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Welcome

I have to admit to spending some of my time wandering around newsagents counting how many magazines have sold this month. It's sad, I know, but there you have it. Last month was a real eye-opener though. The issue virtually walked off the shelves as fast as they were put on them. The tropical beginners' supplement certainly proved very popular. In fact, so popular we really should have sealed the issue up in a poly bag. Personally I hate sealing a magazine up in a bag but it keeps the whole thing together and stops people taking the free gift which in this case was the beginners supplement. Would you believe someone actually took the beginners supplement and left the main magazine behind! Apart from this, sales last month shot up to an all time high and firmly establishes *Today's Fishkeeper* as the fastest growing aquatic magazine in the UK.

The sue culture has certainly taken a grip in the UK now. Last month saw the outcome of a legal wrangle which establishes a very important precedent. An apparently healthy Koi was purchased from a well known dealer and placed in an established pond. The fish were then subject to an outbreak of KHV with large scale mortalities. After lengthy legal procedures and huge expenses, the judge decided that the claimant was entitled to compensation because fish are subject to the sale of goods act, and this specimen should never have been sold because it was diseased. This has widespread implications for the whole of the aquatic industry. It means if a tropical fish were sold and then came down with white spot which killed all the fish in the buyer's aquarium, the shop could be held responsible. The fact that all new purchases should be quarantined before introduction is ignored. Whitespot is a common illness which is easily treated using any one of the many standard treatments available through all good aquarium shops. The whole situation is a nightmare for the industry which both OATA and the OFI are working to find a solution to. In the meantime shop keepers everywhere, beware!

Until next month,
Happy fish keeping

Derek

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

Apart from the free Beginners guide to marines, we have three fascinating articles on marines, as well as a feature on some of the new equipment displayed at GLEE. Don't worry both tropical and pond keepers also have the highlights of this important trade show pointed out. If you want to know where your fish come from, Dr Peter Henderson has teamed up with Kathy Jinkings to bring the most in depth article on Amazon aquatic habitats ever published in the UK.

into something a little exotic? Top German aquarist Erwin Schraml has a whole bunch of new imports to whet your appetite. Pete Liptrai has been trawling through recent imports to find something a little tasty as well, and for the average community tank owner I have selected a beautiful Killifish well worth seeking out. So, as usual, *Today's Fishkeeper* keeps you up to date with what is really happening in the fish keeping hobby today.

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KEY TO SYMBOLS:

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

	COMMUNITY		BIG WATER
	NON COMMUNITY		BOTTOM
	CAREFREE		TEMP.
	SHY		10cm
	RESERVOIR		SIZE
	SURVIVE		NOT SUITABLE FOR KEEPING IN CAPTIVITY



Starting Point...

Just beginning in the hobby?

Pat Lambert writes especially for you...

WRITING A COLUMN LIKE THIS GIVES ME some problems. When I write about a fish that I have kept in the past (probably many moons ago) I am tempted to go out and buy a group again. I'm lucky because I have many tanks that are always under stocked with fish, so I don't necessarily have to resist the temptation. Having so many tanks gives me the flexibility to give any newcomers the right home with compatible tankmates or a tank on its own if that is what's required.

Many beginners have only one tank and this can so easily become overstocked. Maybe the tank you purchased in the first place was too small? If you have the room for it why not buy a larger tank to replace it. Larger tanks are easier to maintain and, once installed, they aren't much more expensive to run. I always advise newcomers to buy the largest tank they can accommodate and afford. A large tank filled with small and beautiful species can give you a kaleidoscope of colour that is truly breathtaking, but take your time stocking it for even a large tank has its limits.

LOOK OUT FOR THESE GORGEOUS GOBIES



Peacock gobies (*Pterapomus ocellifer*) come from New Guinea and were first introduced to the aquarium hobby in 1982.

If you are interested in a very pretty fish which is a little unusual look out for the Peacock goby. It has two dorsal fins and the pelvic fins are fused into a single fin. It's a beautiful little Goby which at 5cm will fit in perfectly with a community of small fish. It likes planted tanks with rocks or other objects to swim around. It's a lovely bright blue in colour with red markings and the dorsals, anal and caudal fin have bright yellow edges. Many of the Gobies have a reduced swim bladder and hug the bottom of the tank, the Peacock goby, however, has a normal swim bladder but still tends to swim in the lower levels. It really appreciates some live food.

Another small Goby which is a favourite of mine is the Desert goby. There are a few of these about at the moment and I was tempted by a pair. Males are territorial but they are peaceful with other fish. This is a real beauty when showing full colour. The body of the male is golden yellow and the deep blue finnage is edged in white. The females lack much of the males colour. I have not found them as easy to keep as the Peacocks though.

Desert gobies are a tempting bottom dwelling fish.





Ocellated stingrays (*Potamotrygon motoro*) live in rivers that have a sandy bottom. They dig themselves into this substrate forming a distinctive circular dip which can still be seen after they calm off.

VERY INTERESTING CHARACTERS

Stingrays make very interesting pets but very few species are small enough for the home aquarium. The Ocellated stingray, however, grows to 30cm all round and is a possibility if you provide it with the right kind of tank, depth is not so important as surface area and the tank needs a deep sandy bottom in which the fish can bury itself. Newcomers are attracted to these fish

but high water quality with excellent filtration is a key factor in their maintenance. They love earthworms, shrimps, mosquito larvae and other animal foods. They give birth to live young but they have a sting to their tail. They are feared by the fishermen in their native habitat because they cannot be seen and if trodden on, their sting can have dire consequences.

Lost for Words

Mimicry Some species closely resemble other species. A predatory fish might resemble a 'safe' fish and thus gain an unfair advantage. There are many examples of this.

Aeration Introduction of compressed air to the aquarium. Ventilates the water to facilitate the intake of oxygen and to expel carbon dioxide.

Cichlids A diverse family of fishes that are found in Africa, and tropical Americas with a few being found in Asia. They are particularly interesting in their breeding habits as all practise parental care. This care can be noticed if a species breeds in a community tank where the parents will establish their own territory.

Ovoviviparity Livebearing reproductive strategies that consist of internal fertilisation with most of the embryo nourishment originating from egg yolk.

Venturi An aeration device incorporated within powerheads or power filters. It draws air from the atmosphere, via a tube, into the water. This produces a stream of bubbles in the water flow.

Benthic Literally means bottom dwelling and refers to species such as Corydoras who spend nearly all their time scuttling around on the substrate.

Total system Term given to aquariums with built in sophisticated filtration and other management systems providing full water treatment.

LET'S TAKE A LOOK AT MEASUREMENTS



The system of measurement used for centuries in Britain has been the Imperial system. In France, during the French revolution a new system was founded called the Metric System. This was modernised in 1960 at an international conference and became known as the International System of Units. Britain, in common with large parts of the world, has or

is adopting this Metric system as its primary system of measurements. As a magazine of today, metric measurements are used in *Today's Fishkeeper* but some manufacturers and much old aquarium literature still use imperial measurements which are gradually being replaced. At the present time, however, a conversion chart could be useful.

CONVERSION CHART

4.5 litres	=	1 imperial gallon
100 litres	=	22 imperial gallons
2.5 cm	=	1 inch
30 cm	=	1 foot
0.5 Kilo	=	1 pound

USEFUL MEASUREMENTS

Tank sizes

60 x 30 x 30 cm	=	24x12x12ins
90 x 30 x 37cm	=	36x12x15ins
120 x 30 x 37cm	=	48x12x15ins

Fish sizes are often seen as:
25mm = 2.5cm = 1ins.

These are approximations to make conversion quicker and easier.



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There are several varieties of *Cryptocoryne wendtii* but they all have the filled edges which are so attractive.

EASY CRYPTS FOR FOREGROUND PLANTING

Cryptocoryne wendtii is a small plant growing to about 10-12 cm. It is a very attractive plant when placed in the central foreground of the aquarium. The coloration varies with the lighting but

they always look attractive and are undemanding plants which tolerate moderate lighting, normal pH and average community temperatures between 22 and 28°C

THE DREADED ALGAE

In early summer the dreaded algae arrives in garden ponds before other plants have started into growth. Problems with algae dominate the Q&As. Autumn comes and eyes are turned indoors. We look in the fish tank and what do we see? **ALGAE!** If ever there was a persistent pest in aquaria it must be algae.

All is not lost (well not quite). Green algae need not be a problem unless your lighting is very intense and you haven't got enough plants. Reduced lighting, more plants and algae eaters, like Bristlenoses (*Anicostus*), will take care of it even if it's quite rampant. Green algae on surfaces looks quite natural, it just needs to be controlled.

