Today's Fishkeeper

SEPTEMBER 2002 £2.95

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FROM BEGINNER TO ADVANCED

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Welcome

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One of the real pleasures of working on a magazine like this is the chance to meet other enthusiastic aquarists of all ages and walks of life. This month I have chatted on the phone to a subscriber who has been buying *Today's Fishkeeper* (when it was *Aquarist and Pondkeeper*) for well over 40 years. The change in the hobby during that time has been phenomenal and he has changed with it. Starting with Goldfish and coldwater fish he then moved into tropicals and now has a very large marine aquarium. Each move from one group of fish into another has meant learning a whole set of new rules and reading up on the subject again. His constant companion throughout, however, has been this magazine.

Alexis (on the left) and Jack are keen aquarists who would like to try their hand at marines in the future.

At the other end of the hobby I was lucky enough to meet Alexis and Jack when I installed Alexis's *Fluval Duo 800* aquarium this month. Two dedicated fishkeepers right at the beginning of the tropical hobby who have already mastered the basics of fish keeping with their coldwater fish. Both are avid readers of *Today's Fishkeeper* and any other literature they can find on the hobby.

What struck me about both these sets of readers was the way the hobby had gripped them at a young age and become a lifelong passion. That happened to me at the ripe old age of 10 and I know of plenty of other people who caught the bug at about the same age. We often have to give up fish keeping for a few years either due to work or children but always seem to end up with an aquarium or two again a few years down the line.

Until next month,
Happy fish keeping

Derek

What's in this month's issue of *Today's Fishkeeper*?

Due to the increase in page number this month three new contributors have joined the editorial team. My good friend Mary Sweeney has agreed to write a regular column on creating a community. Everyone from beginner to advanced aquarist keeps communities of fish (unless they are breeding fish), so this feature will be ringing the changes between set-ups that are ideal for a beginner through to those that need a whole lot more care.

With the increase in size we have been able to bring in another regular contributor on Marines. Anthony Calfo is well known in the American hobby lecturing all over the U.S.A. on marine keeping and coral propagation. He is the author of a book on coral propagation and co-author of a series of books which will be published in the near future. Look out for his regular features on the practical aspects of marine keeping.

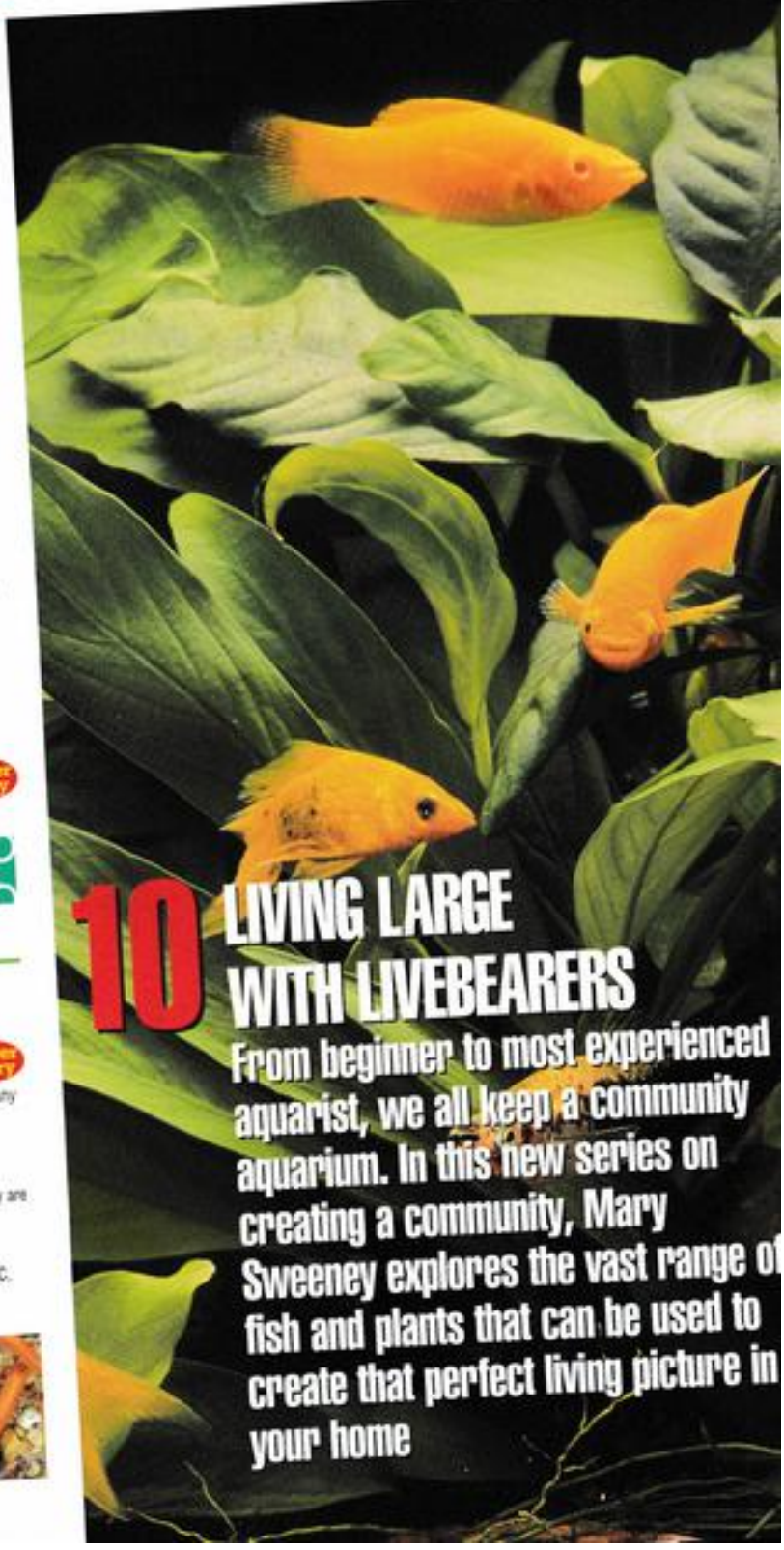
Finally we have been lucky enough to secure the services of top German aquarist Erwin Schraml. Erwin is one of the foremost authorities on Catfish in the world today and bang up to date with all the new species and imports.

SEPTEMBER inside this i

TROPICAL/MARINE/COLDWATER

MARINE

PONDS & COLDWATER



10 LIVING LARGE WITH LIVEBEARERS

From beginner to most experienced aquarist, we all keep a community aquarium. In this new series on creating a community, Mary Sweeney explores the vast range of fish and plants that can be used to create that perfect living picture in your home

ssue of Today's Fishkeeper

TROPICAL

BEGINNERS

NEWS & VIEWS

PLANTS

REPTILES & AMPHIBIANS

REGULARS

KEY TO SYMBOLS:

Keep an eye out for these handy symbols to help you with your fishkeeping.

Starting Point...

Just beginning in the hobby? **Pat Lambert** writes especially for you...

I don't remember a pot like this back in Africa - but it is still home from home!

PHOTO LINDA LEWIS

Top tip

Always wash any ornament in warm water before placing it in the aquarium. Do not use detergents or soap.

SOME VERY STRANGE THINGS HAPPEN IN AN aquarium and I'd like to tell you about one them. I love planted tanks with rocks and wood which create a natural look in the tank, but some people like ruined castles, sunken ships, divers and so on and are looked down upon with scorn by others who say that these things are not natural and the fish will be upset if you introduce them to the aquarium. Well... when my children were small and had their first aquarium, they really enjoyed the fish and wanted them to have a 'play area' so they went out and bought a ruined castle.

When they returned I lifted my hands in horror but managed to suppress any comment when I saw the delighted look on their faces. They washed the ornament very carefully and placed it in their tank with plants around it. Much to my surprise, instead of the fish dashing away in terror they were very curious and carefully inspected this new introduction. In no time at all they were swimming in and out of the ruin which really looked quite good with its curtain of plants.

This leads me very nicely into the strange tale. A friend of mine has a series of slides which show some strange goings on in an aquarium. This aquarium had an ornament of an air driven diver with hands stretched above his head which he mechanically moved into the diving position bringing his hands down. There was a pair of Angelfish in this tank who decided to spawn on the diver. When he was in the straight position the female went up the legs depositing eggs, as he went down they backed off, when he went up again the male fertilized the eggs and so on. I don't know what the end result was but those fish were certainly not frightened, fish don't breed when they're frightened. Truth certainly is stranger than fiction. So, if you like ruined castles, shipwrecks and divers, go ahead enjoy yourself but I think I'll stick to a beautifully planted, natural looking tank, but I do use simulated wood!

GOOD THINGS COME IN SMALL PACKAGES

A beautiful and intensely coloured small fish for a small aquarium is *Barbus jae*. The males of this species have a bright red dorsal and bright red caudal peduncle. Black stripes transverse a body blushed red, the anal and pectoral fins are also edged in bright red. Females are much less colourful These fish may be small at 4cm but what they lack in size they make up for in colour. A shoal of these undemanding fish makes a very colourful display. A dark substrate shows off their colours to great effect. Brightly lit tanks are not appreciated.

A newly imported Jae barb. Not as beautiful as it will be, but already showing its potential.

PHOTO DAVID DAWES

Pangasius catfish come in several colour forms including gold and albino. This is the wild form.

ALL IS NOT WHAT IT SEEMS

At some time or another you will visit an aquarium outlet and you will see some fish labelled either Pangasius catfish or Shark catfish. They will be about 60cm long and look very attractive as they swim in a shoal at the front of the tank.

They shoal as youngsters and just grow and grow until they reach 120cm.They're a food fish in their native Thailand, where they swim in the paddi fields. As adults they are large, solitary species which outgrow the quarters that many fish keepers can provide and ,in desperation, they ask public aquaria to take them in. They live in the lower regions of the tank, have poor eyesight and are rather skittish. They are omnivores when young but at this stage in their development live food is essential. When they reach adulthood they lose their teeth and become vegetarians.

WARNING!
This is not a fish for the average home aquarium!

A DIFFICULT PLANT

The Madagascan lace plant is an unusual aquarium plant that is difficult to keep. It looks delicate as only its vein structure can be seen. It is tougher than its appearance would suggest but conditions must be just right for it to be grown successfully. A friend has grown this very successfully in subdued lighting, temperature 20-22°C (a low temperature for tropical plants) and a low pH of 6.5. I've bought it on several occasions and have had little success but this beautiful plant is sometimes an irresistible temptation

BEWARE!
This plant will not survive if there is any algae in the tank. Algae will destroy the leaves

Lost for Words

Buffers These are used to stabilise the pH in soft water areas where sudden pH crashes are not uncommon. They do not change the pH but help keep it stable for a longer period. There are many buffering agents available to the fish keeper.

Copper Metal used in copper sulphate form is the basis for many aquarium remedies. Poisonous to fishes in excess.

Cyclops A small crustacia that can kill young fry if introduced to their tank but red Cyclops is an excellent food for young fish

Lacustrine species These are fish whose natural habitat is a lake.When compared to the same species which inhabits rivers (riverine species), lacustrine species are deeper bodied and often grow much larger . Sometimes only a scientist can positively identify them as the same species.

Weberian apparatus Linkage of the swim bladder to the inner ear acting like a sounding board to enhance sound and other vibrations. Characins and catfish are among the groups that possess this and sharpened hearing makes them alert to dangers.

Characins Found in the African and South American continents, these are a very ancient group of fishes. Most are schooling fish with their most distinguishing feature being the adipose fin(a projection of fatty tissue) situated behind the dorsal fin , although this is not found in all Characins. This is a diverse group of fish. Hatchet fish, Tetras and Piranhas are all Characins.

The Six-barred distichodus(*Distichodus sexfasciatus*) grows up to 100cm in nature. You can clearly see the adipose fin on this fish between the dorsal and caudal fins.

Chloramine Some water companies add ammonia to chlorine to form chloramine which is used as a disinfectant. Chloramine is more of a problem to fish keepers than chlorine and in some areas where chloramines are produced fish keepers and retailers have experienced increased fish deaths

Gravel tidy Plastic mesh fitted between layers of gravel to protect biological filtration from being exposed by digging fish

Sympatric species Fish that share the same habitat in the wild

SUCCESS WITH PLANTS

There are problems associated with plants that are very common . We see a beautiful plant and think how wonderful it will look in the aquarium. The truth is, just as you need a book which tells you about fish you also need one that tells you about plants, the same rules apply. What temperature suits the species best? Does it prefer hard or soft water? How tall does it grow? How much space will it occupy in the tank? Is it best planted singly or in a group? However, one of the most important aspects of successful plants is the lighting. Frequently the lighting is not strong enough but, on the other hand, some plants prefer more subdued lighting.

Just like plants in the garden aquatic plants need nutrients. These nutrients are supplied by the fish themselves in well balanced community tanks. A nutrient enriched substrate in which the plants are firmly anchored will produce healthy plants. A good aquatic plant fertiliser should supply all the additional food that the plants need, but too much of this will lead to problems.

Carbon dioxide CO_2 is as important to plants as oxygen is to us. Great success has come with the use of CO_2 and several suppliers offer complete systems. Just as we look at garden plant catalogues before deciding which plants to buy for the garden and which location will best suit them, we should think carefully about our aquatic garden and choose those plants that are best suited to the conditions we can provide.

Several firms produce excellent CO_2 units. This is Aquamedic's complete system which contains everything you need for perfect plant growth.

The ten golden rules of fishkeeping

Read all about it

Take the first steps in fish keeping by finding out all you can about caring for your fish.

a) Manufacturers often provide free booklets about fish care.

b) Inexpensive books provide information on setting up.

c) *Today's Fishkeeper* experts are on hand with help & advice and sections of the magazine are devoted to beginners.

THE WATER

1. **Testing:** Before introducing any fish to your new tank test the water for Ammonia, Nitrite and Nitrate. Safe water ready to receive fish should have zero readings of Ammonia & Nitrite and almost Zero nitrate. Test the pH, pH7 is neutral, above this is more alkaline and below 7 is more acidic. Read up on pH requirements for any fish you intend to purchase.

2. **Temperature norms:**
   Freshwater tropicals 21-27°C
   Marines 26°C
   Coldwater 13.5-21°C
   Some delicate species have very specific requirements, read up on them before you purchase.

3. Filtration cleans the water in your tank. Choose the filtration most suitable for the fish you intend to keep. Some species do not appreciate being blown around the tank, others that come from fast flowing waters like more turbulence. Large tropicals, coldwater and marines require larger filtration systems.

THE FISH

4. **Stocking levels:** For freshwater tropical we recommend 12cm² of surface area per 1cm of fish.
   Marines: For a fish only setup we recommend 2.5cm of fish for 9l of water and for Reef only setups we recommend 2.5cm of fish per 27l of water.
   Ponds to a maximum of 250cm of fish per 4500l of water.
   Measurements should be based on the optimum adult size of the species not the size at the time of purchase. **NEVER OVERSTOCK**

5. **Knowledge:** Find out as much as you can about any fish you hope to buy before purchase.

6. **Introducing fish:** Fish should be added a few at a time over a period of several weeks to new setups. This allows the filter system to mature.

7. **Quarantine:** All new purchases should be quarantined for established tanks for at least two weeks.

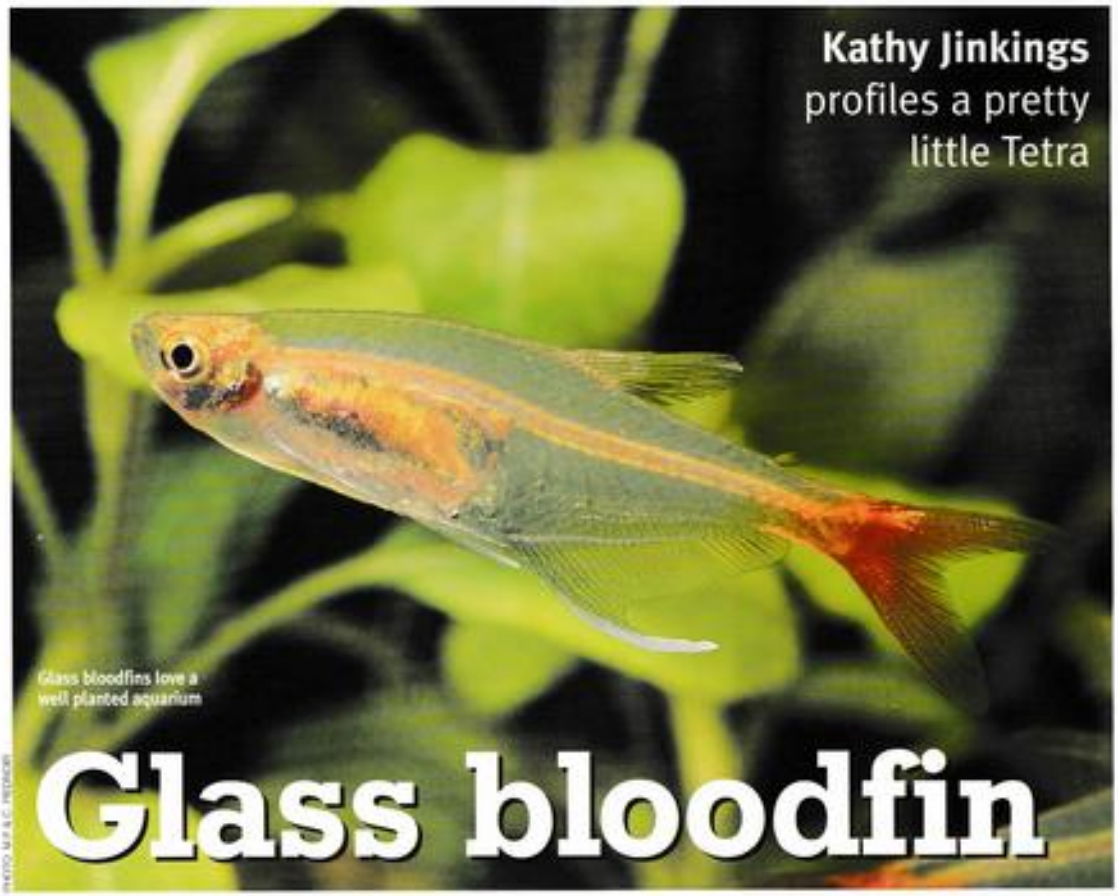
THE ROUTINES

8. **Feeding:** Twice daily feeds are the norm for most adult fish. Try to feed at the same time each day as this establishes a routine. Only offer as much as the fish can eat in a few minutes.

9. **Water changes:** Freshwater tropicals 10-20% weekly
   Marines no more than 20% every two weeks.
   Pond fish also appreciate an occasional water change. Keep an eye on ammonia, nitrite and nitrate levels. They should be zero in a mature pond.

10. **Cleaning filters:** These should be cleaned once a week. If they work by biological filtration (bacteria break down the waste) and have a sponge in them, this must be cleaned in old aquarium water that is then discarded. Never use any household detergent or soap on aquarium equipment or tanks.

OBSERVATION: Daily observation is the key to successful fishkeeping. Look for any abnormal swimming patterns, bullying or listlessness. See that the fish are eating well and that all are getting their share. If fish are in difficulties test the water.



Kathy Jinkings profiles a pretty little Tetra

Glass bloodfins love a well planted aquarium

PHOTO: M.P.& C. PIEDNOIR

Glass bloodfin

ALSO KNOWN AS THE DRAGON-FINNED tetra, the Glass bloodfin is a striking fish. Although the elongated body is almost transparent and colourless, the males make up for this with a vivid scarlet tail fin. Females also have a red tail fin, but not as bright as that of the male. In addition to this, the male has an extended anal fin, with a black mark behind the white strip at the leading edge of the fin. They are an altogether more refined and delicate looking fish than other bloodfins and should not be confused with the Bloodfin tetra, *Aphyochorax anisitsi*, which has a browner body and red coloration along the stomach.

Although sometimes to be found in aquarium shops, these attractive fish do not have the popularity that they deserve. For a beginner starting a community tank, this little fish is ideal. Although a single fish may prove nervous, a small shoal of about six individuals in an aquarium with some floating plant cover will provide both colour and movement in the top and middle depths of the tank. They are active swimmers, and will enjoy playing in strong water currents provided by a filter. These hardy little fish are not fussy about their water.

In Nature they can be found both in the flood plains and rivers and small tributaries in South America, having been recorded in Peru, Bolivia, Ecuador, Columbia and Brazil. This is an environment which usually produces soft water fish, but the tolerant Glass bloodfin thrives with a pH anywhere between 6 and 7.8. Since this bloodfin is so undemanding in terms of its environment, a school of these fish is suitable for any community of equally peaceful fish. They are quite small, with a maximum size of about 6cm, so they should not be kept with any tankmates large enough to eat them.

Their feeding habits are equally unfussy, and they will do well on a diet of flake food or any other floating foods. Being top swimmers with a mouth that is oriented towards the surface, they are not designed for feeding from the substrate. Like most fishes, however, they enjoy occasional live foods, and will be at their best given the opportunity to chase Daphnia around the tank.

They can be spawned quite easily in the aquarium, although the water needs to be towards the softer end of the range and the temperature towards the higher end. They are egg scatterers, so in the community few eggs or fry are likely to survive.

These hardy, tolerant and attractive fish are well worthy of a place in any peaceful community, and although perfect for a beginner their scarlet tails and ethereal bodies may well secure their place in the tanks of any fish keeper who appreciates their beauty. ■

PROFILE

Name
Glass bloodfin

Scientific name
Prionobrama filigera

Aquarium type
60 x 30 x 30cm of small peaceful fish

Size
6cm

Distribution
Paraguay, Argentina, South Brazil

Diet
Flake and all live foods

Temperature
22 - 28°C

This community aquarium was created by Marie-Paule and Christian Piednoir in France. Mollies have been included and the planting is slightly different but it is typical of the setup Mary Sweeney has created in America.

Living large with Livebearers

From beginner to most experienced aquarist, we all keep a community aquarium. In this new series on creating a community, **Mary Sweeney** explores the vast range of fish and plants that can be used to create that perfect living picture in your home.

IF STRONG COLOURS AND LIVELY FISHES fit your vision of a perfect community aquarium, you can't go wrong with a selection of livebearing fishes like Swordtails, Platies, Limias, and Guppies. When I talk about livebearers, I'm not thinking of going on an excursion to the badlands of North America to pluck a rare beauty from a little-known puddle 20 miles from anywhere. Let us leave that adventure for the brave and the few. What I want to put together is an attractive aquarium with good-looking fish that live out their natural life spans in my company. I suspect that many of you feel the same way. Not everyone has the ambition to keep rare, delicate species that weekly require seven large water changes with specially formulated, amendment-added, correctly heated water dripped into the aquarium over the course of 20 hours. I want my hobby to be relaxing, and at this point, relaxing does not include more work. I want livebearers.

Creating the picture

Picture this: a 100 litre tank with a really good light, natural-looking decorations, and a population of colourful fishes. Nice, right? Now put the tank at eye-level from your favourite chair and add three or four Corydoras catfish gossiping about the bottom. You can exhale now.

This is one of the simplest community aquaria that you can design, and a good portion of its beauty is in that simplicity. Maybe later I'll set up a mini-reef, when my ship comes in.

The livebearers we're looking at for this aquarium are all about colour. We have an excellent selection of cultivated varieties in Platies, Swordtails, and Guppies in varying shades and combinations of reds, oranges, yellows, blues, greens, and virtually countless combinations of patterns and fin styles. These "man made" fishes are not bred to be homely. So it is your own aesthetic sensibility that you will please when you choose your fishes. Limias are so handsome that I doubt the fish farmers could improve on their appearance. I hope not anyway, it would be distressing to see these fine fishes "enhanced" by veiled fins or a balloon-shaped body. The Cuban limia, (*Limia vittata*), is something of a "personality" fish, with both Innes and Baensch commenting on its nice nature. Innes called it a robust and friendly fish. Baensch calls it "cheerful." Would that we were all so described.

A young male Cuban limia which has yet to develop its full colour or gonopodium. As it matures the gold flashes become brighter and spread over more of the body and fins.

If this is your first aquarium, I strongly advise you to remember that fish keeping is (for most of us) meant to be a leisure activity. One of the greatest assets of any good aquarist is patience. This should start with the initial set up of the aquarium. It's very tempting to try to make an aquarium in an afternoon. Many people think they can swoop into the shop and buy all their aquarium supplies, fishes included, in the same trip and rush home to dump gravel, blast tap water, drop in a load of fish, and have a work of art for their party that evening. It doesn't work that way. At the very least, the water clarity will be like midnight on the moors. And behind that milky opacity, all but the most ironclad fish (which are usually *not* bred to be good looking) will be struggling for life. Beyond these obvious infractions, there are a few tips that will help make your aquarium set-up most enjoyable.

Planting

Live plants are considered, by me at least, to be essential in the livebearer community. There seems to be a prevailing misconception in the tropical fish hobby at the moment: that you can't grow live plants without several hundred bucks worth of extra equipment. I'm here to tell you it's not true. No offence meant to anyone, especially those green-thumbed friends who keep aquatic plant species for whom a little extra gas can mean the difference between prodigious growth and none at all. Those of us opting for the simple life choose low-light, low-maintenance plants like Java fern (*Microsorum pteropus*), Java moss (*Vesicularia dubyana*), Anubias (*Anubias barteri* var. *nana*), various species of *Sagittaria*, and *Vallisneria spiralis*, which requires the least light of the Val. species. Floating plants, like Riccia (*Riccia fluitans*), Water wisteria (*Ceratopteris thalictroides*), and Salvinia (*Salvinia* sp.) are nice to have and provide safe havens for fry, but will block light to plants at lower levels, so you will likely end up with a tank full of floating plants. This is a nice look for a livebearer aquarium as well, but it would be unusual for substrate-oriented plants to do well in such a tank.

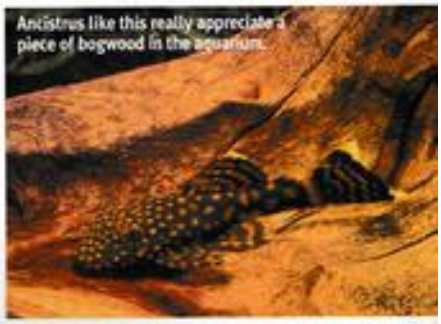
For best results, plant heavily from the start. This alone should prevent any algae problems, but if algae does appear, add more aquatic plants and an algae-eater like one Ancistrus (*Ancistrus temminckii*), which I have found to be an excellent community-tank citizen. One Ancistrus is enough for the average aquarium. Two Ancistrus can be territorial. The fishes will eat none of these plants, but you will see plenty of pecking at the plant leaves. They are swarming with the microscopic life that are the canapés of small fishes everywhere.

Top tip

When setting up for a planted community, be sure to use at least 5cm of substrate depth. Rooted plants need to be able to gain a foothold. It's handy to have a few chemically inert rocks to anchor the plant until the roots have spread. For the Javas, simply attach them to a piece of driftwood or a stone (fishing line works well for this) and they will eventually grab hold. Anubias can be tethered in much the same manner.

WINDOW LAW

It's often been said that one shouldn't place the aquarium tank anywhere near a window. Heat and excessive light are often quoted as good reasons to avoid windows *at all costs!* I have to disagree with this as an absolute rule, especially if the window is not getting full sun. Near a window with northern exposure that can be shaded in extreme heat is a beautiful place to have an aquarium, especially when you have live plants and/or fishes with highly reflective scales. Let common sense be your guide in most things aquatic. Many of the rules seem to have been made by experts who believe that novices cannot be trusted to use any common sense at all. It is very interesting to see what grows differently in the presence of some natural light. In fact, I could wish that fishkeepers would fill a jar with aquarium water and place it on a sunny window sill for a few weeks. See what happens. Beyond the old window debate, place the aquarium out of the way of disruptive household traffic. Anyone who shares space with offspring probably knows what I mean.



Ancistrus like this really appreciate a piece of bogwood in the aquarium.

Top tip

Livebearers thrive on a diet that includes some green foods, so make sure the food you offer them has algae or other vegetables as an ingredient. Always feed sparingly, but especially to start with when the filter is not yet at full capacity.


Swordtails have been bred in many different colours and fin forms. This is a male Red swordtail.

two females and one male, will keep everyone happy. Male Swordtails can be a little testy, so I don't usually like to use more than one unless it's a much larger tank.

The Limias would be added next. Cuban's, Blues (also called Black-bellied) or Humpbacked Limias would all make good choices. They may


Platies should be the first fish introduced. This is a Blue variatus platy which looks absolutely stunning in sunlight.

