

Today's Fishkeeper

AUGUST 2002 £2.95

COLDWATER COMMUNITIES

TROPICAL

**Konings
on Malawis**

BREEDING

Corydoras

EQUIPMENT

**Aquarium
heaters**

MARINES

Setting up a mega reef

**All your fishkeeping
problems solved**

FROM BEGINNER TO ADVANCED





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Welcome

Have you ever wondered how a magazine like this is put together? On the face of it, it is a simple operation of gathering all the contributors material together, obtaining photographs and sending it through to the designer. Then back come the proofs for the editor to check and off to the printers we go! Or not, as the case may be.

This month things have not gone as smoothly as I would hope. First of all an editor's life can be made very difficult by the behaviour of his contributors. This month one of mine visited another one in Canada. That meant a week or so out for both of them talking about fish, visiting other fish keepers and aquarium shops, and otherwise finding any excuse not to write my vitally important articles. Other contributors have been at it as well! As I write this Alf Nilsen is floating around the Philippines and Max Gibbs has just returned from somewhere or other. Fortunately both of those contributors made sure their material was in early. On a bizarre note one contributor who is always last minute was actually first in, mind you that was only because they missed last month's deadline so was first in this month.

New technology is supposed to be a great help, and I am sure it is. Our new system (costing many thousands of pounds), however, has not been the best thing since sliced bread. Five minutes after the computer expert walked out of the door after installing it, it "fell off its perch" and died! Next day it was only taking incoming e-mail on a very go slow basis and couldn't manage anything outgoing at all. Since all my material goes in by e-mail and comes back to me for checking the same way, that makes putting the magazine together a bit of a nightmare.

Despite all these problems, August issue of *Today's Fishkeeper* will be out on time and full of fascinating articles for you to read. The fact the poor old editor is suffering from chronic stress and in need of a holiday is purely coincidental. The two contributors who went AWOL in Canada both owe me a drink and if the computer system plays up again I will return to using a quill and ink and hand write out each copy of the magazine.

Until next month,
Happy fish keeping

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

As usual we have a magazine jam packed with articles for you. Kathy Jenkins has a range of temperate fish to tempt you to try an unheated aquarium. Alf Kenings is back with the second part of his series on Malawi cichlids and in our popular Top of the pops series we feature those stalwarts of the aquatic trade - the tetras.

For those of you interested in Marines, and I have to say, even for those of you not really

interested in keeping Marines, it is well worth reading Andrew Caine's feature on the tank that Mark built. Marine fish keeping has developed beyond all recognition in the last decade and this aquarium uses all the new technology to full advantage. We shall be returning to this tank in the coming months to see how it develops, but even at this early stage it is certainly one of the UK's most spectacular reef set-ups.



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AUGUST inside this i

TROPICAL/MARINE/COLDWATER

6 Starting point

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

64 Today's surgery

Today's vet, Lance Jackson, opens his casebook on jaws - a much loved Gadfish



page 6



TROPICAL

10 Fishkeeping answers

All your tropical questions answered.



24 At home with Malawi

As Kivings has 30 years experience with Malawi cichlids and is widely regarded as one of the world's authorities on the fishes of Lake Malawi. In the second part of this series he looks at sediment-free rocky habitats and some of the fish that live there.



page 24



30 Top of the Pops - the Tetras

Our series features all the most popular aquarium fish in the trade and some of the lesser known cousins who are the "Winnabes" of the fish world.

32 Bountiful Belize

Early this year today's freshwater magazine followed a team of aquarists on holiday in Belize. This is the story of their trip, 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.



page 32

40 New releases

Olivier Lucanus is right at the centre of all the new introductions and discoveries. This month he has a line-up of four interesting fish you are unlikely to find in any of the books.

50 Chain bolts

Kelley Jankings profiles a pretty little Loach.

63 Tony's Tips

This month Tony Sault gives you some tips for keeping Tilapia successfully.

66 Some like it hot

Corydoras expert, Ian Fuller, suggests a few species that like it hot which just happen to be some of the most sought after species, and tells you how to breed them.

page 68



PONDS & COLDWATER

16 Fishkeeping answers

All your coldwater questions answered.



18 Cool community

Our aquarium folk come from all parts of the world including colder waters. Kathy Jankings has a few suggestions for an unheated indoor aquarium.



page 18



56 Ponderings

In Dave Bowen's regular column on ponds and ponds, he shows you how to plant oxygenators and looks at a fascinating fish and some really predatory crustaceans.



page 58

66 Koi World

Cherry Flower Show had its last on display for the first time this year. Service Breeder was in attendance on the World at Koi Garden and has her impressions of what the show will mean for the hobby.



page 66

MARINE

14 Fishkeeping answers

All your marine questions answered.



page 15

21 Sea View

In a specially extended edition Andrew Cane installs a fantastic 7,000 litre reef tank and has another level tribute and fish for you to keep.



54 Coral Kaleidoscope

Ad takes a closer look at the huge range of Stony corals.

Issue of Today's Fishkeeper



page 54

02 End point

Andrew Cahn profiles the Resident or Dragon wrasse (*Acanthaluteres* bairdii).

PLANTS

02 Hidden Gems

Plant expert Mark Dunlop looks at some of the more commonly available species of Cryptocorynes, and the aquarium conditions they require.



page 52

REPTILES & AMPHIBIANS

70 Setting up home

Just starting with reptiles? Bob and Val Davies help you sort out their new home.

REGULARS

3 Editorial

72 Fantastic New Subscription Offer

74 What's in next month's issue



Cut out and keep
39 Croaking Gouramis
75 Mouthbrushed dams



BEGINNERS

6 Starting point

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

10 Fishkeeping answers

All your questions answered.

18 Cool community

Our aquarium fish come from all parts of the world including cooler waters. Kizzy Jenkins has a few suggestions for an unheated indoor aquarium.

21 Sea View

In a specially expanded edition Andrew Gaine installs a fantastic 7,000 litre reef tank and has another invertebrate and fish for you to keep.

30 Top of the Pops – the Tetras

Our advice features all the most popular aquarium fish in the trade and some of their lesser known cousins who are the 'Warblers' of the fish world.

41 Today's Guide to Heating your aquarium

70 Setting up home

Just starting with reptiles? Bob and Val Davies help you sort out their new home.

NEWS & VIEWS

36 Maidenhead Aquatics join Just say no! campaign

As the 'Just say no!' campaign gathers pace we bring you up to date on what has happened so far.

38 Letters

Share your hints, views and experiences through Today's PrintMag.

41 Today's Guide to Heating your aquarium

42 Today's Diary dates

44 Club News

46 Out and about

Today's Fishkeeper visits West Poles in Sutton-in-Ashfield, Nottinghamshire.

46 Trade talk

All the news and new products from around the trade.



page 30

KEY TO SYMBOLS:

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

	COMMUNITY		NEW ENTRY
	NEW COMMUNITY		REVIEW
	COVERAGE		TEST
	BREAKDOWN		10 min
	ESSENTIAL		500
	COUNCIL		NOT OFFICIAL FOR KEEPING IN CAPTIVITY



page 45



Starting Point...

Just beginning in the hobby?

Pat Lambert writes especially for you...



Pat rescued a rare Swamp barb (*Mesomys punctatus*). This species looks a lot like the more common whiting which is more often seen in aquarium shops.

I'M QUITE A SOFT TOUCH FOR FISH THAT I see in aquarium conditions that are totally unsuitable for them. When they used to give Goldfish in plastic bags in drives at the fair, I used to rescue as many as I could to put in my garden pond, with fish built specifically for them. This could have led to real stocking problems, but my dart throwing was frequently off the mark.

This month's fish to be wary of is not a favourite of mine because one of the most beautiful (to me) Barbs I have ever kept was one I rescued from a dealer's tank where it was housed with a Jack Dempsey. The Jack Dempsey had ripped many of the scales off the large (30cm) Barb, so I had to rescue this one. The dealer wanted far too much money for it (due to its bad condition). I offered him a fair price and told him to take what I offered or that fish would be dead by morning.

I had a tank that was just right for it, which I put in the spare bedroom (I didn't want anyone to see the poor fish in its debilitated condition). I nursed that fish back to health and it lived for a further ten years in my 280 x 25 x 45cm large Barb tank. There can be a problem with this rescue tank though. It's important to be sure before taking on any rescues that you are able to provide them with a suitable home.

AN EYE CATCHING FISH

Swimming around in the bottom of dealers' aquaria are some of the most interesting and stunning fish that you could ever see. They are frequently bought by beginners attracted by their striking coloration. These are the Clown loaches, magnificent, bottom dwelling fish that will certainly brighten up your tank. Their bright orange-yellow body is transversed by three broad black stripes, the forward stripe runs down through the eye and the rear one extends into the dorsal.

The Clown loach is thought to have tiny scales embedded in the flesh but this lack of surface scales gives the body a smooth velvety appearance. It's called a Clown because its behaviour is so interesting. It stands on its head, lies on its side, sometimes plays dead in the tank. When you try to net it out you find it's very much alive. Like many *Betta* sp. they are most active at dusk but this one is lively during the day. It's a great community fish that adds interest and colour. They are caught as food fish in the wild where they can reach 30cm in length, so are quite a chunky fish. I have never seen one bigger than 17cm in a home aquarium and they are usually sold at a much smaller size than this, but it is best to house them in a 120 x 30 x 30cm aquarium. It's good to have a few but a single Clown loach will not enrage. It will just join in the fun with its tankmates. The Clown loach adapts well to normal aquarium conditions but after purchase and during the acclimating period this fish is prone to White spot. Due to its sensitivity to medication treatment can be a little tricky. WS 3 (manufactured by King British) has proven to be a safe and reliable treatment, although great care is needed with the dosage.

No need to search for this one it will sell itself to you when you see it.



Clown loaches are lively, playful fish which are on the move a great deal of the time.

Jack Dempsey



THE PUGILIST

The Jack Dempsey is definitely not a fish for the community tank. It has some very bad habits. It is a territorial species that bites (see introduction to this column). It digs up plants as it burrows into the substrate. It also has

pugilistic (fighting) tendencies as its common name implies. It is, however, a rather attractive species which has an adult size of 10cm and is chunky. These do make excellent parents who guard their fry well.

A very versatile plant

Labellia cardinalis is often grown as a marginal plant for the garden pond, but it can also be used as an aquarium plant. Light green in colour when submerged, this plant has red blooms when grown out of water. It grows fairly slowly and when the tips reach the surface cuttings can be made. Give the young plants plenty of space as they benefit from bright light.



This is the true *Labellia cardinalis*. Many garden centres sell *Labellia fulgens* and its varieties as this species.

Let's look at water changes

It is recommended for freshwater tropicals that you change 25% of the water each week. A water change is very important for the fish's well being. It is comparable to opening the windows in a stuffy room and letting the fresh air circulate around. We benefit from this and water changes, in a closed environment like the aquarium, are even more beneficial for your fishes.

Water boards must provide water that is considered safe for humans to drink but are under no obligation to provide water that is suitable for your fishes. You need to be aware of this because some things in your tap water, although probably not harmful to you, can be a danger to your fish, so it is a good idea to add a water conditioner to your fresh water. I always fill a glass with water from the tap before doing a water change to see that the water is running clear. I have had milky water and brown water at various times, especially if the water has been turned off for maintenance reasons. If this happens, do not change any water until the water from the tap runs clear for a day. Ensure that the temperature of the tap water is adjusted to the temperature in the tank water, a slight variation will do no harm.

For some species, and in some areas, it is necessary to use a water purifier. If you use one of these efficiently you need an analysis of your tap water from your local water authority. This will indicate the type of water purification that you need. Most of the good aquarium shops I have visited have an analysis of their tap water to hand.



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Lost for Words

Colony tank This is a group of the same species of fish of varying ages living together. Many livebearers are kept in this way and some of these colonies are brooding colonies where the fry are smothered by the adults.

Specialist tank These tanks contain a group of species of the same family that form a peaceful group. For example you can have a Rainbow tank, a Barb tank or a tank of small Tetras. Some specialist tanks are filled with just one species.

Line breeding This is the selection of closely related fish to parent offspring which will give you the qualities you are looking for. Fish with undesirable traits will not be selected. Specialist Supply breeders use this method of breeding to produce the strains they want.

Facultative feeders These are fish that enjoy a particular diet but when this is in short supply they will eat other foods. They are not like obligate feeders who will only eat a specific diet and will even starve to death if their special dietary requirements are not met.

Infusoria A term used for feeding microscopic organisms, particularly protozoa. Some fry are so small at birth that they need these microscopic foods in abundance to survive. Infusoria can be cultured by

placing vegetable matter such as a piece of lettuce leaf or potato in a jar of water on a window ledge. When the water becomes cloudy it is ready for feeding to the fry. This should be carefully fed to the fry in small amounts at a time. This is the most difficult part, give them too much and the tank is polluted, too little and they starve.

Thermostat Power filter with an inbuilt thermostat unit which heats the water as it passes through the filter.

Airpump An electrically powered device which supplies air to a tank (or tanks) through airline (narrow gauge plastic or silicone tubing) connections.



Beautiful cultivated livebearers like this Mollie Blue varietus are produced using line breeding.

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.

- Manufacturers often provide free booklets about fish care.
- Expensive books provide information on setting up.
- Today's fishkeeper experts are on hand with help & advice and sections of the magazine are devoted to beginners.

THE WATER

- 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.
- Temperature ranges:**
Tropical: 21-27°C
Mesos: 20°C
Coldwater: 13.5-21°C
Some delicate species have very specific requirements, read up on them before you purchase.
- 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 marine require larger filtration systems.

THE FISH

- Stocking levels:** For freshwater tropical we recommend 12cm² of surface area per 1cm of fish.
Mesos: for a fish only setup we recommend 2.5cm² of fish for 6l of water and for reef only setups we recommend 2.5cm² of fish per 27l of water.

For your free beginners guide please call: 0845 677 4770 or visit our website: www.aquarian.com

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Stock 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**

- Knowledge:** Find out as much as you can about any fish you hope to buy before purchase.
- 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.
- Quarantine:** All new purchases should be quarantined for established tanks for at least two weeks.

THE ROUTINES

- Feeding:** Twice daily feeds are the norm for most adult fish. Try to feed at the same time each day so this establishes a routine. Only offer as much as the fish can eat in a few minutes.
 - Water changes:** freshwater tropicals 10-20% weekly. Mesos no more than 20% every two weeks. Reef fish also appreciate an occasional water change. Keep an eye on ammonia, nitrite and nitrate levels. They should be zero in a mature pond.
 - Cleaning filter:** 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, bulging or distension. See that the fish are eating well and that all are getting their share. If fish are in difficulties test the water.



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Q&A

Tropical

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How do I sex my Angelfish?

At 13yrs I am not very experienced, but I love fish keeping. I have a 91cm x 32cm x 30cm tank, slightly acidic, with two 10cm Plecs, 2 Sucking loaches, 10 small Harlequin rasbora, 5 Cardinal tetras and 5 Glass catfish. I have recently purchased 2 small (8cm approx) Angelfish. I am hoping that they are opposite sexes and will form a pair, but, if not, will they fight as they mature? At the moment they seem to get on very well. Can I tell male from female, and how do I tell if they are forming a pair?

Megan Mills, via e-mail

The Aquarium hobby is a wonderful hobby, and if you are patient and let the hobby grow slowly, you will learn a lot and you will become experienced, but it takes some time. To tell you the truth, you will never learn it all. I have been working (and then I mean working) with the hobby for more than 43 years and I'm still learning things. You can talk with an old aquarist and they will tell you the same, but that's why you will grow with the hobby. Your Plecs will outgrow your tank, so they must be exchanged for other fish. I suggest 6 - 8 Corydoras, they are very nice and active fish that do not grow to more than 4 - 6 cm. Your Sucking loach may cause some problems when they get bigger, and they might (I've seen it) cling to the body of your Angelfish which is not very pleasant for your Angelfish.

Angelfish is not very easy to sex, I usually buy a small group of fish (Angelfish) and then when they get bigger two will form a pair and you can sell the other ones. Your tank is just about the right size for one pair of Angelfish, which is why you have to sell the others. But, since you only have two (not a pair so far), you might be lucky that the fish will form a pair. If they form a pair, they will stand together in a chosen place, against the other fish.

Art Steinberg

AM I BEING FAIR BUYING SAME SEX FISH ?

I am interested in buying some Guppies but have the moral issue of what sex should I buy. In my tank I have 4 male Platys and some Danies which I think are male. The reason why I ask this question is because I don't want my fish to put in all the effort of mating just to have all these eggs or young eaten. I know that I could put them in my spare hospital tank but what do I do with them then, I don't want 20 of the same fish ? Is it fair to buy same sex fish, say 6 female Guppies, or should I buy a mixed bag and let them get on with it ?

Bob Catania, via e-mail

In most community tanks fish breed all the time. The eggs or fry are eaten by the other fish or even their own parents. This is just the same as happens in nature. In fact a female in the wild will probably only have 2 young survive to adulthood from all the 1,000's produced. If she had a lot more then there would be a population explosion which would unbalance the whole ecosystem. So I don't think you should worry too much about the moral question. In fact you are



Female Guppies that have large broods of young carry them until they have been fertilised by a male.

causing your fish stress by not having both sexes in the tank. The other problem you have is if you buy only female Guppies. They will already be pregnant and may continue having batches of babies for many months since they store sperm.

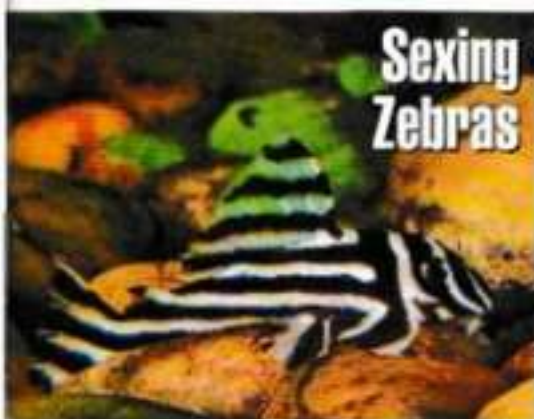
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Sexing Zebras



How do I tell the sex of Zebra pleco (L46).

Barry Thompson, via e-mail



Hypomastix zebra some say are easy to sex, others say they are not so easy. There are two basic areas to look at: firstly sexually mature males in breeding condition display prominent odonate bristles on the pectoral fins and the top of the spine may also change from the normal white colour to a pinkish. When not in breeding condition they lose the pink colour and the bristles reduce in size.

The second area to look at is the shape of the head looking down from above. Males tend to have a broader and pointed head shape than females. This is a feature with many species of *Acrossoch*.

Companions for a real Odd ball

I currently keep what has evolved into a **Catfish community** in a 150cm tank. Inhabitants are two **Rainbow catfish**, two small **'Pleco'**, five **Neon catfish**, a **Talking catfish**, and a **Channalabas aptos**. Decor is logwood and real plants. Can you make any suggestions for a suitable shoaling fish to inhabit the top area of the tank. It needs to be peaceful but preferably colourful. I am unsure what is suitable as particularly since the arrival of the **C. aptos** most normal community fish would be looked on as a snack. The **C. aptos** is not aggressive but I feel he would view **Burbs**, **Tetras** and **Danios** as food as he is persistent when anything resembling food is about.

The tank pH is 6.7-7.0. Also could you please give me any more information about **C. aptos** as I have been unable to find anything else about this species except what is in the Internet 'Tankbusters' manual and I am fascinated by this fish.

C. Mentle via e-mail



Well, you certainly have a taste for the unusual! This fish was described as long ago as 1873, and originates in **Zaire** and **Angola**. It is a member of the family **Catidae**, which includes the infamous **Walking catfish**, **Coryna latrochelis**. There is a similar species also sometimes imported, **Gymnallabas fous** from **Nigeria** and for husbandry purposes they can be regarded as requiring the same care.

Coming from the area of the **Congo** it can be assumed that it will require water somewhere around neutral, and with fairly low hardness, but in reality it is likely that quite a wide range of parameters will be tolerated (although this is not an excuse to ignore good aquarium practice). The pH you mention should be ideal. You have a good spacious aquarium, well suited to the eventual size of the fish which can be expected to reach around 30cm. You don't mention the filtration system you are using, but for a fish like this I would prefer to use a combination of internal and external powered filtration. With weekly partial water changes of around 20% this should provide very good conditions in your aquarium. Lighting will be whatever the plants require, this fish has no particular requirements where light is concerned. Although probably

largely active at dusk or dawn in the wild, I imagine that it will quickly learn to come out for food at any time.