Green algae does not indicate poor water quality but blue algae does. Blue algae indicates a high nitrate level and it should not occur where regular water changes have been carried out and the tank is well maintained. Even algae eating fish don't like it. In this case prevention is better than cure. You'll see brown algae on the glass if there is not sufficient light. It's not difficult to remove with a scraper and the cure is to improve your lighting.

Beard algae and Brush algae are trouble and need to be eradicated. They can be brought in with new plants so examine all plants carefully before introducing them to your tank. They need to be dealt with as soon as you see them. Take out the items covered by them and clean thoroughly finally plunging it into boiling water. Plants or plant parts covered should be discarded. With bad infestations you will have to strip the tank and start again from scratch. Observation is again a key word in controlling it.

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.
- Inexpensive 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

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

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

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

THE FISH

4 Stocking levels: For **freshwater tropical** we recommend 12cm³ of surface area per 1cm of fish.
Marines: For a fish only setup we recommend 2.5cm of fish for 5l of water and for Reef only setups we recommend 2.5cm of fish per 27l of water.

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Scale 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

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

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

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

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



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Glowlight tetra

Kathy Jinkings profiles the Glowlight tetra



Glowlight tetras never look their best in an aquarium shop. This pair are showing only some of their lovely colour.

IN AQUARIUM SHOPS THE PEACEFUL Glowlight rarely shows itself to its best advantage. Under the bright lights of the shop, the 'glow' is barely visible, like a torch on a bright day. However, if you take them home and let them take up residence in a tank with shaded and dark areas (black gravel helps with this, but in a well planted tank there will be plenty of dim spots), then the Glowlights will live up to their name, with their red lateral stripes shining out like little beacons. Once you have seen them like this, you will understand the other common name they are known by in the USA — the Fire neon. Small, quiet and peaceful, they like similar tank mates. Neon, Cardinal and Black neon tetras complement them well, and although once they feel secure they stop bothering to school, these fishes will still provide a beautiful and almost ethereal mix, with flashes of colour appearing like fairy lanterns. Although albino versions of the fish do exist, the natural brown fishes with their red lateral stripe are the most attractive.

Like most South American fishes, Glowlights prefer soft acidic water, with a pH from 5.8 and a hardness of 6 degrees. This does not mean fishkeepers in hard water

areas should give up in despair — the little fishes are quite adaptable, and once they are settled in, quite hardy. If bought in a local shop, they should be acclimatised to your local water, and although they will not spawn in harder water they will still thrive. If, however, you wish to spawn them, then you will need to provide water nearer to their ideal. A pair should be placed in the spawning tank — you can identify females by their rotund, egg-filled midriffs. The tank should include plants and low light levels. Since the plants won't be impressed with the low light, you can use artificial plants provided they are soft and feathery, or Java moss is tolerant enough to endure such conditions.

Although the fish like to spawn around plants, the eggs fall to the bottom. To prevent the parents using them as a tasty snack, a stiff plastic mesh just above the tank bottom will allow the eggs to fall through but keep the parents above. After three days most of the fry should be free swimming, and can be fed on paramecium or similar tiny foods. By the third week, the characteristic 'glow' line will be appearing. These shy fish are easy to please with regard to the menu, and they will enjoy flake food and small live foods, as well

as supplementing their diet by nibbling at plants and algae. If you have a quiet aquarium that has room for a school of small, timid fish, then Glowlights will not disappoint, regardless of how 'washed out' they appear exposed to the world in a busy shop. ■

PROFILE

Name	Glowlight tetra
Scientific name	<i>Hemigrammus erythrozonus</i>
Size	4cm
Aquarium type	Peaceful small community
Distribution	Essequibo river, Guyana.
Diet	Flakes, all small live foods.
Temperature	24 — 28°C

A slightly salty tale

Mary Sweeney
creates a brackish
water community

PHOTOS: MAX GIBBS

ONCE UPON A TIME I BROUGHT HOME A very cute Bumblebee goby and put it in with my Goldfish. That wasn't a very good idea because the little creature was soon dead and I was a very sad little girl. Come here now, and I'll tell you where I went wrong.

It was almost twenty years later that I picked up a book dedicated to brackish-water fishes and thought of that little goby. Suddenly it became very clear that one does not place a brackish-water fish into a freshwater aquarium. For many fishkeepers, it's not something that has ever even occurred to them. That there are freshwater fishes and saltwater fishes is universally understood, but that there are fishes that live in water just a little salty is not so obvious to the average aquarist.

Brackish water

The term "brackish" is unappealing to most of us, evoking images of the fouled drinking water and maggotty headtack of seafaring tales in the good old days (everyone who wants to dine with Captain Bligh, raise their hands). It's no mystery why brackish water is thought of as dirty and unpleasant. Let's get past that, shall we? We're not drinking it, we're keeping fishes in it, though with a good filter and a bit of proper aquarium technique, it will certainly look good enough to drink.

Estuarine waters (where the river meets the sea) are quite fluid in terms of the concentration of marine salts, or salinity. The tide comes in and the tide goes out, constantly mixing the fresh and salt waters. Brackish water fishes are able to move in and out of water of varying salinity's, from fully freshwater to fully saltwater. Their physiology's are so designed that they can do this without peril. In fact, some of the species, like Monos (*Monodactylus argenteus* and *M. seboe*), live in saltwater and spawn in freshwater, but the fry require the saltier

water and the plentiful microscopic foods found in the estuaries. This little peculiarity, plus the extremely small size of the fry (and attendant feeding problems), are what have made it such a challenge for aquarists to spawn and raise Monos in captivity. It has been done, but it is a rare feat and carries a huge risk of disappointment.

Though brackish-water fishes may in nature occupy waters with different degrees of salinity from nearly fresh to fully marine it is possible to keep these animals well and happy in the aquarium in water that is merely brackish. A specific gravity in the range of 1.005 to 1.030 is generally called brackish. (Sea water has a specific gravity

of 1.025.) Unlike with some of our freshwater friends, consistent water chemistry, as far as salinity is concerned anyway, is not critical. In fact, brackish water fishes generally fare better when the salinity of the aquarium water varies a bit from time to time, as it would in their natural waters. As would be expected, primarily freshwater fishes, like the Orange chromide (*Etroplus maculatus*), will be found in the less saline waters and marine fishes, like juveniles of the Batfish (*Plotos orbiculatus*), are found in saltier waters, i.e. mangrove swamps and lagoons. Though it is natural to think of the ocean's edge in terms of brackish water, there are also many

Orange Chromides are one of the very few fish that live in saline environments



**Mitchell House,
Southampton Road,
Eastleigh, Hampshire SO50 9XD
www.tetra-fish.co.uk**

inland bodies of brackish water. One that comes to mind is the Great Salt Lake in Utah. Yum. Brine shrimp.

Managing brackish water

It is not difficult to "make" brackish water. All you need is some marine salt mix and a hydrometer to measure the specific gravity. Please do not be put off by "hydrometer" and "specific gravity." Until I saw and handled a hydrometer, I imagined it to be complicated and difficult to use. Nothing could be further from the truth. They aren't even expensive!

The marine salt is added to fresh, dechlorinated water and mixed well. It is best to keep a fish-only bucket for this operation. The density, or specific gravity, of the water required varies depending on the selection of fishes. The trick to this water conditioning operation is to make full-strength sea water and dilute it to the desired salinity. Do not add the salt directly to the aquarium. Always use a separate vessel to mix your water. The old saw used by carpenters: measure twice, cut once should be measure once, mix twice for aquarists. It is high useless to measure the salinity of the water if the marine mix is not yet dissolved. A trick used by experienced marine fishkeepers is to run a powerhead or airstone in the water-mixing bucket until the salt is fully dissolved.

One important point to consider in keeping a brackish aquarium is that the pH should be kept high, as one would if keeping rift lake cichlids or other hard-water fishes. A calcium-based substrate like oyster shell or dolomite will help to keep the pH up in the 7.5 or 8.0 range where it belongs.

Extra filtration is no harm in the brackish aquarium. The water will be warm and the fish are heavy eaters (gluttons actually). Use a strong biofilter with good mechanical action and introduce the fishes slowly to a newly cultured aquarium. Additional aeration is strongly advised as in the tradition of marine aquariums. Powerheads and airstones or bubblewands will provide good aeration and water circulation.

Brackish water fishes

The list of aquarium fishes that hail from brackish waters is surprisingly long. There

Top tip

In any high pH aquarium, stay on top of the ammonia level with good filtration and regular water changes. Ammonia is particularly toxic in high pH.



Unfortunately, two or three Monos together will fight. Four is the magic number.