Introducing the fish

Once the tank is up and running with no ammonia or nitrite, it's time to start adding the fish. For this population, I would start with the Platies. They are the hardiest of the species involved. For a 100 litre tank, use two females and one male, or if you don't want young, use three males. You probably have a pretty good selection of Platies at your local shop. While it's fun to have a lot of variety in the tank, it's visually more effective to have a small group of the same type of fish. Think of a tank with a large school of fish as opposed to a tank with a mishmash of one each of many species.

The Swordtails would be next, assuming that the water chemistry is still fine: 0 ammonia and 0 nitrite. A trio of Swordtails,


Guppies come in all shapes and colours. This furnished aquarium would look good in any home.

be hard to come by but with a little hunting you should be able to find some.

I save the Guppies for last because they are the most delicate of the fishes we are using in this set-up. Time was that Guppies were the quintessential beginners' fish, tough as old boots, but this is no longer true with the fancy varieties. The more decorative the Guppy, the more delicate it will be. If you can find them and like them, however, the wild-type Guppies are still quite hardy.

Never mind that there will be illicit matings between the Swordtails and the Platies and the young will not be true to type. There will be variety and action and a self-sustaining population in your aquarium for as long as you take good care of them. ■

10 Community Cautions

Tetra
The Heart and Mind of Aquatic Life

Big fish will usually eat small fish

1 Be aware of the size to which the species in your community set up will grow and try to keep them even

Fish require different water temperatures

2 When creating a community, always ensure that the fish you are choosing can live at the same temperature and adjust your thermostat accordingly.

Fish have varying dietary requirements

3 Remember to cover the scope of dietary needs within your feeding regime and add extra filtration if you stock carnivorous species.

Do not mix riverine and still water fish

4 Riverine fish require higher oxygen and filtration levels than still waster fish. Still water will kill them. When exposed to fast moving water, still water fish quickly become distressed and lose condition. Chose either a still water OR a riverine Community.

Fish have different water requirements

5 Always ensure that your community tank only contains species that need the same water pH and hardness.

Fill all the levels

6 Different fish live in different areas of the tank. There are top, middle and bottom dwellers. A good community tank will include each of these.

Never over stock

7 Cramped conditions can lead to aggression in otherwise placid species.

Keep your eyes open

8 Look for bullies in your community and remover them immediately. Prevention is always better than cure.

Provide sufficient territory

9 Always ensure each species in your community has it's own territory. For example if you have 5 species of cave dwellers, ensure there are 5 caves...

Differing dispositions

10 Quiet tranquil species can easily become distressed when in close proximity to lively boisterous tank-mates. Keep the temperaments of your community fish similar.

Create your community with Tetra's Virtual Aquarium at www.tetra-fish.co.uk

Q&A

Star Letter

Home for a Siamese fighter

Q **I am hoping to set up a tank with the aim of keeping a male Siamese fighter (*Betta splendens*). I don't like the idea of keeping them in a bare bowl, which is why I am thinking of getting an 45 x 30 x 30cm tank. What would you recommend to be the "ideal tank" in terms of decor, plants, substrate, water parameters and tankmates?**

Also, do you know how to get hold of good quality bettas in the Bristol area, as many I see in the shops seem to be of inferior quality ie. finnage, colouring etc.

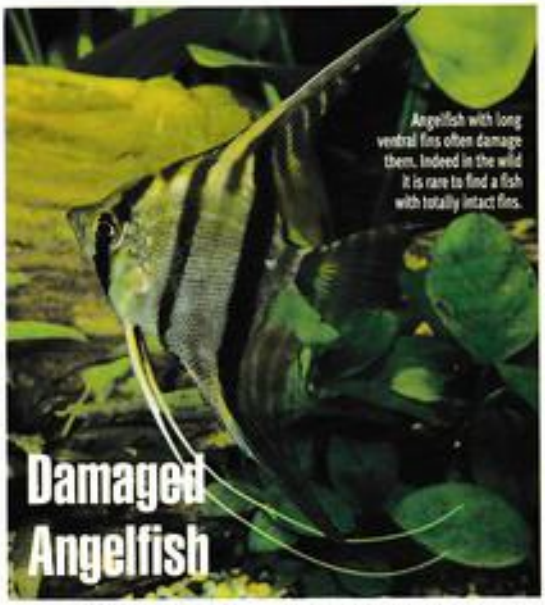
Hannah Wudarski, *Bristol*.

A A 45cm tank is ample space for a male Betta and some colourful Rasboras would make good tank companions with which Bettas might occur in nature. Ideally, the water would be neutral and of minimum hardness to mimic nature but as these selected fish are so far from nature, it scarcely matters to them, although it might to their tank mates. This type of bubble-nesting Betta is usually found in ditches or rice paddys open to the sun so temperatures between 25 and 28°C are ideal for breeding and even higher temperatures are tolerated. I usually recommend some dense thickets of plants for labyrinths so they can shelter and feel secure if they feel like it. If you want to keep the water soft, then you'll have to choose the substrate carefully.

But why keep the poor male on his own? You could easily divide the tank and supply him with a female and put them together to attempt spawnings. That way the sight of her would bring out the best in him and he wouldn't feel so frustrated ! Alternatively, why not consider one of the wild relations of *B.splendens*: *B.smaragdina* or *B.imbellis* which are equally beautiful but by no means so aggressive.

Good Siamese fighters are the product of careful breeding and selective culling so commercial imports are rarely of high quality. You can only get really good specimens via members of the the specialist Betta organisations; AAGB in UK, ISBC or IBC internationally. The alternative is for you to create your own desired specimens by a selective breeding programme. After all, that's how most of the enthusiasts got theirs!

David Armitage



Angelfish with long ventral fins often damage them. Indeed in the wild it is rare to find a fish with totally intact fins.

Damaged Angelfish

Q **One of my Angelfish has lost one of it's long ventral fins, will this grow back in time?**

Brian West, *Wiltshire*

A It will depend on the severity of the damage. If the damage was actually to the base of the fin then regrowth may not occur at all, or the fin may regrow deformed, but if it has merely been damaged part way up then it is likely that given good conditions the fin will regrow over time. If you find there is any infection at the injury site it might be advisable to use a mild anti-fungal medication from your local outlet, but most such injuries heal without any assistance.

Pete Liptrot.

Good Siamese fighters can be hard to come by in the trade. This red is about as good as they get from normal shops.

Having problems? Then let our panel of experts solve them for you. *Today's Answers* is our free reader service. Just send your question by letter or e-mail and we will forward it to our panel of experts. Everyone receives a reply regardless of whether we publish them or not.

Big move

I have recently purchased and set up a tropical freshwater aquarium in my living room. There are four *Pterophyllum scalare* (Angelfish), two *Colisa lalia* (Dwarf Gouramis), one Bristlenose Catfish and ten Tetras. I have become very attached to my new hobby, my problem is that I live in Germany and will soon be moving back to the UK. How can I transport my fish back to the UK without putting them through too much stress?

Richard Beckett, *Germany.*

I'm glad that this wonderful hobby is giving you so much pleasure. The movement of fish internationally can cause some problems, but these can all be circumvented with a bit of planning.

You really need to contact CEFAS for some guidance on the legal aspects, this is the regulatory body governing movements of live fish into the UK. They can be contacted by phone at, or through their web site at .

Really, packing the fish should be the last thing you do before you start your journey, so that they are in transit for as little time as possible. For transport of less than 24 hours duration, you will need to acquire a couple of the shipping boxes as used by exporters and importers, or alternatively large robust cooler boxes. This will all be made far easier of you have a friendly aquatic outlet who you have been a regular customer of.

The fish should be packed much as when you purchase fish from the aquarium shop, but preferably in larger bags than usual. If you can persuade your local outlet to pack the fish with oxygen this will be even better.

Once the fish are in the bags they should be placed into the shipping box or cooler, the lid taped down securely and then disturbed as little as possible until they arrive at their destination.

If they are being transported by air they should be placed in a pressurized cabin or cargo hold.

This is only feasible if you have a mature aquarium waiting for them at their destination. They are likely to be somewhat stressed after their journey, and they will need to be placed into optimal conditions on their arrival to help avoid any problems. They should be unpacked in a darkened room, and left without strong light until the next day. After having been transported in the dark, to move them into bright light would be a huge shock to fish that had already been through a stressful experience.

If the fish are going to be in transit for more than 24 hours, or you will be unable to arrange for a mature aquarium to receive them, to be honest it may be better for their sakes if you rehouse them with someone in Germany who will give them a good home, and then look for new fish once you are settled in your new quarters. I can assure you that there is a wealth of highly regarded retailers in this country from where you should be able to obtain healthy new stock.

Pete Liptrot

Tips on breeding Zebra plecs

Breeding Zebra plecs is one of the major challenges in the catfish hobby today.

I hope you can answer a question for me, or point me in the right direction. A few months ago Ian Fuller wrote that he was trying to breed Zebra Plecs, do you know if he has had any success? I would be grateful for any advice, comments, tips or opinions he or you may have.

Graham Summersgill *via e-mail.*

I have built and set up a tank specifically for breeding *Hypancistrus zebra*. The size of it is 90cm long, 45cm wide and 25cm high, there is a 12mm layer of smooth grained sand on the bottom and six 32mm diameter terracotta tubes placed together, with numerous pieces of slate placed on to and around, forming many various sized caves. The tank is filtered with an Eheim Ecco outside canister filter, there is also a Fluval 602 power head mounted on a 10cm cube of course sponge. This sponge also acts as an additional filter but the main purpose of the power head is to create a lot of water movement, which is a requirement for these fish. The water chemistry is relatively unimportant as they are tolerant of a wide range of water types, The two most important requirements are clean water and it needs to be warm 30°C being the norm. Because of a heavy work load in the day job I have been unable to conduct a series of water changes that may or may not have triggered a spawning. So to answer your question 'No I haven't had any success with breeding the Zebra's - yet!

Ian Fuller

Today's Answers Expert Panel

Alf Stalsberg - Cichlids.
Pete Liptrot - General questions on tropical fish and oddballs.
Andrew Caine - General questions on Marines.
Ben Helm - General questions on Coldwater plus equipment and technical advice.
Lance Jepson - Health.
Tony Sault - Discus.
David Armitage - Anabantids.
Derek Lambert - Livebearers, Rainbows & Breeding fish.
Ian Fuller - Catfish.
Andy Gabbutt - Killifish.
Stephen Smith - Goldfish.
Bernice Brewster - Koi and Ponds.
Bob & Val Davies - Reptiles and amphibians.

Questions by Post

Please indicate clearly on the top left-hand corner of your envelope which person you wish your query to go to.
All letters must be accompanied by a SAE and addressed to: Fishkeeping Answers, *Today's Fishkeeper*, TRMG Ltd., Winchester Court, 1 Forum Place, Hatfield, Hertfordshire, AL10 0RN.

Internet Service

Fishkeeping Answers is also available via e-mail. Most of our experts can be contacted via the Internet. A few are still not on-line so we will have to pass your messages on to them by snail mail (we will tell you when this happens) but otherwise you should receive a reply to your questions in a few days rather than weeks.
Send your e-mails to:- fishkeepinganswers@trmg.co.uk

Tropical

Q&A

What fish should I get?

Q I have just bought a 60cm Bio Life tank and have set it up. It is well planted and I also have a 10cm air curtain. The question is, what mixture of fish do I put in it? I am new to this game but I would ideally like fish that are easy to keep but at the same time attractive to look at. Also, what is the ideal number of fish I should keep in this tank? If you could come up with a plan of how many and of what type of fish I should get I would be most appreciative.

Pete Pritchard *via e-mail*

A The number of fish available in the trade that are suitable for an aquarium of this size is quite staggering. So many in fact, that it is quite a difficult job to do other than give a few guidelines.

Let's look at the physical environment you have provided first. The combination of the Biolife filter and the air curtain means that you should probably avoid those species that do not like a lot of water movement. On the other hand, you could look at some of the small shoaling species that enjoy swimming in some current.

The chemical composition of the water is also important. This will dictate which fish will thrive in your aquarium without the need for altering the parameters significantly. I would acquire some basic test kits which will help you monitor what the conditions are, what is happening within your aquarium, and show you whether your maintenance regime is adequate.

In an aquarium of this size I would avoid anything that gets over about 8cm in length, as swimming room is very important. If fish feel they are in too restricted a space they are likely to be stressed, which will make them more susceptible to health problems. It is always nice to keep fish together from the same geographical region, this is a way of ensuring that all the fish are likely to require the same conditions.

As a few suggestions, if you find your water is fairly soft you could go for a South American mini-community centred around the fish of the Amazon basin. Many West African fishes would also enjoy these conditions, although it may be slightly more difficult to track down a wide range of species.

There is currently a rich assortment of small Rasboras, Danios and Barbs from Burma, Thailand and other areas of Southeast Asia that would be perfectly suited to the smaller aquarium, these should be available at the more specialist outlets in your area. There are also some small and peaceful Loaches and Catfish available from that region that would balance out such a display beautifully (but be careful, there are also some huge Catfish from there sometimes available as youngsters!).

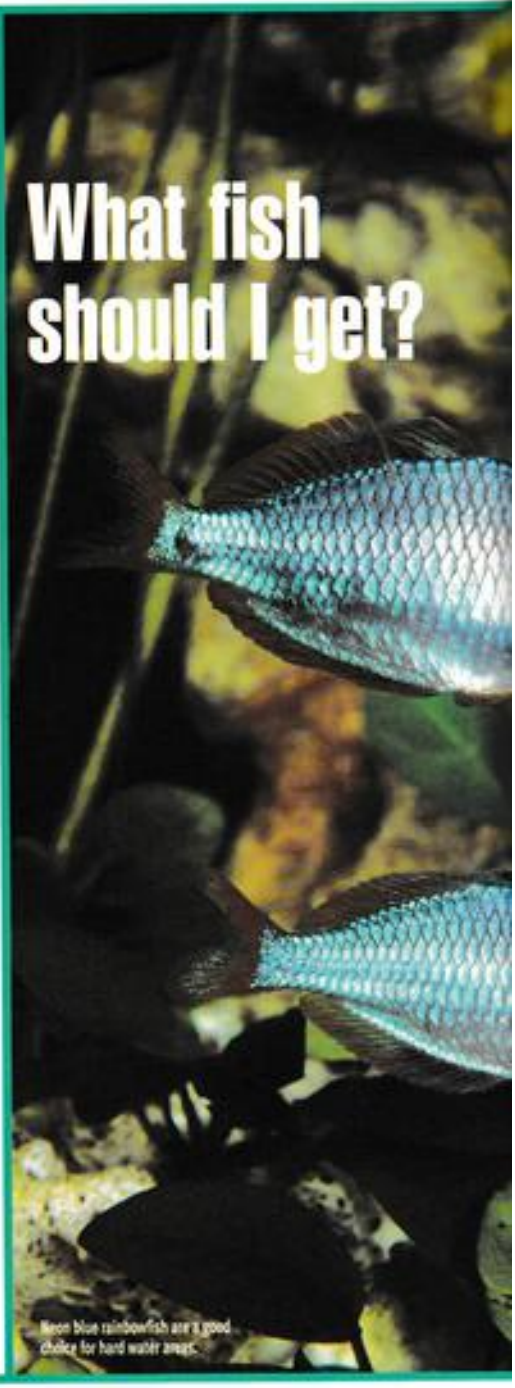
If you find your water is rich in dissolved minerals however, making it more alkaline in nature, you will need to select fish species that will be able to thrive under these conditions. Unfortunately, many of the fish that prefer these conditions are not suitable for the small community aquarium, and so your choice is somewhat more limited.

Commonly available are various Livebearers (though not Swordtails and Mollies, these generally require an aquarium larger than the one you have), some small Rainbowfish (particularly the stunning Neon blue rainbowfish, *M praecox*), and even Glassfish (which do require some special attention when feeding).

What I feel would benefit you would be to acquire a couple of good books, one featuring a wide selection of species for you to make your choices from, and one guide to general aquarium maintenance. I would recommend any of the *Baensch Freshwater Atlases* for a huge range of species with good information, and also the *Tropical Fishlopaedia* as an excellent reference guide for general husbandry of your aquarium.

Quality books are one of the most worthwhile purchases an aquarist can make, and they may well pay for themselves many times over in terms of avoiding mistakes. If you are undecided about any one book, why not borrow a few from your local library? This will give you the option of reading and assessing whether it will be of long term use to you.

Peter Liptrot.



Neon blue rainbowfish are a good choice for hard water areas.

Mapame wood fungus problem

Q I have some Mapame wood in my aquarium which was cracked when I cleaned it a few weeks ago. It has since grown a fungus over much of its surface. I dont want to keep taking it out and cleaning it every week as it will disturb all the aquarium inhabitants yet none of the fungus cures will shift it. Can you suggest a solution to my problem?

David Keys, *by phone.*

A Apparently fungus spores can be lodged in Mapame wood and once in a suitable environment they will grow at an alarming rate. The only cure seems to be to take the wood out and allow it to thoroughly dry out. Then coat it with clear polyurethane varnish making sure to cover all the surfaces completely. Once dry give it a quick rinse and it can go back in the tank.

Derek Lambert

Star Letter Prize from Hagen

This month the writer of our star letter wins a 2 Litre bottle of Nutrafin AquaPlus and a 2 Litre bottle of Nutrafin Cycle worth over £60!

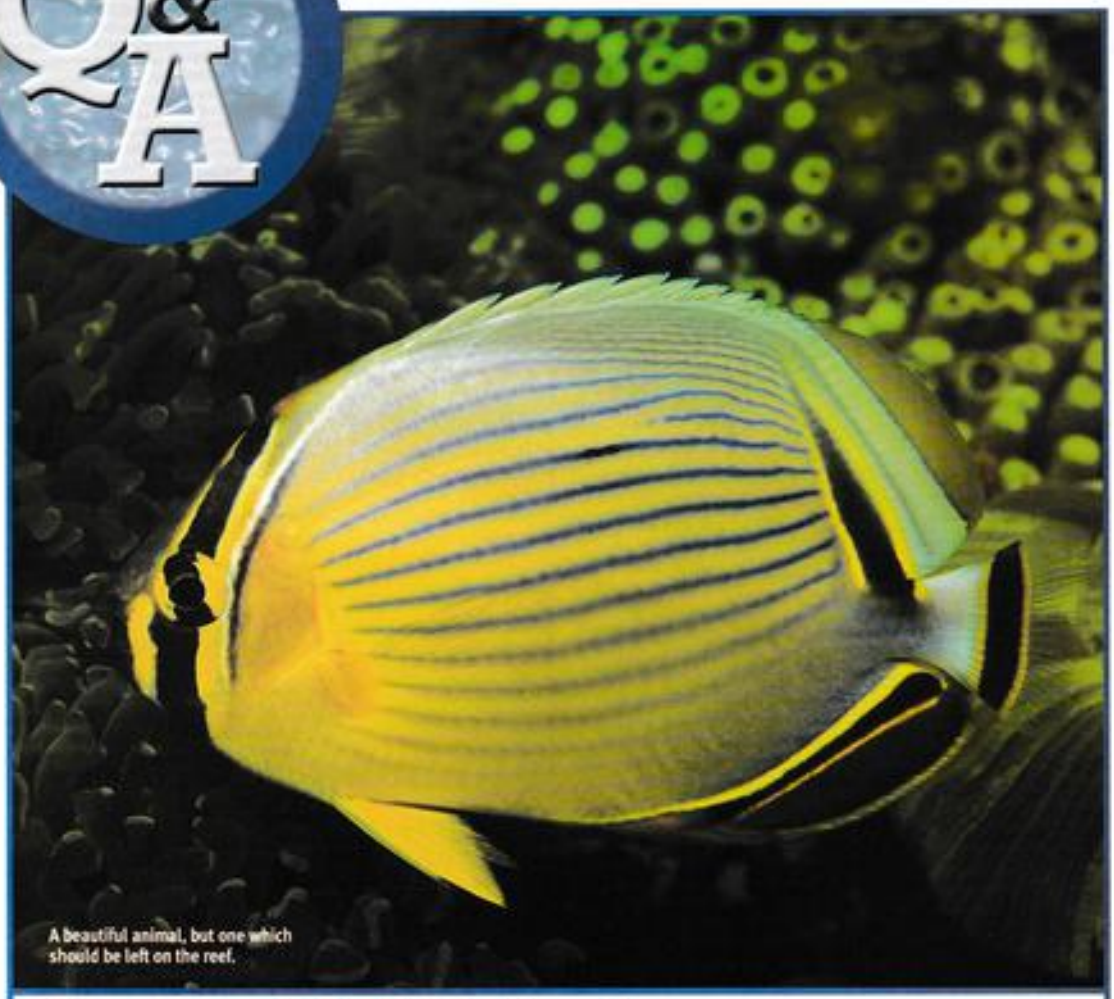
Nutrafin AquaPlus removes the chlorine, chloramine and heavy metals present in tap water which can be harmful to fish.

Nutrafin Cycle is the most powerful biological supplement currently available. Each millilitre contains 100 billion friendly bacteria, which help destroy harmful toxins such as ammonia and nitrite.

www.hagen.com

Marine

Q&A



A beautiful animal, but one which should be left on the reef.

"Impossible" Butterfly

Q **I have fallen for the Red fin butterfly fish but please help, I have tried on three occasions but sadly even though my dealer informs me that the fish is feeding, when I get it home they just wither away. They do not feed and the last one caught Whitespot which took two other fish with it when it died. I am determined to keep one long term, can you tell me how to keep them feeding?**

Simon Long, Northampton.

A Many Butterfly fish were once considered very difficult or even impossible to keep long term due to their feed requirements. Intense study by aquarists has now resulted in many of the 'impossible' Butterflies being kept in captivity long term. The Red fin butterfly *Chaetodon trifasciatus*, however, should still be considered as impossible since they belong to a group known as obligate corallivores meaning they only eat live coral polyps. There are reports that a few (and I mean a few) individuals have been weaned off corals to aquarium food, but hundreds of individuals have died in the process. This practice is totally unacceptable so good importers and retailers leave these well alone.

Andrew Caine

Star Letter

Q **At the moment I have a Juwel Rio 180 would this tank be OK to change from tropical to marine? I want to build up a reef system, please could you tell me what is the best substrate to use and in which way to set it up? I have read that live sand is a good one to use what is you opinion? Should I keep the filter in the Juwel, if not is it possible to take it out? What other filter is best to use and what is the best media? I know water movement is very important in a reef tank. How many power heads would I need for a tank this size and what would the best surge control to get. I know lighting is the most important in a reef tank sadly I can not use metal halide pendants but do have room for two more fluorescent tubes. Which would be the best fluorescent tubes I can use and what is the best cycle for them to work on. Do you think I will need a UV? Do I need a Protein skimmer and should it be running from day one? Which would be the best one for a tank like mine? The last time I tried marine fish keep I have a very bad brown algae problem is there anyway to stop the growth of this?**

Lee Ogley, *Glossop*.

A Your Juwel aquarium is OK but you will be chopping up your hood removing the filter and adding more lights, so when you have finished the only thing that will resemble a Juwel aquarium is the colour. Buy equipment that is over capacity and stretches your budget, you will appreciate this later.

Your filters, remove the internal system. Then purchase two external filters, one large & one small, fill the large one with good biological media such as *Cerapore* from *Aqua-medic* or *Cell-Pore* from *Kent*. The small filter will be your chemical filter, utilise a phosphate remover like *Rowaphos* from *D & D Aquatic Solutions* from day one.

you will also be adding other medias to this as you progress.

There are loads of substrates you can use costing from £3.99 to well over £30.00 per bag, this is personal taste. Aragonite has a benefit for pH stabilisation, however it is expensive and the overall influence it has on a systems pH balance is small. Live sand can be used and introduces loads of good bugs to a system, however do not fall into the trap of introducing stock early because it cycles your water quickly, wait 4 - 6 weeks before adding fish, even if your water quality tells you otherwise.

Water movement, a surge control is what I consider high on the optional extras. *Aqua-Medic* make a cracker, it's expensive but worth every penny. *Algarde* make the best budget model. Two or three power heads will be enough. 900 litres per hour will be a good size, place them on the back glass at each end of the tank, high up, face the jets to the centre of the front pane so both jets hit the front pane at the same point. With the opposing water jets you will create turbulence not water movement much more important. If your power heads are too powerful you will blow your substrate all over the rocks, balance the water movement.

Four light tubes, two actinics on one timer, either two whites or a white and 50 / 50 tube on the other. Actinics on one hour before the whites, both then on for 10 hours then whites off, actinics remain on for another one to three hours then total darkness. DO NOT have your lights on during the maturation process all this will do is grow algae. You will experience a maturation bloom but this will vastly reduce it's intensity.

UVs again I consider high on the optional extras, they kill good stuff as well as bad, but the pro's outweigh the con's, put one on.

Protein skimmers are the one piece of kit that is essential, save up and get a very good one, vastly over skim. *Deltec APH525* or *Aqua-Medic turboflotter 1000* are the two best for you. With this you will be able to superfeed your corals with liquid food and they will grow much better because of it.

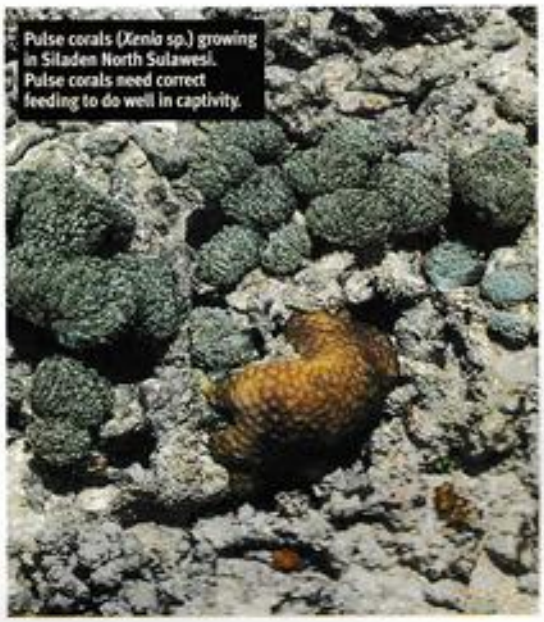
Andrew Caine.

Pulse coral failure

Q **I have no luck with Pulse corals, I see them in dealers tanks, other peoples aquariums, sometimes they overgrow the aquarium causing a problem I would love to have. Mine seem to just wither away after a few weeks. I have a good system, all my other corals are healthy and I feed heavily on preserved phytoplankton food for them.**

Malcolm Sands, Brighton.

A Assuming you have a good lighting system and strong water movement, I feel that you are feeding them the wrong food. There are many aspects about *Xenia sp* that are not fully understood by science but one fact is known, they thrive in organic rich water. So you must feed them a liquid food high in organics, such as *Marine snow* or *Marine deluxe*.



Pulse corals (*Xenia* sp.) growing in Siladen North Sulawesi. Pulse corals need correct feeding to do well in captivity.

PHOTO: ALI NUNN

Star Letter Prize from AQUA MEDIC

Modern Coral Reef Aquarium books, written by Alf J Nilsen and Svein A Fossa are regarded as probably the most authoritative series of books for the marine hobbyist in years.

ab Aqua Medic, the leaders in Marine Aquarium technology, is pleased to present whichever of the three volumes, normally £55.00 each - desired to this months star letter

Coldwater Q&A

Redcap orandas should not be left out all winter.

PHOTO: DAVE HALL

Fancy Goldfish young in outdoor ponds

Q **I have bred some Orandas this year for the first time and have been rearing them up in a garden pond. I have read that they cannot be left out all winter and will need to be housed indoors. When should I move them?**
Peter Blake, *Birmingham*

Most types of Fancy goldfish can not be left out during the winter in this country and this is particularly true of youngsters. I would treat them just like frost tender garden plants and bring them indoors before there is a risk of frost. Early September would probably be fine in your area. When you do this remember you will need to mature your aquarium filters before the fish are added so I usually set my tanks up about four weeks before I put the fish in them. Be careful not to overstock each aquarium even if this means giving youngsters away to friends or asking a local aquatic shop to take the extras.

A **Derek Lambert.**

Bullying Orfe?