I would provide a substrate of fine inert sand in order that it may burrow should it wish to hide, and your décor of logwood and plants should suit the fish perfectly. If you feel that it sometimes disrupts the plants through digging, you may want to look at purchasing some **Anubias** or **Java ferns**, these are very robust plants that do not need to be planted, but can be grown attached to logwood and other décor.

Feeling it as you have probably already discovered, non-problematic, these fish will thrive on a wide range of quality dry frozen and live food. You are correct to be concerned about smaller fish, as it will certainly eat them given the opportunity, but the mouth is not huge and so is not long as you look at fish of 10cm or so you should be OK. I would perhaps look at something that originates in the same area as this fish, as there are a number of medium sized Tetras that I feel would not be under threat. The most obvious one that springs to mind would be the **Congo Tetra**, **Phenacogrammus intercepus**, as in an aquarium the size of yours you could have a shoal of 5-6 without problems. There are a number of similar sized Tetras from Africa that you could also choose, but read up about any given species first as some of them can grow quite large.

Under different circumstances I would have suggested that you set up a purely African community based around the **Channalabas**, but as the other fish you mention are all South American in origin this is not feasible.

This leads me on to my slight concern. The **Talking catfish** you have are members of the **Doradidae** family and they are characterised by thorny spines along the sides of the body. The **Channalabas** has quite delicate unprotected skin, and if it should by to get into a refuge already occupied by one of the **Talking Cat** this could lead to some physical damage, which could result in secondary infection.

I have not heard of any breeding details, or even any way to tell the sexes apart, but like many fish from that area it is likely that the breeding trigger would be a simulated wet season. Of course with only one specimen, this is academic.

Catfish are obviously an interest of yours, so if you wish to find out more about them why not consider joining the **Catfish Study Group**? For further details contact the Chairman, Ian Fuller, at ian@coycatfish.com

Pete Light

Today's Answers Expert Panel

Art Staiberg - Corals
Pete Light - General questions on tropical fish and corals
Andrew Cairns - General questions on koi
Ben Helm - General questions on freshwater plant equipment and technical advice
Lance Jepson - Health
Tony Staff - Disease
David Armitage - Anabantids
Deek Lambert - Livebearers, Rainbows & breeding fish
Ian Fuller - Catfish
Andy Galburt - Whiting
Stephen Smith - Goldfish
Service 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 Academy, Nobby's Fishkeeping, TIBCO Ltd, Winchester Court, 1 Paines Place, Warrick, Northampton, NN10 0RT.**

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 post your messages on to them by post mail (we will tell you when this happens) but otherwise this should mean a reply to your questions in a few days rather than weeks. Send your e-mails to: fishkeepinganswers@timg.co.uk

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Q&A

Tropical

A beautiful aquascape like this can be created if you use the right substrate and CO₂

HOW SHOULD I SET MY TANK UP TO GROW PLANTS PROPERLY?



I have been a fishkeeper for a while now but have always used the old system of undergravel filtration (groan I hear). I have just placed an order for a new 48" x 15" x 18" tank and would like to set it up with a natural substrate in the bottom of the tank for plants to root and grow. I already have two external filters a Rena ap (the medium sized one) and a new Eheim ecco 2223. Firstly what substrate would you recommend etc. as I have read that you need a heater cable under the soil and CO₂. Is this the case or can I get by without them (i.e. add the CO₂ later) and are either of these filters suitable. Are there any other tips that you can give.

Tyrose Taylor, via e-mail



When considering how to set up a successful planted aquarium, substrate is one of the most important areas to consider. Get it wrong, and you will struggle to grow plants irrespective of other conditions in the aquarium. Firstly, the substrate must be inert. This means that it must not be able to react with the water, changing its chemistry and characteristics. I suggest a mix of quartz gravel and sand which by definition will be lime-free. (Use the vinegar test to check). This should be laid on top of undergravel filtering to about a depth of 2.5cm. On top of that place a layer of non-rich inorganic substrate (diatom clay) and cover that with another 2 - 4 cm or so of quartz gravel, creating a substrate sandwich. As the substrate matures and organic acids start to accumulate, those will cause the inorganic iron to become soluble and available for plant uptake.

A planted aquarium thrives with external filtration as a steady flow through the aquarium provides plants with a better environment for growth. Remember not to return the water via a spray bar, but to keep aeration and water movement to a minimum. Maintenance with an external filter is also easier and less frequent and less likely to upset any aquascaping.

Finally, from the outset, CO₂ is essential. Use a cylinder of CO₂ with a needle valve and a diffuser. You assess how much CO₂ you require by using a calculation that takes into account the aquarium's volume and the KH of the water. I hire my CO₂ from BOC. It costs me approx £35 per year to hire with £10 for a refill of CO₂. In 3 years, I am still on my original lot of gas!

Ben Helm

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Will my fish be OK if they are left without food for three days?



I have a 90cm tropical tank containing six silverlip tetras, eight Corydoras and three

Cnumber Pieco's. The tank is filtered by an undergravel and a small internal filter. I am going away for a few days and want to know if I can leave the fish unfed for three days. Will they be all right?

Steve Sands via e-mail



You can leave the fish unfed for three days - in fact up to two weeks will not harm adult fish. Alternatively you can buy holiday feeding blocks from your local aquarium shop. Don't be tempted to give them extra before you go - that may pollute your water and kill the fish while you are away.

Derek Lambert

Star Letter Prize from Hagen



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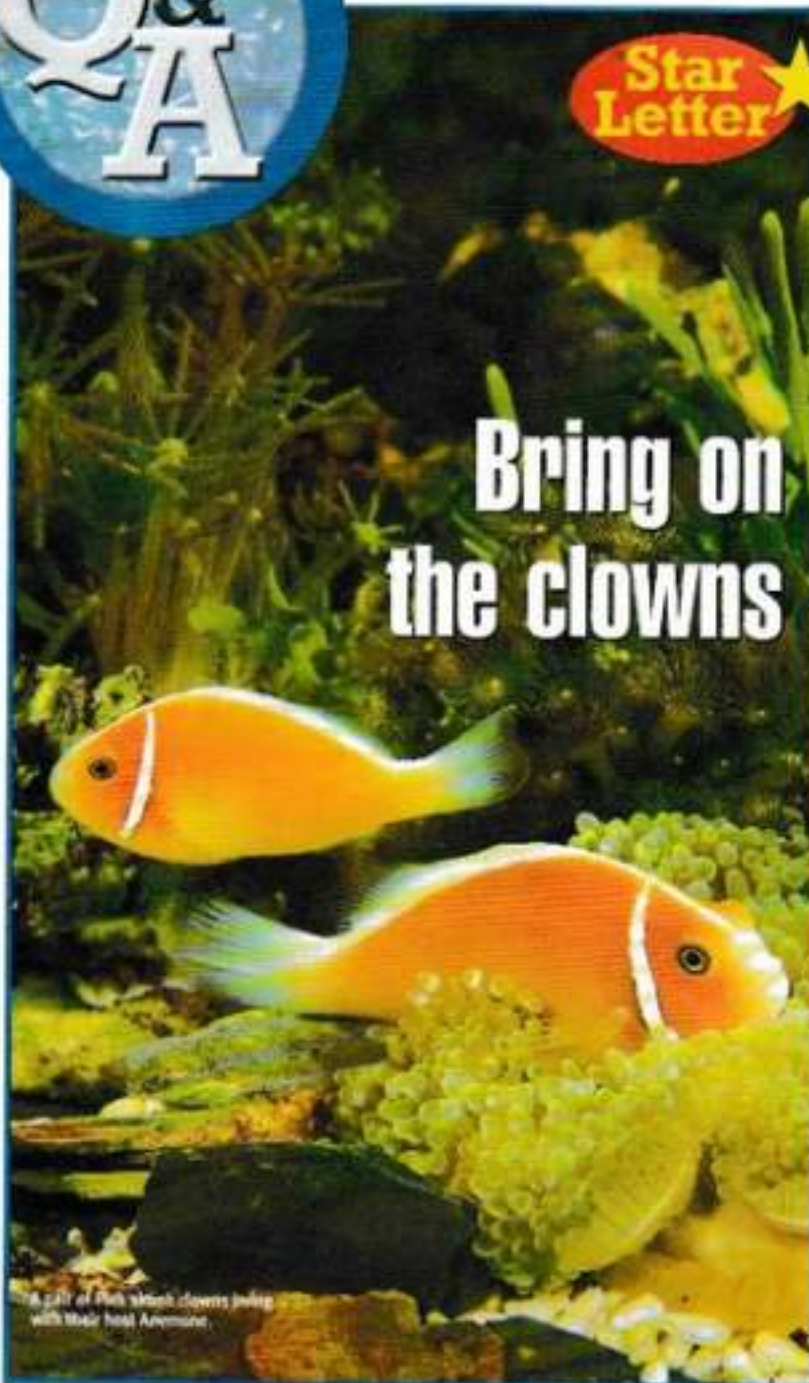
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Q&A

Marine

Star Letter

Bring on the clowns



A pair of fish school clowns living with their host Anemone.



I am considering a marine set up and have looked at the Hagen Tropicarium 88 as a fish only system. I only intend to keep a pair of large Clowns in a host Anemone with a small amount of living rock and no other fishes. Would this set-up be suitable and which would be the best hang-on skimmer to fit as the hood comes complete with the tank? Would I require a further filter or would the bio-life that is supplied with the system suffice on the proposed stocking levels?
Steve Turner, Mervford



Make no mistake the Hagen Tropicarium 88 is designed for freshwater tropical fish only. However, saying that, I have a few friends that have converted these for marine use. The first six months after setting up were the worst with algal problems but after that things settled down and now they have nice little marine aquariums. What you have to consider is what you get for your money and the alterations you will have to do. Firstly, you will have to change the lighting that comes with the set up for a marine Actinic and marine white tube. If you can get a Red Sea Prism or the new Aquamedic biocer skimmer, you will have to chop the hood. Live rock would be great and fit a phosphate remover into the filter with this in mind you can do what you want to, however, do not overstock. Heroin with the Clowns, a pair of Shrimps as cleaners and on no account put in an Anemone, it is too risky. Use only RO water or you are in for a hiding, and follow the golden rule, no lights on for the first month during maturation. It can be done with a little work but consider a small custom made set-up, a tank off the shelf, small external filter, wooden base, etc. Get up both set-ups and find out which one would best suit your pocket. My advice is if the custom job is a little more expensive go for it.
Andrew Cairns

AQUA MEDIC

for all your marine keeping answers



Yellow Tangs are a good choice for the marine hobby

WHICH FISH?

The species I am looking at keeping are Tangs, Dwarf angels and Butterflies, also some Gobies, Wrasses etc. I am not stuck on just these fish, I just like the colours that they have. This tank will be the centre piece of the room and as such I would like as much colour and variety as possible. Any ideas or help would be much appreciated.

Pete Silver, via e-mail

When we are asked for compatibility advice we really need the species name as fish groupings such as "Tangs" is too vague, many Tangs will kill each other, yet the same Tang will live happily with another Tang. However, with your list I can give you some pointers.

Make no mistake, this area is the most difficult area in marine aquatics, we really do play the percentage game as we are dealing with individuals, with different behavioural traits. Too many people study the equipment that is required for marine aquatics. That is good, however, you must spend more time studying the animals you intend to keep. As a good friend once told me, "You may purchase the best set of drums in the world, but that does not mean you will play in the band!" Five

minutes of observation is worth 100 hours of reading. Look at the individual and how it behaves to others in the shop. Floating it in the bag at home with the lights on will often see a response from your tent to the new proposed addition. If you notice any aggression, take it back, don't think it will be OK, take it back! If all seems well turn the lights off for the acclimation and release it, then leave the lights off for at least one hour.

Firstly stock the Wrasses and Gobies, make sure that you purchase small fish, not small fish in the shop, but small fish when grown up. A good example is the Twin spot wrasse, *Coris argyrea* often seen in shops at 5cm coming around £30. What many don't realise is that this beast will grow to 120cm, so be careful. Blennies are also a goodie, the Bicolor blenny, *Ecaenusa bicolor*, is a cracker and like my wife says it is cheap, like me. Most small Wrasses, Blennies and Gobies are good community fish. Then stock the Dwarf Angel, keep to one or two species at the very most, good choices are the Coral beauty, *Gerymyge nitrocaudus*, and the Flame angel, *C. Andochei*, which will often share the same aquarium in captivity. The golden nake with Tangs is to never mix species of the same genus. The Yellow tang, *Acanthurus flavescens*, and the Salmon tang *A. vaeruleus*, will fight to the death, yet you can introduce a small school of 4 Yellow tangs in the same aquarium, if introduced at the same time. Stay away from Butterflies until you are more experienced.

Andrew Caine

CAN FISH GET FLU?

I have a Yellow Tang, which has what looks like little black flecks all over it. I have been told that this is "flu", which, apparently has something to do with seagulls passing it on to snails and then to the fish. I was told to treat it with Myxazin, which should clear this up. Have I been told a load of rubbish or is it possible for a fish to get flu?

John Bates, via e-mail

This infection is commonly known as Black spot, or Black Godwin, it is actually Tubercularian worms which attach themselves to the skin of the fish. Heavily infested cases will show signs of attachment over the gills as well. This is fatal if not treated, as in the later stages skin haemorrhaging occurs resulting in secondary bacterial infection.

To treat the poor fish you must

remove it from any aquarium containing invertebrates, as a copper based medicine is required, such as Cuprazin. Another course of action is to perform freshwater dips for 10 - 15 minutes for 5 days, however, this must be monitored closely as you do not over stress the fish.

For some reason fish originating from Hawaii are most at risk, possibly a high Tubercularian population exists in these waters. If you know that your intended purchase is from this area, utilise a hospital tank and treat the fish as a precautionary measure before adding to your reef.

This Yellow Tang is perfectly healthy, but some from Hawaii may carry Black spot



Do look a gift horse in the mouth!

I have been given a 8W UV, which according to the outside is for a 227 litre tank. My marine tank is 400 litre +, but if I attach it to a powerhead which is pumping around 227 litre per hour then surely I can use this in my sump?

Paul Leeman via e-mail

It was nice for you to be given such a gift but the bottom line is that an 8w UV unit is exactly that and no more. 227 litres is the rated aquarium capacity, it will not protect a 400 litre system. The whole basis of UV protection is to pass a thin layer of water over a light wavelength of 253nm, this will disrupt DNA and kill all manner of nasties. The slower the flow over this light source the longer the contact time, the greater effect in sterilisation. You will need a bigger UV and, as with all filtration, go for the biggest your pocket can stretch to.

Andrew Caine

Star Letter Prize from Aqua Medic



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

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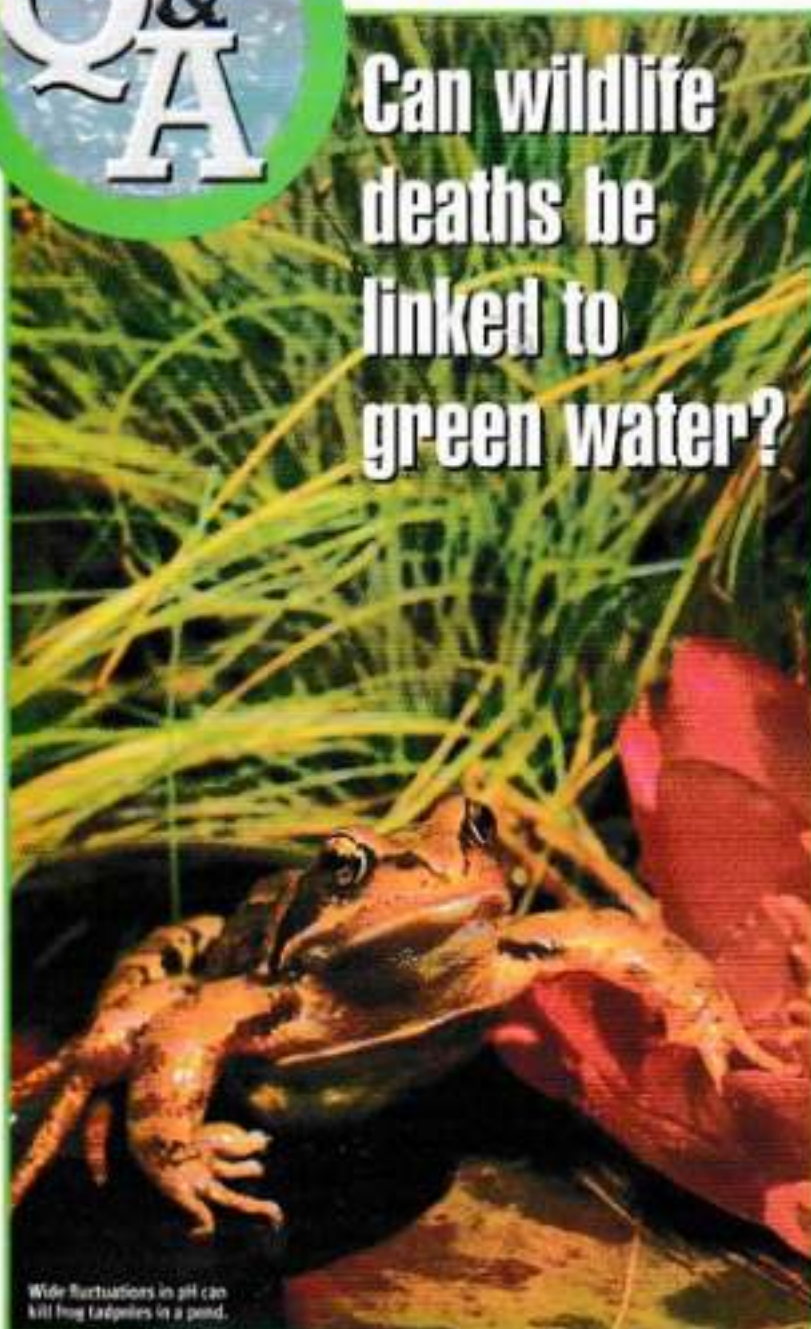
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Q&A

Coldwater

Can wildlife deaths be linked to green water?



Wide fluctuations in pH can kill frog tadpoles in a pond.

Q My new pond has turned a sickly shade of green. Since this happened it seems the Tadpoles, Water beetles, etc are dying. Could the two be linked? My local garden centre says that the green colour is due to harmless algae and will clear by itself once the ponds have established.

A Jane Moore, Christine Green water is not just unsightly but causes the pH to fluctuate wildly through a 24 hour period and it may be this which is affecting the Tadpoles and Water beetles. Hopefully, once the water is clear it will settle down and the wildlife will re-establish itself.
Bernice Brewster

Plagued by green water

Q I am seeking your advice about sorting out a problem with my garden pond. About a month ago, I established this pond with a butyl liner. It is about 3m x 2.7m and has a capacity of about 550 litres. There are planting ledges 23cm deep and the main depth is about 75cm. I have three Water lilies and lots of oxygenating plants. There is also a pump of suitable size operating a filter but I have terrible trouble with green water. I have used an algae treatment several times but the problem recurs within a week. The plants won't establish because the algae blocks the light and I don't want to keep pouring chemicals into the water as I would like to have fish when the plant cover is established.
Brian Belton, Lincoln

A I'm really sorry to learn that your pond is plagued with green water. The use of chemicals, as you have already discovered, is a short term solution. Permanent control of green water can be achieved by installing a UV light unit, which these days are relatively inexpensive. The UV light scrambles the green pigment in the algae, so that it can no longer use the energy from sunlight to manufacture sugars and so the algae dies. If you are pumping water from the pond to the filter, then you need to install the UV light before the filter system. If you use a gravity feed to the filter and pump the water back to the pond, then the UV should be installed after the filter unit. Take advice from your local retailer on the best way to fit the unit. Personally, I prefer them on a by-pass system of pipe work, so that part of the water flow is diverted through the UV after treatment the pipe can be reconnected to the main flow through the filter. If the light is placed between the pond and filtration system, in terms of maintenance, you should replace the bulb every year and occasionally clean the quartz sleeve of lime or lime-scale.
Bernice Brewster

TOUGH CUSTOMERS

One of the most popular aquarium fish, the beautiful Guppy, will thrive in quite low temperatures. These come in just about every colour you could wish for, and will almost certainly present their owner with brood after brood of little live-born fish. In a community the other fishes will certainly embrace their own form of population control, but a few will usually survive from each brood. The females are larger than the males, and not as brightly coloured, but if you wish to breed them you should keep at least two females to each male. If breeding is not desired, then you could keep only males. The females reach up to size, while the males are smaller. They will thrive on flake food, although like most fish, they do enjoy live food. The extreme hardiness of these fish can be illustrated by the tale of a group of fry produced by some adults who had spent the summer outside. Inevitably, they did not make it to the warmth of indoors, and were discovered by air inspection one day swimming underneath a frozen surface. Although they had not grown at all, they nevertheless survived, and when returned to the warmth indoors all grew into normal healthy adults. This is, obviously, not recommended treatment!



