish when kept in the company of more active species. Secondly, they can prove to be difficult to feed, as I have found them very reluctant to accept dried foods. Finally, they are very sensitive to water quality – they are in fact used by several water companies to test changes in water quality. After considering these facts it is no wonder that many individuals prove to be short lived additions to peoples tanks.

You may, at this point, be asking if these fish are worth keeping at all if they have such specific requirements. I hope to be able to show, during this article, that Elephantnoses can prove to be fascinating and very rewarding subjects for study if allowances are made for these requirements. Certainly these fish are some of the most interesting that I have kept and I am personally convinced that they are well worth keeping in a species tank.

When considering keeping any fish it pays to find out as much as possible about its requirements and life style prior to making any purchase. In the case of keeping Elephantnoses, I found that this first step was of vital importance. As I have already stated these fish are of such an unusual and novel appearance that I decided some years ago that I would like to try to keep some of these fish. Upon reading various books and articles, I decided that I would dedicate a three-foot aquarium to a group of these fish and see how they would interact.

Considering their special requirements, I decided to use playsand as a base to the tank as I had read that these fish feed in nature on worms and other animals that they locate in the mud. I had also read that the substrate needed to be deep enough for them to probe with their unique mouthparts. Accordingly, the sand was added to a depth of one and a half inches. The research that I had done revealed that they are found in slow moving water that contains much submerged wood and many aquatic plants. The fish were also stated to be territorial and aggressive towards members of their own species. With this in mind I decided to use a tangle of bogwood pieces and to thickly plant the back and sides of the tank with: Anubias, Onion Plants, Tropical Lilies in order to recreate their natural conditions. I argued that the tropical lilies would also provide the cover that these fish require from the harsh aquarium lighting. The tank was arranged so as a clear feeding area was situated in the centre to allow me to study their feeding behaviour.

As the fish are found in slow flowing water, but require excellent water conditions, I decided to use two Fluval 2 filters and to carry out a twenty-five percent water change weekly. The tank was fitted with a 25w Triton tube for daytime use and a Blue-moon tube that was timed to come on instead at about 8pm to allow me to study the nocturnal behaviour of the Elephantnoses.

IGGY TAVARES

The tank set-up was as follows

Water Conditions:	Soft (Birmingham tap water)
pH:	6.8
Temperature:	80°F
Tank:	36" x 15" x 12"
Substrate:	1½" layer playsand
Filtration:	Two Fluval 2 Internal Power Filters
Décor:	Seven pieces of bogwood
Plants:	Anubias, Onion Plants, Tropical Lilies
Food:	Live and frozen daphnia and bloodworm, frozen brineshrimp and Whiteworm
The Fish:	4 specimens all about 2½" when purchased
Lighting:	25w Triton Tube 30w Blue-moon Tube

It was now time to find some inhabitants for my new aquarium, I must admit that even after over 30 years of keeping fish I still find that the thrill of purchasing specimens is second only to breeding them. After just after two weeks of visiting the local aquatic centres I found exactly what I was searching for; a tank containing 20 or so 2½ inch specimens that looked in good health. Many of the other fish that I had seen, but had decided not to buy, had been slightly larger but often carried scars on their bodies and had sunken stomachs. It can be frustrating to wait when you have a tank all set up ready for your new acquisitions but it is most important to obtain the best quality specimens even if this entails a delay. I decided to purchase four fish and I was well satisfied when I released them into their new home. Knowing that these fish can be particularly sensitive to changes in water conditions I ensured that they were floated for a considerable time. Tank water was slowly added to the bag of fish; in order to reduce any shock induced by the difference between my conditions and those that they were used to in the shop. I also decided that I would leave the tank light off until the next day. I know that you are tempted to see your new purchases as soon as possible but much of the stress of moving can be drastically reduced by exercising a little patience.

The fish seemed to be extremely shy at first and hid as a group amongst the bog wood for the first couple of days. I started to feed the fish at night, after the Blue-moon tube had come on, with live daphnia at first, slowly introducing live and frozen bloodworms to their diet. They fed well after the first week or so and I slowly introduced further foods to their diet. However, I quickly gave up on dried foods as they showed no interest in these at all.

Over the next month the fish began to increase in size and their behaviour began to change as well. The fish now staked out territories in the tank and defended these at all times. The territories luckily seemed to overlap the feeding area and so a delicate peace was observed during feeding. I was however glad that I had resisted my impulse to purchase more than four fish as I believe that any more in the tank would have led to serious conflicts.

The fish were not overly active during the day, except for short, yet frantic, disputes at the edges of the individual territories. However, once the blue moon light came on during the evenings the fish became increasingly active. Their method of hunting for food amongst the sand in the dim lighting conditions gave an insight as to how they must hunt in the mucky waters of their natural home. In fact I found that I was spending more and more time watching these fish during the evenings.

Although I maintained this tank for over three years I never witnessed any signs of these fish spawning, or indeed any behaviour that I could describe as courtship behaviour at all. Three of the fish were considerably deeper in the body than the fourth member of the group, which I thought could well be a male. As far as I know these fish have never been spawned in captivity and it could well be that they spawn in large groups in nature, conditions that can't be recreated easily in a hobbyist's aquarium. They may even need an, as yet, undiscovered factor to bring them into spawning condition.

During the period that I kept Elephantnoses in this tank I found them to be a very fascinating subject for study. I can certainly recommend that anyone should try to recreate this experiment as they certainly justify keeping them in a tank of their own. I hope that someone will succeed where I failed and be able to report a spawning of these interesting fish.

John Dawes

Coldwater World

Take a look at the first three pictures accompanying this article. Notice anything that's 'not quite right'? Yes, of course. One shows several koi, a goldfish and a shoal of platies together in a pond, another shows goldfish and discus sharing the same tank and the third shows two peppered catfish swimming along the edge of a ceramic pond.

The first picture was taken in Big Island in Hawaii, the second in Singapore and the third in Andalucía in southern Spain. The first two show so-called coldwater species in a distinctly tropical environment, while the third shows a typical tropical species in a coldwater one. In fact, the water temperature in the peppered cat pond (one of several I have here at home in Andalucía) drops to below 10°C in January and February every year. Indeed, this year the surface water temperature dipped to 6.5°C…and my Corydoras, rosy barbs, Florida flags, etc., are all still thriving.

I quote these examples because, in many people's minds, there is a definite, clear-cut division between coldwater fish and their tropical counterparts when, in reality, there isn't. These are just convenient labels which we use to make our lives easier. Between what we term as coldwater and tropical, though, there is a sizable 'grey zone' where temperatures are neither cold, nor warm, just as there is a zone of overlap between freshwater and marine habitats, which we refer to as brackish or estuarine.