Q **We have 2 ponds in our garden - we are having problems with fish in one of them - the pond has four Orfe in it and we recently introduced (10 weeks ago) 3 blue Shubunkin and 2 white and gold Goldfish. We have now lost 2 of the blues and one of the white and gold. After 6 weeks one began to develop ulcers on it's tail and lost one of it's fins, the others went the same way. We currently have the last blue in a hospital tank with the same problem. The other white and gold is OK at the moment. Given the time period we do not think they were diseased when purchased, and we now think the Orfe are bullying the other fish – and each other. Yesterday evening the Orfe were furiously chasing each other. (Although the fish in our other pond have been breeding, we think the season is now past and therefore it's unlikely that the chasing is for this reason). We have tested the water and all is OK. Do you think we have a bullying problem and what, if anything, can we do about it?**
Jean Black *via e-mail.*

A Thanks for your question. I was visiting a pond earlier this week to see someone who suspected they had a similar problem with their large Orfe. However, they experienced a bigger problem in that they felt the Orfe had actually eaten their 4 small Goldfish that they had recently introduced. If your Shubunkins and Goldfish are slightly larger or your Orfe slightly smaller, then perhaps the worst they could do is fin-nip and bully. What signs of wound or disease did the fish that you have lost show when you could examine them closely? If there is clear fin damage then it would suggest that your Orfe are bullying your other fish. They are carnivorous (smaller insects / worms etc) and if given the chance, can have a reputation for nipping other fish that are far smaller than them. My usual advice for people who are experiencing a sudden spate of disease is to test the pond water for ammonia and nitrite (checking that they are both at zero). However, as your Orfe are quite healthy and vigorous, this needn't be a consideration at this stage.

Orfe can live happily with other fish in a mixed pond, but if they are much bigger than the other fish they may nip their fins or even eat them.

FESTIVAL WEEKEND

Festival of Fishkeeping & Water Gardening Weekend

11th–13th October 2002

THIS YEAR'S SPEAKERS

Tropical

Harro Hieronimus, one of Germany's foremost livebearing fish experts.

Pete Liptrot, N.I.R.A.H. 's Curator of Fish and *Today's Fishkeeper's* oddball expert.

Dr Steven LaThangue Curator of N.I.R.A.H. will be speaking on all aspects of the project and why it is dramatically different from anything which has gone before.

Ronnie Murning, project director of N.I.R.A.H.

Rupert Bridges, of *Tetra*. will be giving a presentation on fish health and how to avoid disease problems.

Dr Peter Burgess of *Aquarian* will be giving a presentation on aquatic husbandry.

Malcolm Goss & Peter Caria showing you how to set up your first tropical aquarium.

Marines

Alf Nilsen (sponsored by [redacted]) *Today's Fishkeeper's* regular columnist on Marine life.

Paul Davis of *Aquamedic* will be hosting a beginners seminar on marine aquaria.

Ponds

Wincy Willis of the *Water Gardener Magazine*'s wildlife pond expert.

John Negus of the *Water Gardener Magazine*, Speaking on setting up your first pond.

Reptiles and Amphibians

John Dixon DSC. Curator of amphibians and reptiles for N.I.R.A.H.

Plus a host of other speakers covering all aspects of fishkeeping and water gardening.

PETE LIPTROT

ALF NILSEN

RUPERT BRIDGES

OTHER ATTRACTIONS

Livebearer Convention, Goldfish Society of Great Britain, "Jinchu Kai" Ranchu Society, South Hants and Worthing Koi societies and the Southern Catfish Society.

BEGINNERS SEMINARS

Just beginning with Tropicals, Marines, Coldwater or Ponds? Attend one of these beginners seminars and learn all the basics. To book your place on one of these seminars, please phone **01673 885352** or email: **derek@trmg.co.uk**

BEGINNERS MARINE SEMINAR SPONSORED BY AQUA MEDIC

Paul Davis will be hosting a beginners seminar on marines for anyone who wants to learn about this fascinating area of the hobby. Paul started in the Marine hobby over 25 years ago and soon became involved with the British Marine Association. As his hobby expanded into an all encompassing passion he branched out and started importing high quality products from Germany. He distributed one of the first trickle filters ever invented and the very first sea salt mix which was nitrate and phosphate free.
Today Paul heads up the U.K. branch of one of the worlds largest aquatic product manufacturers,Aquamedic. This company currently holds 20 unique patents and employs 180 people throughout 43 countries.

Places on the Marine seminar are available on a first come first served basis and need to be prebooked using the form below.

Your name.....

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Number of people attending.....

Full board weekend packages for the Festival £78

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New Horizons Holidays
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AQUA MEDIC

For more information or to book please call Grace Nethersell, 6 Acacia Avenue, Brentford, Middlesex TW8 8NR. Tel/Fax: 020 8847 3586

Sea view

Andrew Caine returns to the tank that Mark built and asks the question - what do we put in it?

Who lives in a house like this?

WHEN WE HAD FINISHED INSTALLING Mark's aquarium and the live rock was curing, we had nothing to do but twiddle our fingers watch the water and wait. Time on our hands, Mark going all quiet on me, something is up I feel, so out for a drink, we sat down together, looked at each other with blank expressions and both said, what the hell are we going to put in it!

We always knew that coral wise it is going to be 90 - 95% Hard corals and that the majority of fish stock is going to be species that are not common within the trade, but what else can we introduce to make this aquarium special? We had constructed a substrate 8 cm deep, out of scallop shells, coarse gravel and fine gravel for the Blue spot jawfish, *Opistognathus rosenblatti*. How else could we utilise such a bed?

Bingo!!!! The light was turned on, lets introduce a symbiotic relationship that was only discovered 50 years ago, we have the ideal substrate. Mark sat up intensely spilling his pint in excitement. What we are talking about here is the Pistol shrimp and Shrimp goby relationship, and it is by far the most amazing sight you can behold in the aquarium, one that will give you years of total pleasure.

Take one deep gravel bed of different sized pieces, introduce one goby from any of the following genera *Amblyeleotris, Cryptocentrus, Ctenogobiops, Lotilia, Stonogobiops* and *Vanderhorstia* along with a pair of shrimps from the family *Alpheidae* (the two most common genera within the trade are *Alpheus* and *Synalpheus*) pull up a chair sit down and wait for one of the most fantastic aquatic sights you can dream of.

Alpheus armatus shrimp from the Caribbean.

PHOTO: ALF NILSEN

First the two shrimps get to work, mini bulldozers they are utilising their front claws to push gravel up and out of the evolving burrow. Shortly a mini cave entrance is visible with chosen pieces of substrate forming the roof of the entrance, more and more substrate is excavated as the two shrimps work in a frenzy, and they don't stop for a cup of tea either. Very quickly the goby moves in. Many different species of goby will be accepted by the same species of shrimp and visa versa.

House built and all settled, the goby sits at the mouth of the burrow, he moves out to forage for food, out pop the shrimps, with more debris to push, house maintenance is constant. Virtually blind the shrimps remain in close contact with the fish via direct touching of the fins or via water movement created by the movement of the fins, they work and forage. The fish senses danger and starts to retreat tail first into the burrow, alerted by this movement the shrimps are already hiding safely. A few minutes later the fishes head appears, scouting, slowly the goby emerges, again to look for food, closely followed by our bulldozers.

The shrimps dig and maintain a burrow, in exchange for safety created by the goby's powerful eyes, and the goby avoids being a meal via the shrimps work. Truly a mutually beneficial symbiotic relationship and one that will give anyone years of constant pleasure.

However where there is pleasure there is pain, our deep gravel bed will need to be maintained and cleaned to avoid stagnation and anoxic areas. The use of gravel cleaners will be required every month to turn over the bed and clean it, of course keeping well away from our friends house.

Go on my aquatic partners treat yourself to truly one of the aquatic wonders of the world, and enjoy.

***Amblyeleotris* sp. in it's natural habitat in the Maldives where it lived on a large sand flat at about 10 metres depth.**

PHOTO: ALF NILSEN

A fish for you

Sea view

GOLDEN ANGELFISH *(CENTROPYGE AURANTIA)*

I thought I would give this little beauty a spin as now more and more people are after it, so if it takes your fancy let's see what this beastie needs.

Once hard to acquire within the aquarium trade and, when in the shops, very expensive indeed. How things can change over a short while. This amazing fish is now available in small numbers, in fact it is now gaining ground on the Flame angel *C. loriculus* for the " fish to have" title. Price range is a little higher than the Flame, running at between £70 -80 a large investment indeed. It can give you a headache if not treated correctly, treat it well and this beauty will give you years of pleasure.

This is a shy and retiring beast, so do not expect it to be as bold as other Dwarf angels. In fact, quite the opposite is true, as it spends a great deal of time close to and in the rockwork. Stress it and you will never see it until you find that it has passed to the great coral sea in the sky. This tale is so true, there must be no aggressive tankmates at all and no other *Centropyge* species. It must have very little competition for food and no aggression of any kind or it is the last you will see of it.

So you have a peaceful aquarium, stage one complete. You must also have copious amounts of liverock at least one year old. Hopefully at this age your water quality is stable and the bonus of loads of natural food such as sponges growing in hidden places. It could be unfair to ask the dealer to show this fish feeding, as it might be too shy to feed when everyone is walking around. It is not unfair to ask the dealer to reserve it for a week. Look at it, has it nice coloration and is it plump, then it's feeding .

At home in the bag, floating nicely with lights off, slowly over one hour acclimatise it to your water and release. Feed two to three times a day, with a wide variety of vitamin enriched foods and you have one of the most stunning Dwarf angels anyone could hope for.

PROFILE

Family
Pomacanthidae

Name
Centropyge aurantia

Location
Western and South Pacific

Feeding
Variety of shrimps and meaty vitamin foods, 2 - 3 times per day

Reef compatibility
Will nip at large and small polyp stony corals, more suited for the soft coral reef.

Tank mates
Extremely peaceful fish

Size
Up to 10cm

Difficulty
One for the more advanced aquarist

Gardeners, Cleaners and Robbers

Ad Konings examines the feeding habits of two fascinating groups of Mbuna

BESIDES THE PREVIOUSLY MENTIONED genera and complexes there is another group of Mbuna living in the sediment-free rocky habitat. These species, most of which are undescribed (scientifically), are grouped by Ribbink et al. (1983b) under *Pseudotropheus* 'aggressive'. These aggressive Mbuna have a specific behavioural characteristic in common: both male and female defend feeding territories. They are usually species that have to employ aggression in order to obtain sufficient food in the face of competition from Mbuna with more efficient feeding specialisation's. Territoriality in females is probably governed by limitations in food supply. We encounter these aggressive species mainly in crowded habitats with numerous different species trying to make a living from the available resources.

Five species in this type of habitat

There are five aggressive species in the sediment-free rocky habitat, however, there are several more aggressive species found elsewhere in the lake.

Pseudotropheus fuscus is found on the north-western coast between Kande Island and Chilumba. It is a very common Mbuna of the shallow rocky habitat and both male and female defend a feeding territory. Fryer (1956b) found that at Nkhata Bay a very similar, but different, species lived sympatrically with *P. fuscus* and named this species *P.fuscoides*. He found that the latter fed predominantly on insect larvae while *P. fuscus* fed primarily on loose aufwuchs. Ribbink et al. (1983b) suggest that *P. fuscoides* may be young specimens of *P. fuscus* living at a somewhat deeper level than their stronger elders. When they are strong enough to defend a territory they move to the upper rocky habitat. When they become territorial they may have to change their food source in the process. *Pseudotropheus fuscoides* is here likewise regarded as synonymous with *P. Fuscus*.

An aggressive species with a close resemblance to *P. fuscus*, and a superficial resemblance to *P. tursiops*, occurs around Likoma Island. This species, *P.* sp.

Pseudotropheus fuscus male from Nkhata Bay.

P. sp. "Aggressive gray" male from Maingano, Likoma.

"Aggressive gray", is very common and occupies large sections of the upper 30 metres of the rocky habitat. Females are dark brown and lack the light blue seen in the male's dorsal fin.

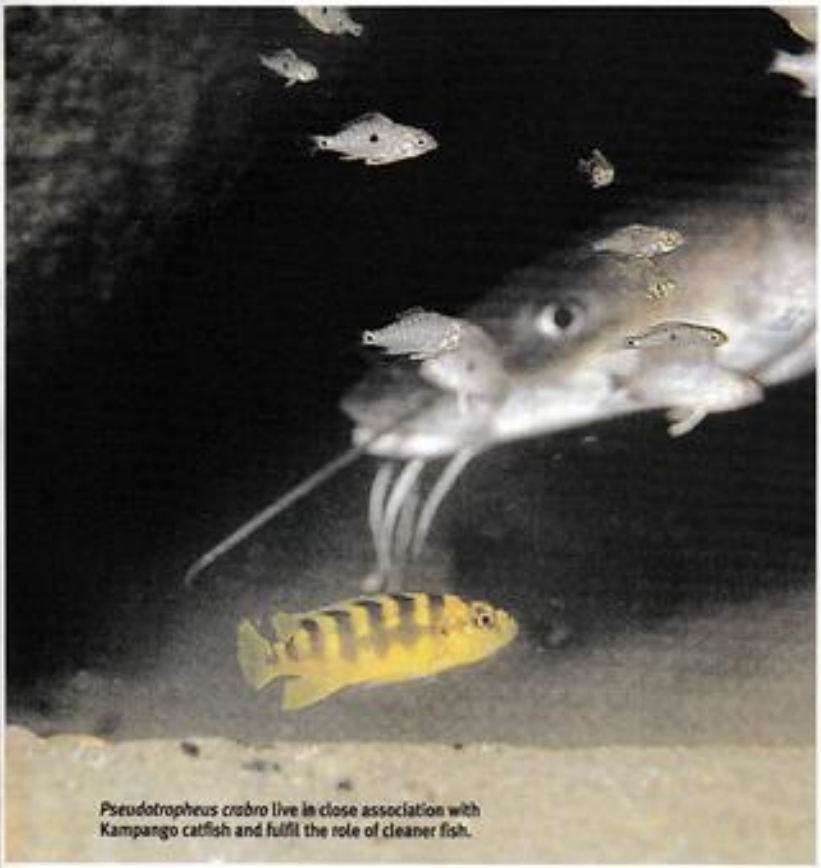
The 'Aggressive gray' is found sympatrically with two other aggressive species, namely the 'Aggressive bars' and *P.* sp. "Aggressive zebra". The latter species looks like an elongate form of *M. zebra*. Females are dark brown, and one has even been seen

P. sp. "Aggressive zebra" male from Ndumbi Likoma.

to chase intruders away from her feeding territory when she was mouthbrooding. The 'Aggressive zebra' is found at Maleri, Mbenji, and Likoma islands. The populations at Mbenji and Maleri exhibit a colour pattern different from that at Likoma: both male and female have rusty brown to orange coloured patches on the head and chest. This may be geographical variation; or it may be that these populations are another species. The habitats at Maleri and Mbenji islands are not completely sediment-free, at least not as much as at the other sites mentioned. This may have influenced the development of the colour pattern in these populations.

Pseudotropheus sp. "Aggressive yellow fin" is found around Chizumulu Island. It is deep bodied, unlike other aggressive species, and characterised by a cobalt blue body lacking any black markings. Females are dark brown, a colour that seems to be common to all territory defending females. *Pseudotropheus* sp. "aggressive brown" →

Pseudotropheus sp. "Aggressive yellow fin" male from Same Chizulmulu.



Pseudotropheus crabro live in close association with Kampango catfish and fulfil the role of cleaner fish.

inhabits the sediment-free rocky habitat around Thumbi West and Mumbo Island in the south of the lake.

Feeding techniques

Like *M. zebra*, the aggressive species comb the algae of the biocover and press their lips against the substrate. Their teeth, however, are stouter and have rounder cusps, with the result that less material is collected (combed) per bite. Such teeth are also unable to tear off attached algal strands. George Turner (pers. comm.) has hypothesised that such aggressive species may be 'cultivating' the only type of algae (diatoms) that they can harvest. They defend their 'gardens' with great zeal because other species would collect not only the preferred food but also the substrate (i.e. attached algae) on which it grows.

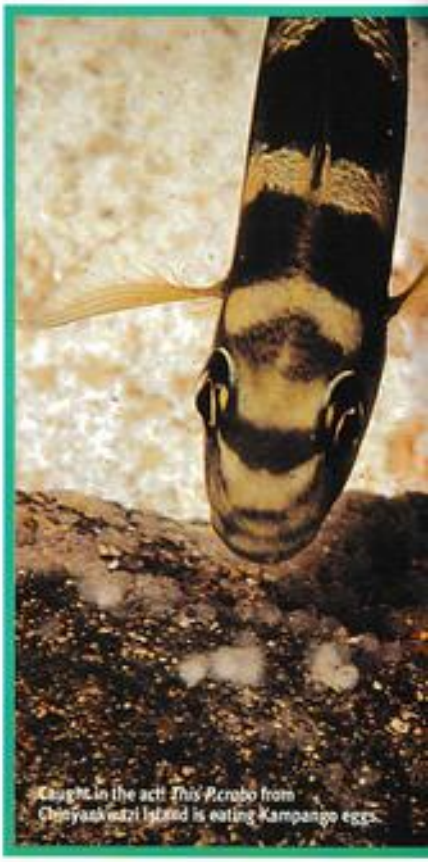
A feature all these aggressive species have in common is that the visible territories of males are centred around a cave (into which the male hastily retreats as soon as he sees a diver approaching). Any intruder is fiercely repelled by a sudden dart out of this cave. Spawning in these species takes place inside the male's cave. Females therefore have temporarily to vacate their own quarters to enter those of the males. After spawning has taken place the females return to their own territories and release their fry in the guarded area.

Wasps without a sting

Pseudotropheus crabro is an interesting species formerly assigned to *Melanochromis*. 'Crabro' is the Latin word for hornet, a kind of wasp common in the western world, and aptly describes this Mbuna's colour pattern. It has been exported infrequently and given the trade name 'Pseudotropheus chameleo', owing to its ability to quickly change its characteristic colour pattern of yellow with brown bars to a uniform dull brown. *Pseudotropheus crabro* has a symbiotic 'cleaner fish' relationship with the large Catfish *Bagrus meridionalis*, and is thus normally found in the large caves in which the latter lurks during the day. It will sometimes follow a diver in a black wet suit over long distances, presumably a case of mistaken identity!

Pseudotropheus crabro picks the parasitic *Argulus africanus* (a fish-louse) from the Catfish's skin. The parasites are firmly attached and are removed by a scraping action. The bicuspid teeth of *P. crabro*, reminiscent of those of *M. zebra* but more pointed, are bent inwards and adapted to dislodge parasites from a smooth surface. The outer row is well separated from the second and third rows, enabling the teeth to lift the parasite from its position. The shape of the body, the coloration, the form of the snout, and the scraping movements of the mouth indicate that *P. crabro* has closer affinities with *Pseudotropheus* than with *Melanochromis*. Its development of a remarkable specialisation that might have evolved during periods of severe competition for food, and the fact that it occurs over a large part of the lake, may indicate that *P. crabro* is an old species.

In my opinion the feeding behaviour evolved during a time of food shortage at some time in the past; *P. crabro*, unable to compete with 'stronger' and better adapted species, survived by taking advantage of an unusual food resource, the parasites on the skin of the 'Kampango' (the African name for this Catfish). Strong selection pressure thus led to a highly specialised species. At present food seems to be abundant because most species can generalise and 'forget' their specialisation's. *Pseudotropheus crabro*, for example, also feeds on aufwuchs and plankton. Its specialisation will never lead to large populations but may enable small numbers to survive during times of other food shortages. ■



Caught in the act! This *P.crabro* from Chinyankwazi Island is eating Kampango eggs.

CAVIAR ON THE MENU!

Besides the beneficial effects of *P. crabro*'s attentions, the Kampango is afflicted with a 'treatment' of a more criminal nature. During the Catfishes' breeding season *P. crabro*'s menu is greatly enriched by 'caviar a la Kampango'. *Pseudotropheus crabro* has on several occasions been observed stealing eggs from beneath a guarding Kampango pair. In the stomachs of three individuals of *P. crabro* (and another, unidentified Mbuna), Ribbink and Lewis (1982) found 1068 eggs that had been stolen from a single pair of Kampango! *Pseudotropheus crabro* and *B. meridionalis* live in a very peculiar symbiosis in which *P. crabro* acts as a beneficial vermin-killer one day and an egg-robber the next. Interestingly *P. crabro* does not eat Argulus from other hosts, as was demonstrated under artificial circumstances by Ribbink & Lewis (1982).

The cleaning behaviour may have developed because Kampangos lurk, during daytime, in large caves, where they remain immobile so that even a diver can touch a Catfish without scaring it away. *Pseudotropheus crabro* may have developed its cave-dwelling habit before it specialised on the Kampango's parasites, and may thus have learned to 'graze' on the Kampango's skin because these Catfishes are present in almost every cave that is large enough to accommodate them. Tearing off tightly attached parasites may hurt a Kampango but the Catfishes have nevertheless come to accept a wasp-coloured Mbuna cleaning their skin. In fact, they may have become so used to *P. crabro* being around that their presence is ignored even during the breeding season. If *P. crabro* were openly to steal the Catfishes' eggs, however, it would probably no longer be accepted as a cleaner. So it both conceals its identity and makes itself less conspicuous by quickly changing colour to dull brown before darting under the guarding male to steal eggs (Saulos Mwale, pers. Comm.).

Pseudotropheus crabro may have specialised initially in stealing eggs from the Campaign, i.e. before evolving its cleaning behaviour, but this seems unlikely as the Catfish has a rather short breeding season (November to March). It is more likely, however, that it has simply learned to take advantage of the Kampango's acceptance of its presence (as cleaner), stealing eggs whenever the guarding male relaxes his vigilance. Breeding Kampangos are usually surrounded by many small fishes including several *P. crabro*. McKaye (1986) discovered that female Kampango release unfertilised eggs to feed their young. *Pseudotropheus crabro* may also feed on these eggs, which would extend their egg-eating period considerably. However, since all Cichlids are removed from the centre of the brood by the Catfish (Jay Stauffer, pers. comm.) this may not be the case.

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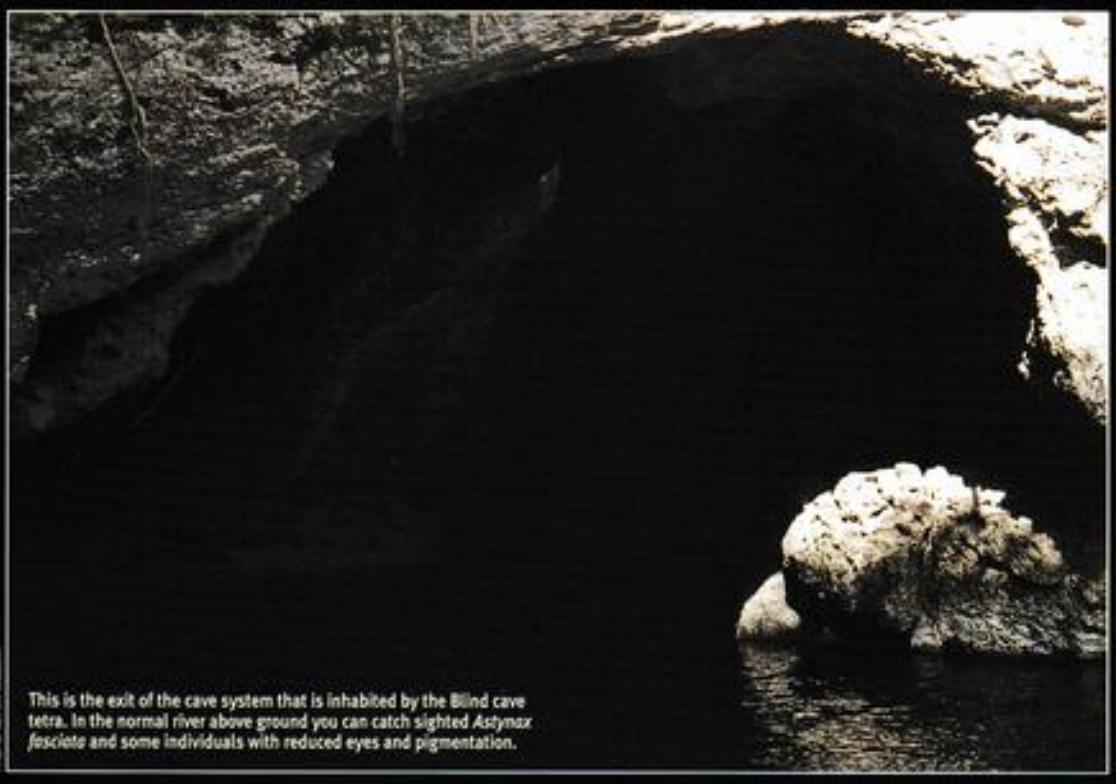


PHOTO: ROY OSMINT

This is the exit of the cave system that is inhabited by the Blind cave tetra. In the normal river above ground you can catch sighted *Astynax fasciata* and some individuals with reduced eyes and pigmentation.

Sightless

Roy Osmint shines a light into the darkness surrounding Blind cave tetras

MANY STRIKING EXAMPLES OF SPECIES specialization can be found right across the aquatic world. Species whose very survival has, as a consequence of radical climatic or environmental changes, depended upon their ability through evolutionary modification to adapt to the altered circumstances.

Nowhere, in my opinion, is this more graphically demonstrated than in the case of the Blind cave tetra (*Astynax fasciatus*). Often in the past regarded primarily for its curiosity value, this fascinating species has in fact much to offer the average aquarist both as a community and specialist subject. It is a remarkable fish in many ways, not the least of which being that, as its common name implies, it is completely sightless!

But any impressions that may initially form of a severely handicapped creature cautiously feeling its way around carefully avoiding obstacles in its path, or losing out when it comes to competition for food, can immediately be expelled. For what this fish lacks in one area it more than makes up for in others.

Separation and entrapment

Countless generations ago in the Mexican state now known as San Luis Potosi, surface dwelling ancestors of the Blind cave tetra become inextricably trapped in a system of subterranean limestone caves (Cueva Chica) into which no light ever penetrated. The precise reason for this is not clear, over the years various suggestions have been put forward. My own theory as to the likely cause is that due to earthquake activity the geology of the area became reformed, effectively isolating the caves from the outside world. The fishes thus entombed suddenly found themselves incarcerated in an environment of total blackness. The fact they survived at all is remarkable. That they adapted so perfectly to the hostility of the circumstances and went on as a species to flourish, is one of the great evolutionary miracles.

Some years ago I visited a system of underground caverns in the South of England. When we reached the innermost cave the guide requested permission to switch off the electric lights to give us a better appreciation of what absolute darkness is all about. The result was frightening! As the last lights were extinguished a blackness, the like of which I have never before experienced, engulfed us. So complete that not even a hand placed centimetres from the face could be detected. As I peered hard into the darkness in a futile effort to distinguish anything at all, my eyes quickly began to positively hurt with the strain. This was only relieved when the eyes were closed! It occurs to me that it would have been something like this for the Blind cave tetra. Suddenly committed to an environment of impenetrable darkness where sight becomes redundant and eyes a positive disadvantage. In evolutionary terms, what is not of benefit does not remain, so

over time the fish's eyes became redundant and diminished. Other senses, however, became more acute in direct compensation.

PROBLEM OF IDENTITY

A certain doubt has long existed regarding the correct scientific name for the Blind cave tetra, this has resulted in a number of changes. In fact, even now the nomenclature can vary depending upon the particular publication referred to. I have used the name *Astyanax fasciatus* in line with current schools of thought, but this will undoubtedly be disputed by some.

Principal causes of this confusion lie in the fish's true origins. That is to say, whether it is a species in its own right, or a subspecies of the surface dwelling Mexican tetra which in biological characteristics is very similar and is found in waters all around the same region.

This close-up of a Blind cave tetra's head clearly shows how the eye has all but vanished from view in adults.

PHOTO: MAX GIBBS

Blindness - no handicap

The Blind cave fish is a member of the family Characidae with an average length of some 9 or 10cm. Like others of this clan it is naturally gregarious and only really happy when part of a shoal.

A happy, well-fed shoal of Blind cave tetra.

PHOTO BY R.G. PETHER

Overall coloration is a fleshy translucent pink, with a lavender sheen exhibited in reflected light. Fins are generally colourless. As might be expected, the depth of colour tends to change to some extent depending upon the intensity of illumination to which it is subjected.

Eyes, as we know, are non existent. It is, however, interesting to note that at birth fry emerge from the eggs with tiny black eyes clearly visible. These do not develop with the rest of the fish, simply reducing in size, eventually becoming enclosed in a cartilaginous sheath. This is formed from the white of the eye and coated with a thick fat layer.