Guppies come in all shapes and colours, but all make good additions to a temperate aquarium.

for the bottom of the tank when born, as opposed to the top-swimming Guppies, so some mass or thickets of plants will protect them from the attentions of the other fish. Although prolific, Platy populations tend to remain more controlled than guppy ones in a community environment.

Never release fish into a wild habitat

When you have set up your temperate aquarium, you should derive many years of pleasure. However, sometimes people have to give up keeping fish due to the fault of their own. Hopefully, in these circumstances everyone would dispose of their fish sensibly, by giving them to friends or back to the shop. Occasionally, however, people are irresponsible, and think that it is kinder to drop their unwanted fish into the nearest river or pond. This is not only unkind to the fish itself, which will probably die, but a source of potential disaster to all the animals who already live there. If the abandoned fish survives and thrives, native species can be driven into extinction, and the likelihood of this is far greater with fish that can survive lower temperatures. If you have fish that you do not want, a trip to the shop is the easiest and best method of finding them a new home. ■



Walden Vain (*Vallisneria spiralis* and *biworsola*) is usually sold as "*Vallisneria tortu*".

PLANTING SCHEME

When planning your temperate aquarium, it is a good idea to include some plants. Although many plants are tropical, there are plenty that can be grown in cooler temperatures, and the fish recommended here will not dedicate themselves to plant eradication as do Goldfish. *Hemisarca*, *Ceratophyllum demersum*, can grow out of control in a pond, but in an aquarium can be trimmed back when necessary. Its feathery fronds make an ideal hiding place for fry, or just for individuals feeling antsy. *Egeria* produces long stalks of small, stiff green leaves, and reproduces easily from cuttings. *Risika* is a floating plant, more attractive and easier to control than the ubiquitous Duckweed. It flourishes in a wide range of temperatures, and if clumps are tied down it can be persuaded to attach itself to items of décor. *Vallisneria spiralis* grows long, reed-like leaves or *Vallisneria spiralis* var. *biworsola* which has twisted reed-like leaves.



Sea view

Mark was standing opposite me with a huge smile across his face, I was not smiling, I was struggling to come to terms with what he was saying. "OK let me get this into my head", I said, "you want to close down your 1350 litre reef and replace it with another IN YOUR COAL SHED".

The tank that Mark built

Original set-up

NOW MARK AND I HAVE BECOME GOOD friends over the past two years and knowing him as I do the coal shed in question would not be your normal concrete level to and the aquarium that was going to reside in such prestigious surroundings would not be your normal aquarium.

The aquarium that was being closed down was a very nice reef located in a conservatory, the sump filter was installed 50 metres away in the darkest depths of the cellar. Most of the equipment we would be able to utilise for the new project, however, a few minor adjustments would be required. The existing aquarium was shipped of livestock and isolated from the sump. Then the water temperature was increased to 34°C for 5 days, to ensure that any *Apocis* oozemones or other nautilus would not contaminate the new system. The 400 kg of live rock (some hiding in the sump) would then be utilised as base rock in the new project.



The coal shed at the beginning

Bye Bye old tank! Hello new 7,000 litre system

First thing was to clean and paint the coal shed. A new floor of non slip tiles would do



The trench dug by I dear old mum!

nicely it was, "Dad that ceiling please, cover that sky light with clear Perspex, we do not want anything dropping down contaminating the new aquarium." Soon a new room was emerging out of a once dirty coal shed. Mum was now not popular in the household, all they wanted was a bath. There was more work to be done, this was a family job, everyone got their hands dirty, and I have never seen so much dirt consumed after a day's work. Goodbye coal shed, hello Acropora House.

Pipe laying time

The drains to the sump, 5 x 40mm drains had to come down along side 2 x 40mm returns

from the sump to the aquarium. Space was limited and we did not want loads of pipe work in the cellar, getting in the way of sump maintenance. We agreed that the drains could connect to two 80mm pipes. Eight am the next morning we managed to liberate the beauty basket from his dear old mum's grasp, out came the pick axes and spades, all were pleased to see, the rest of us had a fry up, while she dug. Soon the pipes were laid coming up through the floor of Acropora House and down to the cellar.

Boys toys

While we were waiting for the aquarium base to be delivered, other work on the sump was on going. Dear old mum was allowed a few days off, so was the rest of

the family as this is Mark's domain, boys toys and all. First was the installation of an algae bed, in the end section of the sump, this is reverse illuminated by a single 250w metal halide to help with pH control. The Kalkwasser stirrer is also located at this end, along with a large fluidised bed calcium reactor. The kalkwasser injection is controlled via a pH probe, and fed with its own automated reverse osmosis unit. Whilst the calcium reactor is on line for five hours during the day, again this is computer controlled. We also installed twin RRF 4,000w sterilisers. Up this end is the automatic water changing unit, here salt water is mixed for water changes. A year ago we

MARINES: TANK INSTALLATION



Boys toys - In the right you can see Aqua-med's Turbofilter 5000 twins and tucked down in the right corner a blue globe sand filter, containing 25 litres of Rowaphos.

decided to utilize a custom water purifier not an RO, this allows us to keep the good constituents of the water whilst removing the bad. It also has another advantage as the purifier processes 4.5 litres of water every two minutes.

We now come to the pre-filter, where the twin 7.50w pipes return to the sump. After this we enter the powerhouse section of the sump. Skimming is via two turbofilter 5000 twins, with ozone injection controlled via rxdm computers. Phosphate removal is via a globe sand filter, using 25 litres of Rowaphos in a fluidised manner. Nitrates are also controlled via a nitrate reducer fed by Deniballs controlled again via a rxdm computer. Temperature is via heaters again controlled by custom made computers, and a chiller if things start getting a bit hot. Here we also have the plankton culturing site where live phytoplankton and rotifers will be grown to feed live food to the hard corals.

Now, how to take the water from the sump up to the aquarium? How I came up with a great idea, I was quite proud of this. First we would construct a large power conveyor belt, with 100 ten litre buckets attached to it. The buckets would take water from the sump up to the aquarium where they would drop the water, collect aquarium water and take it back to the sump. I was quite pleased with this. Mark was not, so we both agreed that a couple of

ITT Marine 1.5 and 2 horsepower pumps would do the job instead.

Taking shape

Now whilst we were talking about the sump, a bit of work had been going on at Acropore House. A stand was delivered, constructed

out of 50mm angle iron with 25mm MDF top, on which were placed polystyrene ceiling tiles. The girds were sealing on us that day for when in place it was level, job oh deep joy! (What we talk about level, any slight deviation is potentially serious, cracked tank and all). An air conditioner was dropped into the wall for an ambient room temperature, helping with water temperature control, and all was going well.

With all this, how were we going to light this beast? We already had a skylight to allow natural light onto the system, but now we needed to install some serious lights, with computer control. Seven 400W Metal Halides (3 blue, 4 white) were attached to the roof, we wanted to control each one, so a custom built control unit was supplied. (I would like to thank Paul Davies of Aqua-Medic for not blowing his fuse with my constant harassment in building this unit). We also have a moonlight to replicate the phase of the moon to get the hard corals to spawn (hopefully). We have not finished yet as I want to supplement this system with LED lighting. However, this aspect is having to wait a few weeks as at the time of writing,



On the right is the lighting control system which Paul Davies of Aqua-Medic specially created for this project.



The sump

Mark's wallet is currently undergoing treatment in the intensive care unit, for sheer exhaustion.

The aquarium arrives

With everything in place we were missing one important aspect, the aquarium itself! So the big day arrived and down the drive came a battered old transit coughing and spluttering as it parked. The doors opened and out popped Andrew and his mate from BOSS Aquariums, Build On Site Specialists. They had a look at the fit base and proceeded to build the aquarium. Mark and I constantly got in their way as they bit on their lips. We were only driven out of Acropore House by the overpowering smell of silicone. Five hours later the beast was in,



two very red faced, exhausted Seamus hopped into the dandy and set off up the Mo back to Folliott's, it's all in a day's work for them. The tank is a 9 shaped, the back pane being 3.2m long, coming out 2.4m, across 1.22m, back down 1.22m, across the front 1.83m and returning to the back pane 1.22m, with a height of 1.02m. The whole thing was constructed out of 9mm plate glass sides and a 38mm base.

After three days it was play time, seven tank connectors were in through the base, two returns and five drains. At equal intervals the drains were installed via vertical pipe at the back of the aquarium each connected to a threaded connector allowing the aquarium water height to be adjusted. The first pump return is 40mm pipe running the length of the aquarium at the back. Here we drilled countless 3mm holes and capped the two ends of the pipe, one spray bar, one very big spray bar, 40mm glass slabs were silked and 450mm out into the aquarium, on this egg crate another 40mm pipe run was constructed, instead of drilling holes every 150mm we glued a 40mm T piece for the main water return. Back siphoning was protected via non return valves and a closed loop pump system. With this in place water would be returned along the whole bottom of the aquarium under the rockwork, mixed and taken to the pump via drains at the surface of the aquarium, so good mixing is ensured. With some more glass we glued the base for a large cave at the back corner of the aquarium. We had to wait a few more days before the next aspect of the project reared its ugly head.

The 'Gold' arrives

The big day arrived, the day I personally had looked forward to more than any other in this job. Yes, the rock was coming down the drive, the rock was here, all 800 kg of it. Not your normal liverock, Oh no, that would be bad, for we had to consider size. If we used normal sized rock we would end up with a pile of small bits in a very large aquarium so

we had to order special stuff. Oh that beautiful Fijian ultra show liverock.

This gold was delivered in 40 kg boxes not the normal 20kg size, within each box was at least one bit weighing between 15-20 kg. This allowed us to create a natural seascape of overhangs, ledges etc whilst the weight of the pieces needed no glue for an absolute solid creation. The rock itself had been in the shallows for a few years longer than normal and so was covered by a large percentage of calcareous algae.

So there it was 800 kg in boxes, soaking of liverock from the old system, in a big pile, I looked at Mark, and said "what the hell do you want me to do with this lot" and ran



home. My wife and co worker Gary, dragged me back where I jumped screaming and kicking, into the aquarium ready for the job. Firstly I went the base rock, the old tank was not feeling too good at this time. Now I was passed very heavy, large, sharp blocks of rock, over the front pane of glass making sure it did not cut me, crush my back, snap my back or heaven forbid, even worse scratch the glass. Six hours later there it was. Three days later the aches and pains disappeared.

We kept the rock wet via a spray bar rigged up within the aquarium as it was

going to take some time to fill. Mark mixed a 1350l batch of new water, and pumped it up to the old aquarium. This new water was then circulated within the pump for 24 hours, after which the batch was sent up to the new aquarium, and so on until the tank was full. Then the spray bar was removed, the old tank removed, all final checks done and it was smelling. Caring live rock in situ, boy oh boy did it smell!

The sand bed

Mark wanted to keep, jawfish and Shrimp gobies along with the shrimp, so we had to create the correct environment for them. An 8 cm deep substrate bed was dropped in, this was a mixture of sand, coral gravel, and crushed scallop shells allowing burrow construction when the time arrived. We will keep the sand bed aerated utilising large burrowing beasts such as starfish.

An IKS computer monitoring system was installed in Armpans House, linked to a lap top so we can monitor all water parameters and even better get a graph to show full parameter movement over a 24 hour period. We also linked up 12 x 3,500 litre IKS variable power heads for water movement. These are programmed in a surge sequence with a 40% power reduction at night to replicate night time calm. This means that when at full power along with the return pumps the total water turnover within the aquarium is 64,355 litres per hour!

Job done, all we have to do now is stock!!!!

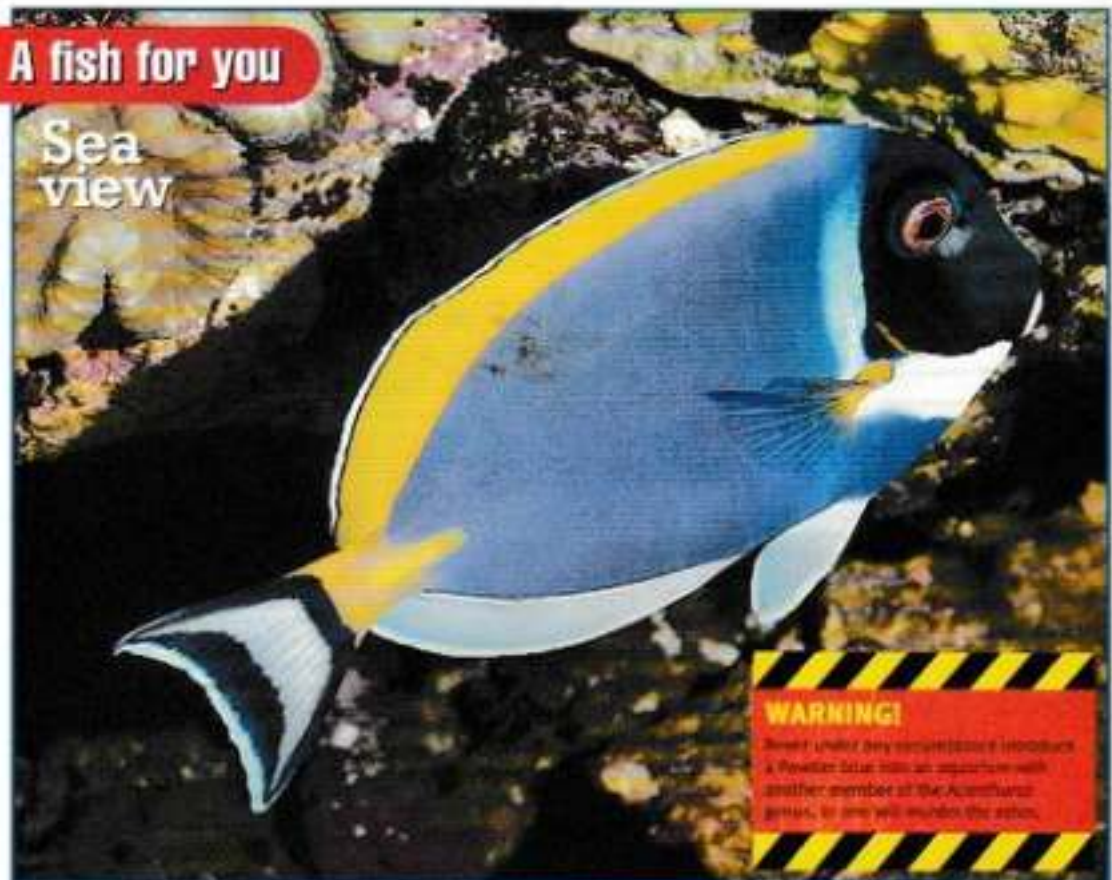
THANKS

Mark and I would like to thank the following companies for their help in this project. All Clear water purifiers, Arcadia, Aqua-Medic, Aquatic solutions, B055 Aquariums, D&D Aquarium solutions, Filtration, and Tropical Marine Centre.

Mark's mum would like to thank any company who produces brandy.



A fish for you

Sea
view**WARNING!**

Never under any circumstances introduce a Powder Blue into an aquarium with another member of the Acanthurus genus, or you will murder the fish.

Powder Blue Surgeonfish (*Acanthurus leucosternon*)

Surgeon fish, we have Yellowes, Solahs, Regis but none compare to a vibrant Powder blue and as the great Elvis once sang, "she's a devil in disguise". This is my exact thought about this fantastic Tang. What a fish it is, and what heartache many have suffered due to the love affair that exists between the Powder blue and the aquarist.

So what is the matter, why all this doom and gloom about this visual wonder? In a word Whitespot, in two words White spot and wipe-out, yes, even netting this animal can cause such outbreaks. So why do we try and how can we overcome such potential trouble?

You cannot beat such a fish for its beauty. It is not the most colourful of the Tangs, or indeed many other species of fish, but there is something about it,

Mainly blue in colour, what is special about that? I truly don't know, however, when you combine this with the texture of the skin, and its thick body, beauty jumps out and screams at you, it's weird really weird. That, and only that, is why so many try and, sadly, so many fail, but when you win - boy do you win!

To avoid the potential death trap there are many things to consider. A large aquarium is needed, at least 400-litres, they need plenty of open swimming room with holes in the rockwork to dart in and out of. A large cave is great, plenty of grazing off the live rock and a set-up at least 6 months old to ensure water chemistry stability. Use of a quarantine tank is advisable if possible and, if it is big enough, you can also treat with a copper based treatment as a precaution.

You should treat your Powder blue to at least three fresh per day with vitamin and algal enriched frozen and live foods. Supplement this with dried or fresh seaweed placed in a grip attached to the side of the aquarium. Any uneaten food should be removed after 24 hours and replaced with fresh. There must also be a

low grazing population within the aquarium to allow low competition for the grazing Tang. A healthy population of cleaner shrimps is also a good idea.

PROFILE

Family	Acanthuridae
Name	<i>Acanthurus leucosternon</i>
Location	Indo-Pacific
Feeding	Very important, a wide variety of foods, feed at least three times per day
Reef compatibility	Excellent
Tank mates	Peaceful fish
Size	22 cm
Difficulty	Hard

Tube anemones *Cerianthus* sp.

Francesca Susanna Cerianthus came sad the vicar as she christened my little baby girl a few months ago. Why oh why, did I do such a thing. Aquarium animals are personal facts, and I think that this is beyond all doubt the most, beautiful, graceful, elegant, animal you can hope to observe and keep in a marine aquarium. However, as with my little girl getting me up in the middle of the night, there is also a dark side to this beast.

Just look at the coloration within the tentacles, it ranges from dark brown to the most vivid orange, purple, red, yellow shall I go on? Virtually every bright colour you can imagine will be displayed. The way the coloration is displayed just adds to this wonder, offering a distinct split between the long outer tentacles and inner ring of short oral tentacles.

So where is that dark side, what should be avoided and how do we keep one?

Firstly, this is an anemone faced with potent stinging cells that pack quite a punch and they are not Clown fish safe. They also have the habit of shedding such cells more commonly when being handled, this results in free floating bullets waiting to be discharged on impact, the dark side. Sounds bad, but wait! If you add any anemone to an aquarium you run risks,

An invertebrate for you

Sea view



PROFILE

Phylum
Cnidaria

Name
Cerianthus sp

Location
World wide

Feeding
Small meaty foods at least twice per week.

Size
Commonly 10 cm, although some species can have a tube length of over 2m.

Water flow
Slow

Lighting
Normal tube lighting, is not effected by high intensity lighting.

Difficulty
Easy if all it's requirements are catered for, as always very good water quality.

but people do not think twice when adding a bubble or Mula anemone!

They like slow flow areas, and this allows the tentacles to be displayed for maximum visual impact, while the aquarium should be at least six litres for the safe disposal of shed cells. The substrate should be at least 4 cm deep with a grain size of no more than 2mm as this is what the tube is constructed out of. When acquiring one, feel the tube and look for a quick retraction. This is the sign of a healthy animal. On introduction,

gently squeeze the beast out of the tube and discard the tube, place the animal on the substrate and it should dig in. Offer small particulate food such as Brine shrimp and chopped Cockle to keep and enhance the coloration, vitamin enriched foods are essential.

This is a cracker, very long lived and easy to keep if treated correctly. Oh yes, if you think naming my baby girl after one is bad, then never ask me what my 5 year old boy is named after!

Feed your fish and not your algae

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AUGUST 2002 TODAY'S FISHKEEPER 25

At home with Malawis



Ad Konings has 30 years experience with Malawi cichlids and is widely regarded as one of the world's authorities on the fishes of Lake Malawi. In the second part of this series he looks at sediment-free rocky habitats and some of the fish that live there.



Male *Mbuna* from Iliuli.