John Dawes

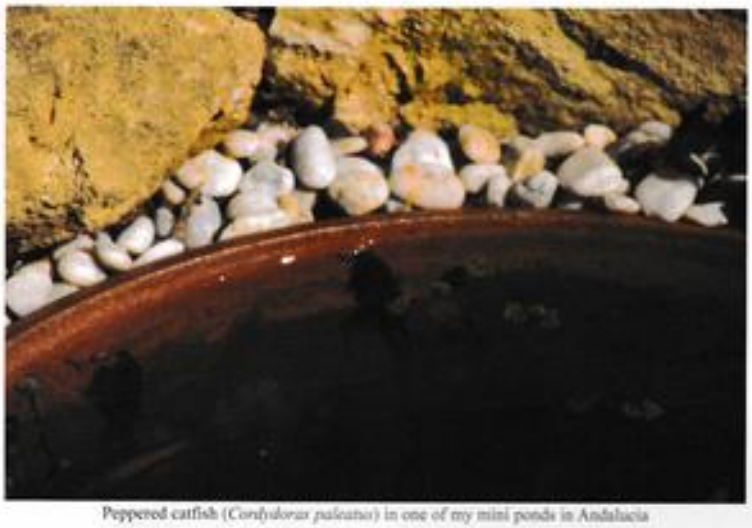
Discus and goldfish sharing an aquarium in genuinely tropical Singapore

John Dawes

Typically tropical platies feeding alongside typically coldwater koi and goldfish in a pond in Hawaii

Coldwater versus Tropical

If the truth be told, the dividing line between what constitutes coldwater and what constitutes tropical is very difficult, if not impossible, to determine precisely. The goldfish (*Carassius auratus*), for example, is universally accepted as a coldwater fish. The rosy barb (*Barbus conchonius*) and the cleaner wrasse (*Labroides dimidiatus*), on the other hand, are equally well known as tropical species, the former being a freshwater fish and the latter a marine one. The goldfish can, nevertheless, easily tolerate so-called tropical temperatures, while rosy barbs can survive in cool conditions that few people, if any, would regard as tropical.



John Dawes

Peppered catfish (*Corydoras paleatus*) in one of my mini ponds in Andalucia

If we were to adopt strict dictionary-type definitions, then species of animals and plants which originate in countries that are situated between the Tropics of Cancer and Capricorn would be regarded as tropical, while those originating outside this region would be excluded. This classification works pretty well most, but not all, of the time. For example, the paradise fish (*Macropodus opercularis*) – the first co-called tropical species imported into Europe in 1869 – is found in parts of non-tropical China, yet it is widely regarded as a tropical fish and is, in fact, never sold as a coldwater species. Equally,other species, such as the white cloud mountain minnow (*Tanichthys albonubes*), or the mosquito fish (*Gambusia affinis* and *G. holbrooki*), feature in most books dealing with tropical fish.

A further potentially confusing factor is that, by definition, the tropics experience high temperatures throughout the year. In such countries, some of which excel at breeding fancy varieties of goldfish, there are, therefore, no such things as coldwater or tropical aquaria. All aquaria are, in practice, tropical, irrespective of what fish they may contain.

There is also another term that is frequently associated with the coldwater scene which can cause further confusion: 'native'. There are, therefore, 'native marines' and 'native freshwater species'. Because we tend to use these terms with regard to animals and plants that are generally classified as 'coldwater' in UK terms, we unconsciously tend to assume that 'native' means 'coldwater'. But, what about all those species that are native to genuinely tropical countries? They cannot, of course, be coldwater in nature!

The Spectrum

Despite the inherent problems that exist with the use of the terms 'coldwater', 'tropical' and 'native', it would be wrong to assume that they have no real meaning or valuable application. Not at all. They must, however, be seen in context, forming elements of a continuous spectrum in much the same way was the terms 'freshwater' and 'marine' do.

In nature, as we move from the truly tropical end of this temperature spectrum towards the centre, the dividing lines become progressively blurred, until there must, almost by definition, be considerable doubt about the classification of those species whose temperature preferences are neither strictly coldwater nor tropical. In some ways, such species could be regarded as 'coldwater tropicals'. The fish mentioned above – paradise fish, white cloud mountain minnow, rosy barb, mosquito fish…and many others – are perfect examples of tropical species that tolerate coldwater quite happily.

So, where does this leave us? Well, in my opinion, in a very interesting and 'flexible' or 'elastic' situation. Perhaps a useful/workable way of regarding a coldwater aquarium would be as one that does not require the provision of any form of heating, either for everyday maintenance, or for the breeding of its inhabitants, even in temperate zones…as long as they are kept indoors, of course. A tropical aquarium, by contrast, is one that requires additional heat for all-round, long-term success…at least in the temperate world!

This series of articles will focus primarily on what we traditionally regard as coldwater species and varieties…but it will also include – for the reasons outlined above – a number of less typical species. The reason for including these is, not just for interest's sake, but because they may also be kept, as indicated in the last paragraph, in so-called coldwater aquaria.

Undoubtedly, of course, the lion's share of the articles will be taken up by the goldfish which is, after all, the classic coldwater fish of all time. However, not all the articles will be of the 'how-to-keep' type. I also hope to include aspects of goldfish biology that – as far as I am aware – have never appeared in hobby magazines before. I look forward to your company…and your views…over the months ahead.

Ivory Tavares

The goldfish – in its numerous varieties – is the classic coldwater species of all time

Anthony Calfo

Making good reef-keeping better!

Part 1: It's in the Water

ANTHONY CALFO

Do not underestimate the need for superb water clarity. The expense of buying and operating specialized reef lights can be considerable... and discolored water reduces the penetration of light in to the aquarium.

In the present state of the hobby, maintaining a successful reef aquarium can be rather easy. With a reasonable, if not comparatively modest, investment of time and money, anyone can enjoy a healthy display of hardy and beautiful reef creatures. Yet after enough time spent in the hobby with a successful tank, you might still see other extraordinary tanks that make you wonder, "What are they doing different?" And you might hear stories of challenging species living many years beyond the norm in systems that seem to be the same as yours in hardware and husbandry. But is the difference simply luck or good fortune? Almost certainly not – especially in the case of species longevity, which requires deliberate effort and consistent husbandry that stands the test of time. To sum it up in a word, the difference is *finesse*. Uniquely successful aquarists tend to have an arsenal of good habits that are thoughtful, tidy, and appears to be not very different than the norm, yet cumulatively sets them apart distinctly from the masses.

In this article series, I intend to cover some key tips and tricks to better reef-keeping techniques that will quickly and noticeably improve the success of your aquarium. I often like to refer to such titbits as "things you thought you knew." Many suggested improvements will not surprise you, and most I expect will make good sense and perhaps be familiar. But it's easy to otherwise forget such good habits and get into a routine that becomes a bad rut. Indeed, we all tend to lead busy lives. However, skipping a *monthly* water change, for example (that might only take 30 minutes or so), seems to be quite remiss when companion dogs and cats require far more *daily* maintenance and attention. Do keep it all in perspective and be diligent about putting in extra effort for good aquarium husbandry, particularly when it requires so very little time. It will pay dividends in happiness for you and better health for your aquarium.