When observing a shoal of Blind cave tetras in a good size aquarium, one cannot help but marvel at the way in which they confidently swim around the tank completely avoiding all obstacles, just like any other species. Their blindness is not a handicap at all! When it comes to feeding time the same thing applies. They home in on the food with speed and precision, rarely losing out to sighted neighbours and often beating them to the prize! At other times they will frequently be seen grubbing around on the bottom where they perform an excellent function clearing up hidden food particles. The secret of their remarkable success lies, as previously mentioned, in the fact that the loss of one major sense has been compensated for by others becoming greatly heightened, particularly those of taste and smell. Use of the lateral line system is also enhanced.

LATERAL LINE SYSTEM

This remarkable and complex "sixth sense" comprises a series of fluid filled canals linked together at the skin's surface and forming a line along the flanks from behind the head to the root of the caudal fin. The principal purpose of this organ is to detect pressure waves generated by underwater sounds. These are then converted into electrical energy and transmitted to the fish's central nervous system. The lateral line also detects waves generated by the fish's movement through the water which are then bounced back from obstacles in its path. It thus operates as a sort of sonar navigational device.

In the aquarium

This is a most accommodating fish in many ways. It will tolerate a very wide water temperature range from about 16 - 30°C, though something around 22°C is probably about right. It can, therefore, theoretically be housed in heated or unheated aquaria. Though medium hard alkaline conditions are preferred, water quality should be regarded as of far greater importance than chemical composition.

The Blind cave tetra can be kept in a community tank with other fishes of peaceable temperament and comparable size, though it does lend itself well to a single species aquarium. Do remember, however, that this is a shoaling fish and a group of 6 or 7 individuals should be considered the minimum. →

Unlike most fishes, where we endeavour as far as possible to simulate its natural conditions, with this species we cannot hope to do so. This would obviously require complete darkness at all times, thus defeating the whole object. Although it appears quite comfortable under normal aquarium lighting, to achieve a more natural compromise look subdued illumination is favoured. Fluorescent tubes are available that give a sort of moonlight glow, these can often be used to good effect. Under subdued lighting conditions most plants are unlikely to survive. Artificial plants are, therefore, the best bet. Pieces of slate of various sizes can be used to help create a cave-like environment. By leaning these against the back and sides of the aquarium, building forward with the smaller bits at the front, a suitable effect can be achieved.

Blind cave tetras are not fussy about food, they will eat virtually anything. All the standard flake, granular, frozen and live foods will be enthusiastically accepted. It is a good idea, however, to supplement the diet with a certain amount of vegetable material.

Blind cave tetras are remarkable fish in many ways and have much to offer the average aquarist both as a community fish or as a specialist subject. So why not try your hand at one of the aquatic world's great survivors, they really are fascinating aquarium fish. ■

Dim lighting and a shoal of Blind cave tetras can work very well as an aquascape. The whole effect is very restful in a lounge setting.

PHOTO: PETER HUNDEN

BREEDING

Reproduction of this species is quite straightforward and takes place in typical Characin fashion. In other words, eggs are randomly scattered and immediately regarded by the parents as food. Some form of trapping device is, therefore, called for. Pebbles or glass marbles covering the base of the breeding tank always works well. Most eggs then falling between the crevices out of reach of the ever hungry parents.

Sexing the fish is not too difficult, females having noticeably plumper bellies with males showing an altogether slimmer appearance. Prospective parents should be introduced into the breeding tank in a ratio of two females to one male. Following the usual vigorous chase eggs are laid and immediately fertilized.

Hatching times vary to some extent according to water temperature, but 1 - 3 days is about average. In a further three to six days the fry should be free swimming and will take liquid fry food or infusoria for the first week. Newly hatched Brine shrimp and powdered fry food can be fed from the second week onwards.

This female is in perfect condition and full of eggs. The ideal fish to use for a spawning attempt.

PHOTO: MAX GIBBS

Bountiful Belize

Part Three


The intrepid explorers. From left to right – Brian (fish catcher), Trevor, Ian, Martine and Dave.

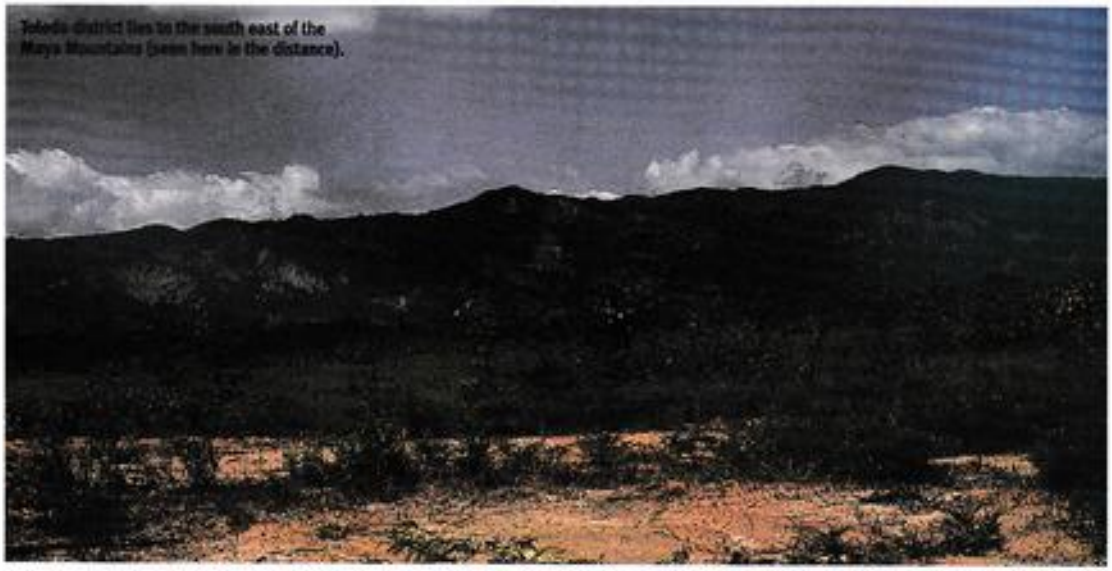
Early this year *Today's Fishkeeper* magazine followed a team of aquarists on holiday in Belize. This is the concluding episode of their trip and the fish they found and just a few of the trials and tribulations which are part and parcel of exploring a third world country looking for fish

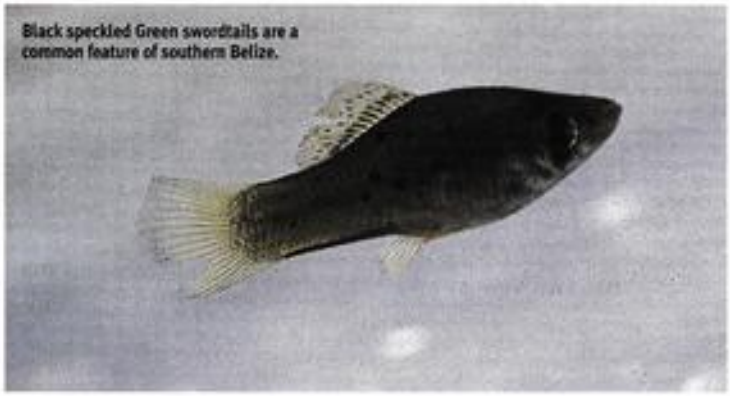
PHOTOS: DEREK LAMBERT

ONCE AWAY FROM BELIZE CITY, WITH THEIR new window in place, our explorers headed south stopping at any likely fishing sites. Southern Belize tends to be much wetter than the north and was formed from limestone during the Cretaceous period. Three districts make up this geographical area. Part of Cayo, and all of Stann Creek and Toledo. The Toledo district gives its name to formations called Toledo beds. These were laid down over the limestone and form the gently rolling plains of this area. This is a unique part of the world since it lies on the southern boundary of a huge tectonic plate, the North American Plate that stretches from Alaska to Southern Belize.

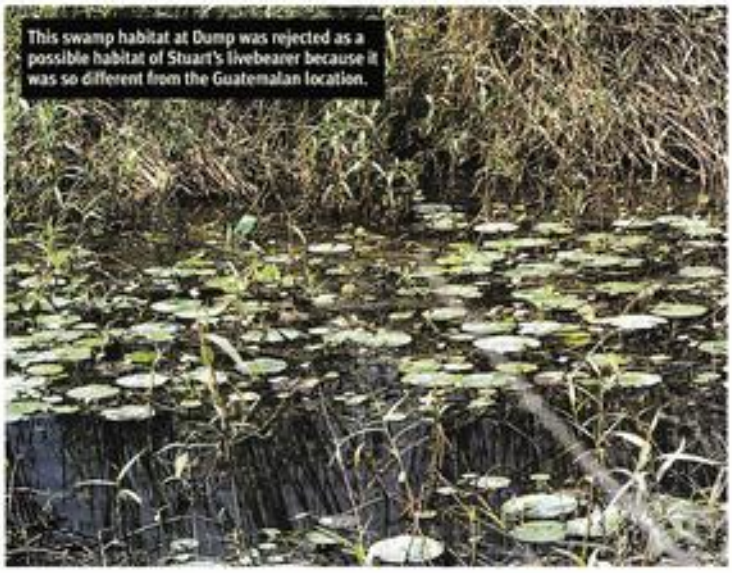
There are lots of rivers in this area with three of the largest being Monkey river, Moho river and finally (forming the border with Honduras) Sarstoon river flowing from the mountains in the west, into the sea. Sarstoon river is almost impossible to reach by normal vehicle since the paved road stops at Punta Gorda.

Along Hummingbird Highway in the northern part of this area several very beautiful rivers were fished. These all contained similar species of fish. Green swordtails (including black spotted ones) were everywhere. Huge adults of these could be seen out in open water but most of what


Toledo district lies to the south east of the Maya Mountains (seen here in the distance).


Black speckled Green swordtails are a common feature of southern Belize.

was caught were youngsters and small adults found in planted areas. *Pseudoxiphophorus* sp. were also everywhere. These stayed close to the planted areas only venturing out when no Gambusia were present. Then the youngsters (about 2cm long) came out into the open to feed just under the surface mimicking the way the Gambusia would normally feed. Mollies were still present everywhere with the adults living in shoals with the Swordtails. Pike livebearers, Catfish and Cichlids were also found at most sites, together with *Gambusia lumo*. These Gambusia are much larger than *Gambusia sexradiata* but live at the surface just like their cousins. Water quality in all these rivers was very similar :- GH 0, KH 7, pH 6.4 with a temperature of about 23°C.


This swamp habitat at Dump was rejected as a possible habitat of Stuart's livebearer because it was so different from the Guatemalan location.

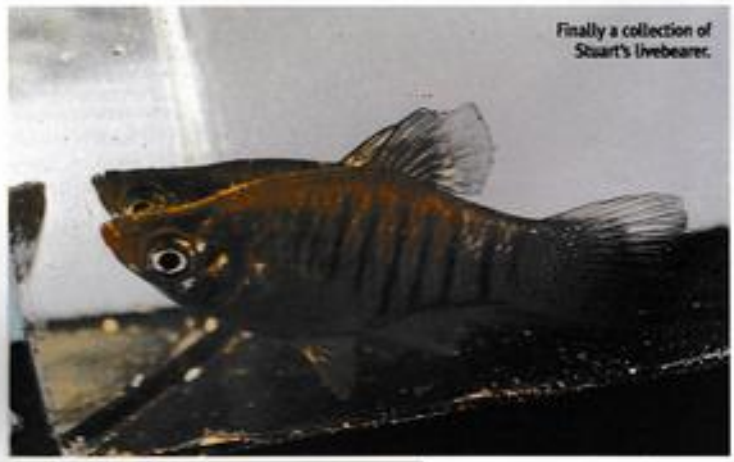
In search of Stuart's livebearer

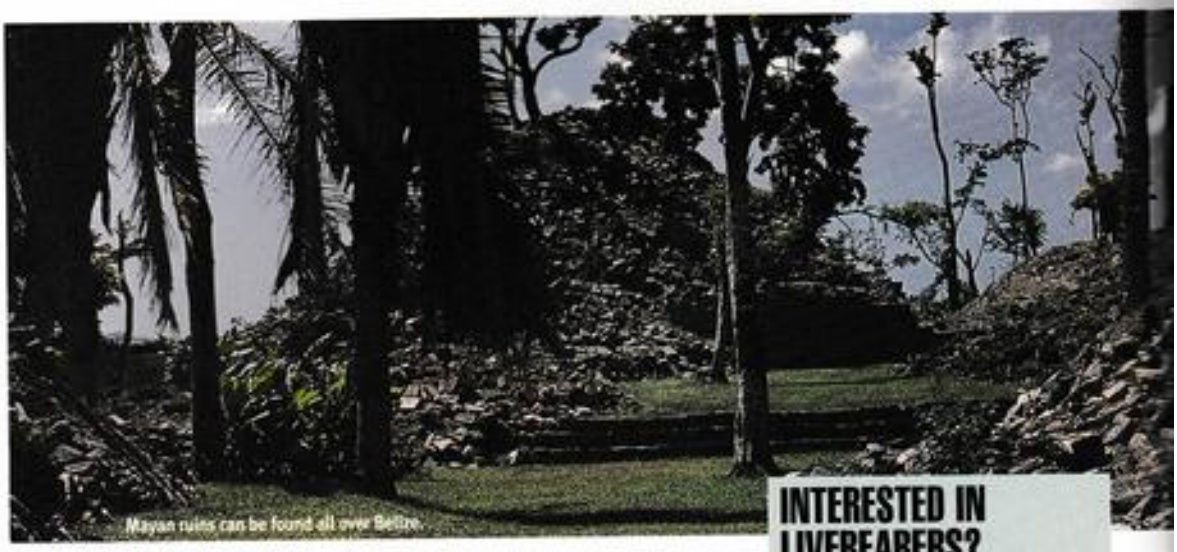
Once established at their most southerly base our explorers worked out their route for the next day. Top priority was to hunt for *Carthubbisia stuarti*. This fish had been collected by Dave and Brian in Guatemala a couple of years before, but it would be interesting to see if they lived in a different habitat or looked any different in this part of their range. Route sorted, it was time to settle down and for the team to enjoy themselves. Dinner was a typical Belizian set menu with rice and chicken. Afterwards it was back to the friendly bar and a chat with the locals. Sadly when the sun rose not everyone did! Dave MacAllister seemed to be a little the worse for wear and decided it would make more sense to stay at the hotel.

Today's Fishkeeper's reporter bravely stepped into the breach and drove off with the remainder of the team. Following the route laid out the night before, lots of locations were fished. At one, "Laguna" a strain of Green swordtails was found that were absolutely stunning. Deep blue with red stripes. *Rivulus* killifish were also found at most locations and either *Gambusia lumo* (in larger flowing rivers) or *Gambusia sexradiata* in smaller streams or still pools. Cichlids and Southern platies were also found, but nowhere checked that day was Stuart's livebearer caught.


All sorts of animals can be found walking about the roads of Belize!

One location was looked at and rejected. This was a swampy bit of vegetation and stagnant pool just by the town of Dump. →


Finally a collection of Stuart's livebearer.



Mayan ruins can be found all over Belize.

It was so totally unlike the Guatemalan location for this fish that no one wanted to bother fishing it - except Brian, but he always wanted to fish every stretch of water.

Next day, spirits were low. It was nearing the end of the trip and shopping was beginning to prey on people's minds. Most of the team had someone back home that would need fussing over with presents bought. Ian and Trevor decided it was time to trek off on their own in search of goodies. The rest of the team piled back into the van for another day's hunting. This time the swamp was fished and Brian had the pleasure of catching his first Stuart's livebearer on this trip. This location proved very rich in fish. At least three different species of Cichlid were caught, five different species of livebearer and a Killifish. Catfish probably lurked in the depths as well but none were caught.

Just down the road from this location was a lake. Mostly open water with some areas of plant near the shore, it had been spotted the day before, but rejected on the same grounds as the swamp. This time it was fished. Here again *Carlhubbsia stuarti* made up part of the catch. The *Gambusia sexradiata* from this lake proved to have the strongest black markings of almost any seen on this trip. Both these habitats had the same water quality :- GH 6, KH 6, & pH 7.2. These were our final fishing grounds before our departure.

The journey home

The journey home was mostly uneventful. With all the extra security checks at the airports and passing through America the team were somewhat concerned. However, everything went smoothly and our intrepid explorers returned safe and well having, for the most part, enjoyed a great adventure in a beautiful land with fascinating fish and a wealth of culture unlike anywhere else on the planet. ■

INTERESTED IN LIVEBEARERS?

The British livebearer organisation - Viviparous produces a quarterly magazine covering all types of livebearers from the rare and unusual species caught on this trip, right through to all the beautiful cultivated types. They also hold auctions and a national convention. This year's convention will be held as part of the *Festival of Fish Keeping and Water Gardening weekend* at Bracklesham bay. The President of the German livebearer organisation, Harro Hieronimus, will be speaking on Goodeids and there will be a large auction of livebearing fish taking place on Sunday 13th October. To join Viviparous send a £10 cheque or P/O made payable to "The livebearer Information Service" "Northside", Spridlington Rd., Faldingworth, Lincs, LN8 3SQ.

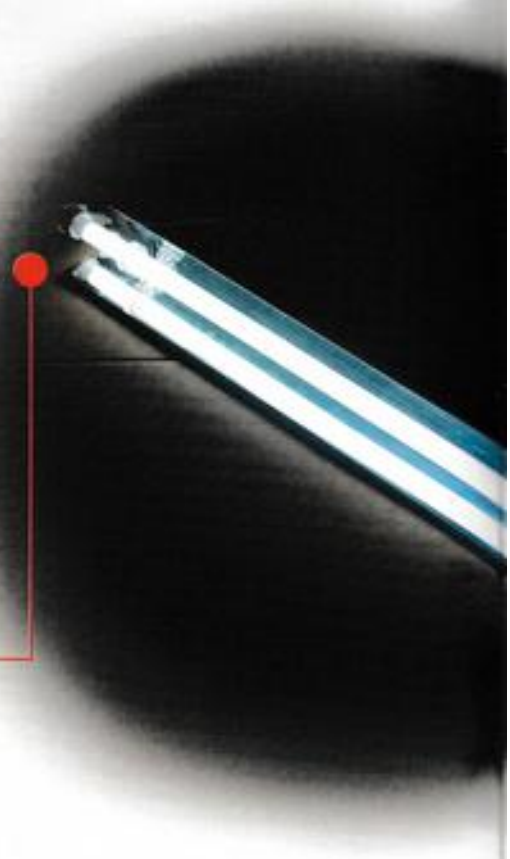
Not a place you want to visit - the police station in Punta Gorda.

THIEF IN THE NIGHT

The last night at Punta Gorda was memorable for something you hope will never happen to you. In the early hours of the morning someone sneaked into Ian and Trevor's room and helped themselves to Trevor's wallet. All the cash was stolen and the empty wallet dumped outside. Next morning we visited the police station and statements were taken but the money was never recovered. Because it was not held in a safe or safety deposit box, the insurance company said they were not paying out. In many ways Ian and Trevor were lucky, if one of them had woken up anything could have happened - guns and knives are common in this part of the world.

TOP GEAR

All the new products



ARCADIA LAUNCH THEIR OWN RANGE OF T5 LIGHTING

In September *Arcadia* are launching a new range of T5 fluorecent light tubes. They can produce the same amount of light as a standard bulb but use 40% less electricity doing it and have a tube life of approximately 15,000 hours, with a maximum drop off of light output of only 15%. For each tube in their current aquarium fluorescent range i.e. "Original Tropical", "Freshwater", "Marine White", and "Marine Actinic Blue". The "Marine Actinic Blue" lamp peaks at 420nm, which is further into the U.V. spectrum than the competing brands, most of which peak at 440 - 450 nm. Arcadia believe that this wavelength is a better one for highlighting the natural fluorescence of many marine invertebrates.

To accompany the range, they are producing a slimline reflector, specifically for use with them. To start with Arcadia will be launching three sies of each lamp - 24W (550mm), 39W (850mm), and 54W (1150mm), with possibly an 80W version to follow. The RRP of this range has yet to be set, however, they will be more expensive than normal fluorescent tubes but are much more powerful and will save money in the long term.

Contact Arcadia for further details. Tel: 020 8251 5515.

KING BRITISH LAUNCH GOLDFISH FLOATING FOOD STICKS

Sinclair, manufacturers of *King British*, have extended their range with the launch of Goldfish Floating Food Sticks. A complete, nutritionally balanced diet for indoor coldwater fish the sticks also contain the natural immune stimulant - Immuno Health Booster - present in all King British Flake foods. This was proven in consumer tests to improve the condition, colour and growth of fish. The sticks, which remain intact for a long time while floating on the water surface, are easily disgested and absorbed once eaten thus minimising waste and water pollution. In addition to feeding as a complete diet the sticks can also be fed alongside *King British* flake for variety. Brand Manager Ann Brassington states that "*King British* is a well established and popular brand with year on year sales increasing at a rate of more than 20%. Goldfish floating food sticks is a natural extension to the King British range".

For further information please contact Ann Brassington, Sinclair Animal & Household Care Ltd., Ropery Road, Gainsborough, Lincolnshire, DN21 2QB.
Tel: 01427 810231 Fax: 01427 810 837.

THE PRICE
35g pots have a RRP of £1.99

NEW *CORALIFE E-Z BALLAST* FROM AQUATIC SOLUTIONS

This excellent new electronic ballast runs two fluorescent tubes instead of the usual one. It is suitable for both T8 (1") or T12 (1 1/2") tubes ranging in length from 18" to 48" (15 to 40 watts). It comes completely assembled and ready to use, just connect the lamps and plug it in. Simple and easy to use this energy efficient electronic ballast is versatile enough to suit almost all aquatic needs.

THE PRICE
RRP £59.99

RED SEA LAUNCH NEW *PRIZM DELUXE* SKIMMER

Red Sea's Prizm skimmer is a very popular protein skimmer for aquariums under 100 gallons. Having recently launched 2 larger versions (*Prizm Pro* and *Prizm Pro Deluxe*), *Red Sea* has now added a deluxe version of the standard *Prizm*.

The *Prizm Deluxe* has all the features of the standard unit, with the addition of a chemical media cartridge and a fully adjustable surface skimmer. The surface skimmer can easily be set to skim upper level proteins, as well as being excellent at removing surface waste such as dust from the aquarium.

For customers wishing to upgrade their existing *Prizm* skimmers, there is a *Deluxe* upgrade kit available which includes a modified inlet pipe, chemical filtration cartridge and adjustable surface skimmer (MRRP £39.99)

Distributed by Interpet, and is available from all good marine outlets.

THE PRICE
MRRP £159.99

TOP GEAR

NEW DEVICE TO PROTECT YOUR POND FISH

A simple to use, new device known as "The Scarecrow", has just been launched in the U.K. and is specifically designed to protect all pond fish from attack by Herons and other predators. Whilst most fish keepers want to protect their fish from attack they don't really want to harm other wildlife so Koi Protection.com have created this revolutionary new device which is completely harmless to the predators yet is simple and effective.

It uses a passive infrared sensor to mount an invisible guard over the area that needs protection. Should any predators enter this area a high powered jet of water will be fired over the offender with an accompanying noise and movement of the device. The combination of noise, movement and discomfort from the water jet ensures the predator is scared away effectively.

To order go to koiprotection.com

NEW MEDIA FROM KENT

Kent have recently introduced a new biological media (*Cell-pore BioBlox*) which has a huge surface area when compared to many other media. The cubes are 5/8" and have a surface area of 2350sq ft each. With a very open structure they allow an unrestricted water flow around and through the media creating the perfect environment for beneficial bacteria to live.

For a stockist near you contact Aquatic Solutions, Unit 10, East Coast Business Park, West Lynn, Norfolk, PE34 3LW. Tel : 01553 776788 Fax 01533 773495

THE PRICE
16oz/473ml
MRRP £30.99

PLANKTON PRODUCTS NOW AVAILABLE TO ENTHUSIASTS

Marine aquarium enthusiasts now have the opportunity to buy plankton products in easy to use packs from Malvern based *Cellpharm*, a supplier to commercial fish farm hatcheries.

Whilst all experts agree that corals and filter feeders will benefit from being fed with both phytoplankton (micro-algae) and zooplankton (rotifers, brine shrimp etc). Many hobbyists believe that growing these is difficult, time consuming and expensive, but now *Cellpharm* with their hatchery experience have made it easy for the enthusiast to introduce plankton to culture their own plankton.

Kits are available complete with everything you need for *Cellpharm's* Micro-algae, Rotifer and Brine shrimp products. They are ideal for the beginner to get quick results from feeding their tanks with fresh live food.

For further information contact Johnathan Mortimer, *Cellpharm Ltd*, Malvern Hills Science Park, Malvern WR14 3SZ Tel: 01684 585345 Fax: 01684 585388. Web www.cellpharm.co.uk

AQUAMEDIC GUARANTEE PRIZE DRAW WINNERS

August:
Mr Burrows of Macclesfield who bought an Aqua Medic Wave from Wilmslow Aquatics in Cheshire

September:
Mr Hughes of Leigh who bought a Nitratreductor from Aqua World in Warrington
Both of them win a pack of Reef Life Calcium, Reef Life Iodine, Reef Life Strontium, Reef Life Trace.

TOP GEAR

TODAY'S GUIDE TO POND FISH FOODS

OF ALL THE decisions a pond keeper has to make, choosing a fish food can be one of the most daunting. We can all compare pack size/price and publicity blurb but this is a very superficial way of making what is the most important decision in your fishes life. So how should you make this decision? Well first of all you need to think about what fish you have in the pond. All species of fish have different dietary needs and feeding positions within the water column This means that in an ideal world there would be a specific food for each species of fish we keep in our ponds.

The reality is that compromises have to be made and most foods will be suitable for most fish but will not be ideal for all. Goldfish and Koi do best being the fish that most foods are designed for. These are the two most commonly kept pond fish and a great deal of research has been done to find out their dietary needs. Specialist foods have been created for each of these species and you will even find foods for enhancing colour or increasing growth rates of young fish.

Commercial foods come as either flakes, granules, pellets, tablets or sticks and your choice of which of these to feed your fish will also be determined by your fishes requirements. Flakes soften quickly without disintegrating in the water and do not sink too rapidly. As the flakes pass through the water column they will be taken by differing species. The top-feeders first, followed by mid-water and bottom-feeders.

Tench (these are the golden form) can starve to death if the wrong foods are fed.

PHOTO: Geoff Rogers

Floating pellets and sticks remain at the surface for the longest and allow pond keepers to watch their fish feeding. On the face of it this is a big plus because you can check for disease or injury at this time and make sure all your fish are feeding. The likelihood of overfeeding these foods is also lessened. The down side is for any bottom feeding species. It is quite possible for them to starve to death if nothing but floating pellets and sticks are fed! Some brands will sink long before others, so you will have to test them out and make sure you feed at least one which will reach the bottom in a few minutes.

Tablet foods and sinking pellets, however, are by far and away the best for bottom dwellers. These sink quickly and reach the fish they have been designed to feed as soon as possible. Granules are probably the least popular of pond foods, yet they have a lot to recommend them. They float long enough for most of the surface feeders to eat their fill but then sink through the water column allowing other species to feed. The danger with these foods is the risk of over-feeding because a larger proportion of the food ends up sinking.

Looking at the other commonly kept pond fish, Orfe are probably most often seen. These differ greatly from Goldfish and Koi in that they are carnivores and need a diet with a higher protein content to satisfy their requirements. They are also surface feeders so floating pellets and sticks are ideal for them.

Tench are one of the commonest bottom feeders to be kept in ponds. They are also the fish most likely to suffer from incorrect feeding. If you have these in your pond make sure you feed a sinking pellet or tablet food at the same time you scatter your floating foods. Flakes will be fine – if they have a chance to reach the bottom.

Chubb, Roach and Rudd are typical omnivores with similar requirements to Koi. The colour enhancing foods designed for Koi will do much to improve the fin colour of these species. Two species to steer well clear of are Channel catfish and Wels catfish. Both these fish are large predators which will eat all your Goldfish and smaller Koi. A large Wels catfish will even pose a threat to a full grown Koi!