SEDIMENT-FREE ROCKY HABITATS ARE normally populated by large numbers of Mbuna. Food is available in abundance and thus competition is mainly for territories. The result is that every square metre has been claimed by one Cichlid or another. The size of the rocks may vary from football-size to huge boulders several tens of metres in diameter. The sediment-free zones are usually located on rather steep sloping shores where the sediment accumulates at the base of the rocks (rather than on them), where the gradient changes to the slowly-sloping sand floor.

Food sources

The rocks are invariably covered with a layer of *aufwuchs* which contains green algae in the shallow areas. The *aufwuchs* consists of a variety of algae: the tough strands of some

filamentous algae (*Cladophora* and *Codium*) are attached to the rocks and form the matrix on which other algae, the so-called 'loose *aufwuchs*', grow. The loose *aufwuchs* contains different types of algae strands, but the many unicellular algae (*diatoms*) also found on it may constitute its most nutritious part.

No vertebrate animal is capable of digesting the outer wall of a plant cell without the help of micro-organisms. To be of nutritive value this wall has to be mechanically broken or crushed in order to expose the easily digestible contents of the cell. Diatoms have cell walls perforated by many pores and are therefore rapidly digested. It is, however, far from certain that the amounts of diatoms available are by themselves sufficient to support a healthy population of Mbuna. The bio-cover contains not only algae but, intermingled with the

algae strands, there are enormous quantities of invertebrates, which, packed in a mass of algae, are an important source of protein for the Mbuna. Nevertheless, because algae dominate stomach contents in most species, we call these species herbivores, although the foods that really make Mbuna grow are (besides the digestible diatoms) micro-organisms, insect nymphs and larvae, crustaceans, mites, snails, and zooplankton, i.e. not vegetable materials at all.

Those Mbuna that do approximate to true herbivores have numerous fine teeth on the pharyngeal bones. The upper and lower pharyngeal teeth are rubbed against each other and partially crush the algae cells between them. Nevertheless a lot remain intact and leave the body as a kind of indigestible fibre. To allow the digestive juices enough time to penetrate the broken



algal cells, the intestine of herbivores is considerably longer than the fish itself (up to ten times longer). In some piscivores the intestine may be only 30% of the fish's length. The long gut in herbivores serves as a holding reservoir, as these species have a large intake of slowly digestible food. Typically, the lining of the body cavity in herbivores is pitch-black. This stops light from penetrating the cavity and thus prevents the chlorophyll in the algae from producing oxygen; otherwise this gas would blow up the fish as large quantities of chlorophyll regularly pass through the gut. Thus, without investigating the gut contents, we can tell immediately if the fish in question feeds on algae or has a carnivorous diet.

The rocks of this habitat create many caves and crevices that are used by Mbuna as spawning-sites. Sometimes, in places with large boulders, the caves are deep and high. Such caves are preferred by some species of the genus *Cynotilapia*, most of the species of the *Pseudotropheus elongatus* complex and a few large non-Mbuna (e.g. some *Aulonocara*). Many cave-dwelling Mbuna have a black ground colour in common. The specific colour pattern of males of such species is not black markings on a coloured background as often assumed, but the reverse coloured pattern: on a black background.

The classic zebras

The sediment-free rocky habitat is home to the 'Classic zebra', *Metrioclimus zebra*, and a number of other *Metrioclimus* species known collectively as 'zebras', which can be classified in three different groups.

The first group consists of *M. zebra* plus *M. mbenzi*, *M. sp. "zebra blue"*, and *M. sp. "zebra slim"*. *M. zebra* is found only in clear water at sediment-free rocky coasts and does not have a continuous distribution, while the other species are found between populations of *M. zebra*, in waters which are less clear. Except at Mphanga Rocks *M. zebra* (or any other member of this sub-group) does not occur in the northwestern part of the lake.

The second species group also has a wide distribution and consists of the 'Cobalt Zebras', *M. collaris*, *M. estherae*, and *M. sp. "estherae blueface"*. The third group is made up of large 'zebras' that are found mainly at extensive nutrient-rich rocky coasts. This group includes *M. fainzilber*, *M. sarnocemus*, and *M. sp. "zebra chilumba"*.

All the species in all of these 'zebra' groups exhibit polychromatism, i.e. their

MARMALADE CATS

Mate recognition in some widely distributed Mbuna is based not just on male coloration but also on the characteristic shape and behaviour of the male. It is only in these species that the so-called orange (O) and orange-blotch (OB) (Fryer & Iles, 1972) morphs evolved. In these species a number of females are, instead of the usual beige, grey or brown, completely orange or orange with black blotches. The orange colour results simply from a lack of black pigment, a mutation that is frequently observed in Cichlids.

Because coloration is so important in mate selection (i.e. the female selecting her mate) in maternal mouthbrooders, the existence of these 'deviant' O and OB

populations of the Red zebra (*Metrioclimus estherae*) orange females are far more common than OB and normal coloured ones, making it unlikely that such a pattern (a morph) has established itself for reasons of camouflage.

OB morphs seem to have evolved mainly in the older species with a wide distribution, perhaps because males of these species do not regard female colour as a critical factor as they instinctively know that females can have several different colour patterns. They even court such conspicuously coloured females. One possibility is that the normal coloured females resemble those of a host of other (sympatric) species, and, since a male is better off courting only females of his own species, the OB trait may have evolved (or stabilised) in

females in order to facilitate the male's choice (in my opinion sexual selection occurs in both directions, i.e. also males select their mates), thus preventing the male from wasting energy courting



Female *M. estherae* from Mpus Reef exhibiting the orange pattern.

colour morphs in Mbuna needs an explanation, as these Cichlids are maternal mouthbrooders. Some (certainly not all) females with OB coloration probably have the advantage that they are much less conspicuous against the background of granite rocks that prevails in their habitat, but orange females are certainly not. In some populations the blotched pattern matches the prevailing structure of the rocks of the environment. Such specific OB patterns are sometimes found in females of several different species at a single location, e.g. those of *Metrioclimus zebra*, *Oxyechinus mono*, and *Lobostropheus fainzilber*.

The orange morph, which is comparatively rare, is an OB pattern in which most of the black pigment is absent. The O morph has the disadvantage that it is more conspicuous than the normal morph, but this is probably an inevitable result of the nature of the OB pattern. In some

species. Following this hypothesis, the frequency of OB females in a population may thus be dependent on the number of similar looking females of other species at the same locality. OB females, of course, are not aware of their aberrant coloration, and breed with the same frequency as normal females. It is thus up to the male to decide whether to accept their advances or chase them from his territory.

OB males also exist and these 'interestingly coloured males' are called 'marmalade cats' in the aquarium trade;



Female *M. estherae* from Mpus Reef exhibiting the orange blotch pattern.

a name derived from the Chichewa word 'namakate' used for all OB Mbuna. An OB male, however, is not, or only very poorly, recognized as a potential mate and is therefore very unproductive.

Male *M. zebra* from Malawi.

populations contain OB (orange blotch, i.e. orange with black blotches or spots) and/or (orange) morphs as well as normally coloured individuals. This is the main reason for grouping these fishes together.

Feeding strategies

All species of the *M. zebra* complex feed in a position perpendicular to the substrate. The teeth in the upper jaw in each jaw have a decile cup and function as a comb. The teeth in the lower jaw have three cusps and are molar. When the fish eats, the mouth is opened wide and the jaws are pressed against the substrate. As the mouth is closed, the teeth comb the so-called loose outgrowth from the rocks. The filamentous algae remain fixed to the substrate. *M. zebra* is specialised for this kind of browsing, but when plankton is available in sufficient quantities they usually feed from this source instead. Females do not have territories and congregate in large groups while feeding from the plankton in the water column. Males normally forage from the bio-cover within their territories, but when plankton is abundant they join the females and juveniles in the water column.

M. zebra spawns in caves and the eggs are fertilised inside the female's mouth. The fry are guarded and lake refuge inside the female's mouth for a few days after release. Mate recognition in *M. zebra* may be dependent on several factors, of which colour is just one. The courting behaviour of the male, his territory, his contours, his scent, and the way he feeds from the substrate, may be important features that the female evaluates during courtship. Furthermore, since *M. zebra* is sedentary and males have permanent territories, a female may remember where certain males in her neighbourhood have their domains. All these factors may combine to produce an accurate species-recognition 'picture' without male coloration being the sole trigger. Although male coloration is probably the dominant factor for mate selection in any territorial Mbuna, a few territorial species (i.e. *M. zebra*, *I. julidoboni*, *I. newmaniae*, and a few species of *Tropheus* seem nevertheless to have found (or retained) additional ways of achieving partner recognition. This also means that males must recognise OB and a females in order to pass on the polymorphic genes. ■

TODAY'S Reader Offer

Ad Konings runs his own publishing company called Cichlid Press, which produces a great range of books, CDs and videos. Since these are very difficult to obtain through normal aquatic outlets, today's Fishkeeper has teamed up with Cichlid Press (UK) to offer a selection of their publications.

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Top of the Pops the Tetras

Our series features all the most popular aquarium fish in the trade and some of their lesser known cousins who are the "Wannabes" of the fish world

PHOTOS: M.P. & C. PIEDNOIR

Neon tetra

Neons come in several different colour forms now, but this is the natural wild form.



OUR VERDICT

This is a wonderful fish which has been a mainstay of the hobby since it was first introduced. One of the all time greats!

Name	Neon tetra
Scientific name	<i>Pareuchelodon innesi</i>
Aquarium type	60 x 30 x 30cm
Distribution	Peru
Diet	Not fussy. Flake, small granular, frozen and live foods.
Companion species	Well suited to a small sized community aquarium with other peaceful fish.

Glowlight

Wild caught Glowlights have a rich red stripe and bright white lips to their fins.



OUR VERDICT

A hit from the moment it was introduced and now firmly established as a "top of the pops" species.

Name	Glowlight tetra
Scientific name	<i>Neon tetodon erythronus</i>
Aquarium type	60 x 30 x 30cm
Distribution	Guyana
Diet	Flake, small granular, frozen and live foods.
Companion species	Any small peaceful community fish.

Splash tetra



A beautiful male Splash tetra.

OUR VERDICT

A real "Wannabe" which should reach "top of the pops". Availability has always held it back since many years can go by between imports. New captive bred is large so should see more of them about.

Name	Splash tetra
Scientific name	<i>Copella arnaldi</i>
Aquarium type	60 x 30 x 30cm
Distribution	Guyana
Diet	Eats all floating foods but will also follow food down to the substrate.
Companion species	Any small community fish which lives in the middle to lower part of the aquarium.

Congo tetra



A shoal of Congo tetras seen in sunlight are as beautiful as any fish in the world.

OUR VERDICT

An excellent community fish which justly deserves to be "top of the pops".

Name	Congo tetra
Scientific name	<i>Phenacogrammus interruptus</i>
Aquarium type	90 x 30 x 30cm
Distribution	Zaire region
Diet	Not fussy. Flake, pellet, frozen and live foods.
Companion species	Well suited to a large sized community aquarium with other peaceful fish.

Rummy-nose tetra



There are several different species of Rummy-nose tetras but this is the most attractive.

OUR VERDICT

An excellent community fish which rightly deserves to be "top of the pops" - but isn't. Spoilers can be erratic and unless totally tame in their surroundings they lack colour.

Name	Rummy-nose tetra
Scientific name	<i>Metinigmaus bleheri</i>
Aquarium type	60 x 30 x 30cm
Distribution	Brazil & Columbia
Diet	Not fussy. Flake, small granular, frozen and live foods.
Companion species	Well suited to a small sized community aquaria with other peaceful fish.

Emperor tetra



Emperor tetras make a great display in a shallow tank.

OUR VERDICT

A lovely fish which has lost out to its better known cousin because supplies can be erratic. A "Wannabe" which deserves to be "top of the pops".

Name	Emperor tetra
Scientific name	<i>Nematobrycon palmeri</i>
Aquarium type	60 x 30 x 30cm
Distribution	Columbia
Diet	Easy to feed taking flake, small granular, frozen and live foods.
Companion species	Well suited to a small sized community aquaria with other peaceful fish.

Cardinal tetra



Cardinals have the red stripe running along the length of their bodies.

OUR VERDICT

This fish was a bit right from the moment it was introduced. It is touchy about water conditions, prices can be high and supplies erratic - yet very much a "top of the pops".

Name	Cardinal tetra
Scientific name	<i>Paracheirodon axelrodi</i>
Aquarium type	60 x 30 x 30cm
Distribution	Brazil, Colombia & Venezuela
Diet	Good quality flake, small granular, frozen and live foods.
Companion species	Any peaceful community fish.

Bountiful Belize

Early this year *Today's Fishkeeper* magazine followed a team of aquarists on holiday in Belize. This is the story of their trip, 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

Part Two

FROM THEIR NORTHERN BASE OUR TEAM OF intrepid explorers moved south back towards Belize City. Along the way they stopped and fished at many different streams and pools. Much of the lowlands of Belize are swampy and have a high salt content which makes farming difficult. Despite this many crops are produced in these areas and the aquatic habitats teem with fish. A constant companion in this area was the Mangrove molly (*Poecilia latipinna*). As Moltes go this is the biggest of the short-finned species. The largest specimens seen were easily 55cm although our team only managed to catch youngsters. You don't get



A young Mangrove molly, fully grown males may be in excess of 55cm and have beautiful blue patterning in their fins.



A typical swampy habitat in the lowlands of Belize.



Dave McAllister was determined to catch some of the larger Mullies - but he failed miserably, but did not fail easily for the cameraman!

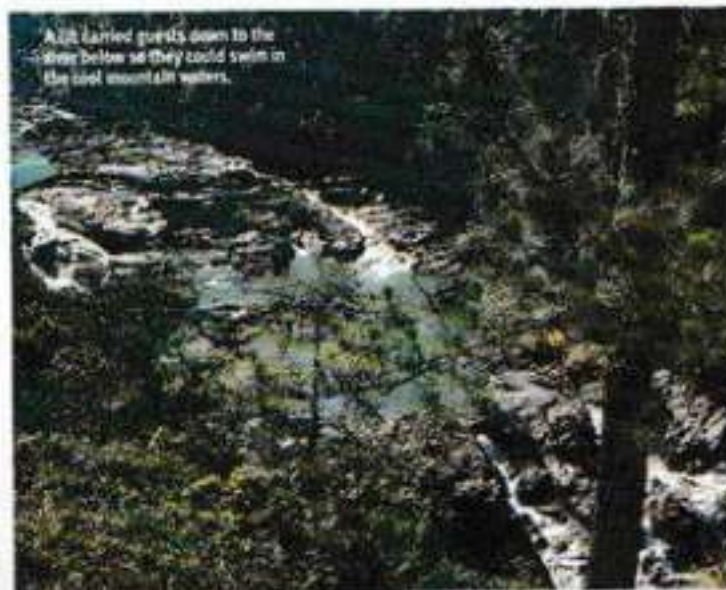
to be a big fish like these without being a wily critter well able to avoid the nets of your typical fish catcher.

From this swampy land our team headed inland and upwards. Dominating Belize are the Maya Mountains. These contain steep slopes and a few areas of flatter terrain found at higher elevations. They were once part of an ancient highland plateau and are considered some of the oldest land in Central America. The soil here is generally shallow, stony and very acidic which give rivers that flow through this area a totally different chemistry to that of the lowland or northern areas of Belize. Fish have had plenty of time to evolve into new species in this area, but due to the lack of roads only a few new ones have been discovered yet. More will no doubt follow as this part of the country becomes more accessible.

The team's destination was a hotel tucked



All the roads in the Mountain pine ridge forest reserve are dirt tracks and very difficult to drive on in bad weather.



All carried guests down to the river below so they could swim in the cool mountain waters.



Rio Macal at Guatemal bridge.

TROPICAL: FISH SAFARI



The muddy colour of this pool was caused by a crocodile stirring up the substrate. Our team tried to avoid fishing in such pools again!

very soft and moderately acidic water.

Catching the fish themselves proved to be difficult. Adults were impossible to find in the main river but lots of youngsters could be caught at the surface. Brian decided to try in a very muddy pool just to the side of the main river. During higher water levels this would be flooded so there should be some fish to be found. Here he caught the

only adult Molly, a mature female. At the time nobody gave the muddy look to this pool a second thought until a British army truck pulled up. The soldiers were very interested in what anyone would want to be splashing around in a pool which contained a very large crocodile! After some discussion it was decided not to tell Brian just yet in case he could catch some more adults! ■



Despite being one of the major roads of Belize many bridges are still only wide enough for one vehicle and some parts are still unpaved.



Everyone wanted to photograph and film the new Molly.

NEW MOLLY

Teresa's Molly has now been bred in captivity and found to be a highly adaptable fish. Fry are produced on a 5 weekly cycle at a temperature of 24 °C. Both mother and fry are gluttons eating all foods. They adapt well to a range of conditions and will live happily in soft acidic water as well as hard alkaline water. Since no adult males were caught on this trip it remains to be seen just what they look like as fully grown fish.



This field photograph shows very little of the true colour of this fish. The belly actually gleams with a blue sheen in sunlight and the fins are pale orange.

TROUBLE WITH TRANSPORT

On any trip your transport is vital. Hire the best car or minibus you can afford or find. Our team had done that but had still been hit by a few problems with the back doors. Nothing, however, can prevent someone from doing something silly. This particular vehicle could be locked by accident when getting out of the van, just by accidentally catching a button on the door. At another river just a few miles away that is exactly what happened with the keys still inside. In the end one of the smallest windows had to be smashed to get back in.

Back at base that evening and after some frantic phone calls it was obvious that the only place our team could get the window replaced was back in Belize City. At that stage it looked like it was going to cost \$3000 or more to repair. Not a good prospect for anyone. The next morning everything was loaded back in the van and our explorers, rather sad faced, headed back to the big smoke. On the outskirts of the city they stopped at a breakers yard who pointed them in the direction of the only place which might have the window they needed. They came up trumps and a second hand window was fitted in no time at all. A quick stop at the bank in the heart of the city to replenish funds and then back on the road heading southwards.



Not a happy sight.

To be continued...



Belize city is where a little piece of Britain, the Caribbean and Central America all meet. It is a lively city with a blend of cultures like nowhere else on earth.



No M.O.T. is needed in Belize but it is amazing just how beaten up a truck can be and still work. This one came flying by while we were at the Rio Macal.

Don't miss next month's installment

Don't miss next month's installment. Our intrepid explorers have to deal with a thief in the night and search for a very pretty livebearer.

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.

Finding a vet

Re June 2001 issue AMP Surgery, P12&3, Fancy Goldfish

I have been meaning to write to you for some time now about this particular article. Last Christmas a friend gave me your magazine as a gift from her extended holiday in England which was a pleasant surprise. The first page I opened was this article on the Oranda Goldfish's operation. Well I tell you it was just the information I had been seeking, not only that but people laughed at me when I mentioned my Oranda goldfish Chuckie needed plastic surgery. This article certainly made me rethink fish, not as just a fish but as an animal with real needs and worthy of consideration.

The day after receiving your magazine I took this article along, together with my Chuckie, to the local vet as he was in much worse condition than the Oranda pictured. His cap had grown rapidly and he could not lift himself off the gravel, he barely moved, his breathing was extremely laboured, his belly had become a square shape. Something had to be done. The vet searched the internet for more information about the procedure but a fellow vet told him to forget it and so he was not happy to try it. I telephoned several vets after that to no avail because none of them had ever operated on a fish before, so it was then I decided it was do or die for 'Chuckie'. I'm a wildlife carer and quite often we have to resort to unorthodox methods with birds and frogs, using a D.I.Y. treatment which really worked. Chuckie is now a very happy Oranda swimming and eating normally.

God bless from Australia

Marilee Ruth O'Souza Orelia, Western Australia

Ed. Note: - We don't normally suggest people operate on their own fish but finding a vet with the skills, knowledge and interest in fish like Linda Jepson can be very difficult. This situation has led to a thriving business for fish health "Gurus". Some of these people are well qualified and knowledgeable specialists providing a vital service for aquarists. Others, however, are "Quacks" which shouldn't be at anywhere near your fish pond or aquarium.



Just because it is a Goldfish doesn't mean it doesn't deserve proper medical care.

Praise for Aquarium Pharmaceuticals

I have enjoyed keeping fish for over twenty years and I have found the quality of products available from Aquarium Pharmaceuticals (AQ) second to none. I use Stress Coat when purchasing new fish and transporting them home before introducing them to my quarantine tank and finally display tank. I use it at intervals as required. This gives a helpful barrier and reduces fish loss. Stress Zyme is another valuable

product when starting or boosting my biological filter.