WARNING

Be aware that Monos can be a bit emotional. They tend to overreact at times, turning black and basking themselves against the bottom and sides of the tank. If this happens, turn out the lights and slowly allow the room to warm. Chances are good that they will settle down again soon, but not if you're watching.

are quite a few well-known and easily accessible species: Monos, Scats, Archerfish, some Mollies, American flagfish, various Rainbowfishes, Kribbs, some Puffers, Glassfish and these are just a few of the wonderful characters that thrive in a slightly briny environment. The only problem is that not all of the brackish-water fishes can be kept in each other's company. Puffers, for example, are so snarly I've heard it asked how they can be trusted in the same tank long enough to reproduce (I honestly don't know. I've never bred them, but I sure would like to try someday).

Today's aquarium set-up features the Mono-Scat-Archer-Molly perfection and how

to manage the details. Monos, Scats, and Archerfish are not small fish. A community aquarium will be large, in the neighborhood of 300 to 450 litres, and deep, at least 60cm.

Monos

Two species of Mono (*M. sebae* and *M. argenteus*) are readily available in the hobby, usually as small juveniles. Breeding difficulties aside, it is the rare hobbyist that will find them less than amiable. It is a matter of taste which species is preferred, but the 15cm *Argenteus* is really quite special with its silver body accented in yellow and black. A school of at least four of →

these beauties is an unforgettable sight. Sebaes are a little more delicate than Argenteus, but once acclimated, should be fine as well.

Scats

Scatophagus argus, the Scat, is a beautiful baby. In its youth, it shows black polka dots on a green background. This pattern diminishes with age, but it is still a good-looking fish. There are several species of Scat, but *S. argus* is generally the most readily available.

Archerfish

Toxotes jaculator, the Archerfish, is a trickster. This is the fish famous for its ability to shoot an insect out of the air with a jet of water. While it can grow to 28cm, it's a lazy fish that doesn't need a huge tank. One to a tank, please, as they are not friendly with their own kind in captivity. They don't mind the company of other species as long as they are large enough not to be considered prey.

Mollies

Both shortfin and sailfin Mollies are appropriate for this community and as they are the smallest of the group, they underscore the good nature of the other fishes chosen here. Mollies, plain, fancy,



There are several different species of Archerfish but *Toxotes jaculator* this is the commonest in the trade.



Scats were named because of what they ate in the wild - excrement

and sailfin are well known in the aquarium hobby. Debates rage often over whether or not Mollies need salt in their water. Both sides, equally convinced that they are right, campaign against the others' ideas. I'm still not willing to engage in this argument, but instead refer you to earlier in this article, where I talk about the ebb and flow of the tides and the effect on salinity. Certainly all cultivated Mollies available through aquarium shops get along just fine with the three species mentioned previously.

Aquarium conditions and decor

For this selection of brackish fishes, keep the water at tropical temperatures of 25 to 30°C. All of these fish will suffer if chilled, so ensure that there will be no drop in water temperature. Since this group needs a large tank, it is no harm to use two heaters to equal the amount of wattage needed (five watts per gallon of water is the general rule). These fish will not be kept with plants.

**Mitchell House,
Southampton Road,
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www.tetra-fish.co.uk**

While there is a surprisingly good selection of plants that are suitable for brackish aquaria, Monos, Scats, and Mollies are voracious plant and algae eaters that should be offered plenty of green foods, but not live aquarium plants. As often as I may say this, there are always people who insist on aquascaping with Monos and Scats. The last I heard, a particularly ambitious Scat had stripped all the leaves from a large Anubias. I can only relate this to a snack of prime beef steak. It's better to use attractive rocks and driftwood to decorate this aquarium and leave the plants for fish that follow a low-carbohydrate diet.

This tank holds greedy eaters, but it is still best not to overfeed the tank. They are omnivorous, and will take live, frozen, and even prepared foods without complaint, but be sure to include some fresh veggies in the menu. Romaine lettuce is a favourite. I like to microwave it for a few seconds to break down the tougher fibres. Otherwise, keep it (and other vegetables for fishes, like zucchini) in the freezer to be thawed before feeding. ■



Two male golden tail Mollies displaying to each other.

10 Community Cautions

Big fish will usually eat small fish

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

Fish require different water temperatures

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

Fish have varying dietary requirements

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

Do not mix riverine and still water fish

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



Fish have different water requirements

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



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Fill all the levels

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

Never over stock

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

Keep your eyes open

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

Provide sufficient territory

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

Differing dispositions

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

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

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Q & A

Tropical

BROUGHT TO YOU BY NUTRAFIN & FLUVAL

Star Letter



Avoid *Anostomus* spp., and definitely do not consider *Leporinus* spp such as the Banded Leporinus. For a Stingray tank as these may harass sedentary fish such as Rays mercilessly.

Not the ideal combination

I am planning to purchase an aquarium 150 x 60 x 60cm primarily for 2 freshwater Stingrays. However, I wish to put other fish with them. I planned to buy 2 Fire eels and either 3 or 4 Clown loach (of adequate size) or 2 to 3 Discus. I have been told by several sources apart from one that these fish would be okay with the Rays. However the shop where I am going to buy the rays have said that sometimes other fish attack the eyes of the rays and we would be better not to put other fish in with them. Can you advise as to whether we can put these fish together, and if not, are there alternative fish that you could suggest.

David Harvey via e-mail

It is good that you are looking to purchase a substantially sized aquarium in which to house your Stingrays. Bottom area is the most important factor with Stingrays, and one square metre should be enough to allow a pair of one of the smaller species adequate room. Do be careful when purchasing your Rays, as some of the species sold will get very large as adults, and would require a large Tropical pond to be

housed adequately.

I have reservations about your proposed tank mates. Clown loach can be quite boisterous, and could unsettle the Rays. Stingrays can take their time chewing their food, and I have seen other fish literally steal food from the mouths of Rays, and I strongly suspect that Clown loaches could do the same. *Botia* spp. also come armed with a very efficient blade under each eye, and this could severely damage the eyes of a Stingray if there was any conflict.

I am also unsure about the suitability of the Fire eels. These fish prefer substantial refuges, which could reduce the amount of floor space available to the Rays. They will also bury themselves in the sand, and may disturb the Rays when they are searching for food.

Why not look at choosing tank mates from the huge range of suitable species from the same continent as the Rays. South America? Your aquarium is large enough to have a small shoal of a medium sized Characoid such as the Pink-tail Characin, *Citalex macrolepidotus*, Silver Dollars, *Metynnis* or *Myleus* sp., Gracelul characin, *Hemiodus gracilis*, or any other similarly sized peaceful species. Avoid *Anostomus* spp., and definitely do not consider *Leporinus* spp., as these may harass sedentary

fish such as Rays mercilessly.

Certain Cichlids will combine very well with Stingrays, but particularly suitably sized *Festuna Mesonauta* spp.. As a largely surface living Cichlid they will provide some movement in the upper levels of the tank (as would some of the Characoids). *Jurupari sarthreata*, *Satanoperca* sp. are peaceful, and are found in the same habitats as Stingrays, sifting through the sand for edible matter. Well-grown Discus may do very well, and I have seen these combined with Stingrays to good effect.

Your potential choice of Catfish is somewhat limited, but certain medium sized Doradids may combine well, such as Hassar species. Royal whiptails, *Sternisoma* sp., should thrive if they have some long branches to perch on, but some other members of the *Loricariidae* family may cause stress to the Rays by grazing on their skin.

There is a small but very good book available on Stingrays from Barrons Pet Guides, this contains a lot of information in a compact and very inexpensive publication. I thoroughly recommend that you obtain a copy of this before purchasing your Rays.

Properly maintained Stingrays can be fascinating and rewarding aquarium inhabitants, and it really is worth making the extra effort required to give them optimal conditions.

Pete Liggett

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Possible case of Ramirez dwarf cichlid virus

Q I have a 180 litre tank set up a few weeks and have added 6 Rams. One of the new arrivals has started acting strangely and will 'chase its tail' like a dog rapidly. I can see no obvious fin damage, its colours are fine and water has been checked for ammonia, nitrite, nitrate and pH (all fine). It will sit still in the water at the front of the tank when it's not acting in this strange way (unlike the others which like to hide in the plants), is there something wrong with this fish? Can you advise me on a probable cause?

Graeme Hawkins

A I certainly would be suspect of a problem with this fish.

Abnormal behaviour along the lines you describe strongly points towards a neurological problem - i.e. it is affecting the central nervous system including the brain. Bacterial infections and toxosis, parasitic cysts (including Sporozoan infections) and tumours would all be examples of possible diseases or disorders that could lead to unusual behavioural signs. If these Rams are wild caught then another possibility would be Ramirez dwarf cichlid virus. This virus causes uncoordinated swimming, muscle spasms leading to temporary flexion of the spine. Other signs include respiratory distress and loss of appetite and eventual wasting. Skin and eye haemorrhages can occur. The full course of the disease is usually considered to be around three to four weeks, with all Rams becoming infected and expected losses of 40 to 80%. If possible I would consider isolating this fish from your main aquarium. Most of the above list of possibilities are going to be difficult or even impossible to deal with on such a small fish. If the fish deteriorates then euthanasia may be the kindest option.