Effects of temperature

Water temperature is also an important factor to consider when feeding pond fish. Below 10°C pond fish feed very little and the food can remain in the intestine for long periods of time. This can lead to severe problems if the wrong diet has been fed. For this reason many manufacturers have produced wheatgerm foods specifically designed to be easily digested at temperatures as low as 4°C. These should be fed sparingly during cold weather but may make the difference between life and death for many fish during winter months.

The analysis

Looking to the analysis of each food many aquarists are left wondering just what do each of the categories mean? Since this is a very complex subject we have selected just the two most important ones – Protein and Fats.

Protein

This is the major ingredient required for growth of fish and makes up most of the body structure. Fish fry and larvae grow rapidly and require a very rich diet for maximum growth. In the wild this will usually top 50 per cent of their diet on a dry weight basis, however, as they grow this requirement falls off and adults will only need 35 to 40 per cent depending upon species. Most pond fish foods have only 25 to 35 per cent protein levels because these fish are expected to forage for themselves as well as be fed by their owner.

Fats

Fats supply energy for most fishes' needs, although proteins can also be used for this. A good food will, therefore, balance just enough fat to satisfy all a fishes energy needs, whilst not overdoing it and producing fatty fish – a common problem with aquarium and pond fish. Most pond foods contain between five and eight per cent fat although higher levels will be found in foods designed for youngsters and carnivores.

TOP GEAR

The safe transportation of fish is always a worry to the owner, therefore, any innovations which arise tend to be very welcome. 'Safe Travel' is a perfect example of this - a new product which, it is claimed, will reduce the stress to fish in transit. Tim Henshaw of Bolton Museum Aquarium tests the product and gives his assessment of it.

Safe Travel – product test

EARLIER THIS YEAR I had to transport fish to France. I was uncertain that the fish - *Nandopsis bartoni* and *Etroplus canarensis* - would survive the trip, and as they were endangered, this was crucial. When I visited the trade fair, GLEE 2001, at the NEC, I came across a new product called '*Safe Travel*'. This product sold by Casco Europe Ltd. claimed to reduce the stress, of travelling, by protecting the mucus coating and reducing the ammonia levels using a bacterial mixture. The product, manufactured in France, intrigued me and I felt it was worth trying.

The product consists of a double-pointed ampoule, or vial, of solution in which there is a living bacteria mixture. The pack contains a minimum of six vials. Each vial is brown in colour and has a point at each end. The neck of each point is scratched to allow it to be snapped off easily. Instructions are written on the outside of the pack, although, there is no explanation given regarding how to break open the vial.

The treatment is prepared by first shaking the vial for a few minutes to disperse the bacteria throughout the solution - it had settled out at one end. The pointed ends lead to a settling out of bacteria in one of them. I found it quite difficult to agitate the bacteria out of the point.

Each vial contains enough solution to treat 10 litres of water. I had a reservoir of matured water at the correct temperature, and a bucket, which had litre marks on it so, 10 litres of water was put in the bucket and the contents of one vial added. The vial has to be snapped off at each end (both points) to allow the contents to flow out. The resulting mixture was carefully stirred to ensure even distribution through out the water.

Water was then placed into a polythene bag between 250 and 500 ml per bag. One fish was added per bag and the bag was sealed. When sealed the ratio of water to air was 1 to 4. - i.e. the bag was 25% water to 75% air. Air was used and not pure oxygen because gill damage sometimes occurs in high concentrations of oxygen. Having sealed the bags, the corners of each bag was taped up to prevent the fish getting stuck in the corner and asphyxiating. A second bag was slipped over the first and that too was sealed. The bag was then placed into a polystyrene box. There were 54 fish prepared for transport.

When the boxes were full the lid was placed on them and sealed with parcel tape. It was decided to not open the boxes until arrival as this would result in loss of heat, and temperature is critical. Obviously there is a risk here, if anything went wrong it wouldn't be detected until arrival. However weighing up the risks of something going wrong against the heat loss, and the stress caused to the fish by opening the boxes early, it was felt this was the best course of action.

Safe travel will be of tremendous help to any aquarist who has to transport fish long distances.

The boxes were placed into the back of my car and the journey began. Upon arrival at the overnight destination, the boxes were placed in a warm environment. They were still not opened, but being in a warm environment would reduce heat loss overnight. The following morning the boxes were once again placed in the car and the journey continued. The first part, to Dunkirk, was completed some considerable time later, over twenty-four hours in all. All the fish arrived safely with no casualties. Because all the fish looked so healthy, and they had more travelling to do - to the south of France, they were not unpacked, but were regularly examined by their new owner - Jean -Claude Nourissat of the President of the French Cichlid Association - to check on their condition. They arrived at their new home on Monday morning - almost 72 hours after being packed - still in their original packaging.

Jean - Claude Nourissat was highly impressed. He said that the fish fed upon immediate release from the bags. He had never seen fish so well packed and looking so healthy, and asked what the product was as he was going to Madagascar shortly and would be bringing fish back.

No ammonia testing was done on arrival and so the claim to reduce ammonia build up could not be verified. However, as all the fish arrived alive, and in perfect condition, the Manufacturers claim regarding 'Safe Travel' aiding the safe transport of fish is accepted.

The product retails at £9.99p for a 6 ampoule/vial pack, £25 - 99p for a 30 pack.

It comes in 6, 12, and 30 vial packs.

Tim's verdict

AVAILABILITY: Poor - not many outlets stock it at present.
EASE OF USE: Poor - hard to mix the bacteria and no instructions given regarding opening the vial.
VALUE FOR MONEY: Excellent - safe arrival of fish is important.

For people who regularly transport fish - to shows, auctions etc. this product will prove to be very useful. Although not cheap, if it safeguards the fish it has to be good value for money. The only improvement I would like to see is to the ampoule/vial to allow for the easier shaking up of the bacteria and better instructions for use. However, I strongly recommend that anybody who transports fish use this product.

For your nearest stockist contact Casco Europe Ltd. on Tel 07000 303940.

Just add water

More aquarists than ever before are buying a complete system rather than trying to put together separate pieces of equipment to set up their own aquarium

OUR FIRST *Just add water* aquarium was the new *Fluval Duo 800* from *Hagen*. This was won by Alexis Towers of Keighley, West Yorkshire. He wrote in and said *"I can't believe you are giving this away! I would kill to have this aquarium. At the moment I have a 60 x 30 x 35cm coldwater aquarium which I love dearly, but what I really want is a tropical setup. It really would be a dream come true to win this setup, nearly a life long dream as I have been interested in this hobby since I was 12 years old and have loved every minute of the past six years."*

Unlike any other aquarium setup offered in an aquatic magazine this prize included our Editor coming along with the aquarium to help set it up. Little did he know that Alexis's room was in the attic! Luckily Alexis had drafted in fellow fishkeeper Jack to help and the tank, stand and equipment were soon sitting on the bedroom floor.

First job was the cabinet. This was not originally part of the prize but Hagen kindly donated it so Alexis would have something to put his new tank on. Here experience really paid off (not our editors but Alexis's!). Having worked in a television shop putting a cabinet like this together was very similar to putting the TV cabinets together. So without further ado, out came all the pieces and instructions.


Working like a well oiled team Alexis and Jack soon had the stand fitted together.


Check out the instructions first.

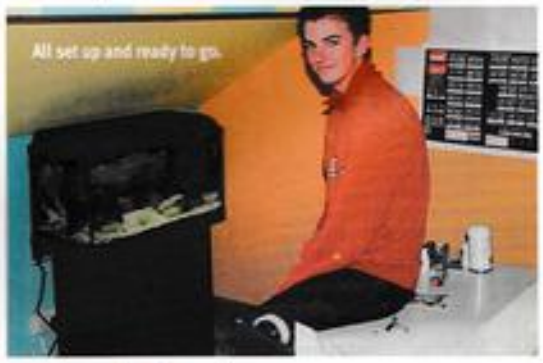

Getting water was not easy as it had to be carried up narrow stairs, but with three pairs of hands the aquarium was soon full.

Next came the tank. In went the gravel (this had been prewashed by Malcolm Goss when he set the aquarium up for our original feature so that saved a lot of time), a few pieces of simulated wood and the artificial plants which came with the setup. The heater/stat was tucked away out of sight behind the wood and filter positioned in the top right corner. Next came the water.

Final adjustments to the gravel and plants, then on with the hood. Plug everything in and switch on. Hey presto! One tropical aquarium up and running. Live plants would be added in a couple of days once the water temperature had settled down and the first fish would follow in a couple of weeks.

Total installation time? Only a couple of hours in total, not bad considering the stairs. Of course it took our Editor more than that to find his way back out of Keighly! He claims that was down to the diversions but we all doubt that at the office knowing how he can get lost in a paper bag!


It only takes a screw driver to fit this stand together.


All set up and ready to go.

Lyretail Killifish

Aphyosemion australe

Copy for Today's Diary Dates

Copy for Today's Diary Dates should be sent to Today's Fishkeeper, Winchester Court, 1 Forum Place, Hatfield, Hertfordshire, AL10 0RN Telephone 01673 885352, fax 01707 269333 or e.mail derek@tfmg.co.uk copy deadline 6 weeks before publication date.

Today's Diary Dates

September's show, auction and club meeting dates

Sun 1st

K.A.A.S Open show. Contact 01634 221291
Wyke A.S. Open show and auction. Contact 01482 445543

Mon 2nd

Kirkcaldy A.S. meeting. Contact 01738 634689
Solway A.S. meeting Contact 01387 750606
St Helens A.S. meeting Contact 0151 4260213
Ayrshire Fishkeepers Association meeting.
Contact 01294 605272
Reigate & Redhill A.S. Contact 01293 781282
Merseyside Aquarist Society meeting. Contact 0151 260 3664

Tues 3rd

Southend Leigh & Dist A.S. Contact 01702 305740
Paisley & District A. S. meeting.
Contact helenburns@thefreeinternet.co.uk.
Dunstable & D.A.S. meeting. Contact 01582 707280
York & Dist. A.S. meeting Contact 01904 424272
The Irish Tropical Fish Society meeting. Contact 01 4560836
Halton A.S. meeting Contact 0151 2898190
North Bucks A.S. meeting. Contact 01908 377333
Oldham A.S. meeting Contact 0161 281 3725
Preston A.S. meeting. Contact 01772 32114
Lang Toun Aquarists and Pondkeepers Group meeting.
Contact 01592 595825

Wed 4th

Corby & DAS. meeting. Contact 01536761736
Oasis Fish Club (Sunderland) meeting. Contact 0191 3841433
Hounslow club meeting. Contact 01784 259230
Perth A.S. meeting. Contact 01 738 621704
Clacton Fish Keeping Club meeting. Contact 01255 428065
Portsmouth A.S. meeting Contact 01673 885352
Bracknell A.S. meeting. Contact 01344 485287
Workington A.S. meeting. Contact 01900 67951

Thurs 5th

Gleenrothes meeting. Contact D. Smart, 4 Lochty Ave.,
Kinglassie, Fife.
Faircity A.S. meeting. Contact 01738 561291
Sandgrounders A.S. meeting. Contact 01704 541177

Fri 6th

NorthWest Cichlid Group meeting Contact 019422 707 593

Sat 7th

Sun 8th

Alden A.S. Open show and auction. Contact 01535 601494
Yorkshire Cichlid Group Auction. Contact 01924 367086

Mon 9th

Kirkcaldy A.S. meeting. Contact 01738 634689
Bristol Aquarist Soc. (Goldfish) meeting. Contact 01792 207467
Ilford &D A&P Society meeting Contact 020 85507329
Grimsby & Cleethorpes meeting. Contact 01472 349178
St Helens A.S.meeting Contact 0151 4260423
Otley A.S. meeting. Contact 01274 531418
Robin Hood A.S. meeting.
Contact mdtalbot@corydoras.freeserve.co.uk

Tues 10th

Darwin A.S. meeting. Contact 01254 701925
Northwich A.S. meeting. Contact 01606 882966
Caer Urfa A.S. meeting. Contact 0191 5237464
Telford & D.A.S. meeting.
Contact 01952 409721 or 01952 616410
Lang Toun Aquarists and Pondkeepers Group meeting.
Contact 01592 595825
Northern Goldfish and Pondkeepers meeting.
Contact 0161 9697567
Greenock D.A.S. Meeting. Ian Fuller speaking.
Contact 01475 704719

Wed 11th

Linlithgow Aquarist Society meeting. Contact 01506 510558
Halifax A.S. meeting. Contact 01274 880471
Tameside A.S. meeting. Contact 0161 339 6593
Bradford A.S. meeting.
Contact (01274) 652542 or (0113) 257 7709
Hounslow D.A.S. Meeting Contact 01753 645675

Thurs 12th

Mid-Sussex A.S. meeting Contact 01273 602407
Kings Lynn Fish Club meeting
Contact 01553 769522 or 01553 763743
York D.A.S. meeting Contact 07776 769 8331

Fri 13th

Yorkshire Cichlid group meeting Contact 01924 367086
Basingstoke A.S. meeting Contact 0118 970 1461
West Cornwall Fishkeepers meeting Contact 01209 713880

Sat 14th

Hounslow Open show. Contact 01753 645675

Sun 15th

Otley Open show and auction. Contact 01274 531418
South London Open show. Contact 0207 231 2317
Catfish Study Group Open show. 01704 213690

Mon 16th

Kirkcaldy A.S.meeting Contact 01738 634689
Thorpe & D.A.S. meeting. Contact 01953 605394
Solway A.S. meeting Contact 01387 750606
Merseyside Aquarist Society meeting. Contact 0151 260 3664

Tues 17th

Southend Leigh & Dist A.S. Contact 01702 305740
Greater Manchester Cichlid Society meeting
Contact 01422 942 155
Midlands Marine Aquarists Society Contact 0121 359 4469
Oldham A.S. meeting Contact 0161 281 3725
Lang Toun Aquarists and Pondkeepers Group meeting.
Contact 01592 595825

Wed 18th

West Yorkshire Marine Aquarist Group meeting.
Contact 01924 420001
Clacton Fish Keeping Club meeting. Contact 01255
Tongham Aquarists Society meeting. Contact 01252 25686
Portsmouth A.S. meeting. Contact Gill Utting 9,
riverness Rd.,Gosport,Hants.
Perth A.S. meeting. Contact 01 738 621704
Bracknell A.S. meeting Contact 01344 485287

Thurs 19th

October 2002 *Today's Fishkeeper* on sale
Gleenrothes meeting. Contact D. Smart, 4 Lochty Ave.,
Kinglassie, Fife.
Bristol Tropical Fish Club meeting. Contact 0117 973 2145
Croydon A.S. Meeting Contact 0208 654 0984
Sandgrounders A.S .Contact 01704 541177
Faircity A.S. meeting. Contact 01738 561291

Fri 20th

Sat 21st

Sun 22nd

Port Talbot A.S. Open show. Contact 01639 774116
Huddersfield Open show. Contact

Mon 23rd

Kirkcaldy A.S. meeting. Contact 01738 634689
Ayrshire Fishkeepers Association meeting.
Contact 01294 605272

Tues 24th

Northwich A.S. meeting Contact 01606 882966
Clyde Aquarist Society meeting.
Contact john@farnanf.freeserve.co.uk
Lang Toun Aquarists and Pondkeepers Group meeting.
Contact 01592 595825
Greenock D.A.S meeting Contact 01475 704 219

Wed 25th

Workington A.S. Contact 01900 67951
Halifax A.S. Contact 01274 880471
Tameside A.S. meeting. Contact 0161 339 6593

Thurs 26th

Mid Sussex A.S. meeting. Contact 01273 602407

Fri 27th

Eastbourne & District Pondkeeping Contact 0132377331369
Discus Ireland meeting. Contact (061) 318593
West Cornwall Fishkeepers meeting. Contact 01209 713880

Sat 28th

Sun 29th

N.G.P.S. (Goldfish) Open show and auction.
Contact 01282 420097
Mid-Sussex A.S. Open show. Contact 01273 602407
Faircity Open show and auction. Contact 01738 561291

Mon 30th

Kirkcaldy A.S. meeting. Contact 01738 634689

FESTIVAL OF FISH KEEPING AND WATER GARDENING WEEKEND – OCTOBER 12TH & 13TH

Four more speakers added

This years Festival has just been augmented by four additional speakers from National Institute for Research into Aquatic Habitats. Full details of this project have yet to be released, however, several of the same people who were behind the Eden Project are involved with this new public aquarium and research centre. The four speakers are Ronnie Murning (Project Director), John Dixon DSC (Curator of amphibians and reptiles), Chris Duffy (Chairman) and Dr S. La Thangue (Curator). They will be speaking on all aspects of the project including why it is dramatically different from anything which has gone before.

The fifth member of the N.I.R.A.H. speaker line-up will be our very own Pete Liptrot in his role as Curator of fishes.

Alf Nilsen from Norway speaking on Marines.

Rupert Bridges B.Sc. (hons) M.Sc. will be giving a presentation on fish health and how to avoid disease problems in your aquarium.

Harro Helronimus from Germany speaking on livebearers • Dr Peter Burgess speaking on aquatic husbandry • Malcolm Goss and Peter Calra on setting up your first tropical aquarium • John Negus on setting up your first pond

There is also live entertainment every evening and a quiet area away from the music (but close to a bar!) arranged for those of you who just want to sit and talk about fish. There will be lots of beautiful furnished aquaria on display thanks to *Maidenhead Aquatics*. All the fish in these displays are available to purchase at the end of the show.

How to book for the marine beginners seminars

If you are interested in attending one of the beginners seminars please phone 01673 885352. They are free to day visitors and weekend guests but places are strictly limited and will be allocated on a first come first served basis.

How to book for the weekend

Full board weekend packages for the Festival are available priced at £78. To book contact Grace Nethersell, 8 Acacia Avenue, Brentford, Middlesex, TW8 8NR. Tel/Fax 020 8847 3586.

Don't forget the National show league

SEVERAL FEDERATIONS already run show leagues in various forms, either for individual exhibitors, or for clubs. These, however, are limited to just the shows held under each Federation's rules. With exhibitors travelling further afield and supporting several different Federation's shows *Today's Fishkeeper's* national show league was started last year. This way prizes gained at any open show throughout the UK would count towards the competition.

For any shows results to count towards the show league it must have its date and contact number published in *Today's Fishkeeper* prior to the show. This means this information must be with the editor 2 months before the show. Hopefully clubs will send this information in themselves, but any exhibitor who wants a show to be included can send the details in.

To register your points (3 for a 1st, 2 for a 2nd & 1 for a 3rd) send a photocopy of your certificates to TFK National Aquatic Show League, *Today's Fishkeeper Magazine, Winchester Court, 1 Forum Place, Hatfield, Herts. AL10 0RN. Joint exhibitors are allowed to enter providing they maintain their fish together.*

Clearwater Aquatics

Today's Fishkeeper visits *Clearwater Aquatics* in Leicester

THE ABDULLA FAMILY (Yoosaf, Firoz & Shavir) have been into fish ever since they were youngsters. Dad first kept fish many years ago and eventually bred Discus some 25 years ago. About 12 years ago the family really started to breed Discus commercially and supplied many of the shops in the area with prime quality fish. Today *Clearwater Aquatics* still prides itself on the high quality Discus they have for sale, although most fish are imported now.

We visited this shop on the same weekend as the British Cichlid Association Convention - which accounted for two staff members not being present. They were busy at the Convention learning all they could about this specialist area of the hobby. This is typical of both the staff and family who own and run this shop.

Looking round the shop two areas were quite remarkable. The marine section contained a good range of healthy fish and inverts and downstairs there were some lovely Discus (thankfully still in quarantine or it would have cost our Editor dear). The tropical range contained all the usual "bread and butter" fish but also a few choice oddballs. Outside the vats contained a range of coldwater fish including some healthy Koi.

Clearwater aim to cater for all fishkeepers needs whether they keep Goldfish, Tropical fish, Marine fish, Inverts, Discus, Rift Valley Cichlids or Koi Ponds, whether they are a beginner or a fully fledged fish keeper.

Our verdict

An excellent shop well deserving its reputation as one of the best aquarium shops in the Midlands. This reputation is based on customer care rather than sheer shop size.

Shop details: Clearwater Aquatics, 338 Green Lane Road, Leicester, LE5 4ND. Tel 0116 274 3426. Fax 0116 246 0915

Shop opening hours: 10am - 6.00pm Tues - Fri, late night Thurs 8pm, Sat 10am - 5pm, Sun 10am - 4pm. Closed Friday lunch 12.30pm - 2.15pm. Bank holiday Mondays 10am - 4pm.

Proprietors: Yoosaf, Firoz & Shavir Abdulla.

Staff: 2 Full time :- Zameer & Rehan

Staff knowledge: All the brothers have their specialist area of knowledge and a good knowledge right across the board. Zameer specialises in Tropical and Malawi, while Rehan is more into Coldwater and Cichlids.

Number of tanks: Tropical 100, Discus 50, Marines 2200 litre system plus 20 tanks of Inverts although this number is increasing soon..

Number of Vats: 10 vats

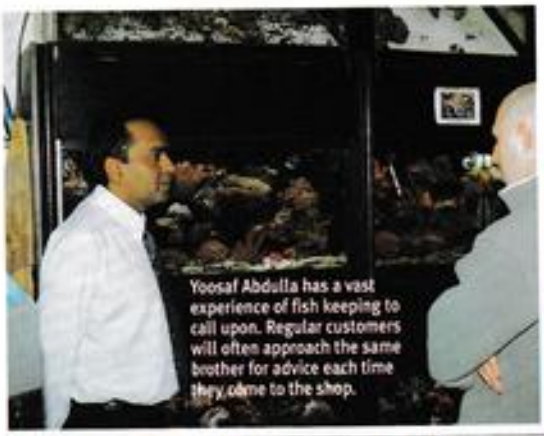
Show tanks & Ponds: 4 Reef & 1 fish only marine plus 1 Cichlid show tank.

Specialities: Discus, Malawis, & Marines.

Additional services: Pond and tank installation available from local specialists.

Brands stocked: All major brands.

Which groups of fish do you sell?: Freshwater tropical, Marine, Coldwater and Koi.


Yoosaf Abdulla has a vast experience of fish keeping to call upon. Regular customers will often approach the same brother for advice each time they come to the shop.

Firoz's verdict on the manufacturers

Which manufacturer has the best range of products in your opinion?
Eheim

Which company gives your customers the best service? Eheim

Letters in association with Tetra

Today's Postbag

Share your news, views and experiences through *Today's Postbag*. Every month the star letter wins £25 worth of Tetra fishcare products – all for the price of a 27p stamp or an e-mail.

Praise for Tony Sault

Star Letter

Dear Mr Lambert

Just a note to let you know that I really appreciate your magazine's look and content. I have been fishkeeping for about 30 years and have bought the usual mags on and off over that time, subscribing to one for one year only.

Earlier this year I bought a new stock of Brown Discus from Tony Sault. Tony was so kind and patient, and when he got the Browns I wanted in stock I went to see him (and them of course). He could not have been more helpful and I came away with 6 beautiful fish. Over the 'settling in' weeks I was on the phone many times for advice - including a panic or two - always he was and still is very understanding, caring and efficient in his advice (including saving me loads of money by advising me on a water purifier system, thereby cutting out the need for me to buy weekly RO at 15p per litre which I had always been doing since keeping Discus - about 12 years! He even suggested getting a formal water report from our Water supplier.

When I bought the Brown Discus Tony told me about *Today's Fishkeeper* and I ordered a couple of copies. I liked what I saw and read so much that I subscribed almost immediately - and have every intention of continuing my subscription. I can't really put my finger on exactly what I find superior to the others, perhaps it is the fact that the people writing for you seem to genuinely care about their subject? I don't know, whatever it is that attracts me to *TFK* seems to be permanent. The magazine also seems friendlier with the staff and writers more accessible.

I read all the articles and would really appreciate larger articles from Tony Sault and others as well as the regular Q&A's although these are always interesting. But I imagine all your regular writers are very busy people - I know Tony is, but if you could persuade him to produce some features I for one would be delighted. I know that I can go up to see him and call him up for a chat, but it also nice to have hard copy of things to read - I suppose this is the long-term dedicated hobbyist in me showing!

I also enjoy reading your leader each month, July's was interesting about the swamp grass etc, the overall writing style throughout the magazine is always friendly and interesting, I have long tired of the slightly arrogant superiority of other mags ! So to start with your leaders is always refreshing no matter what the subject.

Well that's it. I sincerely hope that *TFK* is proving to be a great success for you all, it deserves to be.

Continuing Good Luck to you and your team

Regards,

Mrs Zealah J. Gibbs

More marines please

I would like more on Marines (ideally a quarter of the magazine). After all there are a lot more hobbyists interested in this side of the hobby than there have ever been. If Andrew Caine is too busy there must be more experts to do write ups on Marine fish keeping and coral keeping.

Mr E. Edwards, *Middlesex.*

Andrew Caine is very busy, but it is more a case of space than him not being able to write anymore.

Editor's reply

Both these letters show just how difficult it is to balance the content of a magazine. We try our best and fit in as much about each group of fish as we can, but every month I feel like I am trying to fit a quart into a pint pot! To help solve this problem we have now stepped the magazine up in size by 8 pages a month. This means we will be having an extra Marine article each issue and will probably fit an extra Discus piece in from time to time as well. I hope Mrs Gibbs and Mr Edwards will be satisfied with this.

DJL.

JUST SAY NO! to GM fish

We bring you up to date on *Today's Fishkeeper's* campaign

LAST YEAR WE published the first report about efforts being made to create genetically modified fish for the aquarium hobby. Zebra danios had been spliced with a gene which made them change colour depending upon water conditions. These were originally developed with a specific scientific purpose in mind but someone later thought of selling them to aquarists.

Next came Rice fish which had been spliced with a gene from a Sea anemone to create a fish that was luminous green and glowed in the dark. These were created specifically for the aquarium market and have been condemned by aquarists all over the country.


DAILY EXPRESS

Fears over fish that glows in dark


Sunday Telegraph

Frankenstein fish will glow in the bowl

Roll of honour

Anglia Aquatics, Attleborough	01953 457150
Aquacadabra , Bexley Heath	01322 345742
Aquatic Habitat, Gloucester	01452 862791
Aqualife, Harlow	01279 436929
B.A.S. Manchester.	01204 534343
Clearwater Aquatics, Leicester	01162 743426
Gilberts Pet & Garden supplies, Torquay, Devon.	01803 329149
Maidenhead Aquatics	
@ Ascot	01344 875031
@ Aylesbury	01296 623335
@ Bourne End	01628 528882
@ Bracknell	01344 453666
@ Bristol	0117 977 2955
@ Cardiff	029 2084 2666
@ Chichester	01243 771077
@ Chipperfield	01442 834941
@ Cwmbran	01633 873533
@ Dartford	01322 291221
@ East Grinstead	01342 835373
@ Enfield	0208 3646617
@Guildford	01483 281678
@ Hare Hatch	0118 940 1122
@ Havant	023 9249 8401
@ Henley	01189 402123
@ Hereford	01432 344887
@ Hickstead	01444 882040
@ Hillingdon	01895 819050
@ Iver	01753 630130
@ Mill Hill	020 8201 1999
@ Morden	020 8646 1066
@ Newbury	01635 869900
@ Northampton	01604 592044
@ Osterley	020 8568 0030
@ Polhill	01959 533519
@ Ramsgate	01843 597597
@ Shepperton	01932 781500
@ Southampton	023 8069 6383
@ Swansea	01792 882287
@ Swindon	01793 526888
@ Syon Park	020 8568 7776
@ Wembley	020 8200 3545
@ Weybridge	01932 821199
@ Woking	01483 760180
@ Worthing	01903 244532
Pier Aquatics, Wigan	01942 238661
Riversdale Fishfarm, Lincolnshire	01790752410
Riverside Aquaria, Stirling	01786 473450
Shotgate Aquatics, Billericay, Essex	01268 531287
Spire Aquatics, Chesterfield	01246 278957
The Water Zoo, Peterborough	01733 312142
Tropica, Knaresborough	01423 869590
Ultimate Discount Aquatics, Fife	01334 656699
Waterworld Aquatic Centre, Aberdeen	01224 631164
Wet Pets, Romford	01708 744880
Wet Pets, Southwell, Notts	01636 816910
Wet Pets, Sutton-in Ashfield, Notts	01623 556341
Wholesale Tropicals, Bethnal Green, London	020 77395356
Wings and fins, Stockport	0161 432 5799
Andy's Aquatics & Pet Store	0151 645 8939
Aqua-world partnership.	01925 483979
Holly Bush Aquatics	01922 418050
Home Marine	0208 367 4191
Prestwood Pet Zone	01384 877150
The Aquastore	01935 423438
Tisbury's aquatic centre	01708 341376
Sedgley Road Aquarium	01902 670098
Waterworld aquatics, Glasgow	0141 427 955

JOIN THE CAMPAIGN

Please add my shop to the list of those who are saying no to GM fish.