Recently my friend took me to his house to see his Koi pond. Water quality looked good and the fish perfect. He told me that he uses TCP in his pond. Can you please tell me if this is a safe product. Personally I will continue to use approved products.

G. Robinson, Tile Cross, Birmingham.

Ed. Note: You are wise to use only those preparations which are produced specifically for fish. Many human medications are lethal to fish. I do know TCP at very low dosage rates has been

used by fishkeepers for years, but what long term exposure to the medication does to fish or of what benefit it is to the fish is unknown.

Equipment makes fish keeping so much easier

Dear Editor, I think today's fish keepers are very lucky in the variety of fish that are for sale these days. There is also a wonderful range of equipment and products that make

fish keeping so much easier. Certainly this is very true of marine keeping. I have noticed that many more aquarium shops stock machines than they used to. The best things I know are the all-in-one tanks, you don't have to worry about searching for all the pieces of kit you need as its all in the tank already (well nearly all of it).

Jack Young, Maldenhead
Ed. Note: The hobby has certainly changed dramatically in the 37 years I have kept tropical fish. Marine keeping, in particular, has changed over the last 10 years. This is why we take such care in choosing our contributors.

FISH 30A

FISH 30

CROAKING GOURAMI

Trichopsis vittata

				
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PHOTO: MAX G. HES

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Today's
Guide to...HEATING YOUR
AQUARIUM

Something as essential and basic as heating a tropical fish tank requires a little more thought than most of us give it

TROPICAL FISH AND plants need to be maintained within a certain temperature range. To do this there are a range of different options available. The most popular is the internal combined heater/stat. Lots of different companies produce these and they come in a range of powers to suit the volume of aquarium water. As a rough guide you need 2 watts per litre of aquarium water, although this will depend on room temperature. Check out the exact chart to be sure what you need.

If your aquarium contains 100 litres you may need a 200 watts heater/stat. This is best supplied by two units rather than one, so you would buy 2 x 100 watt units. The reason for this is in case one of the units fail. If it fails in the off position the other heater will keep the temperature warm enough so

the fish won't die. If it fails in the on position (as many do) then it will not be powerful enough to boil your fish. This is a good reason not to buy units which have a higher wattage than those quoted.

WARNING

Under no circumstances should any internal heater be switched on without being submerged in the aquarium.

Combined heater/stat/filters

For a long time now some external power filters contain a heater/stat and will heat the tank for you as well as filter it. These are not a cheap option but are generally made to a very high standard. These are worth considering because they reduce the amount of equipment in the aquarium. If you have big fish which are prone to attacking anything in their tank (discuss how to throw things around) then this would be a really good option. You only have the filter intake to worry about then and these can be protected much easier than a glass tube.

A new innovation last year was an internal version of these. These are suited to small aquaria and again have the advantage of reducing untidy equipment.

Under tank heater/stats

These are another option, although not so popular. They have to be installed correctly or there is a risk of the aquarium bottom cracking but if you follow the instructions correctly then everything will be fine. These units have the advantage of warming the substrate as well as the aquarium water, so plants tend to grow better in tanks heated this way.

External thermostats

Originally heaters and thermostats came as separate pieces of equipment which had to be carefully wired up in the correct sequence before they could be used. Today these have mostly disappeared,

Interpet's *thermafilter* is a combined internal power filter and heater/stat.



however, in certain circumstances they are still useful. Some tanks are too shallow or small to house one of the bulky heater/stats. In these situations an external thermostat will be useful. Also if you use an under tank heater you will have an external thermostat. These work just as effectively as the internal versions but have lovely little knobs that children love to play with. Bear this in mind when you are positioning this type of equipment. ■



Tetra produces a range of heater/stats.

POWER CUTS

Power cuts are a fact of life and happen from time to time in any part of the country. The first thing to do is to turn off the power to the aquarium. If you have a power cut, your fish will not starve for a few minutes. In fact, it's best to have a large aquarium to rise from a power cut. However, if you have a small tank, make sure the lights are switched off in the tank. Then take a large black blanket and cover the tank completely. The top is where most heat will be lost so the more insulation you can have over this area the better. Now ring the local power company and ask how long the power will be off for. If it is only going to be for a few hours then you don't have a problem. If it is days, then you do it the weather is odd. In this case you will need some way of heating the house - and the warmer the better.

Recommended TetraTec model

*Room temperature minimum, degC, assuming tank is at 25°C

Tank volume (litres)	16	18	17	18	19	20 or above
25	HT75	HT75	HT50	HT50	HT50	HT50
30	HT75	HT75	HT75	HT75	HT50	HT50
75	HT100	HT100	HT100	HT75	HT75	HT75
100	HT100	HT100	HT100	HT100	HT100	HT100
125	HT150	HT100	HT100	HT100	HT100	HT100
150	HT150	HT150	HT150	HT100	HT100	HT150
175	HT200	HT150	HT150	HT150	HT100	HT150
200	HT200	HT200	HT200	HT200	HT150	HT150
225	HT200	HT200	HT200	HT200	HT200	HT200
250	HT200	HT200	HT200	HT200	HT200	HT200
275	HT300	HT300	HT200	HT200	HT200	HT200
300	HT300	HT300	HT300	HT300	HT300	HT300

Recommended wattage

*Room temperature minimum, degC, assuming tank is at 25°C

Tank volume (litres)	16	18	17	18	19	20 or above
25	75	75	50	50	50	50
30	75	75	75	75	50	50
75	100	100	100	75	75	75
100	100	100	100	100	100	100
125	150	100	100	100	100	100
150	150	150	100	150	150	150
175	200	150	150	150	150	150
200	200	200	200	200	150	150
225	200	200	200	200	200	200
250	200	200	200	200	200	200
275	300	300	200	200	200	200
300	300	300	300	300	300	300

Sun Plec

Scobiancistrus aureatus



Today's Diary Dates

August's show, auction and club meeting dates

Copy for Today's Diary Dates

Copy for Today's Diary Dates should be sent to Today's Fishkeepers, 48 Winchester Courts, 3 Frome Park, Frome, Wiltshire, Avon Glos, telephone 01457 885354, fax 01457 269333 or e-mail deborah@today.co.uk copy deadline 8 weeks before publication date.

Thurs 1st	Fairley A.S. meeting. Contact: 01781 56286 Sandgrounders A.S. meeting. Contact: 01274 541377	Sat 10th	Perth open show & auction. Contact: 01748 031906 Greater Manchester Child Society open show & auction. Contact: 01625 347335
Fri 2nd	Northwest Child Group meeting. Contact: 01422 267333	Sat 11th	Perth open show & auction. Contact: 01748 031906 Greater Manchester Child Society open show & auction. Contact: 01625 347335
Sat 3rd		Mon 12th	Kirkcaldy A.S. meeting. Contact: 01748 630036 British Aquarist Society (Goldfish) meeting. Contact: 01292 212707
Sun 4th		Tues 13th	Blair AD A&P Society meeting. Contact: 01843 811119 Grimsby & Cumbrians meeting. Contact: 01427 348178 St Helens A.S. meeting. Contact: 0151 606013 Ayrshire Fishkeepers Association meeting. Contact: 01896 567277
Mon 5th	Kirkcaldy A.S. meeting. Contact: 01748 630036 Salway A.S. meeting. Contact: 01249 790006 St Helens A.S. meeting. Contact: 0151 606013 Ayrshire Fishkeepers Association meeting. Contact: 01896 567277	Tues 13th	Derwin A.S. meeting. Contact: 01161 791011 Northwich A.S. meeting. Contact: 01606 842666 Carr-Lyda A.S. meeting. Contact: 01821 527164 Hillhead & D.A.S. meeting. Contact: 01952 469771 or 01952 864646 Lang Town Aquarists and Pondkeepers Group meeting. Contact: 01200 962575 Northern Goldfish and Pondkeepers meeting. Contact: 0161 967557
Tues 6th	Southend Leigh & Dole A.S. Contact: 01707 861346 Paisley & District A.S. meeting. Contact: 01463 620000 Dumfries & D.A.S. meeting. Contact: 01882 707780 Greenwich D.A.S. meeting. Contact: 01875 744719 York & Dist. A.S. meeting. Contact: 01924 634777 The Fish Tropical Fish Society meeting. Contact: 0161 676176 Hullion A.S. meeting. Contact: 0151 480800 North Beck A.S. meeting. Contact: 01692 577333 Oldham A.S. meeting. Contact: 0161 281 3775 Preston A.S. meeting. Contact: 01772 39106 Lang Town Aquarists and Pondkeepers Group meeting. Contact: 01200 962575	Wed 14th	Leithgow Aquarist Society meeting. Contact: 01328 310518 Hullion A.S. meeting. Contact: 015274 88427 Tunbridge Wells A.S. meeting. Contact: 01893 719593 Bridford A.S. meeting. Contact: 01223 652547 01223 837799
Wed 7th	Corby & D.A.S. meeting. Contact: 01507 67276 Oasis Fish Club (Dunderland) meeting. Contact: 01454 311 Hemel Hempstead meeting. Contact: 01783 258233 Perth A.S. meeting. Contact: 01748 630036 Clackston Fish Keeping Club meeting. Contact: 01225 490045 Portsmouth A.S. meeting. Contact: 01303 883312 Brockwell A.S. meeting. Contact: 01884 481287 Workington A.S. meeting. Contact: 01920 422951	Thurs 15th	Sepambr area Today's Fishkeeper on sale British Tropical Fish Club meeting. Contact: 01748 2145 Felling A.S. meeting. Contact: 01292 816406 Sandgrounders A.S. Contact: 01274 541377 Croydon A.S. meeting. Contact: 01881 654046
Thurs 8th	Mid-Sussex A.S. meeting. Contact: 01273 660407 Kings Lynn Fish Club meeting. Contact: 01553 760724 York D.A.S. meeting. Contact: 01774 789839 Greenwich meeting. Contact: 01896 567277 Kings Lynn Fish Club meeting. Contact: 01553 760724	Fri 16th	Greenwich open show & auction. Contact: 01606 842666 Ayrshire A.S. meeting. Contact: 01896 567277
Fri 9th	Yorkshire Child Group meeting. Contact: 01974 391006 Basingstoke A.S. meeting. Contact: 01256 396144 West Cornwall Fishkeepers meeting. Contact: 01200 71886	Sat 17th	Greenwich open show & auction. Contact: 01606 842666 Ayrshire A.S. meeting. Contact: 01896 567277
		Sun 18th	Kirkcaldy A.S. meeting. Contact: 01748 630036 Thorpe & D.A.S. meeting. Contact: 01953 606166 Society A.S. meeting. Contact: 01247 732606 Menyshire Aquarist Society meeting. Contact: 0151 261 3666
		Mon 19th	Greenwich open show & auction. Contact: 01606 842666 Ayrshire A.S. meeting. Contact: 01896 567277
		Tues 20th	Workington A.S. meeting. Contact: 01920 422951 Hullion A.S. meeting. Contact: 015274 88427 Tunbridge Wells A.S. meeting. Contact: 01893 719593
		Thurs 22nd	Southend Leigh & Dole A.S. Contact: 01707 861346 Greater Manchester Child Society meeting. Contact: 01625 347335 Midlands Marine Aquarists Society. Contact: 01203 6491 Oldham A.S. meeting. Contact: 0161 281 3775 Lang Town Aquarists and Pondkeepers Group meeting. Contact: 01200 962575
		Fri 23rd	West Yorkshire Marine Aquarist Group meeting. Contact: 01924 634777 Clackston Fish Keeping Club meeting. Contact: 01225 490045 Tropican Aquarists Society meeting. Contact: 01292 816406 Portsmouth A.S. meeting. Contact: 01303 883312 Beverley & Gosport Harbours. Contact: 01482 728626 Perth A.S. meeting. Contact: 01748 630036 Brockwell A.S. meeting. Contact: 01884 481287
		Sat 24th	Mid-Sussex A.S. meeting. Contact: 01273 660407 Greenwich meeting. Contact: 01896 567277 Kirkcaldy A.S. meeting. Contact: 01748 630036 Ayrshire Fishkeepers Association meeting. Contact: 01896 567277
		Sun 25th	United Scottish Aquarists open show & auction. Contact: 01248 934086
		Mon 26th	Kirkcaldy A.S. meeting. Contact: 01748 630036 Ayrshire Fishkeepers Association meeting. Contact: 01896 567277
		Tues 27th	Northwich A.S. meeting. Contact: 01606 842666 Oyle Aquarist Society meeting. Contact: 01463 620000 Lang Town Aquarists and Pondkeepers Group meeting. Contact: 01200 962575 Greenwich D.A.S. meeting. Contact: 01896 567277
		Wed 28th	Workington A.S. meeting. Contact: 01920 422951 Hullion A.S. meeting. Contact: 015274 88427 Tunbridge Wells A.S. meeting. Contact: 01893 719593
		Thurs 29th	
		Fri 30th	
		Sat 31st	

G.M.C.G. offer £100 prize to "Best in show"

Many rare and beautiful Cichlids will be on display and for sale at the GMCG show and auction.



This year the Greater Manchester Cichlid Group are holding their annual Open show and auction on the 11th August. Batching starts at 11.30am and closes at 1.00pm. It will be run in accordance with the Federation of Northern Aquarium Societies rules and, unusually for a fish show, the fish judged to

be "Best in Show" will receive £100 cash prize. The organisers hope that this cash prize will bring out some exhibitors from other parts of the country who would not normally travel so far.

Apart from the show, the auction is usually very well supported and contains a wealth of

Cichlid species rarely seen in aquatic shops. As usual, some really good bargains will be available and a great selection of rare and unusual Cichlids on show. For further details about the show and auction contact Derek Dawson on 01706 376179.

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

Things are really shaping up for this year's Festival. Aqua-medic, Aquarian, Anglo-aquarium Plants, Tetra, All Clear Water Purifiers, Hagen, Purity on Tap, TFH, and Brian Walsh who makes wonderful wood carvings of fish, have all confirmed their participation this year. Other interests will also be represented with Bonsai having a stand and if you are into cute and fluffy, then the Rabbit display will be of interest.

Another speaker added to the list

Robert Bridges B.Sc. (hons) M.Sc. will be giving a presentation on fish health and how to avoid disease problems in your aquarium. Add to this marine expert Alf



Robert Bridges is the latest speaker to be added to the list.

Nilsen from Norway and Livebearer expert Harro Weirnimus from Germany, our very own Pete Liptrat and several more UK based speakers and we should be in for a great weekend. There is also live entertainment every evening and a quiet area away from the music (just 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.

Wet Pets Today's Fishkeeper visits Wet Pets in Sutton-in-Ashfield, Nottinghamshire

RUNNING ONE AQUARIUM shop is hard enough work for most people but Bob and Sue Coupe have two. The one we visited is at Sutton-in-Ashfield and their other branch is at Southwell Garden Centre. Some people might think that downright greedy, others might think they are suicidal (that is anyone who actually runs an aquarium shop), but the team at today's Fishkeeper know the real truth, these are two passionate aquarists who love their

it houses a great range of tropical fish, so most people will find something of interest. That certainly proved the case for regular columnist Pat Lambert who came along on this trip to make sure our Editor didn't get lost again. She bought 10 *Pseudomugil forcats* (subject of last month's End point) and a lovely pair of Desert Gobies (*Ghiarastrimogobius ornatus*). There were others (Apoecara and the subject of this



Bob & Sue Coupe behind the counter at Wet Pets.



The home of good fishkeeping - but the outside & looks very small. Don't be deterred, there is a lot more to this shop than meets the eye.

fish and fishkeeping and one small shop was simply not big enough for them.

The Sutton-in-Ashfield venue started life as a very small shop and had bits added on, again and again. Today it is a veritable labyrinth of rooms with lots and lots of tanks. Even so it still falls into the "small" aquatic outlet by today's standards. Despite its size,



The Discus room was immaculate and had some very high quality fish for sale.

month's Diary Dates page (*Scobaincostus aureatus*) which could have gone home with her as well, but these two were all she has room for. On the coldwater side the Lemon yellow goldfish stood out as beautiful fish and it was not just the odd one which was of good quality, but the whole vat. Even the plain old Common goldfish had a deep rich colour and were in the peak of condition. The vats had a bit of algae in them, but that didn't detract from the quality and health of the fish for sale.

Shop details: Wet Pets, Redcliffe St., Sutton-in-Ashfield, Nottinghamshire. Tel: 01523 556341
Shop opening hours: 9am - 6.00pm 7 days a week plus late night slots, Thurs. & Fri to 7pm.
Proprietor: Bob & Sue Coupe
Staff: Haydon, Diane Spencer, Alex Tristram
Staff knowledge: All staff fully trained and have a comprehensive knowledge of all fish stocked.
Number of tanks: 160 + 40 quarantine & show tanks.
Number of Vats: 6
Show tanks & Ponds: 3 large show tanks, and an indoor pond.
Specialities: Catfish, unusual tropicals and Discus.
Additional services: Pond and tank installation and maintenance service.
Brands stocked: All major brands.
Which groups of fish do you sell?: Freshwater tropical and Coldwater.

Bob started keeping fish 25 years ago and finally took the plunge into the aquatic industry 16 years ago. His personal passions are Catfish and Discus. For some time he concentrated on breeding their own Discus and many of the fish offered for sale in the shop are bred locally which means they are robust healthy fish well adjusted to local conditions. A builder by trade (the

original Bob the builder?) all the construction work and extensions have been put together by Bob.

Behind every great man, is an even greater woman (or so they say) and Bob is very ably supported by his wife Sue. Sue has been a fishkeeper for many years and now that they have such good staff she is really looking forward to visiting other aquarium shops. ■



Bob inside the vat of Goldfish.

Our verdict

Run by very knowledgeable owners and staff, this is a great tropical fish shop with some very nice coldwater fish as well. Particularly look out for rare Catfish and great Discus. All in all, a shop worth a journey to.

Bob's verdict on the manufacturers

Which manufacturer has the best range of products in your opinion? Hagen
 Which company gives your customers the best service? Hagen/Jawel

tropical marine coldwater & ponds plants reptiles & amphibians regulars

Trade Talk

New Liquid Products from Nutrafin

pH Stabiliser (250ml and 500ml)
Nutrafin pH stabiliser replenishes Carbonate Hardness levels to provide optimal conditions for fish and plant health.

pH levels can be affected by Carbonate Hardness (KH) levels in an aquarium. Fish excrete carbon dioxide, which when mixed with water is converted to acid, this lowers pH levels. Carbonate and bicarbonate ions neutralise these acidic water conditions, helping stabilise pH and keeping it at the desired level.

THE PRICE
RRP start from
£6.69

pH Adjust (100ml and 500ml)
pH levels can affect the colour, behaviour, reproduction and stress levels of aquarium fish. At low levels of pH the beneficial bacteria are less active, reducing their effectiveness at purifying water through converting harmful ammonia and nitrite into nitrate. Use a Nutrafin pH test kit to determine the pH level of an aquarium.

pH Adjust up raises pH levels which can benefit fish and plant species that prefer alkaline environments, such as Guppies, Mollys, Swordtails and African Cichlids. **pH Adjust down** lowers pH levels which can improve coloration and behaviour of species preferring acidic environments such as Tetras, Barbels and South American Cichlids.

THE PRICE
RRP start from
£4.49

African cichlid conditioner
(200ml and 500ml)



Nutrafin have introduced three new liquid products. These are pH Stabiliser, pH Adjust and African Cichlid Conditioner.

Water hardness affects brooding capability, disease resistance, and growth and is important for the successful hatching of fish eggs. African cichlids, in particular, require very hard water to thrive, but this product can also be used to increase water hardness in areas with very soft water. It increases the general hardness

(GH) of water. It provides a natural 3 to 1 ratio of calcium to magnesium which closely mimics the conditions found in nature. It does not affect pH or Carbonate Hardness (KH). It also contains beneficial minerals such as potassium and sodium, which aid reproduction and colour enhancement.

THE PRICE
RRP start from
£6.69

For more information contact
Neil C. Hagen (UK) Ltd on
01977 556622 or visit their
website at www.hagen.com



THE PRICE
MRP £19.99

New test kits from Interpet

Interpet has launched a new liquid Master Test Kit. Brand Manager Stuart Thraves says: "Whilst tablet testing is very popular, our research indicated that some fish keepers prefer to use different methods of testing their aquarium water. So now the Interpet Easy Test Master Test Kit is available in both tablet and liquid form."