The first and single-most stimulating thing you can do for aquarium vigor is to improve water quality; do more frequent

water changes. It is completely lost on me why so many aquarists resist doing regular and hearty water exchanges. The benefits are quickly apparent, the cost of doing it is rather inexpensive, and the cost of *not* doing it is equally motivating (poor livestock health or premature death). In the US, the old rule of thumb is to exchange approximately 20 - 25% of the system water per month. Yet this guideline was established decades ago with aquariums that were necessarily understocked for the limitations of technology at the time, and an inability to keep many animals per tank. A four feet, or one metre, long aquarium in the 1970's or 1980's could only house, for example, a *Zebrasoma* tang, pair of clownfish, some damsels and perhaps a small wrasse... presuming the undergravel or box filters were maintained well! To think of the coarse media used for bio-filtration (sintered glass, crushed dolomite, non-carbonate gravel, etc.) is no wonder why tanks had to be stocked lightly. As such, modest water change schedules were tolerable for the typically lighter bio-loads.

In today's aquariums, however, the amount of biomass banked in live rock and live substrates (sponge, algae, worms, bivalves), plus the increased availability and use of fishes is far greater than decades past by a scale of magnitude. Thus, antiquated rules of thumb on water change schedules are dubious if even useful. Regardless of what decade one keeps fishes in, however, heavy bio-loads simply require more aggressive processing of organics. While we still cannot quantitatively assay all undesirable elements of aged aquarium water (and remove them) while measuring and supplementing all known (missing) desirable elements (or the rate at which they are removed), we can still keep an even keel on water quality by dilution. It's an old adage, but, "The Solution to Pollution is Dilution." Live by these words and you will enjoy greater success in the hobby! Regular and frequent water exchanges dilute known and unknown "nasties" while replenishing known and unknown desirable elements to aquarium water.

Quality filters and nutrient export products like protein skimmers can relieve some of the burden on water quality. But none can wholly replace the need for regular water changes.

The size of water change needed per tank varies not only on bio-load, but on several prominent aspects of husbandry, all focusing on nutrient export. More aggressive protein skimming, carbon and chemical filter media use, and vegetable or animal filtration (filter feeders and macroalgae refugiums, eg.) can alleviate some of the burden on water quality and reduce some of the need for larger water changes. But we cannot avoid water exchanges altogether. Do consider that even with a 50% monthly water change, 50% of the undesirables, and depleted desirables, are still left behind. And those unfavorable "halves" accumulate and amplify month after month. This is the impetus, in fact, for aquarists with smaller marine aquaria to do 50%+ water changes weekly. They are largely spared the need for protein skimmers, dependence on heavy chemical filter media use/exchanges, and the alchemy of estimating how much of which magic elixirs (supplements) must be added. Best of all, it is all done at a very modest expense of mere tens of dollars per year in extra synthetic sea salt.

Although it may sound remarkable at first to do such large water changes, it is not unnatural by any stretch of the imagination. Is there any better example of the power of dilution than the ocean itself? If you spend any time at all on living reef, you will be astounded to see how much water is exchanged in a moment: millions of gallons of water in flux within sight. Add to that the fact that so many popular reef creatures are intertidal, and we have a good argument to start with for the tolerance of reef creatures to hearty water changes.

There comes a point, admittedly, where large water changes are not cost-effective in light of the alternatives

Frozen foods are some of the most nutritious fare to offer reef fish and invertebrates. But take care to feed these foods properly! Always drain and discard the thawed pack juice, otherwise it accumulates and can be considerable fuel for nuisance organisms to grow from.

(supplementation and aggressive skimming, ozone, carbon use, etc.). Larger aquaria themselves by nature are more dilute for their volume (generally less weight of fish per gallon of water) than smaller tanks where overfeeding and overstocking will concentrate in and cripple water quality faster. So instead of doing 50% or larger exchanges, you might only need 10 – 20% weekly water exchanges. This is, in fact, what I recommend most folks start with, and ramp up if needed. The point of the matter all is that smaller and more frequent water changes are better than doing the task monthly or less often.

Under the best of circumstances, water quality in the aquarium after one month typically strays unfavorably downward in pH. It certainly increases in dissolved organics. Water clarity from discoloration becomes darker, however inconspicuous that might be to the naked eye during casual daily inspection. In heavily stocked reef displays – allelopathic compounds (chemical warfare) between corals, plants and algae amplify. Phosphorous and nitrogenous compounds inevitably accumulate too. The list of challenges to water quality goes on. Now instead of allowing these dynamics to crescendo before reducing them abruptly with a large monthly (or less often) water change, the smaller, more frequent water changes will dull the peaks and valleys of such swings in water quality to minimize the stress on the tanks inhabitants.

You don't even have to do larger total (volume) amounts of water exchange on tanks with a light bioload. Instead of doing, say, 20% per month on a lightly stocked large display… you might do 5% per week. Monitor aspects of water quality in the interim to insure that the modest exchanges are enough though (look to see that nitrates are not increasing for starters). Informal experiments have been done to compare if larger monthly water exchanges were better for water quality on testable parameters like nitrate than smaller weekly exchanges. In such trials where the same total volume was exchanged either way, the larger monthly water changes actually had a slight edge on the smaller weekly events. What the statistics do not reflect, however, is the stress of exposing livestock to greater extremes of water quality for longer periods of time by monthly water changes. Greater studies on allelopathic competition in time will undoubtedly, in my opinion, underscore the need for better attention to water quality in marine aquaria. It reminds me of the mantra that good and bad things alike should happen slowly in aquaria; small, frequent water changes support this wisdom.

Water quality issues not only affect livestock directly, but play a role in hardware applications as well. It's no secret that lighting issues are some of the most actively discussed and hotly contested topics in the aquarium hobby. How ironic is it then to see aquarists spend many hundreds of dollars on lighting hardware and operation (replacement lamps, electricity, etc.), only to ignore the fact that poor water clarity (color) is severely handicapping the delivery of quality light to photosynthetic reef corals and invertebrates?!? Please don't just take my word for it though; take the time to notice the difference in color between new synthetic seawater versus aged water from the tank when compared side by side in clean white plastic buckets. To make matters worse, the difference need not be great to have a significant effect (reduction) of light in the water. A tinge of color can reduce the penetration of light at depth dramatically. For clarifying issues like this, the use of a lux or PAR meter for measurements of light is, well.... illuminating (pardon the pun)! If you cannot afford such instruments, look to the local aquarium

Even with monthly partial water exchanges, aquarium water can become noticeably discolored. Even a slight discoloration significantly reduces the penetration of light at depth!

club; many reef clubs will hold a small fundraiser where each member contributes a few dollars for the group to purchase and share a light meter (decent models can be bought for $150-300, typically… Apogee brand has been popular with aquarists). The benefits of using a PAR meter are many.