My name.....

Shop name.....

Shop address.....

.....

.....

..... Post code.....

Shop phone number.....

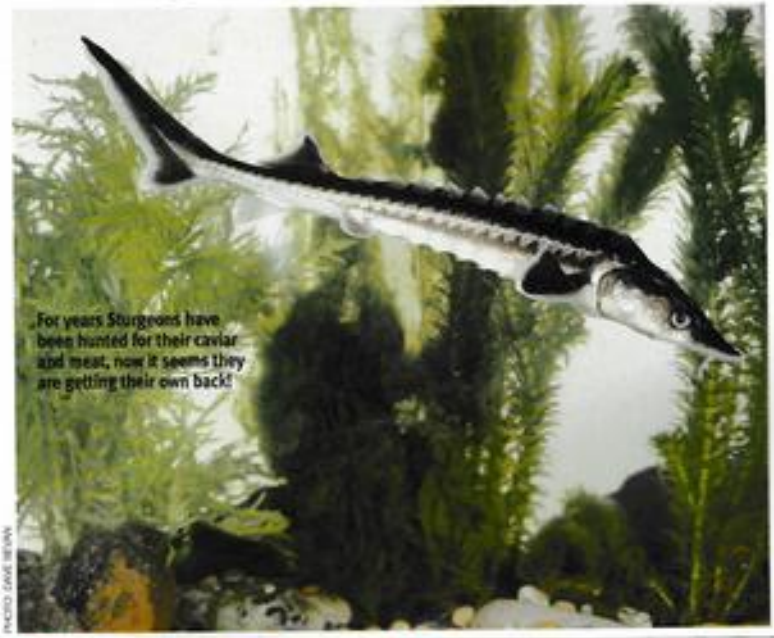
Goldfish epidemic hits Indonesia

MILLIONS OF GOLDFISH have died following an unprecedented epidemic caused by *Aeromonas hydrophila* bacterium in Indonesia. The bacterium has been found to have contaminated the Darma reservoir, breeding farms, and fish ponds. The first attack of the bacterium was detected on 16 Jun 2002. Bunbun B, head of the protection and health division at the local agriculture office speculated that Aeromonas had come from the breeding stock of young fish brought in from other regencies, notably the neighbouring town of Subang. *"It (Subang) is the place where the bacterium was first found. I believe it has already spread to Central Java, Ybgyakarta and East Java,"* he said. Agriculture office chairman Kaswan Heryawan admitted that, based on the research conducted by the Center of Water Fisheries in the regency, before being attacked by the bacterium, the fish were infected with a Rhabdovirus, (a virus that weakens the fishes' immunity) *"Aeromonas is not a new type of bacterium and can be found everywhere, however, it can be lethal if the fish's immunity is weakened."* he said.

These Goldfish are perfectly healthy but huge losses have been reported from Indonesia.

PHOTO: WW 02818

Sturgeon get their own back



For years Sturgeons have been hunted for their caviar and meat, now it seems they are getting their own back!

PHOTO: DAVE BEVAN

FORGET SHARKS, ALLIGATORS and Stingrays. The latest Florida menace is giant leaping Sturgeon! Gainesville elementary school principal Lacy Redd was boating on the Suwannee River over the Memorial Day weekend when a Sturgeon, some 2m long and weighing about 60kg, leaped into her family's boat and knocked her out. She suffered a collapsed lung and five broken ribs. The fish folded the boat's steering wheel in half. With his kids panicking, Lacy's husband, Paul, looked for his wife. *"I'll be honest. I thought she was dead,"* Paul said. A minute earlier, she had handed their 1-year-old child over to Paul, which probably saved the child's life.

On July 4, Danny Cordero of Perry was zipping along the Suwannee on a personal watercraft with his girlfriend when — WHAM! A sturgeon knocked them both in the water. *"I don't remember anything,"* Cordero said. *"My girlfriend said it was like hitting a brick wall. She saw me lying face down in the river. I had blood all over me. It cracked my teeth and chewed up my gums."*

While leaping Sturgeon are not likely to be a problem in the U.K. This story does highlight just how big these fish can grow. Even a Star Sterlet like the one pictured can reach 1.9m in length and pose a serious threat if it came flying at you.

New releases

Top German aquarist **Erwin Schraml** highlights four fascinating new releases in the catfish world. PHOTOS: ERWIN SCHRAML

Astroblepus sabalo (Cuvier & Valenciennes, 1840)

Regan (1903) had already drawings of nine different species of this genus on one table in his paper (A Monograph of the Fishes of the Family Loricariidae), and also Steindachner had before already perfect drawings in his original descriptions. But up to now I don't remember that I have seen any photograph of such a catfish in an aquarium journal. So I think it is not surprising if you don't know *Astroblepus*.

I was very delighted, when I could see and touch the first living specimen. I had not expected, that *Astroblepus* could be such a solid looking fish. The specimen of which I have taken the pictures from measured clearly over 15 cm and left behind an impression of a very compact fish. The large sucker mouth reminded me naturally to a plated catfish and indeed Astroblepids were formerly counted to belong to a subfamily of the Loricariids. Now they form their own family.

So far nothing is known about the housing and husbandry of these fishes, and unfortunately this single fish was also the one and only specimen which has yet arrived as an aquarium fish. It is known that *Astroblepus* normally occurs in fast flowing hill streams. They need lots of oxygen and not too warm temperatures. Maybe that's the reason why they normally don't make it through the strains of export stations.

The barbels of this species are held widely spread so they can detect any food which comes in range

Apistoloricaria condei Isbrücker & Nijssen, 1986

Apistoloricaria condei is one of four species, which belong to this genus. Up to now it was a very rare aquarium import. The original distribution area of it is the Rio Napo in Ecuador, which also flows into Peru. Especially interesting in *Apistoloricaria* are the barbels, which are carried widely spread, almost as much as *Planiloricaria cryptodon*, a species which is known a little bit better. *A. condei* is also much more agile than other similar looking catfishes, for instance those of the genera *Rineloricaria* or *Hemiloricaria*.

For much of the day these fish will be hiding with half of their body in the sand, and only the dorsal spine whipping up from time to time. When food is put into the aquarium, they start to get nervous and move their heads sideways, their barbels stretched all the way sideways too. As soon as some food touches the barbels they grab and devour it. Males of this species carry their egg-graves around under their lower lip until the larvae leave the shells.

This fish was one of the first members of the genus to be imported to Europe.

INSET: Close up of the *Astroblepus* mouth.

Horabagrus brachysoma (Günther, 1864)

In 1994 was this species was seen for the first time alive at the Interzoo as an offer of an Indian exporter. These catfish originated from Kerala (South India). Aquarium Glaser has recently introduced them again. These animals did not have a completely round side blotch as the specimens from 1994. However that might be because of the age, because the later introduced fishes were clearly smaller. The names "Lunar eclipse - bagrid" and "Bullseye bagrid" alludes likewise to the side blotch.

In the aquaristic literature you can't find total agreement about the final size of these fish. Concerning the "Aquarium-Atlas" the species should reach only 13 cm, Shane Linder, however, speaks about 45cm. The latter appears to me to be a more realistic size which is confirmed by *FishBase*.

In their home country the fish therefore can be found during the rainy season regularly on the fish market to serve the people as edible fish. Because they are predatory, the interested aquarist should consider in any case the final size, before all other inhabitants of the aquarium disappear in the large muzzle of the catfish.

The original description of the holotype gives "Cochinchine" as place of origin, that would be the present Vietnam. That might be an error, because Day gives for his *Pseudobagrus chryseus*, which is seen by some authors as synonym to *Horabagrus brachysoma*, as place of discovery "Cochin" (= "Kurriapudnam") in India. South India has to my knowledge a very independent fish fauna and it would be a miracle, if that species occurs in such a big distribution area.

First of all this genus was placed within the Bagridae, until Mo (1991) put them to the Glass-catfishes (Schilbeidae). But in a more recent literature however, Pethiyagoda and Kottelat have decided (within the description of a further *Horabagrus* – species *H. nigricollaris*), that the genus should be placed once again within the Bagridae.

Aquaristically very little information is available about the fish. They like to hide in caves and will devour everything offered to them. Sexual differences and breeding data are unknown at this time.

Horabagrus brachysoma was first imported in 1994 but new imports have started to arrive in the last 12 months

Pygidium taczanowskii are rare imports which do not make good community fish.

Pygidium cf. *taczanowskii*

Some time ago Aquarium Glaser received from Peru a Trichomycterid what might probably be *Pygidium taczanowskii*. A drawing in Steindachner (1882) shows at least a fish, which can not be distinguished from this species using outer features and the described colours. I have noticed in the fish which I have taken pictures of that the fin-membranes were dark reddish at the base of the anal and ventrals. Steindachner has not reported this in his description of *P. taczanowskii*, but the coloration of the preserved specimens which he used, was probably faded out.

The Trichomycterids are called also urethra-catfishes. Some of this group live parasitic lives feeding on other fishes e.g. in the gills of large catfishes. Fishes exchange uric acid in the blood over the gills when they are breathing and release it to the water. Specialised Trichomycterids can smell that. They follow the uric acid in the water and get directed in this way to the gills of giant catfishes. They can, however, be misdirected into the urethras of larger male mammals which are urinating in the water. There they get stuck and die. Also humans can be attacked by the Candirús. Indians, which live in stretches of water in which such catfishes occur, carry a garment as special penis-protection, to prevent these catfishes very painful attack. We would expect now to find relatively small catfishes as the cause but it was published in the Brazilian magazine "A Critica" (Nov 6th, 1996), that a physician in Manaus has removed from a patient a 12 cm (!) long Candirús. Surely this was not a member of the genus *Pygidium*. Even when these catfishes are not parasitic they are mostly rather aggressive against other inhabitants in the aquarium. Perhaps they can be associated with Thorny catfishes or with other very robust or armoured species.

Top of the Pops the Rasboras

Who are "*Top of the pops*" in the fish world? Some Rasboras have always been there, but there are lesser known cousins who are the "Wannabes" coming up on the rails

PHOTOS: MAX GIBBS, OLIVER LUCANUS, LAURENCE AZOULAY

Harlequin

When in good colour Harlequins are very beautiful.

OUR VERDICT
Without a shadow of doubt this Rasbora is the "Top of the pops" of all time and well deserving of its place at number one.

Scientific name	*Trigonostigma heteromorpha*
Aquarium type	60 x 30 x 30cm
Distribution	South east Asia
Diet	Not fussy. Flake, small pellet, frozen and live foods.
Companion species	This species is the perfect community fish. It does well when combined with any other small community fish.

Clown rasbora

A beautiful pair of Clown rasboras.

OUR VERDICT
Could easily have been a "Top of the pops" but for being so temperamental about its water conditions. They need soft acidic water if they are to do well in captivity.

Scientific name	*Rasbora kalochroma*
Aquarium type	90 x 30 x 30cm
Distribution	South East Asia
Diet	All foods
Companion species	Other medium sized lively species.

Scissortail rasbora

Male Scissortail rasbora

OUR VERDICT
One of the few Rasboras to be regularly bred in captivity. This established it as a "Top of the pops" species many years ago and it remains so now.

Scientific name	*Rasbora trilineata*
Aquarium type	60 x 30 x 30cm
Distribution	South East Asia
Diet	All foods including commercial flake and granular.
Companion species	Other small to medium sized community species.

SEE KEY TO SYMBOLS ON PAGE 5

Firetail rasbora

A group of Firetail rasboras

OUR VERDICT
One of the "wannabes" of the fish world. An ideal community fish which is rarely seen in the trade these days.

Scientific name	*Rasbora borapetensis*
Aquarium type	60 x 30 x 30cm
Distribution	South East Asia
Diet	Flake, granular, frozen and live foods. Easy to feed.
Companion species	Other small to medium sized fish.

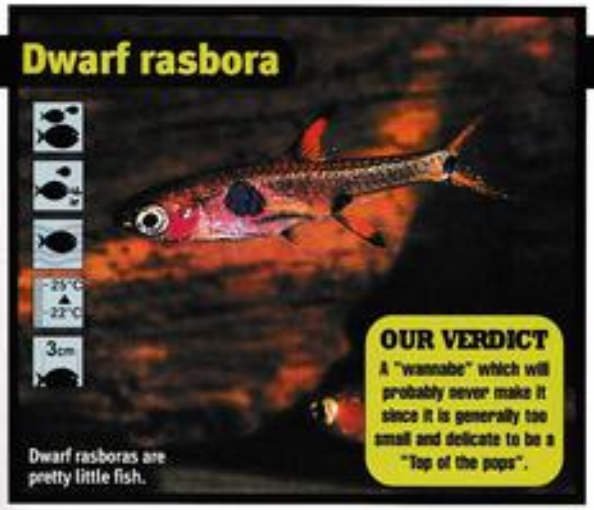
Espe's rasbora

A lovely pair of Espe's rasbora

OUR VERDICT
A "Wannabe" well on the way to becoming a "Top of the pops". Often confused with normal Harlequins but they are smaller and usually a little more expensive.

Scientific name	*Trigonostigma espei*
Aquarium type	60 x 30 x 30cm
Distribution	Thailand
Diet	All commercial foods, plus any live foods they can get hold of.
Companion species	Other small sized, lively community fish.

Dwarf rasbora

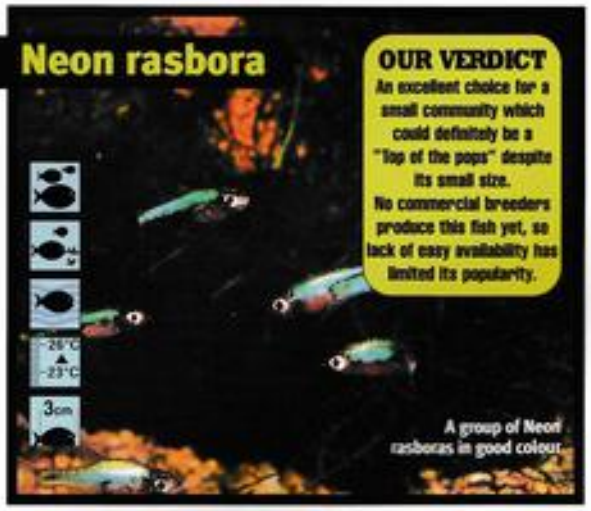


Dwarf rasboras are pretty little fish.

OUR VERDICT
A "wannabe" which will probably never make it since it is generally too small and delicate to be a "Top of the pops".

Scientific name	*Boraras maculatus*
Aquarium type	60 x 30 x 30cm
Distribution	Southeastern Asia
Diet	All foods small enough to fit in their mouth.
Companion species	Other small sized community fish.

Neon rasbora



A group of Neon rasboras in good colour.

OUR VERDICT
An excellent choice for a small community which could definitely be a "Top of the pops" despite its small size. No commercial breeders produce this fish yet, so lack of easy availability has limited its popularity.

Scientific name	*Sundadanio axelrodi*
Aquarium type	60 x 30 x 30cm
Distribution	Indonesia & Sumatra
Diet	All foods providing they fit in their mouth.
Companion species	Other small community fish.

Stony corals in captivity

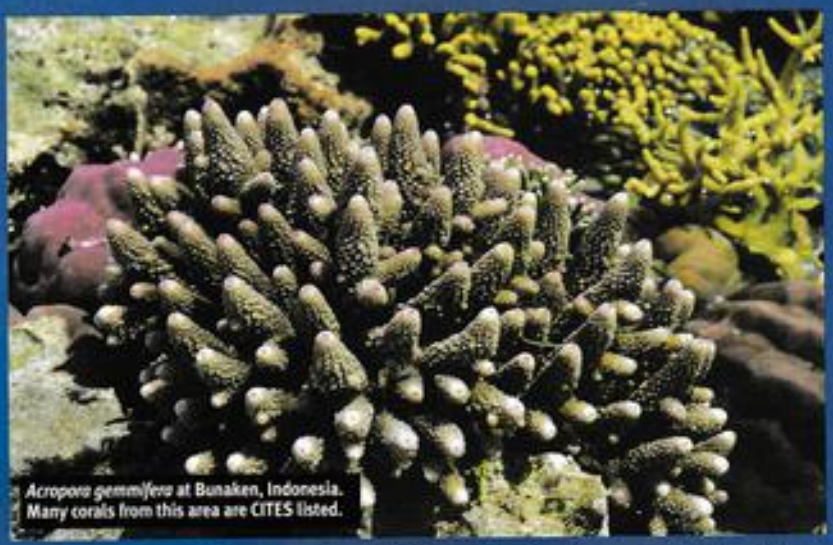
Alf Nilsen tells how marinists have used modern technology to successfully keep Stony corals in aquariums

IN THE FIRST PARTS OF THIS COVERING OF "Stony corals" we primarily looked at the biology of the corals and their appearance in the wild. Now we continue with some aspects of keeping Stony corals in captivity. Not too many years ago Stony corals were regarded as "impossible" to keep in the home reef aquarium, but this situation has indeed changed.

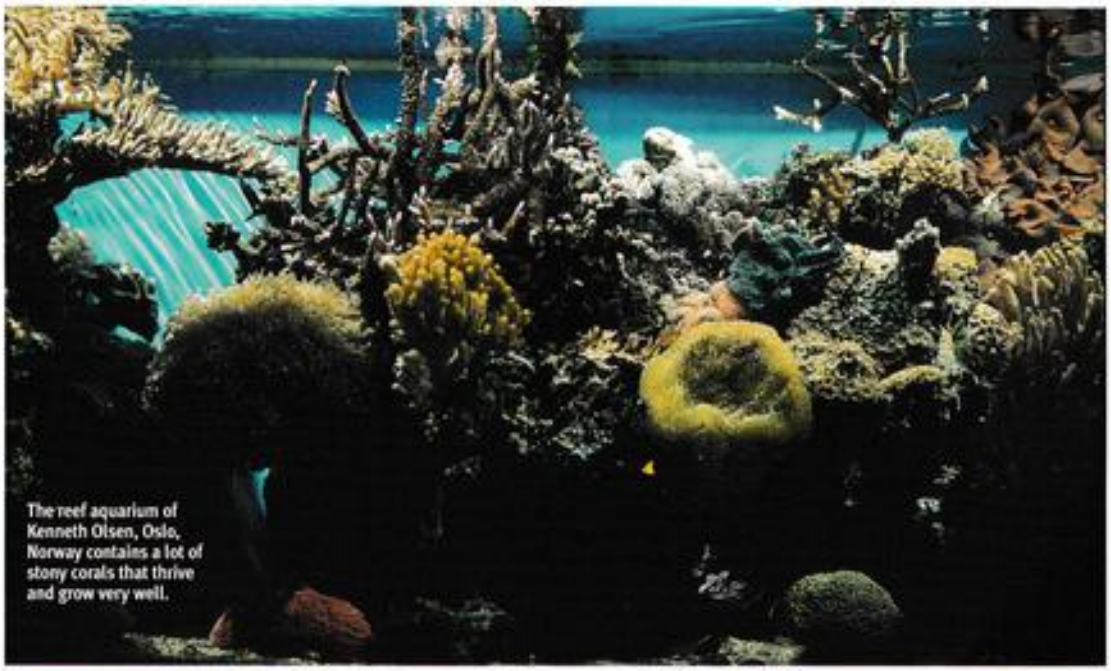
PROTECTED BY CITES

Stony corals are covered by CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora), popularly also known as the Washington-convention. CITES is an international agreement on controlling and regulating trade in animals and plants that are, or may be, threatened by extinction. Contrary to popular belief, this does not imply that all trade in species listed is prohibited. Species of animals and plants covered by CITES are listed in one of three different appendices, depending on the stringency of the trade regulations. The species listed in Appendix 1 are considered particularly vulnerable, and permits for export/import will not be given, except in a very few selected cases. Stony corals, however, are listed in Appendix 2, which merely implies that international trade in these species is to be monitored. Generally it is intended that licences for export and import are to be given. During the last years some new regulations have been implemented. It is for instance not allowed to import from Indonesia to the EU Stony corals of the genera *Catalaphyllia, Trachypyllia, Euphyllia* as well as a number of other genera.

CITES has been formed to monitor and control trade in vulnerable species, from Elephants and Rhinoceroses to Cacti and Orchids. As for Stony corals we will of course argue that they generally are threatened by environment destruction - not by collecting for the aquarium trade. Also for other species covered by CITES it could be rightfully argued that trade is not the major problem. There is no question that extreme protectionists and animal welfare organisations have had far too much impact on the rulings of the convention. Never the less, we think CITES in principle is a valuable means to help save our fauna and flora from destruction, and the CITES rules are to be respected also by aquarists and aquarium traders. It is, however, valuable to argue against questionable decisions and laws, no matter if they are made by CITES or by national governments. We aquarists should do so by actively telling the world what we are doing - protectionist propaganda has dominated far too long. Start with your friends, and move on to other sceptics, bureaucrats and politicians.



Acropora gemmifera at Bunaken, Indonesia. Many corals from this area are CITES listed.



The reef aquarium of Kenneth Olsen, Oslo, Norway contains a lot of stony corals that thrive and grow very well.

Stony corals in the coral reef aquarium

Only by looking back in time, can we see the reef aquarium in the right perspective! In order to acknowledge the many positive developments in marine aquaristic one has to look back at least some 20-25 years. The average tropical marine aquarium of the time was typified by a large selection of fishes and perhaps some anemones, displayed against a background of dead corals skeletons more or less covered with green filamentous algae. The more sophisticated aquarist could pick his choice also from a few species of Stony corals that were said to be relatively hardy. Today we do in fact know these Stony corals are among the most delicate and difficult ones to keep. In this article we will look at Stony corals both from a biological and aquaristic perspective.

In the early days...

Most aquarists remember very well their first marine tanks from the seventies - overgrown with dense clusters of the green algae - exactly as recommended in books and magazine articles. Like most eager aquarists I tried out whatever invertebrates were available through the aquarium trade, most of which did not live more than a few months. Even the hardiest of anemones simply wouldn't survive. Why ? Primarily it was not a question of technology, the principal components of the modern coral reef aquarium was available and in common use even then. It was more a question of how the technology was put to use - the understanding of the biology of the coral reef and how it should affect the aquarium. The aquaria of the seventies were not based on reef ecology principles, neither technologically nor biologically.

Today the situation is very different, indeed! Now we can see invertebrates, including Stony corals, growing in our aquaria. I have been able to study the biology of corals in closed aquarium systems for years. It is now possible to divide coral colonies, even Stony corals, and thereby spread offspring colonies among several aquarists. The serious reef aquarists of the world are in the process of creating a potential for keeping corals without harvesting the reefs. At the same time aquarists are becoming more and more attentive of the splendour and the sensitiveness of the natural coral reefs and the organisms associated with them. The well maintained coral reef aquarium creates respect for the living reefs and for nature. Besides, in the modern reef aquaria, professionals as well as amateur aquarists are continuously making observations, which add to our knowledge of reef biology. Frankly - although invidious instances certainly are to be found - the keeping, growing and propagation of corals by aquarists in general contributes to saving the reefs - not to their destruction!

What is successful keeping?

Now it might be correct to define what is meant with the expression "the successful keeping of Stony corals"? The statement is clearly linked to growth on a time-scale. To keep a Stony coral alive for a few months or a year can certainly not be defined as "successful keeping" - no matter how proud we were 15 years ago when we first succeeded in doing so with a *Goniopora* sp. - the common and perhaps first Stony coral to be imported for the trade. The term "successful keeping" can only rightfully be used when the colony shows very clear and measurable signs of growth and continues to grow steadily for years. This means that if one have a 10 cm3 colony of for instance *Acropora* sp. at day zero one should have a 100 cm3 colony at day 200 and a 1000 cm3 colony at day 400. Probably the term should also imply that the colonies have the possibility to undergo a complete life-cycle with sexual reproduction - although it might be dangerous to say so at this stage when, as yet, only very little and scattered evidence for sexual reproduction in aquaria is known.

Just as important, the successful keeping-term must imply that the aquarium system should be controlled adequately to avoid risks of algae-overgrowing or other damage from technical failure. Even relatively minor irregularities may cause the whole →

Real success in keeping corals like *Acropora formosa* should be judged on how well they grow in the aquarium.

EIGHT IMPORTANT POINTS TO CONSIDER

In order to provide appropriate living conditions for Stony corals in a captive environment, the following eight points should be fulfilled:

1. Completed break-in period.
2. Stable algae conditions, through which the growth of green filamentous and other filamentous algae should be kept absolutely minimal.
3. Optimal lighting, including both the light intensity, as well as the spectral quality.
4. Optimal availability of calcium ions (Ca^{2+}): around 420 ppm.
5. Stable and natural carbonate hardness about 5-9 (KH), pH in the range of 8.00-9.50, temperature in the range of 22-28° and salinity in the range of 32-35 parts per 1000
6. Nutrient-poor water where the concentrations of nitrate and phosphate are kept to an absolute minimum.
7. Very good water flow.
8. Availability of important trace elements, although in minimal concentrations.

population of corals to die. The aquarium system must fulfil a certain technical and biological standard.

Even though some aquarists might disagree, we think it is correct to say that the biologically filtered systems, such as the Mini-Riff, in general has not proven to be good systems for keeping Stony corals over a longer period of time. From my point of view the greatest disadvantage with the biological filtered (dry/wet filtered) system is the potential for the build-up of nutrients, which in turn makes it practically impossible to control the growth of algae.

The introduction of the protein skimmer

During the early eighties another system of technical solution was introduced in reef-aquariums with protein skimming as the main or only filtration. The skimmer itself was not a new idea - it had been irregularly used since the early sixties - but the context in which it was now used represented something new. When techniques such as the adding of calcareous water, the use of metal halide lamps (at least for larger tanks), the use of live rock as decoration and perhaps the careful adding of carbon dioxide to control pH were combined with optimal skimming, the reef-aquarium that could house and grow Stony corals was a fact. From my point of view there is no doubt that the skimmer-filtered aquarium has proved to have the potential to develop into a real, optimal reef aquarium.

The debate on skimmer vs. dry/wet filtration arose together with the increasing use of the protein skimmer, and the debate is still going on. Intensive skimming can of course be negative as it can remove essential elements. This has long been the strongest argument against the use of protein skimming in the reef-aquarium. The problem with removal of elements is especially important in an aquarium with Stony corals as they depend fully upon certain elements to build up UV-absorbing compounds that can protect them from being burned and bleached from heavy illumination. However, it is usually possible to add trace elements in order to replace those being skimmed off. The greatest advantage in the continuous use of skimmers is the possibility to control the nutrient-level in the aquarium water and hence control the growth of filamentous algae - essential in the Stony coral aquarium.