Lance Jepson

Companions species for a breeding group of *Neolamprologus*



The ultimate shoaling fish for any display based around Lake Tanganyika has to be *Lamprolabeus tanganyicensis*, the Tanganyika Killifish.

Q I would just like to know if you have any ideas on tank mates for nine breeding *Neolamprologus ocellatus* "silver strings". I would like them to occupy the middle to upper part of the tank so that they will not interfere too much with the breeding group.

Dave, Staffs.

A While the water conditions in Lake Tanganyika would be quite suited to many Livebearers and small Rainbowfish, it is always more attractive, in my view, to house fish from the same geographical region together.

My first choice would be the Tanganyika Killifish, *Lamprolabeus tanganyicensis*, is an absolutely stunning species of fish, that behaves more like a Rainbowfish than a Killifish. It is a fast active swimmer that occurs in large shoals around the shore areas of the lake. Males are a beautiful iridescent silver, with blue and green highlights and yellow fin edges; and while the females are much less colourful they would still compete well for appearance with many other aquarium fish. In the wild they deposit their eggs into cracks in rocks, and certain species of Cichlid will follow spawning groups attempting to snatch the eggs as soon as they are laid.

Unfortunately, while from what has been said so far this would seem to be the perfect option, there are some rather large obstacles. The most obvious one of these is that this fish is only very rarely available in the trade, and then only at fairly high prices, so actually obtaining some

may be difficult. This is partly due to the next problem. This fish is notorious for extremely poor tolerance to transportation, and so losses can be high, which means traders are reluctant to take a risk on ordering them even if they are available on import lists.

They need excellent water quality, and are even less tolerant than most of the Cichlids from the lake. Water changes would need to be small but very frequent, and any variation from hard and alkaline conditions is likely to result very quickly in ill-health and death. The water should be very low in dissolved metabolites; and if your tap water is high in Nitrates you may need to take steps to reduce this before use in your aquarium.

Another option that means you will be staying with species of fish from Lake Tanganyika, and this may actually be the better option given the size of your aquarium, would be to look at one of the species of 'Cyprid-Cichlids' (*Cyprichromis* and *Paracyprichromis*).

All the species are available through the trade, and a group of 5 of any one of them would make a great addition to your aquarium, but if I had to pick one it would probably be *Cyprichromis leprosum*. In spite of being Cichlids like your *Neolamprologus*, there should be no issues around territory, as these fish actually form three-dimensional territories in the mid- to upper areas of the water column.

They will feed on much the same foods as the fish you already have, and will demonstrate some of the wonderful range of Cichlids found just within this one remarkable lake.

Pete Liptrot

Today's Answers Expert Panel

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



Questions by Post

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

Internet Service

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



Tropical

How do I look after Chocolate gouramis?

Q I have recently purchased four Chocolate gouramis which have settled into my Discus tank very well. They spend their time displaying to each other and dashing in and out of the plants. I have not been able to find out very much information about these fascinating fish, only that they are a difficult species and require soft acidic water. I would be grateful for any information you could provide me with on the general care of these fish or how to breed them.

Mike Essam, Swindon.

A There are a lot of "Chocolate gouramis" besides *Sphaenichthys ophryotrocha*. These include: *S. selatensis*, *S. acrostoma*, *S. valentini*, *Parasphaenichthys*

ocelatus and *Parasphaenichthys* sp. nov. Of all these, the first-named is the most commonly encountered and also paradoxically the most difficult to keep.

If your fish are doing well in your water, whatever you do, don't change it! It is true that they invariably come from soft acid water in Malaysia (pH 3-5) but they are intolerant of changes in water quality. However, once adjusted to tap water it would be fatal to change overnight to acid soft water. I usually find they will even take flake in time but they are quite aggressive so you often end up with just a pair. A temperature range of between 24 - 25°C seems to suit them fine.

It might be necessary to change back to acid water for breeding. The only way you should do this is during partial water changes, literally by dropping the new water



Sphaenichthys valentini is the largest and most beautiful species of Chocolate gourami.

Where can I buy white gravel?

Q I was thinking about filling my next tank completely with white gravel on the bottom. I have seen small tubs of it, but I would need at least 40 of these for such a big tank, and at £3.50 a tub this is half the price of the actual tank!!!! Is there anywhere you know of that I can get a big bag of white gravel, which is a lot cheaper?

Mark George via e-mail

A You could try contacting Tricot on 01205 358058 and Underworld on 01509 610310 to see if they produce a white substrate at a reasonable price. The alternative is to use ordinary gravel over the base and then use a thin layer of white gravel over the top. If you use this method push the natural gravel back from the front glass and run a thin layer of white down in front. This way it looks like you have only white gravel as your substrate instead of a sandwich of white on brown. Using this method also allows you to use a proper plant growing substrate which will help your plants grow better.

Derek Lambert

in. But initially, I'd see what they do in the water you have them in since they are doing well and seem healthy.

If they do spawn you'll see them circling over the tank base and the female will pick up and brood the eggs in her mouth for about 14 days. It's best if there's a lot of floating weed for her to hide in during this period and for the fry to hide in when she releases them. When this happens the fry are reasonably large and will take Brine shrimp nauplii but like the parents they're ultra-susceptible to aquarium diseases - particularly velvet.

Dave Armitage



Skin growths

Q From time to time my Mbu puffer develops a small beige growth around his dorsal fin which grows to (at most) 2 millimetre diameter, protruding 2 millimetres or so. It then disappears after a couple of weeks. This doesn't seem to bother him and when the growth disappears it stays away for a while then one might appear elsewhere, albeit in the same region. I wonder if this is some sort of parasite, and if so how should I treat it? I attach a couple of pictures, one of the Puffer himself and one of such a growth just behind his dorsal fin (its not very clear, as its so small I'm afraid).

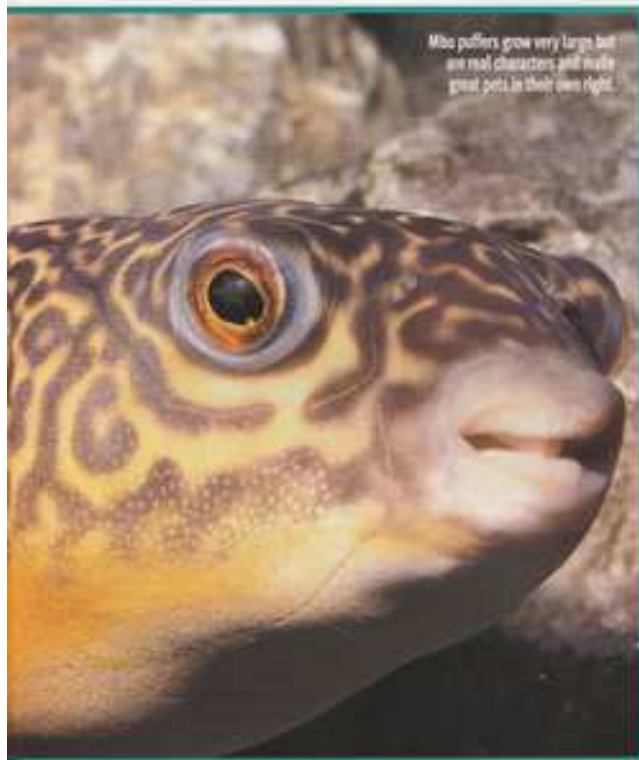
Marc Woolward, Brighton.

A The short reply to your question is that I'm not exactly sure what your Mbu puffer has got, but I think that it is very unlikely to be a parasite. My short list of possibilities would be:

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Mbu puffers grow very large but are real characters and really great pets in their own right.

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1 - Viral infection. Herpes viruses are well recognised as causing temporary skin "growths" in a variety of species including Common carp, Koi, Pike and Walleyes. I do not see why Mbu's cannot have a similar virus. Just like our cold sores, once a fish becomes infected it will stay infected for life, with the virus showing itself at irregular intervals. Lymphocystis would be another possibility although I would argue that this viral infection does not fit the description you describe.

2 - Fungal. Another possibility, but I would expect some rupturing or ulceration before resolution, akin to what can be seen in Koi with Dermocystidium.

3 - Skin "growths". Wart-like growths known as papillomas are well documented in fish. These potentially could fade only to reappear locally. In other species viruses have been implicated in triggering these papillomatous growths.