The Interpet Easy Test Master test liquid kit tests for the four main parameters that need to be monitored on a regular basis in the aquarium, Ammonia, Nitrite, Nitrate and pH Broad Range. All the test kits have easy to follow diagrammatic instructions on the pack and this is reinforced with reminder instructions on each reagent bottle label. The kit also contains a guide to aquarium water giving specific advice on their test result and how to correct it as well as general information on looking after their aquarium water.

The Easy Test range contains a number of unique features e.g. the Nitrate test kit enables the consumer to use the same test kit to test for two different levels of nitrate (0-100mg/l and also 100-300mg/l). This High Nitrate Range test enables uniquely effective monitoring of nitrate removing products. Each kit carries out 40 tests of each parameter.

For more information contact Interpet on 01306 881033.

The Giant Pet Store expands its aquatics department



Fish specialists Wayne Barber and Richard Dale in the new aquatics department at the Giant Pet Store.

The Giant Pet Store in Norwich, has invested over £35,000 in creating a dedicated 2,500 sq ft area offering one of the most comprehensive selections of fish and equipment in East Anglia. More than 250 species – including freshwater, tropical and marine fish, crustaceans and invertebrates – as well as aquatic plants are displayed in 120 separate tanks.

"There's a growing interest in keeping fish as a hobby. With our

ability to offer expert advice to the novice just starting out and help to the discerning aquarist, we attract customers from up to 100 miles away," commented Giant Pet Store director, Simon Legood.

Today's Fishkeeper magazine has not visited the store since its revamp, but we will try to visit there in the near future and tell you what we think about it.

For further information contact Simon Legood on 01603 423600.

New Range of Laguna Spitters

Hagen has introduced a new range of Laguna Spitters. These light weight, frost resistant, durable poly-resin water features make a welcome decorative addition to the Laguna water garden collection. New additions include Angel with flower, Angel spilling water, Angel boy, Angel with water pot, Laughing gargoyle, Gargoyle with pop, Jumping dolphin and Laguna gargoyle.

Each Spitter comes complete with a Laguna multi-hose adapter to allow simple transitions to different hose sizes. Attach to any pond pump to add the soothing sounds of splashing water to garden and pond settings. You can also use them in conjunction with the full range of Laguna pumps, filters, UV sterilisers and underwater lighting for a practical, compatible and complete garden set up. These units have 'click-fit' couplings, easy maintenance and low running costs.

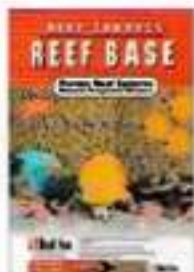
For more information contact Ruf C. Hagen (UK) Ltd on 01977 555622 or visit our website at www.hagen.com.



THE PRICE
RRP start
from £19.99

Price correction

Last month we quoted Reef base from Red Sea as costing £59.99 for 5.4kg. In fact it is only £14.99 for 5.4 kg.



New releases

The hobby is moving at a tremendous pace these days and new fish and other aquatic life are being discovered and imported all the time.

Oliver Lucanus is right at the centre of all the new introductions and discoveries. This month he has a line-up of interesting fish you are unlikely to find in any of the books. PHOTOS: OLIVER LUCANUS



Male Brunei beauties are absolutely gorgeous when in full colour.

INSET: Female Brunei beauties are rather plain fish lacking the male's attractive colours.

The most desired of Bettas

The Brunei beauty (*Betta macrostoma*) is perhaps the most sought after species in the genus, but is also among the most high priced fishes from Asia. These striking Bettas are found in the highlands of Brunei and parts of northern Sarawak on the island of Borneo. Their maximum size is over 12.5 cm. The more colourful males mouthbrood up to 30 young. Despite its reputation as a difficult aquarium fish, this species is relatively easy to keep in the aquarium. Soft, slightly acidic water is a must, as are larger tanks (over 180 litres) and a strong current. They are efficient predators of smaller fish and thrive in a well planted aquarium with powerheads giving a directional current. Best foods are Bloodworm and other Mosquito larvae as well as healthy feeder fish such as home grown Cichlid fry. Bad water conditions or contaminated foods can lead to bacterial infections to which this species is very sensitive.

Darter tetra

Found in clear water habitats this small Characin is rarely collected for the aquarium hobby. In nature they live among aquatic plants and branches hanging into fast moving streams. They are slow feeders that need to be kept with other calm species that allow them to feed sufficiently. Adult size is around 5cm. Among the many Darter or Goby tetras *Ammocryptocharax* are the most interesting and colourful species that make good community fishes for small fish such as Farlowella, Acridodon and Corydoras that occur in the same waters.

Ammocryptocharax species from the Rio Negro



African moon tetra (*Bathyaethiops caudomaculatus*)

Few African tetras have made it into the common assortment of aquarium fish and, apart from the Congo tetra (*Phenacogrammus interruptus*), none are bred commercially by fish farms in Asia or the USA. The African moon tetra, *Bathyaethiops caudomaculatus* is one of the nicest and most striking schooling fish for the well planted

aquarium, yet it is rarely available and only in wild imports from the Congo region. Since this is a very unstable area these can be few and far between.

The maximum size of this hardy tetra is just under 7cm making it better suited for the average community aquarium than the much larger Congo tetra. With maturity the African moon tetra displays a bright red line along the head and back. A lovely attractive fish which really should be more widely available. Perhaps one for the commercial fish breeders to take on board in the future?

African moon tetras (*Bathyaethiops caudomaculatus*) like this are just one of many African species which would be great assets to the aquarium hobby.



The true Parrot cichlid, *Hoplosternus pinnatus* collected in the Rio Negro.



The real Parrot cichlid

The true Parrot cichlid is a large but peaceful and striking aquarium fish, yet few people associate the name with this fish (Latin *Pinnatus* = parrot), but with the deformed Red parrot creatures (I don't want to call them Cichlids) produced in Asia. Long before fish farms came up with the freakish concoction of Severum, Red devil and other species, the beautiful Parrot cichlid from the Rio Negro and Rio Orinoco was being imported from South America. Adult males develop a bright red chest that rivals their colour injected Asian namesakes. Although *Hoplosternus* attain lengths over 30cm they are, much like Uaru, peaceful giants with a taste for vegetation, snails and other large food bits. *Hoplosternus* may be kept with similar fishes such as Hetero, Anguiter and even wild Angelfish in big aquariums.

tropical marine coldwater & ponds plants reptiles & amphibians regulars

Kathy Jinkings profiles
a pretty little Loach



Chain botia

Chain botias are fun
loving fish which are
always on the move.

THE CHAIN BOTIA (ALSO CALLED DWARF botia or Dwarf loach) is a peaceful and endearing fish, suitable for any peaceful community. This is the smallest of the botias, and patterned attractively with a brown back, silvery-white belly, and golden flanks patterned with two lateral bands of dark brown markings. These markings are very variable, and are connected by dark brown bars giving the fish a reticulate, or chain-like appearance. The patterns are black in young fish, but fade to dark brown with age.

These are sociable fishes that live in shoals in the wild. As far as possible, their natural living conditions should be replicated by keeping a small group of them in soft, regularly changed water with a soft substrate. If kept in conditions to their liking, they can live up to twenty years. They will feel secure if hiding places are provided, and rocks and roots can be arranged to provide this. This small shoal of fishes are unusual for botias, in that they will swim in the middle water levels rather than sticking to the bottom, and are always active, both day and night. Although most specimens reach only a small size, wild-caught fish have been found with a length up to 5cm. However, the fish are now

regarded to be almost extinct in their native Thai waters, due to the construction of two dams which prevented one of the major populations migrating to their breeding area, so wild-caught specimens are now virtually non-existent. The fish is now protected in Thailand, and listed as critically endangered. Although they are being bred in captivity by a breeder in Thailand, this is still a lucky find in the fish shop, so if you come across some do not hesitate too long over purchasing them.

All loaches have spikes in front of the eyes, which the fish raises in defence when it feels threatened. Because of this, extra care needs to be taken when netting the fish, to ensure it does not become tangled. If this does happen, you should be careful while extricating them, as the spikes can cause painful hand punctures!

These are not fussy eaters, and will take flake quite happily. However, they do particularly enjoy live food treats of bloodworm or small earthworms.

Chain botias have been spawning in aquaria, but only very rarely, and little information is available about their breeding habits. It is reported that before spawning the female becomes noticeably rounder and the fish display a change of

coloration when ready to spawn.

These are ideal fish for the community, being peaceful, attractive and active for most of the time. Although many botias can be nippy, the Chain botia can be trusted with the most delicate of fish, and will provide regular enjoyment for the fishkeeper with their active swimming habits. ■

PROFILE

Name

Chain botia (Dwarf loach)

Scientific name

Botia sidhimaoki

Aquarium type

60 x 30 x 30cm of small peaceful fish

Distribution

Small muddy lakes in Northern India and Thailand

Diet

Flake and all live foods.

Temperature

26 - 28°C



tropical



marine



coldwater & ponds



plants



reptiles & amphibians



regulars



It is possible to build up layers in aquarium planting by using species of *Cryptocoryne* which grow to different heights. Different leaf shapes also create a contrast.



C. beckettii has several different forms which are available in shops. This is the original one.

Hidden Gems

Aquarium conditions

In general *Cryptocorynes* prefer an aquarium with a pH from 6.0 - 7.5 which, although not completely mimicking native conditions (which can go down to pH 5.0) enables the maintenance of a wider variety of fish. The temperature may vary between 20-28°C. From experience I have found that *Cryptocorynes* prefer a deep root run with a substrate depth of at least 40 mm of fine gravel, or alternatively a bed of gravel 25 mm deep with a further 15 mm of fine pea gravel as a top dressing. Although the peat does not add any nutrients, it does provide a soft layer in which to become established. It may be useful, if you keep fish that like to dig in the aquarium or you are over vigorous when clearing the gravel, to incorporate a layer of filter matting between the gravel and peat to prevent any disturbance. Most aquaria have poor lighting with only a single fluorescent strip, and this does in fact suit most of the species of *Cryptocoryne* grown. I personally grow *C. alata*, so that it shades all the other plants in the aquarium, and under plant it with various other *Cryptocorynes* such as *C. rubrovolvata*, *bolanderi*, *C. beckettii* and *C. wendtii* - in the aquarium, as in the wild, sexual

propagation is extremely unusual, with flowers being rarely pollinated and forming fruit. Therefore most propagation, including the commercial production of *Cryptocorynes*, has to be done by vegetative means, which fortunately is very easy. Plants readily produce runners and shoots, and these shoots can be separated once established on the mother plant. Once rooted, the young plant should be allowed to become established and protected from any fish which may nibble the tender shoots. The only maintenance that needs to be carried out specific to *Cryptocorynes* is the removal of any fading or dead leaves and regular feeding with suitable plant food tablets pushed near to the base of the plant.

The species

C. alata is possibly the most commonly grown *Cryptocoryne* and is very adaptable, tolerating a wide range of light levels, growing quickly and reaching to 30cm making it useful at the front and towards the back of an aquarium. As with most *Cryptocorynes* it resists major changes in conditions in the tank.

C. beckettii was one of the first *Cryptocorynes* to be grown in aquaria,

AVAILABLE SPECIES

Of the species available to the aquarist, the most common are *C. alata*, *C. beckettii*, *C. litorea*, *C. rutilans*, *C. imrayana* var. *bolanderi*, *C. longicauda*, *C. pinnatifida*, *C. pinnatifida*, *C. wendtii* and *C. A. willsonii*. *C. wendtii*, with many other species available commercially, especially under the general name of *Maravilla* brand. This name is very misleading as the members of the genus, especially in their young, have many varieties and the real flower structure enough to be identified.

having been imported for the first time in 1906. In the wild it tends to develop a low growing vigorous habit above water, whilst the submerged form has a wider and longer leaf shape. The front of the leaf is a pleasant olive colour and the back has an overall red sheen. Even in the aquarium its height rarely exceeds 10cm making it ideal for the foreground of the aquarium. As well as being small, it is also slow growing, which enables it to be kept in a compact shape.



C. brownii has several different leaf forms depending upon lighting.



There are several different forms of *C. wendtii* available in the trade. This is the common green form.

In the final part of his two part article on *Cryptocorynes*, plant expert **Mark Duffell** looks at some of the more commonly available species and the aquarium conditions they require

PHOTOS: M.P. & C. PIEDNOIR

Part
Two

C. crispata var. *balonae* is one of my favourite species having puckered foliage which is very narrow and prefers low to medium light levels, changing its appearance to thinner leaves in brighter conditions which gives the illusion that two different plants are being grown. It can prove slightly difficult to get established, but will grow vigorously once conditions are

to its liking.

C. rotospicis is one of several members of the genus that can endure quite long dryish spells above water, but to do this it develops a "resting form" which has reed like leaves primarily to reduce moisture loss through transpiration. It gets its specific name from the unusual twisted inflorescence.

C. wendtii is a species which grows in

rivers and streams and can be used to occupy large areas of the open midground of an aquarium, providing a translucent shade of green with a rusty coloured venation, once established this adaptable species will soon send out runners and tolerates all but the very brightest aquarium. Like most *Cryptocorynes*, this species has flowers about half the height of the plant which are pale cream with a brown top and throat lining.

Cryptocorynes are well mannered plants which have earned the undeserved reputation of being hard to grow. In fact many of them are easy reliable plants, that once established, will form an important part of any aquascape. ■

LARGEST SPECIES

In the wild, *C. rotospicis*, which is the largest member of the genus, can reach a very impressive 1 metre tall when grown in boggy conditions such as the muddy margins of its homeland. In the aquarium where it is usually grown, totally submerged, it will rarely exceed 30 cm. It is fairly resistant to a *Cryptocoryne* problem known as the green or red rot, and full light does in fact improve the saturation of the leaf which forms a pale red colour. If you are lucky enough to have this plant from then you will be treated to the ornamental display leading to the variegated forms being marketed the wrong way.

Inflorescence. This species has also adopted its method of reproduction to suit its habitat, because it lives on or near the water level of water can be dried, it, as another *Cryptocoryne*, the seeds when ripe will go into the water and then wait for germination. It is more than likely they would be swept away preventing them settling in a suitable seed bed. With *C. rotospicis* the seed is incapable, meaning that before it takes root from the mother plant it has to get to the germination, waiting for it to start sending up shoots and roots as well as a suitable medium to stand. The method of propagation is very similar to the *Alaogone* (*Alaogone*) amongst which occurs a similar method.

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Coral

Alf takes a closer look at the huge range of Stony corals

Kaleidoscope



LET US NOW LOOK A BIT closer at some Stony corals. I have chosen to group the selection of species and families according to what has been mentioned last month. This is only a personal selection, making up a fraction of the species that exist. It is impossible in this article to go into details. The selected Corals and group of Corals will, hopefully, give you an idea of what Stony corals are all about. For detailed information on Stony corals, please start by reading special literature such as Fossá & Nilsen (1996), Wallace (1999) and Veron (1986, 1995, and 2000).

WHAT IS A HERMATYPIC CORAL?

Stony corals containing symbiotic algae are the true builders of tropical coral reefs and are called "hermatypic corals". Corals that do not contain zooxanthellae are called "ahermatypic corals" and are totally dependent on the capture of plankton for survival.

Ahermatypic solitary Stony corals

Visitors to the tropical coral reefs will rarely spot this group of corals. However, when diving along the coast of Norway and in the Mediterranean there is a fair chance that you will spot small solitary corals from the genus *Caryophyllia*. This is a cosmopolitan genus that is also well represented in tropical waters. The genus belongs in the family Caryophyllidae, which contains many hermatypic corals as well as a number of small solitary ahermatypic genera and species that look like *Caryophyllia*. Genera such as *Trochocyathus*, *Pectrocyathus*, *Polycyathus*, *Denticyathus* and *Stephanocyathus* are just a few of these. The best known species is without doubt *Caryophyllia smithii*, which is distributed in the Mediterranean and in the northern Atlantic as far north as Trondelag in mid-Norway. This coral is no larger than 10 mm in diameter — which makes it

easily overlooked — and a little less high than wide. The polyp shape is oval. The mouth is large and surrounded by about 10 transparent tentacles. Along the coast of Great Britain this species is found in the tidal zone, while along the coast of Norway it is usually living deeper than 20 metres and can be found as deep as 130 metres. *C. smithii* is clearly a solitary coral, but occasionally one can observe that the coral has three "heads". This is not the result of replication, but is caused by larvae settling on top of other corals and developing here. *Caryophyllia inornata* is another species in the genus from the Mediterranean, and can be separated from *C. smithii* by its round polyp shape.

The small, ahermatypic solitary corals exist in caves, under overhangs and in deep water and are a poorly investigated group of Stony corals. There are certainly many species that remain un-discovered. I have no reports of this group being kept in captivity.

Photosynthetic solitary Stony corals

Now the selection becomes difficult. This is a large group of Stony corals. I shall, however, concentrate on the family Fungidae, which contain clear solitary species as well as species that exist on the border of being solitary or colonial. Fungid corals or Mushroom corals, as they are commonly called, are common organisms on the shallow coral reefs and in some locations they can be extremely numerous.

They are the largest of all Stony coral polyps with the polyps of *Heliofungia actiniformis* growing to 50 cm in diameter and having tentacles that are up to 25 cm long. Its colour is greenish brown or pink with pink or bluish white tentacle tips. The popular name in English is "Aemone mushroom coral" and when seen on the reef it can easily be mistaken for an anemone. Young *Heliofungia*, like young Fungid corals in general, are attached. The juvenile polyp





CUP CORALS

These are athermatypic colonial Stony corals with one genus well known to marine aquarists and to divers of the tropical coral reefs — *Tubastrea*, belonging in the family *Dendrophylliidae*. These corals have got the popular name "Cup corals" as their corallites resemble a cup. The closely related genus *Dendrophyllia* can only be separated from *Tubastrea* by looking at the corallite's septa. *Tubastrea* includes about 5 species from the tropical reefs. All species have similar looking polyps, but there can be some differences in colours. The easiest species to identify is *Tubastrea micrantha*, which forms large, branching colonies usually growing where the current is strong. The colony colour is greenish-brown to blackish-green with the polyp tentacles being greenish. The tree-shaped colonies can be more than one metre high and are spectacular sights, usually surrounded by colourful fishes like species of *Pluridontostus*. The species is widely distributed in the Indo-Pacific, but is — like the rest of the Athermatypic corals in this genus — very difficult to keep in captivity. The three species *Tubastrea fouquieri*, *Tubastrea cocineus* and *Tubastrea aurea* look very much alike, and can hardly be separated without detailed studies of the skeleton and colony structure. All three species have bright orange tentacles and red to orange tissue. The colonies are small, flat sized or in some cases even bigger than a fist. They grow in caves on vertical reef walls and under overhangs, but never in direct sunlight. Their polyps are wide

open during night, but mostly closed during the day. All species are found in the Indo-Pacific, but *T. cocineus* is the only one of the species that is distributed also in the Caribbean. *Tubastrea alaphana* in contrast to the three last mentioned species have brown polyps and is usually easily identified.

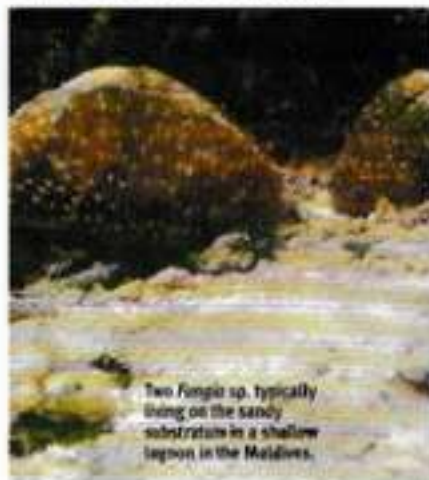
In colder waters and in deep tropical seas, the Glass coral (*Lophelia pertusa*) is a good example of an Athermatypic colonial Stony coral. This coral has hardly been seen alive by divers until very recently when Norwegian divers have photographed and investigated bioherms of Norwegian fjords. Here the reefs grow in water only 70 metres in depth, while they are normally found in several hundred metres deep water out of reach to divers. Glass corals grow extremely slowly at about 0.5 cm per year. Slowly it forms large deep-water reefs called "bioherms". Bioherms consist principally of living Glass coral at their top, dead below the living colonies, and dead, broken and partly eroded colonies at the bottom. In between the Stony corals many other organisms exist, such as Gorgonian corals, sponges, crustaceans, worms and fishes. Bioherms almost 30 metres high and several hundreds metres long have recently been discovered on the Norwegian continental shelf. These are consequently 8 to 10,000 years old, making them the oldest living organisms in Norway. However, since bioherms attract fishes, and fishes attract tourists — the ancient and magnificent structures that nature has spent thousands of years building can be destroyed in minutes. The Bioherms of Norway are now protected by law

is called "arthrocaulid" and is attached to the substratum by the means of a little stalk. As the polyp grows it detaches and start living freely. In the aquarium I have seen this several times, and even spotted how new polyps regenerated from the stalk after the first arthrocaulid has detached.