A negative tendency today is the use of enormously oversized skimmers even in relatively small aquariums. I have seen far too many gigantic skimmers in operation on tanks that would have been better off with medium sized skimmers. Similarly many aquarists tend to build too large tanks without thoughts about subsequent costs in stocking and maintaining the system. There is a definite danger that aquarists today concentrate on the size and diversity of the technic instead of the biology and health of the animals. Although there is a lot of valuable technical equipment for creating stable reef-aquariums available, this certainly does not mean that everything available has to be used. One should also select equipment designed for the aquarium size in question - bigger is not always better, and gigantomania should be avoided in the aquarium hobby. ■

Ponderings

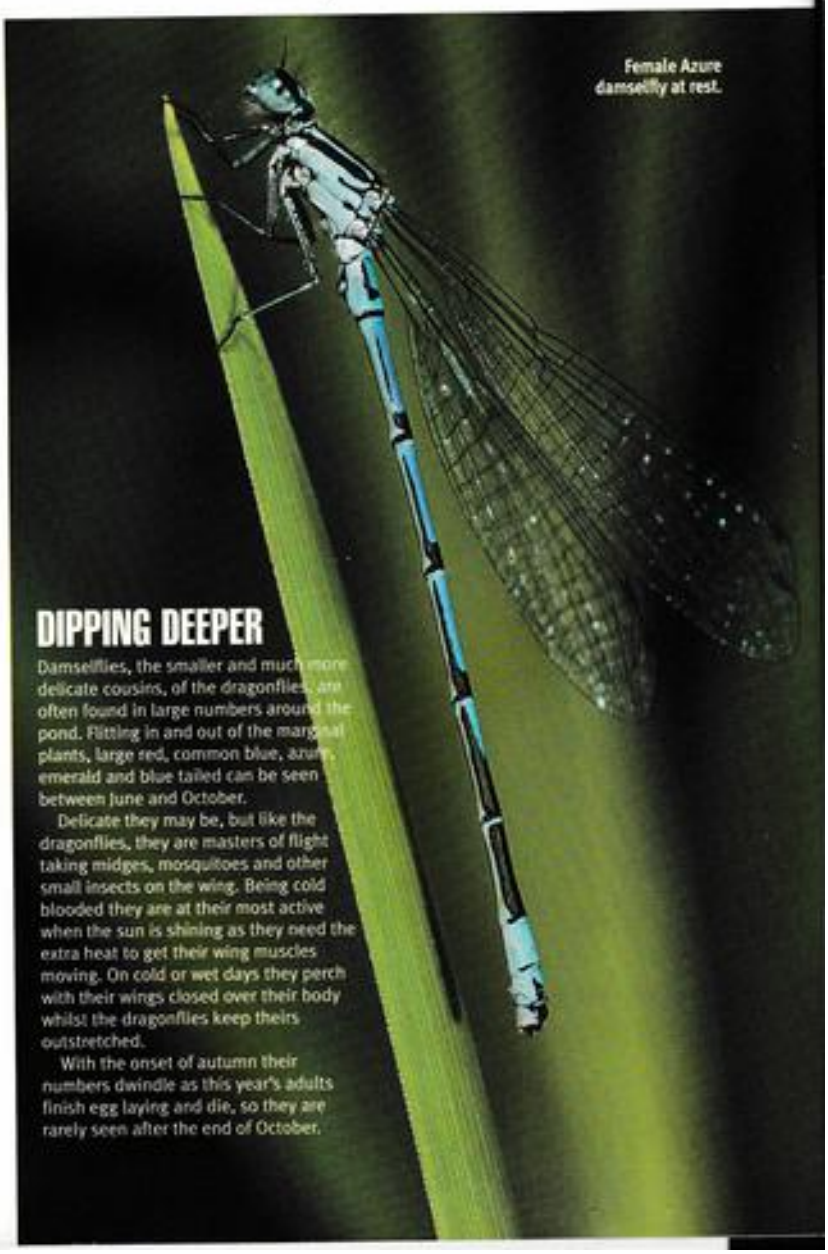
Has your pond been taken over by Aliens? Up and down the country many ponds have. **Dave Bevan** explains

POND PROBLEM – FOAMING WATER

The water gardener needs to be on guard at all times against pollution. Polluted water is not always discoloured or smelly but it can kill fish — fast.

The presence of a persistent foam on the water surface is often an indication that all is not well and warrants further investigation. At best, it may be due to higher than normal levels of protein in the water due to over feeding or decay but in the worst scenario run off from surrounding land may have introduced pesticides, herbicides or large quantities of fertiliser.

Ponds with foam constantly on the surface may be polluted.



Female Azure damselfly at rest.

DIPPING DEEPER

Damselflies, the smaller and much more delicate cousins, of the dragonflies, are often found in large numbers around the pond. Flitting in and out of the marginal plants, large red, common blue, azure, emerald and blue tailed can be seen between June and October.

Delicate they may be, but like the dragonflies, they are masters of flight taking midges, mosquitoes and other small insects on the wing. Being cold blooded they are at their most active when the sun is shining as they need the extra heat to get their wing muscles moving. On cold or wet days they perch with their wings closed over their body whilst the dragonflies keep theirs outstretched.

With the onset of autumn their numbers dwindle as this year's adults finish egg laying and die, so they are rarely seen after the end of October.

ORFE FACTFILE

Species: Orfe (*Leuciscus idus*)

Other names: Ide

Other forms: Blue orfe, Red and White orfe

Size: Up to 60 centimetres

Weight: 3 kilos

Availability: Golden and Blue orfe available from most aquatic outlets.

Habitat: A native of northern Europe found in large lakes and rivers.

Identification: A slender golden coloured fish which moves very quickly and shoals near the surface.

Habits: An active, shoaling fish which requires oxygen rich water and is usually the first to suffer if supplies are low. They are sensitive to some medications and are prone to jumping, sometimes ending up on the bank. Although a predatory fish by nature, they will accept most commercial fish foods.

Pondfish value: A visible, shoaling fish excellent for the well aerated pond with moving water.

Orfe love flowing, well oxygenated water.

BELOW THE SURFACE

When the pond is murky green, or you are pulling out stringy blanketweed by the metre, it is hard to believe that a large handful of barley straw could be the answer to your problems.

How does it work? Rotting barley straw releases algal inhibitors. These complex phenolic compounds inhibit the growth of most algal species but there is a catch — it is not an instant cure and may take from 1 to 3 months depending upon temperature before any effect is seen.

The best results are usually obtained if the straw is loosely packed in a net and placed in a water flow, or at least just under the surface in the early spring well before the algal populations start to build up. A natural cure which really is a win-win situation (if it works) as the rotting material boosts invertebrate numbers providing welcome snacks for your fish.

Barley straw is very effective at stopping algae growing.

GRASS CARP MYTH

The Grass carp hails from China where under ideal conditions it can top 35 kg. It is one of the species recently introduced for the coldwater pond — a rather plain fish not unlike the Common carp. So what is the attraction? Well ,if you substitute water plants for grass you have a fish which will keep all those rampant oxygenators and filamentous algae under control. Least ways this is usually one of the main selling points. However there is a catch. How often does the temperature of the water in your pond approach 20 °C let alone 25°C which is the temperature at which the Grass carp starts to graze efficiently even eating blanket weed. At around 15°C it will eat a few choice tender plants but below this temperature it grubs around on the bottom looking for insect larvae just like the Common carp — whilst the blanketweed grows apace.

Azolla can become an invasive weed rather than an asset to your pond.

PLANT LORE

Has your pond been taken over this summer? The water disappearing under a sea of plant growth. Pulling it out by the barrow load makes little difference as it comes back with a vengeance. The chances are that you have been invaded by an alien. These plants, not native to this country are rampant once established, often completely taking over the pond to the detriment of the native species. More insidious is their ability to establish in the wild where they can do untold harm to the delicate balance.

These aliens may be introduced with fish or other water plants, but the chances are that to add insult to injury you probably actually paid good money for it under the guise of an oxygenating or floating plant.

Floaters like Azolla, sold under the attractive name of fairy moss or fairy fern, are certainly attractive with their red and green leaves. However they multiply rapidly, often forming a mat several inches thick over the surface, successfully blocking out the light to the detriment of native plants.

The so called oxygenators are even worse, completely filling the pond then moving to take over the damp margin. *Crassula helmsii* is one of the worst and has several aliases to confuse the unwary. Look out for *Tilia recurva*, Australian stonecrop and New Zealand pygmy weed.

Other aliens include floating Pennywort, Parrot's feather and Water hawthorn as well as the temperature sensitive Water lettuce, Water chestnut and Water hyacinth that fortunately cannot survive a normal winter.

FASCINATING Fact

Creatures have adapted to exploit every corner of the pond and none more so than the Rat-tailed maggot. It is the larval stage of one of the hoverflies, better known to gardeners as beneficial predators. How do these larvae survive in the black anaerobic mud? They send up an elastic breathing tube which pokes out into the air allowing the maggot to remain in the mud. This tube can be up to 10cm long.

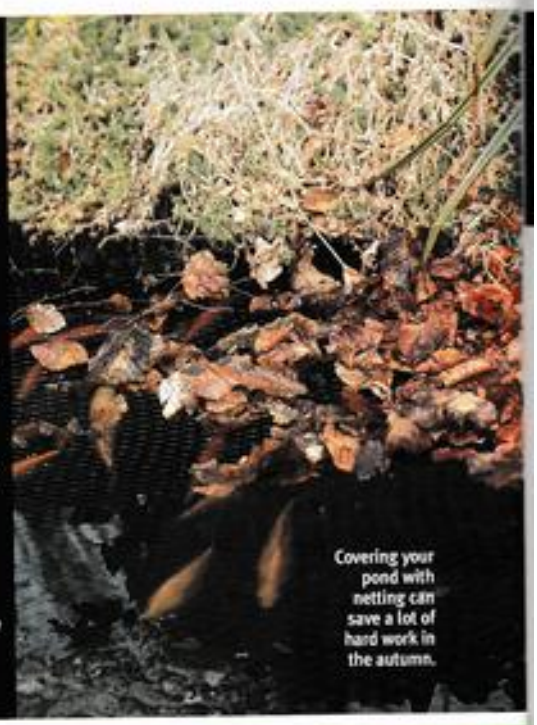
Rat-tailed maggots are one of the most repulsive looking inhabitants of a pond.

NETTING OUT TROUBLE

As summer recedes leaf fall is only just round the corner. Dead leaves from all corners of the garden seem to end up in my pond significantly increasing the decaying biomass and upsetting that all-important balance.

However leaves need not be a problem if you put a net in place before leaf fall starts. A lightweight polypropylene net is all that is required which only takes a few minutes to be stretched over the pond and pegged down. Far better than trying to scoop them of the surface or dredging them from the bottom of the pond.

On larger ponds the weight of leaves, particularly if wet, may cause the net to sink. As any contact with the pond water is detrimental to water quality, it may be necessary to support the net every metre on thin wooden battens which span the pond.



Covering your pond with netting can save a lot of hard work in the autumn.

Equipment corner

Fake Herons can look very lifelike.

It is claimed that one of the best ways of keeping the heron away from your pond is to install a look a like plastic heron — apparently herons will not tolerate each others company. Strange, because on the tidal mud flats of the river Teifi in West Wales I have seen them fishing only yards apart on several occasions.

When I suggested this to one supplier of plastic herons I was told that positioning of the plastic heron was critical. It must be placed were the heron lands, not at the edge of the pond. The trouble is my local heron has landed in at least ten different places round my pond before hopping up onto the wall to try his luck.

They may have limited success under certain conditions but they are not going to keep a determined hungry heron away from an easy meal for long. However, they make great pond side ornaments, some so realistic they can be mistaken for the real thing.

Koi world

Can you mix Koi and plants? **Bernice Brewster** says yes - but make sure they are the right species

TRADITIONALLY, KOI PONDS ARE FORMAL, often with steep sides and devoid of any aquatic plant life. The reasons generally given for not including plants in the pond are that firstly, nothing should detract from the beauty of the Koi and secondly the Koi will eat the plants and in doing so, probably make a mess of the water as they root around in the plants baskets. Carp and therefore Koi, are omnivorous, which means to say that in the wild, they will consume food of both animal and plant origin and even bacteria and bits of organic material found in the sediments. The animal component of the diet comes from a range of aquatic insects, bugs, fish eggs and fish fry, the plant life may be succulent new leaf growth, through to Duck weed and even Blanket weed.

In the Koi pond, we tend to feed a manufactured diet which has all the nutrients they could require and often more, in the form of colour enhancers and indeed, these are a good quality balanced diet. I have to say though, that if I was offered cereal for every meal for a month, even though it probably delivers all the nutrients I require, I would kill for an apple or some other piece of fresh fruit! It really is no wonder to me that if aquatic plants are put into the pond, the Koi rapidly consume them. There are ponds, which may not be the ideal Koi pond, which do have aquatic plants and all the fish live in perfect harmony with the plants. In many cases the plants have been well established before the Koi have been put into the pond and are able to withstand the attentions of the fish.

Adding plants can solve your Blanket weed problem

Apart from the nutritional benefits of growing plants in the pond, there is a second benefit in that the aquatic plants compete with the Blanket weed for the available nutrients. It might even be quite surprising to learn that aquatic plants are more efficient at removing ammonia from the water than is a biological filter. The plants use the ammonia as a source of essential nitrogen and will strip phosphate from the water. The phosphate is actually the limiting factor on plant growth, which means that where this nutrient is present in abundance, algae such as Blanket weed can and do, thrive.

As to which plants are suitable for the garden pond, well this brings me round to one of my hobby horses, yes, another one. Possibly due to the effects of climate change, or more likely because there is an absence of natural biological controls, exotic aquatic plants are becoming an increasing nuisance in the wild and very expensive to control. The Environment Agency is having to divert vital money from other projects to the control of these nuisance exotic plants. Why does it matter, why not let these pretty new comers simply take over if they are pleasing to the eye, I hear you say. The answer is very simple. The native aquatic plants have complex interrelationships with other plants and animals, especially aquatic insect life and plant life. When our native plants are barged out of the way by these intrusive exotics, we start to lose our wildlife. I for one, care passionately about our native wildlife. ■

Koi will eat most plants but Australian swamp stonecrop grows so fast the ponds surface will soon be covered by a thick layer.

PHOTO: DAVE BEAN

WHO ARE THE INVADERS?

Nuisance plants include, Himalayan balsam, Water fern (*Azolla filiculoides*), Parrot's feather (*Myriophyllum aquaticum*), Floating pennywort (*Hydrocotyle ranunculoides*) and Australian swamp stonecrop (*Crassula helmsii*) also sold as "*Tillaea recurva*" and "*Tillaea helmsii*". All commonly found in garden centres up and down the country and whilst sold in good faith for the garden pond, trust me, they find there way into the wild where they wreak havoc. We have a wealth of delightful native aquatic plants, which are really pretty, so why do we need these invaders? Lets vote with our purses and stop buying the exotics!

Leaflets and further information on this topic is available from IACR-Centre for Aquatic Plant Management, Broadmoor Lane, Sonning, Reading, Berkshire RG4 6TH web site www.capm.org.uk

DISCUS PROBLEM SOLVER

Tony Sault answers more questions on Discus

PHOTO: OLIVER LUCANUS

Modern Discus come in many different colours. This is "Red dream".

Moving fry or parents

Q **Two of my Discus have recently had fry and to my surprise about 20 have survived and are now about two weeks old. The question is when can I take them away from the parents and do I have to take away the fry or take away the parents from the fry?**
Mrs J Philips, *Sheffield*

A Congratulations on your success. I usually remove the fry from the parents at approximately two weeks old, but there are no hard and fast rules. Usually when the fry are old enough to take food other than from their parents mucus, then they are old enough to be removed. In answer to your question of removing the parents or the fry my overriding concern has always been to protect the parents as they are your investment, you can always get another batch of fry.

Heater malfunction

Q **When I set up my tank for Discus which is 1m×50cm×50cm I was advised that one 250watt heater/stat would do the job adequately but due to a fault in the heater I lost nearly all my fish. Before I set the tank up again can you tell me if this is the correct size of heater for the tank or should I buy a different size?**
Michael Jameson, *Edinburgh*

A I am sorry to hear of your disaster. If it was new equipment that was faulty contact the manufacturer who I am sure will supply you with a replacement. It is a fact that when heaters develop a fault it is normally in the contacts closed position and that means eventually boiling your fish. It may be wise to consider 2x150 watt heaters spaced at each end of the tank to distribute the temperature evenly. You may feel that putting in two heaters only doubles the chance of a fault occurring, but this is not the case as it is unlikely that a 150watt heater will raise the temperature to a critical level whereas a 250watt heater can.

Can live foods introduce diseases?

Q **I have been told not to feed live foods to my Discus as I can give them diseases. Is this true and are there any live foods that are safe to use?**
Pete Makinson, *Birmingham*

A It is true that a lot of live food such as live Bloodworm, Tubifex and Daphnia can pass unwanted nasties on to your fish. The reason is that a lot of Discus parasites require an intermediate host and the usual live food on sale fits the bill. As a rule I do not use any live food that I do not culture myself. Try culturing Whiteworm or small red earthworms, these are taken avidly by Discus and are relatively safe. They can be grown in shallow trays of compost and fed on a paste of oatmeal or *Reody Brek*

Can I keep other cichlids with Discus?

Q **My Discus community tank at the moment contains 6 Discus, 4 Corydoras, 2 Bristlenose cats, and a variety of Tetras. Can I keep other Cichlids in my community?**
D.Palmer, *London*

A The simple answer is most certainly yes. Many Cichlids will live quite happily in a Discus set-up as long as they do not grow too large or aggressive. Try Angels, or many of the Dwarf cichlids such as *Apistogramma agassizi*. These beautiful little fish enhance any set-up

PHOTO BY ALF TIELENS

The classic image of a coral reef, but to recreate this image in an aquarium you will need special lighting.

Reef lighting without controversy!

Anthony Calfo sheds a little light on how best to illuminate your reef aquarium

POPULAR DEBATES OVER SO-CALLED "best" reef lighting schemes for marine invertebrates are ever so much ado about nothing. Yet if you get enough beers into the wrong group of aquarists debating the issue you are likely to instigate a riot the likes of which you'll not find outside of a good football match! The address of lighting symbiotic invertebrates may be the single most important issue of captive reef husbandry and does indeed warrant thoughtful consideration.

How much light do I need?

The two most common questions posed by aquarists on this topic are, "*How much light do I need*" and, "*What are the best kinds of bulbs?*" These questions are fair and quite natural to ask but, unfortunately, they open the door for misinformation and ill-advised counsel. It is crucial for an aquarist to take inventory of the invertebrates that they have or intend to keep and then evaluate the animals' individual needs. Only then can we find a suitable lighting scheme that will help them to hopefully exceed their compensation points for photosynthesis.

At the compensation point, however, a coral may only survive with just enough food from photosynthesis to maintain vital functions, but has little or no resources in surplus for growth or reproduction. Aquarists with corals that seem to live "forever" but don't seem to grow much or at all should consider increasing light and/or feeding levels gradually. They may actually be holding their corals too close to the compensation point. Indeed, a coral kept inappropriately under modest illumination can ultimately thrive, grow and reproduce if they can be supplied with food to compensate for the deficiency in available carbon from weak photosynthetic activity.

JARGON BUSTER

Compensation point = The minimum amount of radiation needed for zooxanthellae to generate enough oxygen for carbon dioxide to be produced during respiration.

Beyond the compensation point, aquarists may aspire to illuminate corals up to their saturation point. The saturation point in essence is the point at which any extra radiation will not improve photosynthetic productivity. The zooxanthellae reach the limit of their ability to produce oxygen and subsequently the amount of carbon that can be "fed" (translocated) to the host. As aquarists, it is not easily possible to test or evaluate the level of photosynthetic activity for any coral. In fact, even if we could know that we are reaching the saturation point for a given specimen that likely leaves all of the many other species in the tank at various levels of satisfaction regarding their respective saturation points. This dilemma illuminates one of the most underrated problems with modern reef keeping: the reality of garden reef aquaria.

The reality of garden reef aquaria

What I mean by "garden reef aquaria" is mixing invertebrates from the widest spectrum of locations on a reef. Hard corals, Soft corals, Mushrooms, Polyps, Gorgonians, Hamsters and Elves are all commonly thrown together under one standardised lighting outfit (OK, at least most of the aforementioned creatures are mixed together: not everybody has Gorgonians). With due consideration for the fact that Mushroom false-corals (*corallimorphs*) collected at 20 metres are

less likely to thrive in the same aquarium next to a Yellow leather coral (*Sarcophyton elegans*) collected in ankle deep water, one is faced with a challenge. We can either accept the fact that one or both will suffer for the unnatural mix under standardised lighting, or we can resist the temptation to mix them at all and separate them to species-specific displays. Unfortunately neither is likely. Most aquarists do not relish the former notion of a beautiful animal suffering and dying in their charge. Alas, most aquarists are also not likely to resist the temptation to mix many different animals awaiting purchase in a tantalising shop display!

I now favour displays of reef invertebrates that are grouped by family, species or region/niche, however, it was not always so. Early on as an aquarist, I too assembled my collections rather whimsically or with a strong emphasis on aesthetics (the mixed garden reef aquarium). Whatever one's motivation for mixing unnatural reef invertebrates is, reconciliation may be possible. The key is to illuminate the display adequately but not to over illuminate it. In effect, we are trying to find the lowest common denominator for reaching the compensation point for all of our charges without exceeding the saturation point for some (as the case might be for example with an adequately illuminated shallow water Yellow leather coral next to an over illuminated deep water zoantharian).

PHOTO ALF NILSEN

Most (but not all) sponges thrive in the shadow and are severely harmed if exposed to UV-light. In older reef tanks sponges can therefore be found growing on the lower side of live rocks, under overhangs and in caves.

PHOTO ALF NILSEN

Mushroom false-corals (*Corallimorphs*) do best in moderate light at the bottom of the aquarium. Here they will expand to beautiful sizes. If the light is too intense they will often shrink and not display themselves fully.

Too much light

Excessive illumination (photo inhibition) has become a more prevalent problem in reef keeping with the increased popularity of aquarists trying to make molten lava in their aquariums via banks of 400-watt metal halides suspended over Soft corals in less than 50cm of water. Such corals shocked by photo inhibition often pale in colour ("bleaching" or expelling their pigmenting dinoflagellates) and any remaining zooxanthellae shut down, effectively leaving the symbiotic host to starve to death. With a more tempered lighting scheme, various corals can be targeted for specific feeding to spur growth and reproduction in the absence of light far above the compensation point. Since it would be impossible to optimally radiate a reef aquarium that included anything short of a same species mix, the address of extra and targeted feedings is inevitable and appropriate to ensure a thriving population of reef invertebrates.

Perhaps an even better compromise is flexibility on the nature and species of invertebrates kept. With so many wonderful species of reef invertebrates to choose from, I generally advise aquarists to collect a more compatible selection of animals with regard for like husbandry preferences. One might try to replicate a low tide environment with predominantly high light scleractinian Acroporids and Pocilloporids (the infamous S.P.S tank: so-called small polyped Stony corals). Another exciting display might include lagoon species of soft corals or free-living scleractinians (like the Fungiids) on the sand bottom. And even less common but very dramatic displays represent the "twilight" denizens of deeper water (aposymbiotic and wild →

MAKING A SELECTION

With a bead on the needs of your collection (low light, moderate light, high light), the decision between standard fluorescent, VHO or power compact lamps, and metal halides is hardly as difficult as it might appear. For some clarification on the above categorisation, let me give some examples with the understanding that there are often exceptions within a family, but the advice given represents the majority.

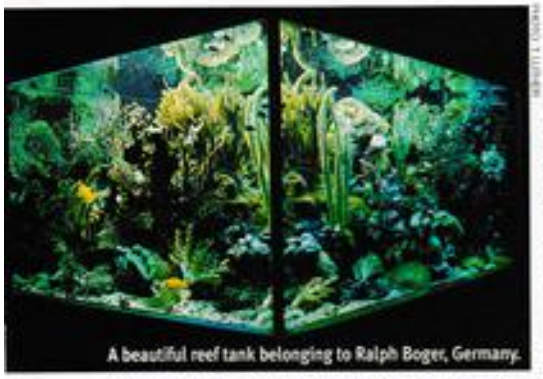
Low light creatures include quite a few zoantharians and so-called L.P.S. corals (large polyped Stony corals). Many are collected below 15 metres with some found at nearly 30 metres! A few examples include many *corallimorphs* (Mushroom false-corals), "Large Button" polyps like *Protopalythoa grandis*, *Duncanopsammia*, and even most of the *Catalaphyllia* "Elegance" corals collected today (some of these purple-tipped beauties are found in near darkness at almost 30 metres and suffer from light shock on import under bright lamps, indeed significant if not the primary catalyst in the recent plague of difficulties with this genus).

Moderate light corals include many of the popular octocorals kept like the *Alcyonids* and *Nepthеids*. Far and away, corals in this category are some of the hardiest and most forgiving for many reasons, not the least of which is their compatibility with commonly under-illuminated aquaria (often fluorescent lit systems).

High light invertebrates include many of the S.P.S corals like Acroporids and Pocilloporids, and most Tridacnid clams. Use these guidelines loosely and know that it is best, of course, to research the needs of each animal at least by genus and better by species whenever possible.

PHOTO ALF NILSEN

Giant clams (*Tridacnidae*) feed almost exclusively from the photosynthetic products released from their symbiotic algae photosynthesis and need strong illumination to thrive in the reef aquarium.



A beautiful reef tank belonging to Ralph Boger, Germany.

coloured corals, shy big-eyed fishes, and fascinating sessile invertebrates). Each microcosm can be maintained with less effort and assumedly more enjoyment for the aquarist by assembling animals from niches with like physical requirements of light, water movement and composition.

Once we can categorise the mix of corals and their subsequent needs, we look to the various lamps and outfits to achieve our luminary target. At this point an aquarist might feel overwhelmed by the plethora of lamp types, styles and wattage. If I hear one more "Marine expert" tout yet another watt-per-gallon "*rule of thumb*" for reef invertebrates, I think I shall laugh myself to incontinence. Fundamentally, it must be obvious that a watt-per-gallon rule is worthless when comparing the mechanics and ability of very different lamps to penetrate the dense medium of water at depth. 175 watts of standard fluorescent light appears dramatically different than 175 watts of metal halide illumination at 50 cm of water. A submersible light metre makes this contrast starkly clear. Many symbiotic animals under the metal halide lamps at such depth will do fine while nearly as many of the same invertebrates will struggle to reach their compensation point of photosynthesis, if they even can at all, under standard fluorescent tubes. Does that mean the metal halides are better: not necessarily. An aquarist must simply match the needs of symbiotic invertebrates with the "best" lamp at the water depth for said specimens in residence but we must concede that there is no such thing as one "best" reef lighting scheme overall. ■

HIGH INTENSITY FLUORESCENT LAMPS (VHO AND POWER COMPACT/PC)

Fluorescent lamps are available in the widest range of colours, shapes, and sizes. They are truly the most flexible luminary hardware for any installation.

Aesthetically, fluorescent lamps can produce some of the most attractive spectrums of light over reef invertebrates. They are ideal for viewing and photography. Actinic blue light showcases the iridescent pigmentation of many reef invertebrates.

High intensity fluorescents are recommended for medium to high light invertebrates in aquaria up to 60cm deep.

Most fluorescent lamps have a short useful life of 6-10 months for optimum growth of coral.

Some fixtures are significantly less expensive to purchase compared to HQI and MH systems. Thus, they serve a crucial role in the aquarium industry for helping aquarists afford to enter the market segment of reef keeping.

Top tip

Mount fluorescent lamps no further than 15 cm above the surface of the water. Close to 7cm may be ideal.

Daylight coloured tubes (near 7,000K) are ideal for shallow water and high light species. Increasing amounts of blue actinic light are appropriate for deeper water species. A 50/50 split of white daylight and blue actinic light will satisfy low to medium light demanding invertebrates. Categorically, corals acclimated to high intensity fluorescent lighting at a ratio of 3:1 tubes (daylight:actinic) fair very well.

BEST BETS under VHO and PC lighting.

Most octocorals, many scleractinians, most zoantharians. An excellent all purpose light for reef invertebrates in 40 to 60 cm of aquarium water (3:1 favouring daylight).

HQI AND METAL HALIDE LAMPS (MH)

These provide very good to excellent penetration/delivery of useful light at depth. They are arguably necessary for aquaria 60 cm and deeper over symbiotic reef invertebrates.

Quality lamps in the 6500K to 10,000K colour range generally issue the best rated light (PAR) for symbiotic invertebrates. Supplementation with actinic (blue) light is not even necessary with such bulbs (they have enough blue spectrum). MH and HQI lamp colours above 10K have more blue elements than necessary for mixed garden reef aquaria.

Up until now they have been the most cost effective illumination for aquaria among all lamps when one considers lamp life (2-4 years), they have a strong tendency for bulb colours to stay true (useful longer throughout life of lamp), and they are most cost effective to operate (more useful PAR per watt than any other lamp style).

The heat generated by these and any high intensity lamps are easily tempered with properly designed canopies or pendants for fixtures. Those that criticise HQI and MH units for shedding excessive heat conveniently overlook similar heat produced by other high intensity lamps (like VHO and PC). All such arguments are moot in a properly ventilated system.

Glitter lines produced from refracted light is theorised to be very stimulating to many reef invertebrates under these lamps. Fluorescent lamps do not produce this aesthetically attractive dappling of light.

Top tip

Mount lamps 15 to 35 cm above water surface.

BEST BETS under HQI and MH lighting

Clams, cultured invertebrates (faster growth of many *Alcyonids*, symbiotic *Gorgonids* and other soft coral), shallow water scleractinians like *Mussids*, *Faviids*, *Acroporids*, *Pocilloporids* and *Poritids*.

STANDARD OUTPUT FLUORESCENT LIGHTING (SO OR NO)

The same general attributes as high intensity fluorescent tubes with the limitation of its potential to support symbiotic invertebrates at depth.