I'm afraid that a definitive diagnosis could only be made from a biopsy. I would continue to monitor this condition - make notes of when it occurs, how

extensive it is and when it fades. Bouts of herpesvirus activity are often linked to stressful incidents so your notes may provide a correlation.

Lance Jepson

Star Letter Prize from Hagen



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Q&A

Marine

Enriching frozen foods with a vitamin supplement is simple job, yet one of the most important things you can do.



How do I enrich frozen foods?

I hope you can help to enlighten me on enriching food such as frozen Brine shrimp. Am I right in understanding that if I took a product, such as esha minarol and placed say two or three drops on to the block of frozen food, this would improve its quality or am I off the mark and if so can you explain to me the process of enriching foods.

Nick Honor, via e-mail

Enriching frozen foods with vitamins is of great importance and produces great results within two weeks, your fish and inverts will love you for it. Try to perform a double whammy effect in enriching the food and aquarium water at the same time. Purchase as many different kinds of frozen food as you can find, since this will also vary the nutritional intake. Defrost your food in about 3 cm of aquarium water in a small glass, into this drop 2-3 drops of vitamins designed for aquarium usage. Leave this to stand for at least one hour, the longer the better, and then feed.



I have just finished reading September's star letter concerning converting from fresh water to a marine reef set up. My questions are similar but different. I would like to start a marine tank from scratch in a 120 x 45 x 60cm tank. I would like this to be a mainly fish only set up, but with some hardy Anemones. There are some questions I would like to ask, as I find that confusion sets in after reading different advice in a number of books. Could you advise me on filtration, for instance some books state reverse flow under gravel as being the best while others state external canister type. Some have even stated that a combination of the two is most efficient. Also please advise on which filter media to use. Do power heads have to be used even with external filtration, and if so, how many? Which lighting would you suggest?

Mike Watson, via e-mail



I am very sorry but there is no such thing as a hardy Anemone, however that does not mean you cannot keep one. They are a frustrating animal to keep but provide one of the most fascinating animal displays when tended correctly.

Regarding the set up you must consider all marines, fish only or reef as demanding the same water quality. After setting up your new system do not consider an Anemone for the first six months as

Star Letter

they require aged water which is far more stable in water chemistry than new systems.

Filtration, only consider large canister filters. You need two, one for biological and one for chemical filtration. Filter media: cerapour from Aqua Medic or Cell pore from Kent are very good, pricey yes, but don't skimp. A phosphate remover should be included in the chemical filter right from the start - this is essential. Add live rock, the more the better. Do not buy via a cheap mail order company, go to your local shop and examine pieces as it is expensive but worth it if you get good stuff. You also need a hang on skimmer, go for a big one if you can afford it, a Turbofilter multi 1000, by Aqua Medic or Prism pro by Red Sea you will appreciate these later. Failing this you will have to get the normal size Prism from Red Sea.

Lighting will either have to be T5 tubes which can be placed within the hood either from D & D Aquarium Solutions or Avocade, a total of 4 tubes are needed for your width of aquarium, or a pendant light using either halides, T5's or a combination of the two.

A source for purified water is essential. Aqua Medic now produce a great little unit for only £95.00, high on the optional extras list would be a UV steriliser and a surge control for the power heads.

Andrew Caine

Is it possible that the fish were affected by the colour of the wallpaper?

This may sound like a daft question, but are fish affected by colour? I have a new 5lt marine set-up which at the minute has a Fire fish, Sailfin tang and a Foxface in. All are doing well and there doesn't seem to be any problems. I have a blue background on my tank, which my wife decided she didn't like. She had some Terracotta (orange) coloured wallpaper which she thought would look nice, so I put it in front of the blue for about 3/4 of the tank to see what it looked like. Immediately the fish swam to the end where the blue was still showing. I thought that they were just a little stressed with me messing about around the tank, so decided to leave them for 1 hour. The fish just kept swimming at the blue end of the tank and didn't go past the end of the blue. I removed the wallpaper and straight away the fish started swimming across the full length of the tank as if nothing was the matter.

Paul Leeman, via e-mail



Even though you did not realise it you were performing an experiment with livestock, which produced interesting results. The blue backing resembled the open ocean to your fish, they felt safe and secure. Suddenly the open ocean was no more and the fish were indeed stressed. The open ocean disappeared to be replaced with something else they could not relate to and swam to the area of open ocean again and remained there, confused by this alien coloration. Remember one mistake by a fish means death in the wild, survival instincts were on display here. As the open ocean was again restored, the stress was released and normal behaviour resumed.

Experiments are the only way the hobby moves forward and animal behaviour is understood to an extent along with equipment development. However it is good to experiment at home but you must be able to take the consequences if things go wrong. If you wish to play around, and it is good, do so on a smaller set up and not your main display aquarium, as tears can follow.

Andrew Caine

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Can I keep a Moray eel in my tank?



I am interested in keeping a Moray eel in a 180 x 60 x 60cm tank. I am aware that they require reef like conditions, but could you help me with the feeding habits and availability.

Peter Bloom, via e-mail



You have a large aquarium but the fact is that for many Morays it is too small. Go for species with a maximum length of 120 cm. A reef environment is ideal but make sure the rock work is glued together or your eel will cause major rock falls. Remember a 100 cm fish will have a large girth. Feeding such animals should be performed twice a week with pieces of fish and other meaty foods, and feed them until they will not eat any more. Availability is not a problem for many species but you may have to fork out some serious cash for one, however it is well worth it as the coloration can be spectacular.

Andrew Caine

Star Letter Prize from AQUA MEDIC



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

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Moray eels can be spectacularly coloured. This is a Zebra Moray eel.



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Q&A

Coldwater



This planted Goldfish aquarium worked very well once the plants had rooted themselves properly.

Can I keep Goldfish in a planted aquarium?

I am planning the set up of my new tank - 150 x 60 x 45cm - to house Goldfish varieties and other coldwater species. I would like a lush, planted environment, but have failed miserably at this in the past, the Goldfish just decimate the plants. I intend to use a laterite sandwich substrate along with root tabs, liquid feed, and am toying with the idea of CO₂ injection. Is it worth going to the expense or would you think the idea of a Goldfish planted aquarium is a non starter? If not, are there any tips/tricks to stop the fish wrecking the planting?
Nick James, via e-mail.

I have set this sort of aquarium up myself in the past and had good success with it. I would certainly go to the expense of adding a CO₂ injection system to the aquarium, your plants will love you for it. Don't forget the most important piece of kit for a planted aquarium is the lighting. All the money and effort you put in can be undone by not paying enough attention to the lights. Fit at least two, better still three or even four tubes, including at least one special plant growing

tube in your tank. You might even consider trying the new T5 lighting out on your tank in which case you will only need a single or possibly two tubes for good plant growth.

The other key to success with a planted Goldfish tank is to choose plant species that root well and give them time to become established. I would plant the aquarium and leave it for at least a month before adding the fish. Vallis is one of the best plants for this type of aquarium. Various species of Ludwigia can also be used and, of course, you can buy any of the pond oxygenators from your local garden centre. If the room is warm enough you will have success with a wide variety of what are normally considered tropical plants. Bacopa sp., Lobelia cardinalis, Sagittaria sp., Nuphar pumila and Samolus parviflorus are all worth trying. Java Fern attached to pieces of bogwood work very well in this sort of set up. To attach Java Fern to a piece of bogwood all you have to do is use fishing line to tie the rhizome to the bogwood. Over the next month the plant will send roots out into the wood that will permanently attach it to the bogwood.

Derek Lambert



Bitterling make interesting aquarium inhabitants

No room at the inn!

I have a 60 x 30 x 30cm aquarium containing five Minnows, a coldwater Plec, and two Bitterlings. Can you advise me on what other fish I can keep in this aquarium?

James Lark, Peterborough.

Your aquarium is just about full up. In an aquarium of this size you can only keep 60cm of fish. When your Minnows are full grown they will be 10 cm each so that is 50cm used up. The coldwater Plec will take another 6cm, and your two Bitterling 6cm each, which makes a total of 62cm of fish in your aquarium. Your tank is already overstocked, but with good filtration and regular water changes they should be O.K.

Derek Lambert

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- Q1) How many stages are there in the biOrb filtration process?
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REEF ONE



Sea view

In his regular monthly column, **Andrew Caine** reintroduces a wonderful coral which has been banned for a number of years and profiles a fish which glows in the dark. We also have an interview with a "simple" sponge

An invertebrate for you

Sea view



HAMMER CORAL (*EUPHYLLIA ANCORA*)

We have waited a long time for the king of *Euphyllia* to return to the aquatic fold and what a welcome return it is. Why have we waited so long for them to be seen in shops again? Simply because it was a banned import. As so often happens its perceived beauty was its downfall in the wild. This little beauty has been given a licence for a strict number of pieces to be imported. So we should know how to care for our new addition.