A free-living mode of life is, of course, vulnerable. Waves hitting the shallow reef move and turn the polyps upside down and smash them against rocks and other corals. Consequently the Mushroom corals get hurt and damaged! They compensate for this by having a great ability to regenerate damaged tissue. This is why we can see different shapes of the same polyp species on the reefs. But survival is more important than being pretty!

Heliofungia actiniformis is the only species in this genus. It is distributed in the central Indo-Pacific and is usually found in protected areas of the reef, its skeleton seems to be more delicate than that of other Mushroom corals, and hence the necessity to live in more protected environments.

The largest genus in Fungidae is *Fungia*, which contains more than 30 valid species.



Two *Fungia* sp., typically living on the sandy substratum in a shallow lagoon in the Maldives.

Most species form circular, conical polyps with a diameter of 15-30 cm. Some species form elongated polyps with more than one mouth-opening, and here we meet the problem with "what is actually a solitary vs. a colonial coral". *Fungia fungeter* is a widely distributed and common species of *Fungia*, but the individual species can only be identified by examination of the septal structures of the polyps. *Fungia* have separate sexes, and I have observed this genus to spawn in captivity releasing packages of sperm at regular intervals for hours. In general *Fungia* spp. are hardy aquarium corals.

Other genera of mushroom corals are *Dioses*, *Cycloseris*, *Herposilia*, *Heliomeris*, *Sardulomeris*, *Phaeophyllia*, *Lithophyllon* and *Pedobacis*.

Of other solitary photosynthetic corals the "Button coral", *Zygonema laevis*, is



Button coral (*Cyrtina lacrymala*)

worth mentioning. The species belongs in the family Mussidae and is widely distributed in the Indo-Pacific, from the Red Sea to Guam. This coral lives free or attached and fully expanded it reaches a diameter of about 30 cm at maximum. Fully



Scöber's acropora (possibly *Acropora formosa*) was the very first *Acropora* to be grown in captivity. This picture from 1985 shows the original colony that grew out of live rocks in the aquarium of Dietrich Scöber, Berlin.

Hermatypic colonial Stony corals

The Hermatypic stony corals are diverse — very diverse! I have chosen to briefly mention two families; the fast growing reef builders in *Acroporidae* and the Brain corals of family *Faviidae*.

Acroporidae is the largest of all Stony coral families containing the genera *Amacropora*, *Acropora*, *Montipora* and *Ascropora*. Here we will concentrate on *Acropora* only, which alone contains about 170 described species.

Acropora is distributed in great abundance in reef habitats in the tropical and sub-tropical regions of the world. Like the late John Wells (Cornell University, 1995) wrote when doing a survey of the distribution of reef coral genera along the Great Barrier Reef: "The protuberant

scleractinian genus, with boisterous speculation, and reef-former par excellence".

This is indeed true! With a shallow reef flat during low tide, take a snorkel on a reef edge, dive the reef slope or even the deeper fore-reef — everywhere you see them: the branching, colourful and lovely *Acropora*.

The diversity in the genus is great, and it is peculiar that so many species of stony corals belonging to the same genus occur together on the reef. Several *Acropora* spp. can grow side by side in a very small area — often only a couple of square metres large. This indicates that similar environmental requirements such as high light energy levels, rich oxygenated water, clear water and relatively nutrient poor conditions, conditions typically found on seaward reef slopes, are needed for all these corals. I once dived "Warrior Reef" in the middle Great Barrier Reef section and spotted the most incredible growth of plate shaped *Acropora* in clearly demonstrating how the genus can occupy a specific zone of a reef. As for the form of *Acropora* looks hard and feels hard to touch. Do a night dive on the same location and you

will see that all the polyps are expanded, swinging their tiny tentacles for food and giving the *Acropora* forest a soft appearance.

The diversity of *Acropora* is truly impressive, yet if we look between the branches of *Acropora*, we find another kind of diversity — a small world of symbiotic animals that live their complete lives among the branches of their coral host. Shrimps, crabs, fishes and molluscs all settle here and

WANT TO KNOW MORE ABOUT ACROPORA?

For those who want to study this family of corals in detail, please see Wallace (1999), which is the best and only updated publication on the subject. Dr. Carsten Wallace is the foremost expert on this group of corals and is working as a curator of Museum of Tropical Queensland (Townsville, Australia). She has published a complete revision of *Acropora*, followed by a CD-ROM useful for species identification.

give moving life to the interior of the corals.

If *Acroporidae* contains branching corals, *Faviidae* contains the massive species. That is one of the reasons they are called "Brain corals". Like huge brains they grow scattered on the reef, from the muddy beach, throughout the reef flat and down the reef slope. Their polyps are round and very large compared to those of the *Acroporidae*. Some colonies form a pattern of curved ridges and valleys and really deserve the name "Brain corals". Compared to *Acroporidae*, many Brain corals are slow growing. Some grow huge, though, and can reach several metres in diameter, such as *Diploria* spp. These are mostly very old — often hundreds of years, and in this sense they are valuable and protective.

Favia, *Favites*, *Montastrea*, *Goniastrea*, *Colastrea* and *Polygona* are only some of the genera of *Faviidae*. Just like for *Acropora* the polyps stay closed during the day, but open up at night. Long sweeper tentacles keep intruding corals away and feeding tentacles capture plankton for food. Even in this group we spot symbiotic animals. Worms and molluscs drill into the Brain coral's skeletons and live here in their own house.

Parrot fishes feed from the symbiotic algae in the coral tissue. They take a big mouthful of Brain coral and spit out the sand through their gill openings. The sand falls to the bottom, slowly building up — the Brain coral is damaged but the reef exist. The feeding behaviour of the Parrot fishes is only one out of the many interactions on the coral reefs — interactions that keep it all in a

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Ponderings

In **Dave Bevan's** regular column on ponds and pondlife, he shows you how to plant oxygenators and he looks at a fascinating fish and some nasty predatory creatures

Plant Lore

Black princess is a nearly black water lily.



Of all the water plants the water lily is arguably the most popular. Available in a large number of cultivars, *Nymphaea* comes in many sizes, and colour ranging from white through to red and even black.

Planted at the correct depth in a good pond soil the rhizome starts to send up leaf stalks in the spring which culminate in the broad green leaves (quads) sitting on the surface. Some of the more prolific cultivars can easily cover several square metres of surface. In a good season many cultivars produce flowers for several months, adding colour to the pond.

Provided that the water lilies are well established, particularly if growing in soil on the pond bottom rather than in planters, then they can coexist with fish quite happily, their broad leaves providing shelter and shade.

If a water lily is not flowering then provided the rhizome is well rooted and growing in reasonably still water then it is usually the planting depth, which is wrong. Check the actual depth against variety recommendation and adjust accordingly. Conversely if the leaves bunch up above the water then it is usually due to over-crowding - time to split the rhizome and make some more plants.

As with most successful plants the water lily is not without its enemies. Aphids can move in and cover blooms and leaves with sticky black patches, lily beetles and their larvae chew the leaves, crown rot can attack the rhizome and China mark moth caterpillars take chunks out of the leaves.

POND PROBLEM — FISH GASPING

In a balanced pond the water will hold more than 6 mg/litre of dissolved oxygen, which will allow the fish to breathe normally. Unfortunately as the temperature of the water rises its ability to hold dissolved oxygen becomes less, as is the case when the barometric pressure drops just before a thunderstorm.

At night there is another factor working against us. During the day all the so-called oxygenating plants (those that grow and photosynthesise below the water) have been producing oxygen. At night they stop photosynthesising and deal us a double blow. Not only do they take oxygen from the water but they also release carbon dioxide - a toxic gas to fish.

If all these conditions coincide then the oxygen levels will be greatly depleted and the fish left gasping on the surface. Add to this a tendency towards overstocking and it is usually the largest fish which are left floating dead on the surface. So check the pond in early morning and if the fish are congregating at the waterfall outlet then it may be time to consider additional mechanical aeration.



Waterfalls and fountains help increase the oxygen content of your pond, it is essential that large fish will congregate

MINNOW FACTFILE

Species: Minnow (*Phoxinus phoxinus*)

Other names: Tiddlers

Other forms: None

Size: 5 to 20 cm

Weight: 10 grams

Availability: A native species occasionally available through aquatic outlets.

Habitat: Prefer the clean, well oxygenated water of fast flowing streams but can be found in large slow running rivers.

Identification: Rounded body covered with very small scales and an incomplete lateral line. The back is

bluish green and the sides light green with a row of dark spots or stripes. Males develop spawning tubercles together with red on the lips and the tips of the fins in the breeding season.

Habitat: Tends to live in large shoals for protection against predators. They feed on minute plankton and insect larvae which they find by foraging among the stones on the stream bed. Minnows will often bank in large numbers in shallow water. They can live for up to six years producing around seven eggs each year.

Pond fish value: Only for the clean well filtered and aerated pond with plenty of natural cover.



Minnows feed here with oxygenated water from a stream.



Australian stonecrop is considered an invasive weed by many pond keepers.

Time for a clean out?

There is no best time to do a full clean out of the average garden pond. It is a messy business in summer, very cold in winter, causes stress to the fish at any time and disturbs or interrupts the breeding cycle of the resident wildlife. Striving to maintain a balanced environment in the pond is the name of the game so that unless the liner becomes punctured or some other catastrophic event overtakes the pond then always try to put off the evil day.

By August some of the early flowering plants will have completed their growing cycle and set seed. Remove dead and dying material as it spoils. Clogged oxygenators will be spreading rapidly. Remove some every week to keep the clutter down to a manageable size, leaving them on a mesh to allow the pond life to return to the water. Be ruthless with fast growing aliens like Parrot's feather and Australian stonecrop - however hard you try it will probably keep coming back.

Floaters like *Alisma* and *Duckweed* will cover the surface. Net it out periodically because if it builds up to form a thick mat and starts to sink the rotting material will soon reduce water quality.

Finally, into the bucket, and take a hard look at your fish stocks - an overstocked pond is an unbalanced pond. Removing the excess now will give them a chance to settle into their new home before the onset of winter.

Below the surface

Red-eared terrapins love basking in the sun on a log.



Remember the Ninja turtle craze of the early 1980s? The most hated creature was a turtle. So, tiny two penny sized Red-eared terrapins were imported in their thousands from the States. Most did not survive the first few months of captivity but those that did grew apace, soon out growing their quarters. As with all crazes, the seed passed. So what happened to the terrapins, now the size of small dinner plates?

Well meaning, but lured owners, released them into garden ponds and local parks where they managed to survive the winter and now some years later many are still alive and well and still growing. As top predators they are quite capable of removing all the fish and amphibians from a small pond over a period of time. Fortunately, so far, they do not appear to have bred successfully in the wild in this country but the Red-eared terrapin illustrates very clearly the dangers of introducing alien species into our countryside.



Water stick insects are powerful predators.

DIPPING DEEPER

During August the dragonflies are at their best swimming low over the pond and engaging in aerial combat for the best territory. The Chasers of June have been replaced by the Tiger Hawkers. The Southern Hawker, an insouciant dragonfly, is often at home in the garden pond where it may be joined by the small darlings like the Cinnamon darter.

Away from the pond the brown hawker, with its transparent brown wings shimmering in the sunlight, hurls along the hedgeow while back at the pond the Tiger Hawkers are busy egg laying well into September. The female seeks her sodden and lays eggs on damp plants or moss, close to the water or actually on its surface just below the surface.

Often called Dams during seedling or hatching stages, none of our dragonflies can afford more than a gentle nip, but in their quest for food the flying insect is sure as they launch themselves from shrub or tree to gnaw their prey with their legs to form a cradle before flying back to their perch.



Southern hawker dragonfly at rest on a water lily flower.

MISSING FRY

Earlier in the year, following spawning, there were lots of tiny fry swimming amongst the plants, now some three months later there are hardly any to be seen! Where have they gone?

Life in the garden pond, particularly a well-planted pond with plenty of oxygenators, can be a dangerous place for any small creature. In this dog eat dog world, size matters and sharp teeth coupled with lightning speed are a distinct advantage.

The cover provided by the water plants is useful against attack from above and provides places to hide from the larger fish but lurking amongst the water plants are some fearsome predators, creatures which are veritable killing machines. They wait patiently, ambushing passing fry with an array of sharp jaws, piercers and clasping front legs.

They include the Great diving beetle and its larva, dragonfly nymphs, Water scorpions and Water stick insects in the depths whilst the backswimmer patrols the surface. Usually a few survive and these will represent the strongest and fittest from the spawning.

Equipment corner



Children and ponds don't mix. Always supervise youngsters around a pond.

Take one tranquil garden pond, fish moving slowly through the water, on a warm summer's day. Add one child and what have you got? A recipe for disaster! Garden ponds act like a magnet for children and sadly every year children are injured or drowned in garden ponds. How safe is your pond? Is it childproof?

Probably the best way of protecting children from the pond - and the pond from children is a secure perimeter fence with a lockable gate. Covered with climbing and creeping plants it will soon blend in with the rest of the garden.

For the open plan pond a professionally installed polypropylene grid capable of taking a persons weight could be the answer. Installed just below the surface it provides safety without obstructing access or visibility.

If children are allowed to use the pond - dipping in a wildlife pond or feeding the fish then make sure there is safe access in the form of a solidly built platform.

Check out electrical connections and cables. Have you made permanent, the temporary connection to the new pump or filter installed in the Spring? Loose trailing cables can be easily damaged or trip the unwary. Finally always supervise young children whilst they are near the pond.

Tony's TIPS

This month Tony Sault gives you some tips for keeping Discus successfully



A **Activated carbon** when used with Discus should be changed on a regular basis.

B **Breeding tanks** for Discus can be made of all but essentials such as heater, filter, spawning media and, of course, water.

C **Cloudy eyes** can be treated with a mixture of broad spectrum antibiotics.

D **Dominant Discus** frequently hog most of the food and can take down the growth rate of the others. To offset this alter your feeding routine and feed in the east areas of the tank.

E **Equalise the pH** when moving Discus by placing the fish in a container with a small amount of water from their tank, then topoff with water from the new tank.

F **Fahrenheit degrees** can be converted to Centigrade by subtracting 32, then multiplying by 5, and dividing by 9. e.g. 80 F is 26.67 C = 27 C approx. divided by 9 = 30 C.

G **Garlic** can be added to the fishes diet as a preservative by mixing it with prepared food with a 2ml beef oil.

H **Headstanders** very often have a deflated swim bladder. Check for swelling on one or both sides of the fish, if these are absent the fish will usually recover normally over a short period.

I **Internal power filters** can be used with Discus. It is a failure that they do not filter water turbulence.

J **Juvenile Discus** will not eat hourly intervals if fed small amounts.

K **Keep a check** on tank parameters, test pH once a week, nitrite, nitrate and ammonia, but these will need to be carefully monitored.

L **Large water changes** and Discus do not go together; instead small water changes are more beneficial.

M **Mucus** when secreted by Discus is often a precursor to a problem and is very often followed by a change in colour such as darkening of the fish, check all parameters are within safe limits before looking for symptoms of disease.

N **Nitrite** should be at zero in a heavily stocked marine tank, but can 'bump' to a higher level when stock is increased. A small water change should reduce this to a level where bacteria can handle it.

O **Organic material** left to itself in under gravel filters can be a breeding ground for many pathogens, so when the gravel is a regular bit up, prevention is better than cure.

P **Peat** needs to be used with Discus as this very often has an adverse effect by filling the water with very fine particles of matter which irritates the Discus making them itch and scratch.

Q **Quality** is the operative word that can be applied to Discus, the food they eat and the water they live in. Select good quality fish, give them a good quality varied diet and maintain the quality of the tank water and they will reward you with many years of enjoyment.

R **Reverse Osmosis** units are not essential for keeping Discus, the same sort of water purification to remove the chemicals and metals is certainly a bonus.

S **Standard judging length** is measured from the nose to the caudal peduncle, beware of overall length as this includes the tail.

T **Toxic poisoning** from hot water has definite symptoms, watch for a fish that starts circling the tank at high speed, often ignoring objects in its path and coming to rest exhausted. This often is a poisonous fish only as fish absorb the toxins at varying rates due to their different body masses.

U **Under gravel filters** can be used successfully with Discus but I always recommend a back-up such as a small internal filter just in case.

V **Vitamins** need not be added to your food mix if you add at least a good quality fish food as part of the mix.

W **White spot** should not be seen on a Discus as the condition - that affects fish such as pH and temperature are not to the point of harming it, you see white spot on a Discus and stop you can be sure that it is and being kept in the wrong conditions.

X **Extreme changes** in parameters such as temperature and pH can be deadly to Discus. Stability is the watchword.

Y **Young Discus** kept in large schools often fare better than their parents keep in small schools. They find security in numbers and are consequently more outgoing.

Z **Zero ammonia** in a Discus tank is essential, but beware of your test kit which may lie to you if you keep your pH below neutral. Ammonia then becomes ammonium which your test kit will not register.

Today's Surgery

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Today's vet,
Lance Jepson,
opens his casebook
on Jaws - a much-loved goldfish



KEEPING GOLDFISH IN SMALL CONTAINERS has a long history. Hervey and Herby in their book *The Goldfish* (1983, 4th edition, Faber) cite the following two goldfish references:

"The *Chi* (goldfish) is the most prized for keeping, and the *Li* (*carpi*) comes next. Most people sweep our stone to make a pool, and place them between the eaves and the lattice (ie, on the veranda) to provide amusement." (117) - 1220 from *T'ing Shih*.

"The larger go to other pools or ponds, the smaller go to bowls or basins or glass jars, and can swim about actively all day." (135) from *Ti Ching Ching Wu Loeh*.

There are many arguments against keeping goldfish this way and the old goldfish bowl is to be deplored, but the fact remains that for many people this is the accepted way of keeping goldfish. For me, this can mean having to deal professionally with the problems that arise. After a while the scenario becomes not uncommon. The next client in the waiting room is a slightly harassed looking mother accompanied by her to - 11 year old son/daughter. In they come holding a small perspex aquarium that is in great danger of splashing a significant amount of the water. It contains down the front of the said mother.

The tank is delicately placed on the consulting room table, often with a slightly apologetic ah. Apologetic because most adults appear to be embarrassed about the thought of bringing a goldfish to see the vet. So the 10 year old child it does not seem unreasonable to bring Jaws to the vet when he's unwell. To me, the vet, it also does not seem unreasonable. After all I see rabbits, chinchillas, tortoises, snakes and parrots on a daily basis. I have even had to administer to ailing tarantulas and was once asked to attend to an elephant with colic. So why not a goldfish?

Anyway, back to the job in hand. Even before a word is spoken, just by looking we

are already gaining lots of clues and background information. We can guess that the aquarium is around 30cm x 20cm x 20cm. Jaws it would appear has a standard length (excluding the tail) of around 15cm, so the tank is a tight fit for him. It is made tighter by the porcelain frog holding a small "No fishing" sign and the two seashells collected on a family outing to the beach. There is deep layer of brightly coloured gravel on the bottom.

What do we now know? The chances are that this is Jaws' permanent home, his complete world is encapsulated here. He's also probably lived there for a number of years slowly growing and adapting to his environment. We can see that there are no obvious filtration systems in place.



Jaws' Jaws' has a very nasty ulcer on his gill cover (operculum)

Now we come to the crux of the problem - it seems that Jaws has a nasty sore on his head, and sure enough there is a large ulcer on one side of the head extending out over the operculum. We know that ulcers in goldfish are likely to be due to a bacterial infection, although parasites can be the cause. We also know that the majority of bacteria that cause these infections are always present in the water so something must be making the difference between the fish not becoming ill, and becoming infected. That difference is "stress", and the usual cause of this is poor water quality. We need to dig deeper into this. A sample of water is taken for basic water quality parameters whilst we ask a couple of pertinent questions:

- 1 How often do you do a water change? The answer comes back at every two weeks we clean out the tank.
- 2 What do you do when you clean him out? We net him out into a jar, pour away all the old water and rinse out the gravel. We then fill it back up and put him back in.
- 3 Do you use a tapwater conditioner? No.
- 4 Do you make sure the water temperatures are the same before you return him, and that you let him adjust to the new water gradually? No.
- 5 Is Jaws the only goldfish you have had? No, we had two but the other died around eighteen months ago.