Beyond the measure of useful light (to photosynthetic creatures), a light meter can give a revealing indication as to when lamps have exceeded their useful lifespan. With a baseline measurement of new bulbs, you can track the degradation of light quality over time. It really is surprising to see how so many lamps lose considerable PAR value after as little as 10 months (hence the oft-cited "yearly" lamp replacement recommendations).

Another great use for such meters is to take readings in the tank for corals that are being sold or traded. Similarly, known readings from coral suppliers will help you find optimal places in your tank for new specimens. The stress of acclimation to such new light is reduced by such efforts. You can also get a concise appreciation for how significant even a small amount of dust, salt creep or debris on lamps, lenses or canopies can be. With regards for how expensive electricity is too, it's a money saving lesson that also improves the amount and quality of light that reaches precious reef creatures. While the purchase of a light meter is a not-insignificant expense, the savings on operational expense and lighting hardware alone may recoup the cost in the short term. And for the value of typical reef systems overall… it is a small investment that provides invaluable benefits to the care of photosynthetic livestock.

In closing, some words should be said about doing a "proper" water change. Mixing up synthetic seawater is very easy and safe for doing large water changes if you follow some simple guidelines. As with all incoming water, whether for evaporation top-off or salted for exchanges, be sure to aerate and slowly warm new water for at least one day in advance. Using untreated tap water can be bad for several reasons. First of all, the dissolved oxygen coming out of mains is low in dissolved oxygen, which can be quite a shock for aquarium livestock. All tap water needs to be aerated to reach equilibrium or saturation with the atmosphere of the room that the aquarium is kept in. It also needs to be heated slowly over hours or a couple of days to match the system's temperature. It can be dangerous to heat water quickly and use it right afterwards in the aquarium! When pouring oxygen poor hot water into oxygen-rich cool water, there is the risk of driving oxygen off/out of solution and even causing oxygen/air embolisms in fishes much like divers that get "the bends" from nitrogen. It should also go without saying that the salinity of new water should be adjusted to match the salinity of aged/out-going water. While plastic hydrometers are handy and durable, please keep an extra hydrometer made of glass or a refractometer on hand to check the accuracy of plastic handheld hydrometers periodically. And finally, you should not underestimate the caustic nature of newly mixed seawater. Chemical reactions in dissolving synthetic sea salt mixes take time to complete. To temper the harshness of newly mixed seawater as well as insure thorough dissolution, mix freshly salted water for some hours up to one day in advance of use in the aquarium. Follow these suggestions and you will be on your way to finessing your own successful marine aquarium!

Ben Helm

Pond Makeover – adding new ideas

Our first (or even second) attempt at building a pond rarely turns out to be as big, wide or voluminous as we had intended. Ponds have a habit of looking larger on paper and the size of our finished construction seems to mock the amount of spadework we had to do.

But if we're limited by space, or we haven't got the budget or time to put our pond back into dry dock, why not try adding a number of 'finishing touches' to give our tired old pond a contemporary feel. If they can transform a house on TV overnight, then why not try the same with your pond?

There are a number of features that, with a degree of planning and some simple DIY skills, (get ready to roll those sleeves up) could soon add another dimension to any garden pond.

Although this bridge is more for decorative purposes it still makes a nice feature of the pond. – as do the stepping stones around the gravel garden

1. Stepping stones

Stepping stones offer an irresistible challenge to us all. When confronted with the opportunity to walk on water and partake in what appears to be a risky passage over a water body, we feel compelled to do so. Stepping stones should be positioned as an alternative route through a garden, offering the visitor a short cut across the pond as opposed to the more natural journey around it. Positioned sufficiently close to each other to allow easy movement from one to the next, they should offer us a safe route or vantage point from which to view the pond.

Again this bridge is more for decorative purposes and makes a nice feature to the pond

Despite what I've already said about giving a pond a simple makeover, stepping stones cannot be an after thought, but must be built with a pond as they must be structurally sound and safe to walk on, ensuring that they are placed on a firm foundation. But depending on your pond's initial construction, you may just have to drain your pond to install them.

Most stepping stones will consist of suitably sized flat stones, perched on a brickwork pillar, standing in about 2 feet of water. If your subsoil is suitably hard, (ie, clay – you'll certainly remember if it is from digging it!), then a foundation is not

likely to be needed. But if your garden is sandy, then the level piece of ground that will support the stepping stones will require a concrete foundation – perhaps putting this makeover project on hold. Having established the foundation for the stepping stones, the rest of the pond can be excavated into the shape required, whether formal or informal. The pond liner can then be put in place and filled with water until the level is just below the flat foundation prepared for the stepping stones. Having selected the size and shape of the stones, a number of brickwork piers can be constructed on top of the liner, ready to take each stepping stone. To protect the pond liner, construct the first layer of bricks on an off-cut of liner. Bed the stepping stone on the top of each pier with mortar so that when filled, the water will lap up against the edge of the stone.

Be sure to choose a stone with a rough finish, as this will afford a good grip to those using them. Either natural flat (sedimentary) stone or 'natural' concrete cast flags are ideal, choosing a shape of stepping stone to complement the shape of the pond and surrounding rock work.

2. Bridges

Bridges offer an alternative to stepping stones as a means of crossing a pond. They can be built in situ, or bought ready-made to be placed directly across a pre-determined point. A number of different bridge designs are available ranging from flat, simply constructed bridges to more rustic bridges that may offer a hump-back, being made from roughly cut pine, complete with bark. A bridge may be designed as purely ornamental, with no intention of it carrying traffic, or as is usual, built to take people who are keen on viewing a pond from above.

Stepping stones must be planned prior to a pond being installed, whereas a bridge can be installed over an existing pond. A bridge too must have good, level, foundations on which to sit, and if they can be excavated without interfering with the pond, the project should be straight forward.

It is important that a bridge should not look like an afterthought, but an integral part of the pond, having a valid reason for its position. Try to keep hand rails as low as possible, and the width of the bridge in keeping with the scale of the pond. The greatest problem when adding a bridge to a pond is maintaining a sense of proportion and making it blend in with the pond and its surroundings. A useful trick is to construct a bridge that does not end at the pond edge but continues into the border either side of the pond, with hand rails (if present) dropping away. Softening both ends of the bridge with planting that hides the edges will work well to give the impression that the bridge has been there for ever.