Medium to low water flow is gratefully accepted, this allows the large polyps to fully expand. If the animal is placed in high flow, the polyps still expand, however, the production of sweeper tentacles is more apparent than in slow flow. These tentacles are powerful weapons and like stinging spears they seek out prey, not food, but other corals. When located they attach to the surface of the enemy colony and inject

powerful toxins. Humans can even be stung by these on the forearm where our skin is thin, so watch out for these.

Hammer corals are found quite deep down in their natural habitat, so intense lighting is not required, but definitely not restricted. Lighting with a rack of normal high intensity tubes will suffice, T5s and halides can also be used. Under normal lighting, place the coral in the upper half of your aquarium. Under more intense lighting place it in the lower half or it will be taking the space needed by a coral that requires a greater light intensity.

Feeding cannot be easier. They will take small particles caught in their mucus over the tentacles. If you place a piece of fish in the middle it will slowly disappear into the animal. Be sure to feed your shrimps at the same time or the coral might lose out on a meal.

PROFILE

Phylum
Cnidaria

Name
Euphyllia ancora

Location
Indo-Pacific

Feeding
Meaty foods at least once per week, general coral foods daily.

Size
Up to 15cm in shops but cover huge areas in the wild.

Water flow
Moderate is best.

Lighting
Medium to high.

Difficulty
Easy, if all its requirements are catered for. Needs very good water quality.

Apogon leptacanthus photographed in a German aquarium.

A fish for you

**Sea
view**



GHOST CARDINAL FISH (*APOGON LEPTACANTHUS*)

Many years ago, a young boy walked into a fish shop for the first time with his mum and dad. They walked through this funny land full of glass boxes and bubbles until they came to a big black door, slowly it opened with a creak and a groan, the young boy peered around this door and holding his parents hands they walked in. What he saw filled his young heart with joy, he stared at the rows and rows of fish, he burst with sheer excitement in this aquatic wonderland, then he stopped in his tracks and pointed "You can see the bones in that fish" he screamed, "It's a skeleton", I still look at Glass catfish in wonder, but when I discovered the Ghost cardinal I just melted, and still do every time.

This shoaling fish is often passed by in dealers' tanks. They often look bland, dull, and huddled together in a corner, but the person who knows what they are doing will snap this pathetic shoal up. When they are introduced into a reef aquarium a transformation occurs. De-stressed the

shoal now takes on a different appearance, hanging around under a coral head or overhang, the vivid blue coloration is now apparent, turning on and off as they shimmer under the light.

These are a great beginners fish along with most of the Cardinals, and one that will stay with the beginner for many years. But what are the pitfalls to be avoided? As with all fish there are a few.

Firstly, as you can imagine, they are a timid fish, very easily stressed and scared. Bold and aggressive fish should be avoided as tank mates or they will just hide in the rockwork until they die. They are more active during the dawn and dusk lighting cycle and feeding should take place during these times. If you feed during the day, they might not collect enough to remain healthy and vibrant. As with all marine animals, water quality is of paramount importance.

If you stick to these simple rules you will be rewarded with a shoal of amazing fish, one that brings another aspect to reef keeping, for this a shoaling fish that sticks

close to the rock work, disappearing and reappearing with flashes of iridescent blue to captivate any admirer. Truly a great fish that is often overlooked and one that won't stretch any pocket.

PROFILE

Family
Apogonidae

Name
Apogon leptacanthus

Location
Indo Pacific

Size
6 cm

Feeding
Small meaty vitamin enriched foods,
at least twice per day.

Reef compatibility
Great reef fish

Sea view

Don't take a bath with me!

I am described by humans as one of the simplest and primitive multicellular life forms on earth today. How insulting can you get! Yes I have got a chip on my shoulder, however, I can grow my chip back, could you grow another arm if I chopped it off? So

being simple and primitive isn't that bad is it! I am not simple, I am just uncomplicated in my body structure, and quite amazing really. Please allow me to introduce myself, I am a "simple" sponge.

I started life as a member of the plankton,

drifting along the currents. I had a beating whip on me called a flagella, this helped me float in the water, but I drifted for quite a distance before I landed. I tested the water flow and chemical cues of the rock I was on before I finally settled, then I 'simply' turned myself inside out. My outer cells with the flagella migrated inwards and my inner cells migrated outwards, a funny feeling I can say.

All grown up

That was a long time ago, now I am much older. Lining my exterior are millions of cells called porocytes, each has a tunnel running right through it, allowing the passage of water. These can close a pore at will, turning the water supply on and off. Once in, the water passes through loads of tunnels until it meets a large central exhalant tunnel. Millions of cells, each with a beating flagellum, live along the tunnel walls. Around the base of the flagellum is a collar of microvilli, hence the term collar cells. The beating action draws water in from the sea, microscopic detritus particles and dissolved organics are assimilated into the cells by the microvilli, food lovely food.


As the water passes, waste from my body is excreted from cell walls and taken by the water into the exhalant tunnel, here it is passed upwards to the big hole in the top called the osculum. This big exhalant opening is given some help by the design we sponges created, yes we are quite proud of this feature. The shape of the osculum causes a localised drop in water pressure around it, thus exhalant water is sucked out of our bodies up and away to stop me re-ingesting it. I am 10 cm tall and filter over 100 litres a day, not bad at all.

My body structure is supported by large spines called spicules made out of silica, my mates make them out of calcium or sponging, which is a soft organic material. When scientists cut us up, this is what is used to identify the species. We are mashed to pulp so you can discover chemicals that we produce, many new ones have helped in the treatment of diseases and can even reduce cancer tumours. Someone once pulped us and then sieved the little particles of solids that was left, they placed these in an experimental aquarium and within months my old friend was growing all over the place!


I will have to go now as I can sense a large concentration of dissolved organics coming my way, but remember if you want to try a sponge in your aquarium feed us very well, and have the filter system to cope with the organics or trouble will follow. ■

A "simple" sponge with expanded oscula. This is possibly a *Pseudosuberites* sp.






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 **AQUA MEDIC**

Top of the Pops Cichlids

Who are "Top of the pops" in the fish world? Certain Cichlids have always been there, but some species come and go as fashions change. Here we have a snap shot of the current state of play including some of the "Wannabes" of the fish world just waiting for their chance to topple one of the established species.

PHOTOS: MAX GIBBS, OLIVER LUCANUS, DEREK LAMBERT

Angelfish



Marble Angelfish

OUR VERDICT

Popular from the very beginning of the aquarium fish hobby and still ranking as a "top of the pops".

Scientific name	<i>Pterophyllum scalare</i>
Aquarium type	90 x 30 x 45cm
Distribution	South America.
Diet	Not fussy. Flake, granular, pellet, frozen and live foods.

Companion species This species is a perfect community fish providing the other fish are not too small nor overly boisterous. Often combined with Neon tetras which is fine until they grow large enough to eat them!

Kribensis



Kribensis are very beautiful when full grown

OUR VERDICT

A "Top of the pops" which has fallen a little by the wayside in recent times. Its lack of colour as a young fish puts off people buying what is probably the most suitable Cichlid for a community aquarium.

Scientific name	<i>Pelvicachromis pulcher</i>
Aquarium type	60 x 30 x 30cm
Distribution	Africa
Diet	Flake, granular and pellet foods plus all types of live foods.
Companion species	Other medium sized peaceful species.

Discus



Pigeon Blood Discus

OUR VERDICT

A well established "Top of the pops" which requires special conditions and extra care. Not for the beginner.

Scientific name	<i>Symphysodon hybrid</i>
Aquarium type	90 x 45 x 45cm
Distribution	South America
Diet	All good quality foods including commercial flake, granular and specialist Discus mixes.
Companion species	Other medium sized peaceful community species which like high temperatures and soft acidic water.

Oscar



Oscars come in many different colours.

OUR VERDICT

A "Top of the pops" which probably shouldn't be. Grows too large for the average aquarium.

Scientific name	<i>Astronotus ocellatus</i>
Aquarium type	120 x 60 x 60cm
Distribution	Amazon
Diet	Flake, granular, pellet, frozen and live foods. Easy to feed.
Companion species	Other large tough cichlids.

Ram



A beautiful male ram in full colour

OUR VERDICT

A "Top of the pops" which gained a whole new lease of life when some wild caught fish appeared in the trade again. A very beautiful fish justly deserving its popularity.

Scientific name	<i>Papiliochromis ramirezi</i>
Aquarium type	60 x 30 x 30cm
Distribution	Venezuela & Columbia
Diet	All commercial foods, plus any live foods they can get hold of.
Companion species	Other small peaceful community fish.