First of all we need to explain the results to Jaws' owner. This involves a round of the Nitrogen cycle (see Figure 1) and the part played in it by the beneficial bacteria *Nitrosomonas* and *Nitrobacter* species, and how these are cultivated on filter media.

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TEST RESULTS

The water quality results have been done now. These read:

Ammonia : 0.5mg/l

Nitrite : 0.5 mg/l

Nitrate : 40 mg/l

pH : 7.8

We must remember that these water quality results give us a snapshot of water quality at this point only - they could vary widely over the life time of this fish.

There is a good chance that the other fish died at a point at which the toxic product levels from both fish became too much. We also need to discuss how these substances cause problems in the fish.

Ammonia

This is present in two forms - non-ionised ammonia and ionised ammonium. The crucial point here is that non-ionised ammonia is more toxic than ionised, and the amount of ionised ammonia is determined in part by:

- 1 Temperature. Increasing temperature favours non-ionised ammonia formation.
- 2 pH. Increasing pH favours non-ionised ammonia formation.
- 3 Salinity. There is a slight decrease in non-ionised ammonia with increasing salinity.

Non-ionised ammonia is able to cross anatomical barriers with ease, causing damage at a cellular level to internal organs, especially the central nervous system where it can trigger obvious behavioural disorders. Some thickening of gill tissue can also occur, and it can be

infectious to the skin, possibly paving the way for bacterial infections. Total (ionised plus non-ionised) ammonia levels should be less than 0.02mg/l.

Nitrite

This is absorbed across the gills of fish and is absorbed into the red blood cells. Here it combines with the oxygen-carrying pigment haemoglobin to form the stable compound of methaemoglobin. In this form haemoglobin cannot carry oxygen, and once significant numbers of red blood cells are affected, the fish is unable to supply its body with enough oxygen to survive. Nitrite levels should be below 0.5mg/l.

Nitrate

Its actions are often more subtle and as a result are less well understood than ammonia and nitrite, but they do occur. Certainly high levels appear to act as stressors, and it is thought that at high concentrations nitrate may have an osmotic effect. Suggested minimum lethal levels are 50.0 to 300.0 mg/l for sensitive fish.

pH

A measure of the acidity or alkalinity of water, here our main concern would be its effect upon the levels of non-ionised ammonia.

The above is a hypothetical account based upon an amalgamation of many of the goldfish consultations I have been involved with over the years. I have used it to point out some of the problems encountered when keeping goldfish this way. I hope no problems with "No fishing" frogs, small fairy castles and the like - I'm sure they provide as much environmental

enrichment for the fish as any rock or log - the aim of the article is to educate by example. As you, the reader, are already buying and reading *Fishkeeper* then the chances are that you are pretty clued up on water quality in any case, but from time to time we all meet people with a jaws. So rather than bore your friends and neighbours with mini chemistry lessons, point them towards this article, or others like it. Do your bit for jaws. ■

THE CURE

The remedial action that we would then recommend would be:

- 1 In future only undertake partial water changes - no more than 20% at a time. Use a tapwater conditioner, taking care to mention the importance of removing chlorine from tapwater.
- 2 Install some kind of water management system. There are now some very good small power filters as well as air powered ones available. Other possibilities would include some of the newer products that actively absorb ammonia directly from the water.
- 3 For the duration of treatment adding aquarium salt to the water at a dose rate of around two tablespoons per 10 litres of water. This helps to reduce the harmful effects of high nitrite levels, will slightly decrease non-ionised ammonia levels and has a mild antiseptic effect on the ulcer.
- 4 A proprietary medicine, possibly one based upon tea tree oil, may also be a useful adjunct to our treatment regime.
- 5 Discuss the possibility of upgrading jaws' accommodation to a more appropriate size - possibly a 60cm x 30cm x 30cm aquarium with filtration.
- 6 Finally we inject the fish with an antibiotic. Handling the fish also gives us an ideal opportunity to skin scrape the fish to check for external parasites. There are none.
- 7 Once again we stress to the owner that unless water quality management is addressed then our chances of success are poor.



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Koi world



Chelsea Flower Show had live fish on display for the first time this year, **Bernice Brewster** was in attendance on the World of Koi Garden and has her impressions of what the show will mean for the hobby

IT WAS MY GREAT PLEASURE TO HAVE THE task of attending the Royal Horticultural Society, Chelsea Flower Show, on the World of Koi Garden. I really did have a delightful few days and extend my heartfelt congratulations to Steve Hiskling, Billy Stone and the rest of the lads from World of Koi for achieving a Bronze Medal on their first visit to Chelsea. The garden was indeed worthy of its prize, beautifully planted with Rhododendrons, Maples, carefully selected Cedars and even Pines subject to a spot of topiary, with the most natural effect of a stream running down the side and into the Koi pond. Even the pond was planted and the Koi loved it, nibbling the grass and surrounding plants. Few of us could have missed the television coverage, the Koi were indeed the stars of the Chelsea Flower Show 2008.

This was a very big occasion for the Royal Horticultural Society as it was the first time that live stock has ever been allowed into the prestigious Chelsea Flower Show, although the Aquatic Village is a regular feature of the RHS, Hampton Court Flower Show which takes place annually at the beginning of July. The presence of the Koi was taken seriously by the local authorities, The Royal Borough of Kensington and Chelsea, who sent their Animal Welfare Officer to ensure the Koi were being held in satisfactory conditions and every credit to them for this attendance.

Great success with public

My impression of the World of Koi Garden was that it was a huge success with the visiting public, many of whom queued for up to 2 hours just to get a glimpse of the garden! The Koi were really the stars of the Garden, especially a Kujaku who became known to the public as 'Flash'. It was interesting chatting to many people who visited the stand and who felt the design of the garden was something they liked and felt was achievable for their own homes.

My overall impression of the World of Koi Garden was that it has acted as a much needed catalyst for the Koi hobby. I have no doubt that many retailers and Koi Societies throughout the country will be able to capitalise on the attention which the arrival of Koi at the RHS Chelsea Flower Show has achieved. Many people have ponds in their gardens and large numbers also keep Koi, we believe that Koi have earned a place in these shows, it can only benefit Koi keeping for all of us. I look forward to garden ponds and fish, especially Koi, being a regular occurrence at this prestigious event. ■



KOI SEMINAR

In conjunction with Bill and Maureen McGuirk of 'KoiSHI', I am planning a Koi seminar to take place next March. We are anticipating holding the event on the weekend of 15th-16th, with a number of guest speakers on the Saturday, covering topics such as health, filtration, water quality, nutrition and breeding Koi plus, on the Sunday, a more practical approach to Koi appreciation and Bonsai. We have the date fixed and are currently working on a selection of speakers but if you think there is a topic we are not covering and which you think should be included, we would be really pleased to hear from you, if you would like more information, please contact either myself

at Aquatic Consultants, 9 Clanton Lane, West Farleigh, Maidstone, Kent ME15 0RA, telephone 01622 815355 email bernice@koiworld.com or Bill and Maureen at KoiSHI, Kingsbridge, Devon, nr Brixton, Marlborough AL2 0LJ, telephone 01238 708009 email koiwh@btconnect.com



Some like it hot

Corydoras expert, **Ian Fuller**, suggests a few species that like it hot which just happen to be some of the most sought after species **PHOTOS: IAN FULLER**



A well conditioned pair of *Corydoras adolfoi*.

HOT CORYS! YES THESE ARE SOME OF THE most sought after species of the whole family, but that is not the point of this article. In a previous article I wrote about three species that prefer or, indeed, needed to be maintained at cooler temperatures to be at their best. Well, in this article I will look at three species that most certainly are at their best when kept at the higher end of the so-called tropical range.

First indications

The first indication I had of Corydoras species tolerating higher temperatures, let alone being a requirement for good health and a necessity for breeding, was when a friend back in 1985 had started breeding *Corydoras adolfoi*. He had been keeping

Corydoras duplicornis is a species that is almost identical in appearance to *Corydoras adolfoi*.



them at about 28°C when they first spawned. It was not until 1994 that I first started to breed them myself, although it was not at such a high temperature. I had been keeping a group of six fish at around 26°C and it was after the influx of cool water following a 50% water change, which triggered the spawning activity. The

temperature was taken again shortly after spawning activity had ended and was recorded at 24.4°C. It is also possible that *Corydoras duplicornis* also prefers warmer water, since they are at times found inhabiting the same tributaries of the upper Rio Negro.

Another two hot Cory's

The next two species *Corydoras gesseli* and *Corydoras seussii* are also found inhabiting the same areas in the Rio Mamore system Brazil. The first is most definitely a lover of warm water. To be successfully bred they need to be kept at temperatures around 27°C, if not a little warmer. I first realised their needs for a warmer environment a couple of years ago when a tropical fish

wholesaler friend of mine imported a large quantity of *Corydoras gosseii*. Half of these were put in tanks on the highest section of the fish room along with some large *Discus*. The following day I received a phone call from my friend to say that the "New Cory's" were spawning. After a short pause he said, "but the *Discus* are caring the eggs just as fast as the catfish were laying them". I went over to his place as quickly as I could to see if I could get some pictures of the spawning activity. Unfortunately, by the time I arrived it was as though nothing had happened. I decided to buy a group and see if they would give a repeat performance. The first thing that struck me when I started to catch the fish was the fact that the water felt warm, very warm. When I checked it was 29°C and had been warmed up in readiness for the arrival of the *Discus* in the shipment. Apparently one of the boxes of *Corydoras gosseii* had been put in the *Discus* prepared tank by mistake.

Another hot Cory

The main visual difference between *Corydoras gosseii* and *Corydoras alvizi* is that the latter species has a longer snout, slimmer body shape and the colour of the dorsal and preanal fin spines are pinkish orange, instead of *Corydoras gosseii*'s yellow orange fin spines. Both species are found in the Rio Mamore river system, from an area known as Est. Rondonia in Brazil. This means that these two species will be living in the same temperatures and water conditions. It may very well be that when the rainy season starts, both species migrate to totally different areas to spawn in their own chosen niches, only to meet up again as the waters recede. This is only conjecture on my part. Using the same conditions for both species is a good place to start when I set up the aquarium in an attempt to spawn this species. ■

BREEDING *CORYDORAS GOSSEI*

It was in May 1999, that my *C. gosseii* first spawned. They were housed in their own 36 litre tank, where the temperature was an average 25.6°C. The tank furnishings were a 20mm layer of smooth grained sand, a small air driven box filter, a large clump of java moss and a piece of bog wood with a piece of java fern attached. Because of the amount of java moss in the tank giving the *Corydoras gosseii* almost total privacy, I only found out that they had spawned when a 20mm long youngster showed itself. I then decided to move the adults to a tank at the warmest part of the fish house. This tank was a little larger, holding 55 litres of water and had an average temperature of 28°C. This tank was filtered using a three hundred litre per hour internal power filter and only had four pieces of java fern attached to pieces of bogwood for cover, which would make observation of the *Corydoras gosseii* far easier than in the java moss filled tank. Two weeks after being moved to their new tank and the day following a regular weekly 30% cool water change, spawning activity could be observed.

The replacement cool water reduced the tanks temperature by only 1.5°C. The two females deposited eggs on every conceivable surface; some were even placed on the filter's outlet spout. On this occasion all of the eggs that could be found were removed.



Corydoras seussii is a species with a very similar colour pattern to that of *Corydoras gosseii*.



HATCHING AND REARING CORY'S

Place the eggs in a small two litre hatching container, which contains water from the main tank. This water is treated with three drops of Methylene blue to help protect the eggs from fungal attack.

An air stone is also added for water movement and maximum oxygen absorption.

The container is kept floating at the edge of the main tank to ensure the eggs are maintained at the same temperature.

It usually takes about four days for the fry to emerge from the eggs and another two to three days for all the fry to become free swimming.

The first feeds fed should be Blinn-worms, followed by alternate feeds of Brine shrimp or pre-cooked powdered fry food.

Setting up home

THE FIRST THING TO CONSIDER WHEN venturing into reptile keeping is that the housing and its equipment may well cost (as with fish keeping) more than the inhabitants if you are going to do the job properly. Another important consideration is the type of reptile (i.e. lizard, turtle or snake). Other questions to ask include: is it aquatic, slightly moisture dependent or arid; arboreal, terrestrial or fossorial. The

creatures but can have disadvantages for others. Glass is easy to clean, but is easily broken and can crack due to heat. Cracked bones commonly occur when heat mats are placed under a tank with a substrate deeper than that recommended by the mat's manufacturer. NB. As with a fish aquarium, glass reptile tanks must be placed on Styrofoam or equivalent blocks when the furnishings are added. Access from the top

exposed where bacteria can hide. Metal hoods with a ventilation panel and hole for light bulb fitting can be purchased for standard sized aquariums. These are useful in that they are fireproof but in smaller sizes ventilation is only at one end. Furthermore, should you wish to use a fluorescent light tube the lid will have to be drilled for the clips and access holes for the leads cut. Aquatic/semi aquatic reptiles such as



A tall, home made vivarium for housing arboreal baby frilled lizards.

answers to these questions will determine the type, size and material of the vivarium as well as the equipment and furnishings which will be needed.

Starting out

Many beginners may start with a disused/second hand or new standard all-glass aquarium that is adequate for some

can be awkward when furnishing and cleaning a tank. Features such as branches cannot be screwed/fastened to the inside unless using silicone - this makes removal for cleaning their difficult (unfastened furnishings in a glass tank slide easily and become dislodged). Although all-glass aquariums are sealed with silicone this does tend to come loose after prolonged use in dry conditions which leaves gaps

Turtles need very good ventilation and light (with spot lamp and full spectrum tube) which is hard to provide with their heads.

Purpose built vivaria

Purpose built, front opening, all-glass vivaria are readily available at dealers. These are easy to access for furnishing and servicing but the advantages and

CHIPBOARD OPTION

In more recent years plastic faced/melamine faced chipboard has been used for vivarium construction and has become exceedingly popular both for D.I.Y. and commercial vivarium manufacturers. These can be very attractive and will fit in nicely with a room's décor as they are available in a variety of finishes. As with the all-glass models the ventilation is at the top of the back panel. Many keepers prefer ventilation panels at each end of the vivarium and at slightly different levels to get a through-flow of fresh air. Some of these models come as flat packs; others are ready assembled. They are generally made in standard sizes but you may be able to order others.

Fixtures and fittings can be screwed to the inside for stability. Wattage size and positioning of heat sources must be carefully considered to avoid blistering the melamine. One disadvantage with melamine board is that it is affected by moisture. Even a water towel which slopes over slightly causing damp conditions underneath it will eventually cause the melamine to bubble up. A slightly damp substrate has a similar affect and any moisture, gaining access to the actual chipboard via the joints, will very quickly cause the panels to crumble. Silicone sealer along joints can delay this. Having made literally scores of vivaria with this material we have found kitchen work top off-cuts make a tough base which is highly resistant to moisture and withstands even vigorous scraping and scrubbing to remove substrate and droppings. Melamine tends to scratch with regular scraping and can even be gradually eroded by tortoises and lizards digging, especially where an abrasive substrate like coarse sand is used.



Commercially made vivarium in melamine displayed showing wiring for heat lamp. This would need adapting for fitting a fluorescent light.

disadvantages of glass, as above, still apply. One additional disadvantage is that it is not so easy to fit light fittings. Some versions have the ventilation mesh at the top of the back pane, others may have it in the top of the vivarium. For any reptiles which need a slight degree of humid substrate or a pool or large drinking vessel the front glass may develop condensation which ruins visibility. We tend to make our own glass vivaria (not a job for beginners) and fit the ventilation mesh at the top, near the front, to help reduce condensation. Some dealers, when ordering such a vivarium, may be able to have the mesh panel fitted at the front - it is worth asking. Again, front opening models are usually made in standard sizes but your dealer may be able to obtain non-standard models at extra cost (not all manufacturers do this since tanks are made on standard sized jigs). Another drawback, which is why we tend to make our own, is that taller models for arboreal creatures are difficult to come by.

Plastic option

Plastic vivaria are available but many of them are too small to allow a thermal gradient between each end as well as limiting the amount of space for exercise. Plastic tends to scratch and discolour easily. They are also difficult to fit with spot lamps because of problems of melting. However, they can be useful for housing hatching snakes, as quarantine cages, for checking out a new specimen for a day or two or temporary accommodation whilst cleaning the main vivarium. Some snake keepers use large, shallow models for keeping snakes on a rack system heating them with thermostatically controlled cables or heat mats.

Whatever type of vivarium you decide to use it must be **ESCAPE PROOF**. Overlapping front glass doors leave a narrow gap through which some small lizards and snakes could escape. Crickets will also find any escape avenues. Plastic file binder slotted into the

edge of the outer glass door will block the gap. Locks for sliding doors prevent both unauthorised access and snakes which rub against the doors from pushing them open. Many reptiles are stronger than one thinks so top opening lids must be very tight fitting or else weighed down. A word of caution if using plastic greenhouse shading for ventilation panels - whilst excellent and attractive in appearance it does become brittle after a while and some snakes and lizards have pushed their way through it. This is how one of our Blue-tongued skinks managed to join us in front of the T.V. in the lounge one evening via the loft opening and down the stairs! ■



Space saving housing for a collection of snakes using large, plastic boxes in a rack system - all basic requirements are met. Many snake breeders use this method successfully.

FISH 75A

FISH 75



MOUSTACHED DANIO

Danio danglia



PHOTO: VAX GIFTS

TOMMY'S - SHREVEPORT

...End Point

You simply can't escape him! Yes, Andrew Caine is back with a cute marine fish



One look at this picture and you can see why these fish are called Reindeer or Dragon wrasse.



I REALLY ENJOY MY LITTLE SEA VIEW TUCKED away nice and cosy surrounded by white pebbles on each side keeping me warm. Then suddenly out of the blue comes a phone call from our beloved dictator, the Editor himself (we are not worthy) and what happens, I am suddenly pushed out to the darkest cold depths of the End point. However, all is not lost for chilly as it is, I can wrap up with some hot chocolate and rabbit some more about our amazing marine life. So let's look at a weird looking fish with funny behaviours.

More names than a rap star

This little baby has more names than a rap star, "The Reindeer wrasse", "The Dragon wrasse", and "The Rock Mover". So we all know who we are talking about, the scientist's have named it *Novaculaichthys straminea*.

Only Gobies have a larger family in the marine environment, with the Wrasses coming in second place boasting a total generic number of 66, and, up to now, a total of over 500 species with more arriving each year. The family name is Labridae, the Greek

word *labros*, means greedy which really fits this bunch as jigs they are indeed. They need to be, as all Wrasses are constantly on the move, expending a great deal of energy which needs to be replenished.

Too cute for its own good

Here we have a Wrasse that has fallen foul of a great many hobbyists because of its looks. You know the story (and we are all guilty) we see a fish, fall in love and purchase without research. Next morning, or in the near future, your aquarium resembles a building site with corals and rocks dumped all over the place. So let's see what this fish is really like.

It is obvious we have a love / hate fish here, there is no in between and for those who love it read on. We commonly see these in retailers' tanks at around the 3 cm size, and they are cute, at this size anyway. It isn't surprising that these grow and grow! Reindeer Wrasses eat a lot, soon a 5 cm fish can become a six to 15 cm animal, with different behavioural traits than the baby you purchased.

Now it is more aggressive than before and harasses its tank mates. In the end, that the stress kills them. Your stressed stock is disappearing. Serpent soon lose their legs and then it really starts to come into its own moving rocks. They behave like bulldozers moving everything looking for food hidden out of sight. ■

Still want to keep one?

If you still want one, create the right environment for it. A large aquarium of at least 100 L, as we are looking at a 30cm adult. Keep all rock work glued down and purchase other large peaceful fish for its tank mates. Make sure they have a deep sand bed at least 5 cm thick because they also like to bury themselves at night or when threatened. This is a great "fish only species" that will give you many years of pleasure if treated correctly, and a truly wonderful animal.