When constructing a wooden bridge, or using other wooden structures close to water, be sure to take care when using wood preservatives. Choose ones that are 'pet safe', and that will not harm the pond or its inhabitants should some leach in.

3. Lighting

Lighting can be used to convey different moods to your pond and the surrounding garden. If you haven't tried lighting yet – I can recommend it. Subtle down lighting to create a glow from behind rock work or an evergreen shrub to cast its haunting silhouette can add a placid mood while brighter and more direct lighting of a spouting gargoyle or a busy fountain can bring nocturnal life to your pond. Garden lighting has really caught on in the market place imagination with many different types and varieties even available from DIY stores.

Underwater lighting can extend the life and entertainment from a pond well into the night, creating a focal point of both sight and sound for an evening around the barbeque, while subtle lighting can be used to delineate a path or give a lit backdrop. You will probably have to visit your local pond store for more specialist underwater lighting. They're just as straight forward to install as garden lights.

Artificial lighting gives you the opportunity to direct light in ways that nature did not intend, shining light upwards out of your pond, bouncing it off the underside of bridges or from beneath stepping stones (if you've decided to rise to the challenge). Underwater lighting also gives you the opportunity to see your fish illuminated from below, watching silhouetted fish darting about in the twilight of a summer night.

Recent innovations in pond lighting involve the use of solar panels. Charging throughout the day in sunlight and when dusk arrives the charged battery powers the light well into the night . These are available as lanterns for illuminating garden features or as floating solar lights that are free to move and glow all night.

Controlling lights – power at your finger tips

Lights can be controlled in a number of different ways, using a simple switch (which should ideally be located inside the house to save having to go into the garden), through to more elaborate control techniques.

- **Light sensors:** A simple light sensitive switch (as used by street lamps), can be used to switch the lighting on automatically as dusk approaches.

- **Remote control:** Some lighting units are now supplied with a remote control unit that can be used to operate and even dim the lights!

More hi-tech still

State of the art fibre-optic lighting can be installed to great effect. Recently introduced in the USA, this method of lighting is so unobtrusive by the space it requires that you can put lights in places that were previous no-go areas. They also add unrivalled, jaw-dropping, dynamic contemporary lighting effects.

In summary, creative design and finishing touches do not simply belong indoors. By treating the garden as our home's extra room, you can add interest, intrigue and improve both the function and appearance of your pond, putting it in true context with the rest of the garden. Furthermore, it is within the abilities and budget of most of us.

TODAY'S FISHKEEPER

All the latest news from aquarist clubs around the country

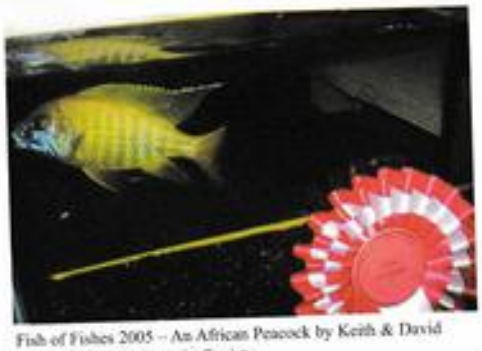
Yorkshire's 'Fish of Fishes' Award

The once famous Yorkshire Aquarist Festival (YAF), held at Doncaster Racecourse for so many years, lives on at the annual Yorkshire Association of Aquarist Societies' Open Show. Now held at Stockton on Forest (near York) Village Hall on the first Sunday in July, representatives of the 23 Yorkshire clubs meet to discuss fish, have an auction and run an Open Show with 36 classes.

This also includes the prestigious 'Fish of Fishes' award from YAF and is now 30 years old. It was won with a magnificent African Peacock, *Aulonocara hansbaenschi* by Keith & David Lawson of Wyke Aquarist Society. The Best Exhibit award, a similar annual event in the YAAS calendar was won by Ian and Kerrie Wallbridge of Bradford & District Aquarist Society with six Cherry barbs, *Barbus titteya*.

There was also a cermony for winners of the Silver and Gold Pin awards. Aquarists who show their fish under YAAS rules and win a first receive a plaque for 50 and 100 wins, but at 200 there is a White Rose Pin in Silver, and a Gold version for 500 firsts. Gavin Cowan of Solway Aquarist Society won a Silver and the show team of B. & S. Crich and I. Wright of Sutton Aquarist Society won the Gold award.

The Show included stands by The North East Yorkshire Killifish Group and the Aquarian Advisory Service with Dr. David Ford. There were 283 entries in the 36 classes plus 11 entries in Fish of Fishes and 5 in Best Exhibit, giving almost 300 on display, a new record for YAAF's Open Show.



Fish of Fishes 2005 – An African Peacock by Keith & David Lawson of Wyke Aquarist Society

'Fish of Fishes' winners Keith and David Lawson of Wyke Aquarist Society with YAAF Chairman Steve Jones (centre)

Best Exhibit 2005 was six female Cherry barbs

Best Exhibit Award went to Ian Wallbridge (right) of Bradford & District Aquarist Society

Corby & District Aquarist Society

Although Corby & District Aquarist Society had a very successful Open Show, there was one incident which marred all the proceedings. After de-benching, the entry W1, *Etheostoma gracile* (Slough Darter) was missing from the showbench. The owner is obviously very perturbed about this, especially as this exhibit is an extremely rare fish in the UK (this may be the only known living example in the United Kingdom), and requires special care.

Native to the South-East corner of the USA, it does not survive well in the UK unless given the appropriate environment.

If anyone reading this news item can offer any information as regards its' whereabouts, please contact CADAS via cadas.submissions@ntlworld.com – all e-mail transactions will be treated with total confidentiality.

An example of the missing exhibit is shown right; the actual fish has a slightly 'greener' body.

Diary Dates

September 2005

3: Bristol Aquarist Society Show

7: Corby & District Aquarist Society – talk by Chris Cheswright – *Old fish houses and fish-keeping*

17: Hounslow Open Show

October 2005

14 – 16: Supreme Festival of Fishkeeping at the Mill Tythe Holiday Village.www.fbas.co.uk/Events.html

February 2006

17 – 19: 2006 Catfish Convention at The Britannia Hotel, Wigan. E-mail Ian Fuller ian@corycats.com or check out their website www.Catfishstudygroup.org

Please send details of what's happening in your club to:

Today's Fishkeeper
Valley Publishing Ltd.
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or e-mail:
info@valleypublishing.org

Dave Bevan

Ponderings

ALL PHOTOS: DAVE BEVAN PHOTOGRAPHY

Bloodworms

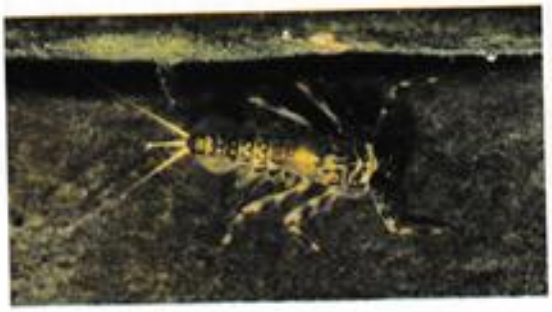
Have you ever pulled out a clump of pond plants complete with some of the black smelly mud they are growing in or taken a filter to pieces for cleaning during the summer months? The chances are that this sludge contained lots of tiny (about 1 to 2 cms. long) red worms.