Firemouth cichlid



A lovely pair of Firemouths.

OUR VERDICT

A "Wannabe" which used to be a "Top of the pops".

Scientific name	<i>Thorichthys meeki</i>
Aquarium type	90 x 30 x 30cm
Distribution	Guatemala & Mexico.
Diet	All foods including some live foods.
Companion species	Other medium sized community fish.

Red parrot cichlid



Parrot cichlids come in many colours now

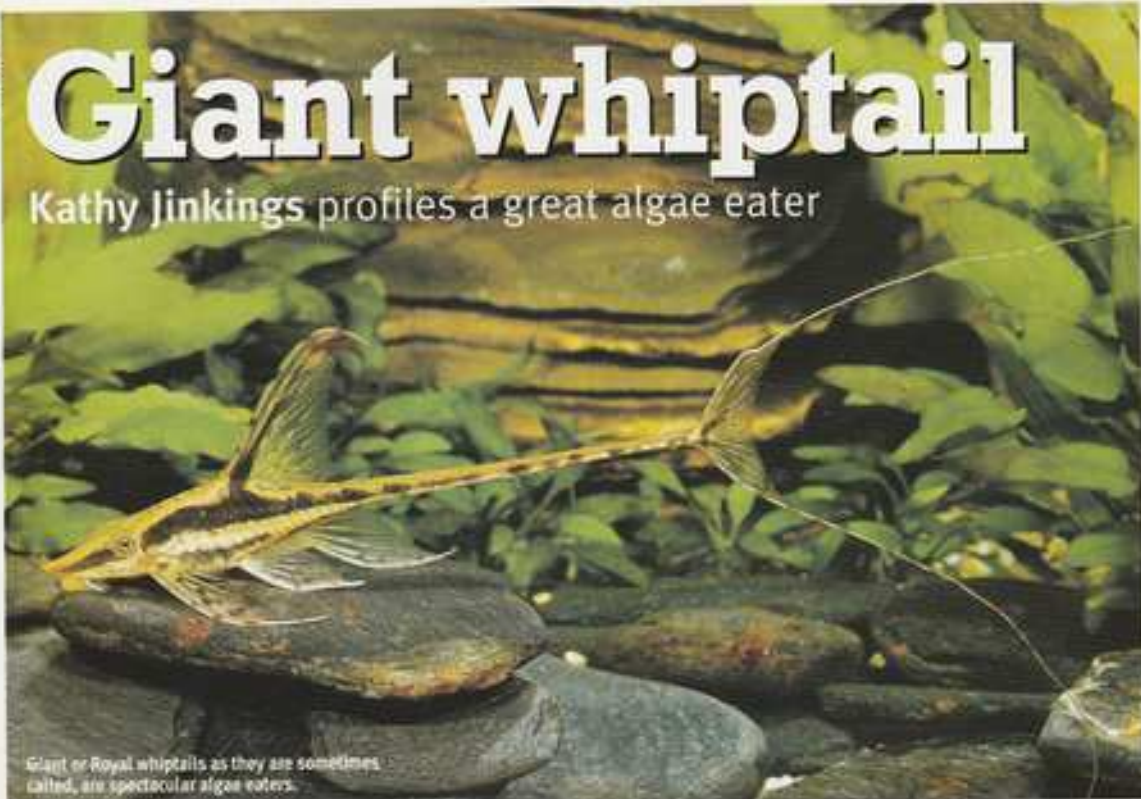
OUR VERDICT

Hated by all serious Cichlid keepers, this fish has become a "Top of the pops" despite the anger and furor which greeted its introduction during the 1990's. New colours and body shapes are arriving all the time.

Scientific name	No scientific name - hybrid
Aquarium type	90 x 30 x 30cm
Distribution	In captivity only
Diet	All foods including some live.
Companion species	Other medium to large community fish.

Giant whiptail

Kathy Jinkings profiles a great algae eater



Giant or Royal whiptails as they are sometimes called, are spectacular algae eaters.

IF YOU HAVE GONE TO THE TROUBLE AND investment of a reasonable size tank, it is entirely normal to want to fill it with brightly coloured and active fish. The suggestion that you might want to use 22.5 of your 'fish cm' on a fish that is mostly brown (albeit with a very striking black stripe), that moves very little during the daytime, is not always an immediately popular one. However, the Giant whiptail is not only a fascinating fish, but one that can be quite impressive without moving at all! As with many Loricariids, a piece of bogwood in the tank provides a dietary supplement, but also provides a 'perch' for your whiptail. They will nearly always oblige by choosing to lie along the bogwood, even in plain view, where they will rapidly draw the attention of an observer away from more flashy fish.

Giant whiptails are completely peaceful and ideal for a community aquarium where they will keep to the bottom and sides of the tank well out of the way of the other inhabitants. Their main diet is algae, and they will dedicate their night-time efforts to ensuring that your tank never suffers from an unsightly growth. Their mouth, which is located on the bottom of the head, is designed for grazing over glass, substrate and bogwood, rasping algae in its path. This is, however, a sizeable fish, and unless you have a real algae problem it is not reasonable to expect them to scrape a living from this alone. You can supplement their diet by algae wafers, soaked vegetable flake

(so that it sinks) and occasional live foods such as Bloodworm.

As far as water chemistry goes they are fairly tolerant. Although coming from the soft waters of South America, they thrive in a pH between 6.5 and 7.8, with a hardness up to 18 dGH. Pollutants, however, are definitely not appreciated, and you will need to be well on top of your tank maintenance; if the water is becoming foul you may notice them positioned near the filter outlet. It is, of course, better not to let such an occurrence happen in the first place! The Giant whiptail has been bred many times in aquaria, and you will know when your male is thinking of starting a family by the stiff bristles which appear along the edge of the mouth. The eggs are attached to a flat surface, such as the aquarium glass. Having spawned, the female takes her leave, with the proud father left to guard his spawn of up to 100 eggs, which begin to hatch after about six to eight days. Two days later the fry will have finished the food left in their yolk sacs, and be looking for food. Although the parents feed only at night, the little fry are in a hurry to grow past 'tasty morsel' size, and will feed during the day as well. Food should always be available for them. Soft vegetables are suitable, but if you intend to spawn these fish keeping a spare tank in the sun to get a good algae growth will stand you in good stead. The little fish may eat protein foods, such as meat or protein

pellets, but will not thrive on this — to survive they need veggies, and lots of them. Unfortunately, filling the tank with soft vegetables can lead to pollution, so it is vital to check the tank regularly, and perform 50% water changes as often as possible. The Giant, or Royal whiptail is a fascinating addition to any peaceful aquarium, and well deserving of a place in your home. ■

PROFILE

Name

Giant whiptail

Scientific name

Sturisoma aureum

Size

22.5cm

Aquarium type

Large community

Distribution

South America: Magdalena, San Jorge and Cesar Rivers.

Diet

algae, algae wafers, sunken vegetable flake, mashed peas, sinking frozen live food.

Temperature

22 – 26°C



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The aquarium should be well planted as they prefer to lie in wait, well hidden by plants until prey swims into range.

Pick up a Pike

Most livebearers are pretty little fish which wouldn't harm a fly. One, however, is an altogether different beast as **Peter Capon** explains

THE PIKE LIVEBEARER, *BELTONOSX bellatorus* is not the type of fish that is normally available at your local aquarium shop. Occasionally, however, they are seen in outlets that stock the rarer and more unusual fish. Otherwise they are only available from fishkeepers who specialise in keeping the more unusual livebearers and through the livebearer specialist societies. Another good method is to visit a number of shows around the country and when you see specimens on the show bench ask the stewards to introduce you to the exhibitor who may well have some young that you can purchase.

Common enough in nature

It is not that the fish is particularly rare in its native habitat, more that its feeding habits make it a specialists' fish. There have, however, been reports that its numbers have diminished in the wild owing to over zealous spraying of insecticides in the war against mosquitos and malaria.



In this stream at San Estavan, Belize, Pike livebearers were found feeding on Platies and Elegant widow livebearers.

Since it is a predator the food chain tends to concentrate the insecticide to the detriment of the Pike Livebearers.

It is found in brackish and fresh waters ranging from Southern Mexico to Honduras and Nicaragua. It inhabits slow moving streams, where it remains close to the

balance the large prominent eye. The dorsal fin is set well back on its flattened back, which indicates a fish used to frequenting the upper levels of the water. Males grow to 10 cm while the larger female can achieve 20 cm. It is reported that the fish takes on a totally different colour and pattern during

being universally kept is that the adult fish will rarely feed on any thing other than live fishes, with a marked preference for livebearer shaped prey. In their native waters this feeding preference whilst cruel to the aquarist's mind, serves to keep other livebearers numbers in check and has the added advantage that diseased and deformed specimens are culled naturally since they will be more easily caught.