Recommended only for the least demanding animals in shallow aquaria 40 cm or less in depth.

Top tip

Mount SO or NO lamps 7-10cm above water surface

About the author

Anthony Calfo has been an aquarium industry professional for the last decade working at most levels in the chain of custody for marine fish and invertebrates. He was an early participant in the mariculture of reef coral and invertebrates, operating a greenhouse with 30,000 litres of sea water for coral propagation. He is the author of the Book of Coral Propagation, Volume 1 (450 pp). [The second volume will be released in 2003 with the first of three volumes of the Natural Marine Aquarium series co-authored with Robert Fenner (Conscientious Marine Aquarist) and Steven Pro of Wet Web Media.]

For your local stockist of the Book of Coral Propagation contact Midland Reefs Tel. 01543684621 or e-mail midlandreefs@inverts.demon.co.uk

Today's Surgery

IN ASSOCIATION WITH
AQUARIUM PHARMACEUTICALS (UK) LTD

Our resident vet, **Lance Jepson,** tackles one of the most serious diseases in coldwater fish

Spring Viraemia of Carp

What causes the disease?

Spring Viraemia of Carp (SVC) is caused by a rhabdovirus (a group of viruses that also includes rabies). It is sometimes known as *Rhabdovirus carpio*.

Infected fish shed the virus into the surrounding water in their faeces and in anal mucous casts. Viral particles are inhaled by other fish, where they attach to the gills, invade these and replicate there before spreading out in the circulation to infect the internal organs. Incubation of the disease varies from 7 to 60 days, depending upon temperature.

There are two main presentations of SVC:

1 - Classic SVC
In this the main effect this virus has is to damage and hence cause inflammation of the lining of blood vessels. This in turn makes them "leaky", allowing both fluid and red blood cells to leak out into the surrounding tissues. As a result SVC usually presents as haemorrhages and oedema (fluid build-up) in a number of tissues including the heart, brain and intestines. Haemorrhages are also seen in the muscles and tissues of and beneath the skin. In the kidneys there is serious damage to the microscopic tubes there, affecting their ability to function properly. Pancreatic tissue is often very inflammed. Fluid accumulates in the body cavity causing a swelling of the fish – this pressure can build up so much that the anus may be partially forced out as a prolapse. The eyes may bulge (exophthalmia) due to fluid in the eye sockets. Those tissues involved with the immune response such as the spleen and the cranial kidney often show marked reactive changes. Further changes often described are thought by many to be attributable to secondary bacterial infection. These signs include ulceration and accumulations of pus-like material inside the body cavity.

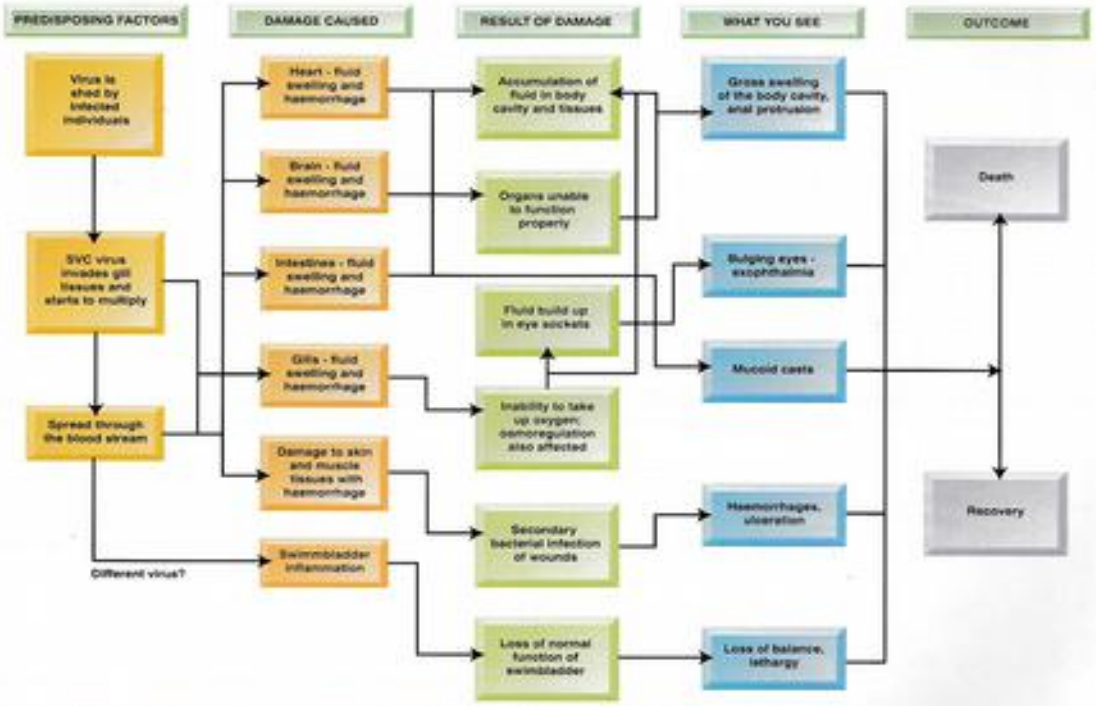
2 - Swimbladder Inflammation
In this form only the swimbladder is targeted. Marked haemorrhages occur on the swimbladder surface and there is serious damage to its lining. Such fish lose their balance and co-ordination before eventually dying. This disease is said to be due to a second rhabdovirus, called SBI (Swimbladder Inflammation) virus, although it is as yet impossible to distinguish it from the virus behind SVC. In both cases there are often mass mortalities that can continue on for weeks.

Predisposing Factors

Low or rapidly fluctuating temperatures can predispose to infection if the virus is present. The fish produce interferon as part of their antiviral response, but interferon production is also temperature dependant. Above 18°C immunity is usually quite good; at 11 to 18°C obvious clinical signs occur but some fish are able to mount an immune response and survive. At temperatures below 10°C the fish immune response is so sluggish that viral multiplication (which is itself reduced by the low temperatures) is able to continue unchecked causing mortalities.

Fish lice (*Argulus*) and Leeches (*Piscicola*) have been implicated with transmission of SVC from fish to fish, as has the Heron in transferring virus between ponds. Contaminated equipment may also help to spread infection.

Prevention
None, other than quarantining of all new stock. Vaccination has been tried and appears to be reasonably effective at temperatures above 20°C, but these are unlikely to be made available in the UK as they may interfere by masking disease outbreaks.



DIAGNOSIS

SPECIES SUSCEPTIBILITY

Many cyprinid fish apart from Koi and Common carp can be affected, including Goldfish, Grass carp and Tench. The picture is further complicated by the fact that some infected fish may harbour the virus but not show clinical signs. I have seen one case where only Koi became ill and died - Goldfish and Rudd in the same pond were not clinically affected. Some non-cyprinids such as Pike (*Esox spp.*) and Wels catfish (*Siluris glanis*) can also become infected.

RECOGNISABLE SIGNS OF DISEASE

Affected fish show darkened body colour. With classic SVC infected fish show a build up of fluid in the abdominal cavity suggestive of "dropsy". Haemorrhages can be present both internally and externally. The anus may partially prolapse and be seen to be bulging out. Infected fish are weak, breathe shallowly and may have a thick, mucoid cast trailing from the anus. Gills are often pale. Alternatively it may present as a swimbladder inflammation. These fish lose their balance and will be seen lying on their side at the bottom, or floating beneath the surface. If the fish swim, their movements are wobbly and uncoordinated. Usually no haemorrhages can be seen.

DEFINITIVE DIAGNOSIS

This is done by a professional laboratory (see Notes), and involves isolating virus from infected tissue.

DISEASE LOOKALIKES

Classic SVC can closely mimic a bacterial septicaemia or a severe parasitic infestation. Indeed the ubiquitous presence of *Aeromonas* bacteria in pond water and on fish wounds can easily mislead one into making a diagnosis of bacterial disease. Mass mortalities, especially if largely affecting Koi, Carp or other susceptible species, that fail to respond to usual antibacterial medications should be considered suspect particularly if weather/temperature conditions have been suitable for this virus.

TREATMENT

None. In theory supportive management would be appropriate. This would include antibiotics to prevent secondary infections, and adding salt to the water to help with osmoregulation, but most fish exhibiting signs of the disease will die, especially at low temperatures. In the UK, the legal status of the disease means that eradication of all infected fish and their "in-contacts" is usually performed (but see Notes).

NOTES

In the UK, SVC is a notifiable disease under the Diseases of the Fish Act 1937. This means that if it is strongly suspected or diagnosed it must be reported to DEFRA. Testing is carried out at the CEFAS laboratories at Weymouth. If SVC is found, then the owner of the infected fish has two choices:

1 - Euthanasia of all in-contact potentially susceptible fish, followed by disinfection of the pond, equipment etc. This is carried out by DEFRA personnel.

2 - Becoming a designated infected zone. In practice this means no fish in or out for a period of three years with the lifting of this restriction only after a designated period when tests have proved consistently negative for SVC.

Using an open topped aquarium like this one combined with natural sunlight Malcolm has encouraged his *Echinodorus cordifolius* to develop its natural growth – part above water and part below.

Amazon swords

Plants of the genus *Echinodorus* are well known to both experienced, and novice aquarists alike as "Amazon Swords". **Malcolm Goss** takes a look

THESE PLANTS ARE WIDELY DISTRIBUTED IN tropical America, with large concentrations being found in Brazil. Most of these are swamp plants in their natural habitat, with a strong root system being sustained in the substrate.

These marsh plants start their growth with submerged leaves in shallow water. By the time they reach above the water's surface, the leaves that develop are unrecognisable from those we see growing underwater in our aquariums. The most common underwater Swordplants that we purchase have ribbon shaped leaves varying from a few centimetres in length to over 30cm. depending on the species. The colour of the leaves are often pale green , but there are many shades and markings that can help us to identify some of them. Leaves that grow with the plant out of the water are darker in colour and much wider, often being 20cm at their widest contour. These leaves develop on long stalks, some 30cm in length. These stalks are incredibly strong and tough. Even when the leaves die on my own plants I cannot break them off, and I need a pair of very sharp scissors to cut them back.

Not all *Echinodorus* are large specimen type plants. *Echinodorus tenellus* is the smallest species in the genus reaching only 30 to 40mm in height and make wonderful foreground plants. The small Pygmy chain sword propagates vegetatively from root runners, in the same way as Vallisneria , hence its common name of Pygmy chain sword. In ideal conditions the plant soon covers the bottom of your aquarium with a fine, fresh growth of plant, here we should supply it with sandy or fine gravel and plenty of light. However, this species likes the temperature between 21 - 24°C. I have grown these plants successfully in aged tap water at a temperature of 24°C. In my community aquarium, with the overhead lighting being only a 60w tungsten bulb.

In recent years we have seen the introduction of new *Echinodorus* species.

One of the most beautiful is *Echinodorus horemanii* at present, only found in submersed conditions. While the leaves resemble those of the larger form of Swordplants the surface colour differs, being dark olive green, very glossy, with undulate margins. This very decorative plant requires clear water with a gravel substrate. Aquarists say this plant grows very well even at temperatures of 27°C, but in nature it grows in cool running streams. Larger *Echinodorus* species grow best in the larger Bio - Tropical Aquarium among many different types of plants and fish that are found naturally in the American tropics.

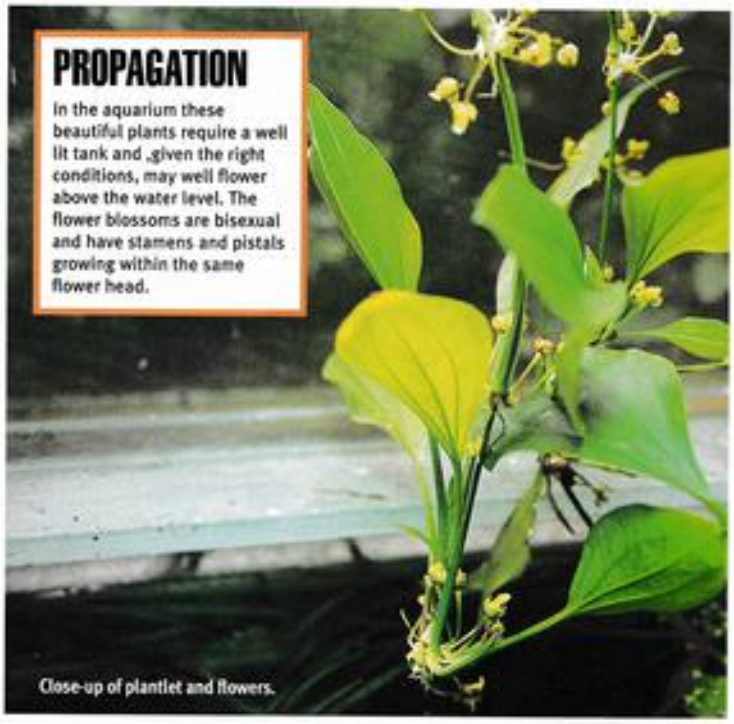
Their best growing temperature, ranges from 18 to 25°C, however, many aquarists do not realise that even tropical plants have seasonal changes. Plants from many genera not only like, but require, rest periods similar to those from our own native waters. *Echinodorus* are no exception, resting is important. This means that they rest in our winter season from December to April. So, if your Swordplants seem to be throwing off their leaves at this time of the year, and look as if they are dying back, its not your fault. Do not turn up the lighting, in fact, reduce the time your aquarium lighting is on during this period. Also if the fish in your aquarium will allow, drop the water temperature gradually by up to 3°C from its normal temperature, possibly to as low as 21°C. If this is not possible, you may well be able to transplant your best specimens to a separate aquarium, returning them during late March or early April to the warmer conditions.

Echinodorus grow well in terracotta pots, housing one plant within a special plant growing medium or a mixture of sand, clay and over layered with gravel. The whole pot housing your specimen plant can be buried in the aquarium's substrate. You can move them whenever you like, without disturbing the roots and subsequently losing time for your plants to re-establish themselves.

Echinodorus grow into specimen plants, like the *Echinodorus cordifolius* now growing in my own aquarium. This plant is growing in a substrate of aquarium gravel with small amounts of a clay and sand mixture and a top layer of gravel. The water is hard with a neutral, pH 7.0 and temperature 23°C. It is lit by natural sun light coming through a glass roof. This plant produces bisexual flowers, these are white and grow on "floral stalks" at intervals of approximately 7cm. The small leaves surrounding the flowers turn into individual plants which make their own root systems and grow progressively along the flower stalk. Don't be too keen to plant your new plants, leave them till the leaves are well established reaching a height of 7 or 8cm. Cut them and place individually in separate pots to grow on. These pots can be easily moved around your different aquariums. Within a few months, providing the conditions are correct, you will have fantastic Amazon Sword plants, these can be the focal point of your best furnished aquaria. ■

PROPAGATION

In the aquarium these beautiful plants require a well lit tank and ,given the right conditions, may well flower above the water level. The flower blossoms are bisexual and have stamens and pistals growing within the same flower head.



Close-up of plantlet and flowers.

Malcolm's own *Echinodorus cordifolius* is a superb specimen plant with emerse leaves growing well out of the water.

WHICH SPECIES?

Many species of *Echinodorus*, including those that are grown within our home aquariums, have not been sufficiently studied to correctly identify them. Scientific descriptions of species within the genus vary in numbers, from 31 to 53 depending upon which documentation you are reading.

Pete's Parade

Pete Liptrot has been trawling through some recent imports and pulled out four which are a little special

ALLAN'S LIQUORICE GOURAMI *(PAROSPHROMENUS ALLANI)*

This delightful small member of the Liquorice gourami group comes from Sarawak, Western Borneo, where it inhabits acidic blackwater forest streams. It is quite a delicate fish, which needs plenty of cover, if it is not to be nervous. Sponge filtration would seem to be ideal to maintain water quality and the chemical parameters should be soft and acidic as in the wild. This is a fish that requires a bit more care in its husbandry.

Allen's gourami may accept quality frozen foods, but really requires live foods in order to thrive and breed. They breed in small cavities as do the rest of this genus, building a tiny submerged bubblenest. As they reach little more than 2.5cm S.L., they can be maintained in very small tanks with just this species, or they could be combined with some of the beautiful tiny Rasboras of the area in a slightly larger display. Axelrod's Rasbora (*Sundadanio axelrodi*) is found in the same streams and would enjoy the same conditions as this fish.

Allan's liquorice gourami is a beautiful but rare import.

A shoal of Red hook myleus would make a superb addition to a very large community of Catfish and Cichlids from the same area.

RED HOOK MYLEUS *(MYLEUS RUBRIPINNIS)*

This species is definitely one for the larger home aquarium of 450 litres or more, with a possible maximum size of 18cm. Widely distributed throughout the Amazon system, this fish is thought to undergo substantial migrations over the course of the year. At other times they spread out widely through the network of rivers and flooded forest, feeding on fruits, seeds and practically anything else that is available, laying down substantial fat deposits.

In captivity they will enjoy most aquarium foods, with an emphasis on a vegetable component. Care needs to be taken to make sure that any other fish in the aquarium get enough to eat, as this species will often get to the food first. In very large aquaria the addition of various fruits and fresh vegetables to the diet will be welcomed. Breeding has been achieved in captivity, but only rarely. Because of their appetite, filtration should be very efficient, with plenty of water changes. They should be housed in a shoal, as single fish will be nervous and stressed. A secure lid is needed for the aquarium housing this species, they can and will jump several feet into the air if startled!

HONGSLO'S APISTO (*APISTOGRAMMA HONGSLOI*)

Hongslo's apisto originates from a very wide area of the upper Orinoco drainage in Colombia and Venezuela. The waters it inhabits in nature are usually acidic and very soft, but in the aquarium usually proves to be quite adaptable for routine maintenance (although successful breeding may require the same water chemistry as found in the wild). What is important, as with all Apistogramma, is that the water quality should be ideal. These fish will soon let you know, in a somewhat terminal manner, if your maintenance standards need to be improved!

Although they can be bred in fairly small aquaria, the ideal way to keep this fish is as a group in a larger aquarium with other fish from the home range. Then the fascinating social behaviour of Dwarf cichlids will become apparent. This is quite a large Apistogramma species, which can be aggressive, and so numerous refuges should be provided within the aquarium. The substrate should be of fine sand, as they are reported to react to being startled by diving headfirst into whatever bottom covering is available.

Unlike some Dwarf Cichlids, this is one of those that usually accepts quality dry foods with enthusiasm, but this should be supplemented with frozen foods and 'safe' live foods.

Spawning takes place within a cave, and the female will stay within the cave until the fry are ready to start feeding, at which time she guards them ferociously.

The colours of this fish can be spectacular, and it is well worth searching out at your nearest specialist outlet. Be aware that it is possible that the different populations actually represent different species, so it would be better not to combine fish from more than one location.

Hongslo's apisto has several different colour forms, this one was imported as "Rotstrich".

RED CRYSTAL TETRA (*HYPHESSOBRYCON* SP. 'CRYSTALINHO')

Currently without a scientific name, about the only thing we can be sure of with this fish is that it is an extremely beautiful, if slightly expensive addition to the range of fish available to us from Brazil. They are usually only imported in small numbers because of the difficulty in getting to the habitat and actually catching the fish. Obviously this also results in the higher price that needs to be paid for them. There is contradictory information available on the exact collecting locations for this fish. This may be to protect the market for what is a desirable and valuable catch.

They require soft acidic water, and plenty of shelter. This will make them feel more secure, and encourage them to show their full colours. Planted aquaria would seem to be the ideal setting for such a fish, even though it is possible that in the wild they are more likely to be found amongst leaf litter and the like.

They will happily eat any small aquarium foods, from quality flake and small granules through to frozen and live foods. They are well worth laying out the extra expense to acquire a small shoal, this would make a stunning introduction to a mixed community of small Brazilian fish. Breeding has been achieved, this was accomplished using techniques as used for other egg-scattering Tetras from the central Amazon region.

Equipping your vivarium

Bob and Val Davies sort out the heating and lighting for your first vivarium

THE CORRECT DEGREE OF HEAT AND THE type of light used are crucial to the welfare of captive reptiles. Failure to provide these will cause illness and eventual death. Reptiles are *ectothermic* which means that they rely on external heat sources to raise body temperatures. They control their body temperature by *thermoregulation* i.e. moving close to or away from heat sources. To enable a reptile to do this the heating and lighting within the vivarium must be arranged to create a *thermal gradient*, in other words, a cool end and a hot end. This becomes very difficult to achieve in a small vivarium. At least one shelter should be placed at the cool end. Cork bark is a good insulator and helps the animal escape the heat.

Ceramic heater with reflector and wire guard.

Heating

Heat can be provided by a variety of methods some of which are termed 'non visible' heat sources. Ceramic heaters are used for very large vivaria since they are made in quite high wattage's. They produce infrared rays, become very hot to touch and need to be surrounded by a guard to prevent animals burning themselves. You also need to be careful they do not harm the material from which the vivarium is constructed. Tubular greenhouse type heaters also get very hot - most models being 60 watt per 30cm length. Tubular heaters are probably more use for providing background room heating on winter nights if a minimum temperature is required. If used in a large vivarium they need a strong, protective guard.

Heat mats can be bought in a variety of sizes and wattage's. They are better fastened to the back, sides or even the top of the vivarium so that the animal cannot lie on them because this can cause the heat to build up under the animal's body and burn it. This does happen - the creature does not always move away as one would expect. Again this is a heat source using infrared rays. Heat tapes and heat cables do not seem to be as popular these days. Some keepers use them in rack systems where a number of boxes are used. 'Hot Rocks' are imitation stones containing a heating element. These are not very effective and again, as with heat mats, animals will lie on them. Terrapin/turtle tanks can be heated using an aquarium heater/thermostat but a very secure guard must be devised as the inhabitants can easily break the heater. Shallow water for small specimens can be heated by a thermostatically controlled spot bulb above the water which will also be used for basking. ■

Electronic thermostats. Several types are available, check with the dealer their suitability for your chosen heat source.

Desert iguana. High temperatures and UVB light are essential for its well being.

LIGHTING

The vivarium should be lit for a number of hours per day according to the species. This is known as the *photoperiod*. Tropical reptiles tend to need 12-14 hours per day; temperate reptiles 10-12 hours. This photoperiod is reduced when carrying out winter cooling without actual hibernation. Many keepers tend to rely on thermostatically controlled domestic spot lamps which provide both heat and light. For this system the thermostat must be a dimmer type otherwise the bulb is switching on and off which is disturbing and does not create a proper photoperiod, as well as eventually wrecking the thermostat.

Because diurnal reptiles need UVB rays to assist in the metabolism of vitamin D3 (which is essential for the metabolism of calcium) the vivarium should be fitted with a fluorescent tube specifically made for reptiles. Several manufacturers produce these and are usually available from reptile dealers. Desert type lizards need a tube with a high percentage of UVB (7.5%), others 5%. The low percentage tubes (2%) are better for diurnal amphibians. The latter are also useful with crepuscular/nocturnal lizards, such as most geckos, some of which will come out and have short basking periods in the daytime. However, it must be said that such creatures are kept and bred without these tubes but their food is dusted with multivitamin/calcium supplements. Turtles and tortoises kept indoors need UVB tubes. Most snakes, particularly mammal eaters, do not require UVB fluorescent tubes. Although they will bask under a heat source until warm it would seem that mammals are a complete meal and UVB light and dietary supplements are not necessary.

It is now known that some reptiles can see ultra violet light and this can affect their recognition of food. Such species may refuse to eat in the absence of UVB light. The Desert iguana (*Dipsosaurus dorsalis*) is a species known to recognise its food and to find a mate because of its ability to see ultra violet light - it is likely that other species will be found with a similar ability.

SAFETY POINTS TO REMEMBER

1. All heat and light sources, (except fluorescent tubes), must be controlled by a reliable thermostat to avoid overheating.
2. Fluorescent tubes do produce some heat and may have to be switched off during heat waves if the vivarium it exceeding its desired temperature.
3. Heat and light sources must be kept clear of furnishings to prevent combustion.
4. In a large vivarium 2 lower powered heat sources are better than 1 very powerful source - still maintain a thermal gradient.
5. Do not spray electrical fitting especially when hot.
6. A reliable thermometer should be situated at each end of the vivarium and checked to ensure desired temperatures are not exceeded.

HOCKEY STICK PENCILFISH
Nannobrycon eques
28°C
23°C
5cm
PHOTO: M.P. & C. PIEDNOIR
TODAY'S FISHKEEPER
TFISH 83A
TFISH 83

...End Point

Pete Liptrot says for those people with the larger aquarium South America is home to a range of medium-sized Catfish ideal for your aquarium

Mago's gulper catfish are not aggressive towards each other so a group of them can be kept which will increase the possibility of viewing social interaction.

PHOTO: OLIVER LUCANUS

Mago's Gulper Catfish

THERE ARE QUITE A NUMBER OF SPECIES OF South American catfish which are only usually seen in the more specialist outlets and then only occasionally, but are worth searching for, and will thoroughly reward the aquarist who provides them with the conditions they require. This can certainly be said of Mago's gulper catfish, *Ageneiosus magoi* Castillo and Brull 1989.

Plenty of room needed

This fish grows to about 20cm and will need a tank about 150cm x 45cm as a minimum to be happy. It spends some time (particularly during the daylight hours) resting on the substrate or in a suitable refuge. When feeding, however, they are active and fast swimmers that require plenty of room or they may panic if startled and injure themselves.

Aquarium conditions

They have a fairly wide distribution within Venezuela so will be able to tolerate a range of water conditions as long as extremes are avoided. A pH of anywhere between 6.5 and 7.5 should be acceptable, with low to medium hardness. A temperature between 24 and 27°C with good filtration and some water movement. Large-capacity powered filtration is probably the most sensible option with internal canister filters to provide back up and extra oxygenation. Water changes should be as large and as frequent as possible, 25% twice a week is not overdoing it, even more would be better. This will dilute metabolic waste products, elevated levels of which are something these fish are known to be intolerant of.

The swimming activity of this fish combined with the naked skin means that décor and substrate should be chosen carefully to limit the possibility of scratches which could lead to infection. Aquarium sand would be ideal for the base of the aquarium, with rounded pieces of bogwood as the main items of decoration. Planting can be purely down to personal choice. The light levels preferred by this fish are not likely to prove ideal for good plant growth, although floating plants will help to diffuse bright light and also will perform the valuable function of removing metabolic pollutants from the water.

Food needs to be 'chunky'. Frozen foods such as krill, mysis, cockles, mussel, chopped squid and lancefish will form a good basis for a diet that can be supplemented with quality foodsticks or carnivore pellets to provide vitamins. Your local fishmonger should not be overlooked as a useful source of extra food, with prawns and other shellfish (not in vinegar!) but avoid whitebait. These fish like to eat large meals in one go and then digest their food over the next couple of days.

Any fish less than 2/3 the size of the Catfish should be considered as being at risk of being eaten. Enough refuges should be provided so that any fish with sharp fin spines or body scutes, such as Doradids or Loricarids, are not in competition for homes otherwise severe damage may result to the Gulper catfish. Cichlids could be included as can medium-sized Characoids such as Silver dollars. ■

HALF WAY TO LIVEBEARERS

As with the other members of the *Auchenipteridae*, it is fairly easy for adult fish to be sexed. Unlike most fish where fertilisation takes place externally, these fertilise the eggs while still inside the body of the female. Male fish have the first few rays of the anal fin slightly elongated and modified into an organ used to introduce the sperm into the female, and it can easily be seen that these rays are covered with a fleshy skin. This can be seen all the time, but when the fish are actually in breeding condition there are other physical changes that occur. The first spine of the dorsal fin becomes elongated, curved and nodular, and the barbels may also become elongated and stiffened. These two alterations are thought to be used to assist in maintaining contact between the sexes during copulation.

Once mating has occurred, it may be anything up to two weeks before eggs are laid, during which time there must be some form of sperm storage by the female. Further information on the reproductive behaviour of this species is still unclear. In one instance, where egg laying was observed, the eggs appeared to be infertile in spite of mating having been witnessed at an earlier date. In another, there was a suggestion that guarding of the newly deposited eggs was taking place, but the eggs disappeared before definite observations could be made. This is where long-term maintenance of a group could provide a lot of missing information about the biology of this species, information that would otherwise be very difficult to gather from the wild.

This represents a challenge for the aquarist, but one that would be well worth accepting.