These are the larvae of those tiny flies called midges which can be so annoying in the warm summer evenings. Annoying they may be but they fill an important niche in the pond due to their ability to live happily in these anaerobic (no oxygen) conditions helping to break down the waste materials as well as providing the fish with a tasty snack.

The Mayfly

When the hatch is on they dance above the water in their thousands. For the adult mayfly time is short as they must mate and lay their eggs all in the space of a day. There are many different species and they can hatch in most months of the year although the majority have their day during the summer months.

After the nuptial dance the female scatters her eggs on the water and they hatch into tiny nymphs which feed on the bottom amongst the stones. After a year or more when the time is right the nymphs move to the surface and the sub imago or dun struggles free from the nymphal case and leaves the water to rest on the nearby vegetation. Here it moults again and the adult mayfly takes to the air.



Mayflies are an important part of the pond foodchain and many nymphs are eaten by fish as they nose about on the bottom but when the hatch is on the emerging duns give the resident fish a real bonanza.

Water test strips

Water testing is a vital part of pond management particularly if you have a large number of fish. Waste products can build up rapidly and the very dangerous products like ammonia and nitrite you cannot see.

There are many test kits available which, although basically simple, can be difficult to use. Have you tried carrying out a multiple water test at the pond side on a windy day? I have and the job becomes laborious and frustrating as the various instruction sheets and test cards take to the air.

Why not try the Laguna quick test which consists of five impregnated patches on a paper strip. All you have to do is take a strip from the container, dip it into the pond for 2 seconds, shake it once and wait for the colour to develop and check against the colour chart on the side of the container. After 25 seconds you read off the levels for pH, Total alkalinity and Total hardness and then after 60 seconds check the levels for nitrite and nitrate. It's quick and easy and if the results indicate a problem they can always be confirmed using a more accurate method.

ROACH FACTFILE

Species: Roach (*Rutilus rutilus*)

Other names: None

Other forms: Occasionally interbreeds with rudd, bream, silver bream or bleak

Size: Up to 12 inches (30cms)

Weight: Around 1 kilo

Availability: Occasionally available through specialist outlets

Habitat: Large shoals in slow running rivers and large lakes

Identification: Roach have a dark rounded back with silvery white sides and reddish eyes

Habits: Roach eat a large range of water animals including caddis and mayfly larvae and can survive on relatively low amounts of oxygen when necessary. Between April and May each year they produce up to 50,000 eggs and may cross breed with rudd or bream. The males are often covered with tiny white breeding tubercles in the breeding season.

Pond fish value: Roach adapt well to pondlife and are particularly at home in ponds with some running water. They are peaceful shoaling fish which will happily mingle with goldfish in the middle of the pool and may breed in larger garden ponds.

Fascinating Fact

Chaser Dragonfly Nymphs

Chaser dragonfly nymphs have found a way of making themselves almost invisible by covering their backs with tiny sand grains so that they can hide on the pond bottom. Aided by this camouflage they can easily catch an unsuspecting tadpole as it swims past.

Planting Soil

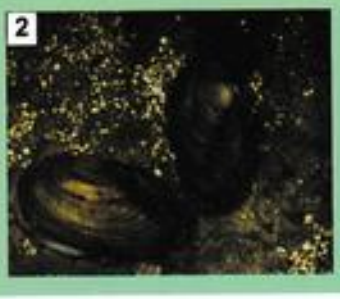
An open textured soil with plenty of readily available nutrients is ideal for plants but unfortunately not for the pond as particles of soil and humus disperse into the pond water leading to cloudiness, rampant algal growth and production of harmful gasses.

Scientifically formulated aquatic soils from leading manufacturers are expensive but will produce healthy plants with minimal nutrient loss to the pond whilst providing the plant with the all important support to keep the plant upright and growing towards the light.

If however you want to prepare your own choose impoverished, predominately clay based soil free from added fertilizers or pesticides and sieve it to remove unwanted objects. Plant directly into this soil and then add a balanced slow release fertilizer in tablet or sachet form. Alternatively you could try a fertilizer stick which can be pushed down amongst the roots and will only release nutrients when the soil temperature is high enough for them to be beneficial to the plant.

Fishy Tales


1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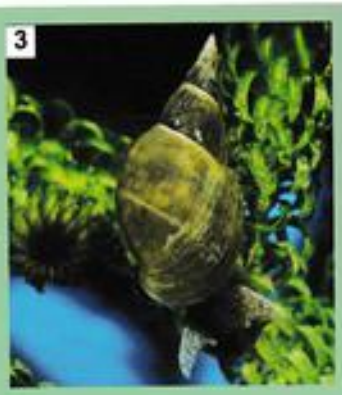
During the first year many pond owners experience a variety of problems but when seeking advice beware the somewhat exaggerated claims offered for some potential cures.

1. Grass carp will eat blanket weed – yes they will – along with many other plants; some of which they prefer and then only in quantity once the water temperature rises to around 20 degrees centigrade.. This does not happen for very long each year in this country.

2. Freshwater mussels will clean up a dirty pond – actually they require good quality water from which they extract their food. Put them in an unbalanced pond and they usually die simply adding to the problem.

3. Snails will control your blanket weed. They will eat blanket weed but only in small amounts as they much prefer tender plants.

4. Bullfrogs can be put in a wildlife pond. It is now illegal to offer them for sale and in no circumstances should they be released into a garden pond.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Feeding Fish

Once the water temperature rises above 10 degrees centigrade your pondfish should be accepting food on a regular basis. Feeding your fish regularly also gives you a chance to check them out for signs of illness without netting them from the pool. At this time of the year use floating fish sticks, tiny sticks of a dried food which is balanced and nutritious. They will float for quite a long time bringing the fish to the surface for closer inspection and any that have not been eaten can be netted off after about 15 minutes thus helping to reduce the build up of harmful ammonia in the water.

Feed a small amount 2 or 3 times a day rather than all at once and the fish will thrive, supplementing this diet with live food they catch themselves in the pond. For an occasional treat you could feed them some live food in the form of small earthworms obtained from the garden but avoid areas which have been treated with chemicals. Live daphnia (water fleas) purchased from aquatic outlets or you could even grow your own in a small barrel.

Predatory Fish

A successful pond is a peaceful pond where the fish community lives in harmony. If you deliberately or accidentally introduce a predator into their midst then you are asking for trouble. Your fish will start to disappear at an ever-increasing rate as the predator grows. Because of the confined nature of the pond the community may become stressed causing an outbreak of disease.

Amongst our native fish the pike and the zander are both predators and you would be very unlucky to introduce one of these accidentally. However both the perch and trout species like the brown trout or rainbow trout are very attractive fish and they are occasionally offered for sale but resist the offer because they are predatory particularly once they start to increase in size.

Wells catfish are also offered for sale and are capable of turning into 5 ft monsters. Introduce one of these to your pond and your pond will soon only contain one fish – the catfish which will be rarely seen.

Apistogramma nijsseni

The Search

During my years of keeping and breeding fish, dwarf cichlids could be found somewhere in one of my tanks. There would be such fish as *Apistogramma agassizi*, *Apistogramma cacatuoides*, *Apistogramma borelli*, *Nannacarra anomalla*, and many others. Then in the 1980's I was shown an article in a German fish magazine. I could not read the text, but I could as they say 'look at the pictures'. Apparently the article was titled 'The Panda Cichlid' and the photographs were of a very beautiful little cichlid. I knew then that somehow I would have to obtain and breed the 'Panda Cichlid', *Apistogramma nijsseni*. There were, at this time, *nijsseni* filtering into the retail trade in this country and I began to let local dealers know that I would be interested if they became available on their lists. A couple of them told me that they were on the wholesaler's lists, but were expensive. It was not until early in 1990 that I was able to obtain my first *Apistogramma nijsseni*, from a local dealer.

Information

I can honestly say that at this time there was not an abundance of information around on the *nijsseni*. There were a few facts in Hans-Joachim Richters book 'The Complete Book of Dwarf Cichlids'. This gave me a brief outline of the fish, but no in-depth breeding information.

Adult female *Apistogramma nijsseni* in breeding colours.

Spawning sequence – male inside of pot with female displaying outside.

Apistogramma nijsseni
(Kullander 1979)

Distribution: Lower Rio Ucayali, near Jenaro Herrara in Peru

Habitat: Small, slow flowing water, dH under 1, pH around 5.5.

Length: Males 80mm, females 60mm

Sexing: To determine the sex of the fish at the adult stage or even as young adults should not be a problem. As the photographs indicate the male has a somewhat more robust body. Compared to other *Apistogramma* males such as the *agassizi* and *cacatuoides*. I would go as far to say that the male *nijsseni* is rather compressed. The dorsal and caudal fins have strong red markings at the edges. Whereas the body colour can change according to its mood. At breeding time the males body colour is at its best, with blue and red hues. Another factor is that with most of the *Apistogrammas*, when looking for a pair you can look at the front rays on the dorsal fin. On the males they would be higher than the females, but with the nijsseni this is not so apparent. With this fish I tend to look for the females first as they tend to carry more distinct signs of sexual differentiation. As I have said they are smaller and the body shape is slightly more elongated. The main point is the centre black marking on the body, also when older they will start to show the distinctive yellow body colour.

Tank set-up

All the fish that I had acquired could be classed as young adults, and I was to follow the normal ground rules I use for keeping dwarf cichlids. They would be placed together to allow them to choose their own compatible partners. Or on the other hand let the dominant male court a couple of females and form his own harem. To allow this the tank must be large enough for the fish to establish their own areas of territory. The area required by a pair of dwarf cichlids can be as large as 30cm in diameter. For example, you could have one male breeding with two females; the male would cover two areas of 30cm. The females once they have bred will hold their selected patch at all costs. So in theory you would require a 60cm x 30cm (24" x 12") tank at least to hold this breeding trio. I had three pairs of fish so I used a 90cm x 3cm x 30cm (36" x 15" x 12)" tank, this was just enough to allow 30cm (12") each pair.

The tank consisted of a gravel substrate and plants, somewhat similar to your normal community tank. The only difference was the abundance of slate caves, clay flowerpots and small clay plant dishes with an entrance cut to allow the fish to enter. These established hiding places are a must for the *nijsseni* as it is classed as a 'cave spawner' – one of the dwarf cichlids that adhere its eggs to the roof or wall of such a hiding place.

The plants in the tank were Java fern (*Microsorium pteropus*), Cryptocoryne *wendtii* and clumps of Java moss (*Vesicularia dubyana*). You could say that the tank was well planted, and the reason for this is that like most dwarf cichlids, the *nijsseni* can be very nervous. So they need this cover to hide in if they feel threatened in any way.

The water temperature was around 78°F to 80°F, and a large sponge type filter supplied the tank filtration. This was, by the way, the only tank in the fish room that had a permanent lighting system. It consisted of two 40-watt incandescent light bulbs, this was ideal for this type of fish as dwarf cichlids tend to be nervous and will hide under strong lights.

Water conditions

The water from their natural biotope can be said to be very soft and on the acidic

side. Where I live the water is very soft and a pH around 7 to 7.2, and I breed all my dwarf cichlids using water as it comes from the tap. In the fish room at this time were *Apistogramma borelli*, *Apistogramma cacatuoides* and *Apistogramma agassizi*. All these fish had young broods and all in my tap water, so I did not see the need to change it for *Ap nijsseni*. I know there will be people reading this who cannot obtain tap water as soft as the water in my area. To them I say do not let this put you off keeping any of the dwarf cichlids, such as *nijsseni*. There are now many items on the market for changing water chemistry, and I am sure your local dealer will be able to suggest the best options.

There will be the readers who can state that they have bred dwarf cichlids in water with a higher hardness and pH. All I can say to this is to keep *nijsseni* in good condition try and adhere to the water I have suggested. Once a week I would carry out a 15% water change and clean the sponge filter.

Feeding

You will find that feeding is not difficult, as they will take most dry foods. I fed them a standard flake and high protein food, frozen bloodworm and live white worm. On this diet a good growth ratio was achieved, and soon the fish were showing signs of pairing off.

The daily feeding programme would be:-

(1) Morning: Dry Foods
(2) Evening: Frozen Blood Worm
(3) Twice a Week: Live White Worm

Breeding

It has been said that *Apistogramma nijsseni* can cause a few problems when it comes to attempt captive breeding. I must say that I did have initial minor problems, but once I had established the breeding pairs I was able to raise large broods of fry.

Of all the dwarf cichlids I have bred, I cannot think of a female that will show you so many colour variances as the female *nijsseni*. You will soon get to recognise its defence, offence and fright patterns. The one you will not fail to identify is the breeding pattern; this will be seen at its best when she is guarding her eggs or a brood of fry. The bright yellow body with the prominent black centre body marking is the sign of a proud mother who will protect her clutch at all costs. At this point you will see why it is called the 'Panda Cichlid'.

In the 90cm (36") tank, which held the stockfish, one pair was spawning at regular intervals, but did not raise any young. The female would eat the eggs after a couple of days. One other pair was also spawning under a clay dish at the opposite end of the tank, but again no young. The males and females of the two groups would defend their own areas of the tank – each one not moving into the others patch. This constant meeting at the boundaries I felt could be the reason for the females eating the eggs. So after this happening about six times I decided to set up a 60cm x 30cm x 30cm (24" x 12" x 12") tank with the same layout and use a one pair one tank system.

This type of set up was to prove advantageous to me as it enabled me to observe the spawning and allowed me to take photographs. I selected a pair of fish and placed them in their new home and allowed them time to settle in and again establish a territory. I did not have to wait long before I noticed they were into their pre-spawning dance, this was taking place outside of a 3" flower pot with a small aperture cut to serve as an entrance. The male and the female would both enter the pot at frequent intervals, and at one point during this I could see eggs on the side of the pot. Once the spawning was over, in typical *Apistogramma* fashion the female drove the male from the site, this was the signal for me to remove him from the tank for his own protection. The female, meanwhile, protected the eggs and would advance to the front of the tank to warn me off at feeding time. The eggs hatched within three days, and were moved by the female to the slate cave, where they could be clearly seen wriggling. It was on the sixth day that I was greeted with the sight of her herding the free swimming brood in search of food. Feeding the young fry was no problem, as they took brine shrimp *nauplii* and micro worms as their first foods. After a period of 18 days I removed the female and young fish were left to fend for themselves. At this stage a 25% water change was carried out once a week. This was to remove any uneaten brine shrimp that could pollute the tank.

Growing on

When the young fish were six weeks old I moved them to a larger tank 90cm x

JOHN RANDLE

Spawning sequence – the male trying to entice female into the cave

John Rudge

Brood of young *nijsseni*. The females can be identified by the black marks at the caudal base and in the centre of the body.

30cm x 30cm (36" x 12" x 12"). This tank was to be a bare tank, that is to say it had no substrate. Filtration was supplied by one of my homemade filters; you would use a sponge type filter just as well. By now the fish were large enough to take dry foods and this they did with relish. The size of the broods was 50 fish, further broods were around these numbers and I was soon to have three pairs spawning in separate tanks, this allowed me to build up a large collection of *nijsseni*.

I could sex the fish at about 15 mm in length. The males would show the red edge in the caudal fin and the female the centre black marking would start to show. The problem would start when I would have to catch a pair. Every fish would loose all markings as soon as the net hit the water.

Conclusion

This a record of an early breeding project with this very attractive dwarf cichlid and I have used the same method to breed a few times. While it is still not one the cheaper dwarf cichlids, it can be recommend to all fishkeepers. I do believe that if you keep the water conditions as I have suggested, you will eliminate any breeding problems. Also remember that the adult pairs need plenty of space. Go on spoil yourself and buy the 'Panda Cichlid'.

Summary of essential points when keeping and breeding *Apistogramma* Nijsseni

1. Tank Size
You can keep them in a community type tank with other fish of compatible size and temperament, but if you intend to breed them they will require the space I have suggested.

2. Temperature
A good range is 78°F (26°C) to 82°F (28.4°C). If kept at lower temperatures breeding instincts seem to be impaired.

3. Tank decor
Allow plenty of hiding places in whatever set-up you use. When using plant pots do not use plastic, only clay.

4. Lighting
Do not use bright lights over the tank. A cover of floating plant will help to subdue the lighting.

5. Water
The pH can be allowed to vary slightly, but try to keep the dH (hardness) within the parameters suggested. 6 to 8 pH; 1 to 6 dH

6. Feeding adults
By using the high quality dry foods on the market you can bring most fish into breeding condition. *Apistogramma nijsseni* are no different. I found that they would take all types of dry food. The white worm was a bonus.

7. Breeding

Eggs
The number of eggs can vary according to the size of the female. I was observing egg clusters of about 50 to 60 in number. The colour of the eggs are red.

Incubation period
After three days the eggs hatch, but will not be free swimming for another three days. Remember; do not be too eager to view the eggs. You may cause the brooding female to eat them.

Size of fry
They are about 2 mm in length when first seen free swimming. They will take as first foods freshly hatched brine shrimp and micro worm.

Kathy Jinkings

...End Point

All the *Apistogrammas* are beautiful little cichlids from South America, and the Cockatoo cichlid is one of the prettiest as well as one of the best known and most easily available. The males are both larger and more striking than the yellow-grey females, although when caring for a brood the female may become a bright yellow. The male also has longer fins. A range of different colour morphs are available. The common name of 'cockatoo', and indeed their scientific name, which stems from 'cacatua', the cockatoo, is a reference to the spiky first rays of the dorsal, which resemble the raised crest of an excited cockatoo.

Aquarium conditions

Although small, these are territorial cichlids. Fortunately their size means a territory can be accommodated in quite a small tank, and a 30in tank will be adequate for a male and a small harem of five females. Only one male should be kept, as they are most aggressive between the males. In the aquarium the male will establish himself in the upper reaches while the females stake out individual areas at the bottom of the tank. These areas are where, if all goes according to plan, they will raise their families, so each female should have at least one cave to call her own. Plants in the aquarium will serve to break up the territories, as well as looking attractive and providing the fish with a range of hiding places. In the aquarium they are very sensitive to water conditions. In the wild they are found in water conditions with a pH ranging from 6-8, and 5-19dH, but a good regime of cleanliness and treated water changes will be necessary. They can be sensitive to medications.

Breeding

Softening the water may stimulate the fish to spawn, when the female will lay up 80 oval eggs on the roof of her cave. She guards the eggs, while the male continues to patrol his whole territory, encompassing that of all his wives. The female may become aggressive towards the male at this time. Once the fry are hatched, if there is more than one brood in the tank at once the youngsters may switch from one to the other. The mother continues to look after them, bringing them out into the tank to forage after about seven days. The little fry must have live food – microworms and then Brine shrimp *nauplii* will give them a good start in life. You can make sure the food gets to the waiting mouths by squirting it at them gently with a pipette or turkey baster.

These beautiful little fish can be expected to give you two to three years of pleasure, as they are not long-lived. For someone with limited space this dwarf cichlid will supply both an attractive display and interesting behaviour.

PROFILE

Name:
Cockatoo dwarf cichlid, Crested dwarf cichlid

Scientific Name:
Apistogramma cacatuoids

Size:
9cm / 3'/2in (male); 5cm /2in (female)

Aquarium Type:
Species tank or with small gentle fish

Distribution:
Amazon Basin: tributaries of the Rio Ucayali, Rio Amazonas and Rio Solimoes. Lago Mlatamata (Peru)

Diet:
Prepared foods and small live foods

Temperature:
23-28°C