While their preferred diet is other livebearers, they have been observed in the wild to take the ubiquitous Characin, *Astymax mexicanus*. When they are extremely hungry some specimens can be induced to eat tadpoles and large aquatic insects, but, as a general rule they must have live fishes if they are themselves to survive.

Breeding

Breeding is similar to the other Poeciliids except that the male does not display in front of the female, he always approaches from behind when attempting to deposit his sperm with his gonopodium, thus keeping well clear of the female's savage jaws. At a temperature of 24°C the gestation period is 52 days. The mother-to-be will need to be housed in a tank with plenty of plants to give her fry the best chance of not ending up on a mother's menu.



The gonopodium (modified anal fin) of the male is large in comparison with the body size.

banks in vegetated areas, mangrove swamps, reedy swamps, and even inlets of brackish bays.

Looks like its name

The fish, as its common name suggests, is pike-like in appearance. Its flanks are olive green with regular rows of small black spots, and the body can show by reflected light an iridescent green sheen. The broad tail carries a black spot which seems to

the hours of darkness, with some specimens becoming almost completely black at night.

Why are they so rarely kept?

The Pike livebearer was first introduced to German aquarists in 1909 and has been represented in a small number of aquarists' tanks ever since. The reason for their not

The fry are 25 mm long at birth and are born at ten to fifteen minute intervals. According to E.Schaumberg of New Orleans writing in 1930 the fry issue forth first head first, second tail first and so on as though they are arranged within the mother in a space saving head to tail packing arrangement. Later authorities have claimed that the fry are all born head first. Perhaps a reader with both the time and patience to witness a complete birth can record the exact manner of birth and clear up the →

The Pike livebearers jaws are elongated and are curved in such a way that the fish cannot completely close its mouth. It has fine needle like teeth which are readily visible to the naked eye.



apparent conflict of information.

It is said that the female stops eating two days before the fry are due and some authorities claim that she doesn't attack her offspring for several hours after the birth. It is, however, safer to move her to another aquarium soon after the births are complete rather than test this theory and possibly loose many of the fry.

CAPTIVE FEEDING

Aquarium observations show that the preferred food for adult Pike livebearers is adult Guppies and Platies or similar sized and shaped fish. They do not appreciate small cichlids but whether this is because of their shape or because of their spined fins is not clear. Prey fish must be alive. Unfortunately, for our sensibilities they rarely accept dead fish. They will then slowly stalk it and then with a lightning movement snatch the fish across the middle with their wicked jaws. The prey is then turned around by repeatedly releasing and re-grabbing until it is in a position to be swallowed. Smaller fish can be swallowed head first, but larger fish are invariably swallowed tail first. The sight of a Pike livebearer swimming around with the head of its meal protruding from its mouth and obviously still conscious doesn't endear this species to the more sensitive aquarists. A fully grown adult female would require a 7 cm fish every two to three weeks to sustain it. If a pair are maintained in the same tank it should be well planted and at least 45 litres capacity and should be well matched for size and always well fed. The female is not adverse to making a meal of a small male if she is hungry. When well fed the fish will spend most of their time stationary in the plants but will become more active when they feel the need for a meal.

Feeding the fry

The fry are 25 mm long and a large female can deliver over a hundred offspring. The young have a different pattern to the adults; they have a black bar on the flanks extending from the gills to the caudal peduncle. The fry will accept Daphnia and White worm as a first food but for the best growth rate and for healthy fish, small livebearer fry are more acceptable. These should be fed at the rate of a hundred fry per week to each young Pike. The young grow at a fast rate and should be 50 mm within two months.

The difficulty is in supplying the large amount of food that they need and unless the aquarist has enthusiasts willing to take

WHAT DOES THE NAME MEAN?

Belonesox belizanus was first described by Rudolf Kner, the Austrian biologist in 1860. The first specimens were collected close to the capital of British Honduras (the country is now called Belize). In 1936 Hubbs separated the species into two subspecies *Belonesox belizanus* and *Belonesox belizanus moxillosum*, the latter being restricted to the Yucatan peninsula. The generic name is derived from *Belone* which means arrow and *esox* the generic name of the Pike of British fresh waters. The specific name refers to the city of Belize. Hence the whole name means the arrow shaped pike from Belize.

Top tip



Belonesox belizanus is an interesting addition to your fish collection, but not a fish to be acquired without consideration being given to housing and the supply of food fishes.

his surplus fry it is probably best to cull the brood and only attempt to raise a dozen or so fry to maturity. If it is desired to raise the whole brood it should be borne in mind that the young will regard their slower growing siblings as food. The brood will therefore have to be sorted and spread over a number of tanks. ■

Wild Guppies often make up a significant part of Pike livebearers diet.





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The river Amazon flows through a giant river valley, of which about 80% is rainforest.

Aquatic habitats of the Amazon

After nine years of field work in Brazil Dr Peter Henderson is the UK's undisputed expert on aquatic habitats of the Amazon. In this new six part series **Peter and Kathy Jinkings** examine the most important types of habitat our aquarium fish come from

THE RIVER AMAZON IS BY FAR THE LARGEST river in the world; about 20% of all the freshwater flowing into the oceans of the world passes through the mouth of the Amazon, at an average rate of 200,000 cubic metres per second, pushing freshwater far out into the Atlantic ocean.

Fish kills in the wild

Many Amazonian fishes are surprisingly hardy. When the water is low, they are often isolated in pools or lakes, with limited food supplies and oxygen, which can bring frequent and catastrophic mass mortalities for the fish. One such occurrence was

AMAZONIAN HISTORY

Once, during the Paleozoic (over 250 million years ago), this area was a huge marine inlet which opened into the Pacific Ocean. Some of the Amazonian fish fauna is related to Pacific marine fishes rather than Atlantic ones, which were cut off from their relatives when the Andes began to form during the Miocene, between five and twenty-five million years ago. The modern sediments of the Amazon, up to three hundred metres thick, are called the Barreiras formation and were formed during the Quaternary (from 1.6 million years ago) as sea levels rose and fell, alternately depositing sediments and carving away river valleys. Because these sediments are so old, most of the nutrients and easily soluble minerals such as calcium have been leached away. Thus waters flowing from the sedimentary deposits in the basin always have a low conductivity.

documented in the Maminaua lake system in October 1995. Due to the low water, the lake system had become completely isolated from the Rio Japura. A slight rise in the water level in October opened up a small channel, which held static water, little sediment, and copious phytoplankton which gave the water a green colour. Up until 2 o'clock the sun had warmed the water to a surface temperature of 34.9°C, with cooler water below at a depth of four metres. At two o'clock a light rain shower started, followed at three o'clock by heavier rains. The loss of sunlight and the influx of cool water from the rain rapidly reduced the surface temperature, so that the surface became colder than the water below.

As the surface cooled, convection carried less oxygenated water up from below, and with the loss of sunlight the phytoplankton stopped photosynthesising and started using up the oxygen in the water. By eight o'clock the oxygen levels had fallen to

almost unappreciable levels, and in another forty minutes the first fish, bottom-living Doradids, were seen gasping at the surface. Within ten minutes a mass mortality occurred, affecting all the fish in a 1km area. Rays, Cichlids, Catfish, and many others were all affected, and collections of the dead fish showed that large Tucunare were especially affected, with one dead for every 3m of bank. These events, and subsequent fish kills, were repeated for the next two days, the last of which affected the whole length of the channel.

Some survivors

However, even in such dire times, many Amazonian fish have adaptations which enable them to survive through disaster. The huge Arapaima and many other species are able to come to the surface and use atmospheric oxygen, and by this method escaped the carnage. This ability to breathe



When fish kills occur, the water surface will become white with dead fish, and the smell of the decomposition can be intense. This condition will also contribute to the oxygen depletion making the situation even worse.

DRYING HABITATS

Floodplain lakes, at an elevation of only 1 metres above sea level, usually dry out completely in the dry season. Those that are slightly lower, at a more common elevation of -1 or -2 metres, only dry out completely once every ten to fifty years, but are reduced in area by the drying. Channels that link the lakes and rivers, which usually have a bed at sea level, dry completely every four or five years. This means that every century the floodplain fishes will experience an almost complete loss of habitat, although there are always a few deeper channels that retain some water.

The river is full of islands left by the falling water level, and the exposed banks provide homes for birds in burrows where once fishes made their nests.

The Cockatoo dwarf cichlid, *Apothogoniscus caratoides*, is a very popular Cichlid in the aquarium hobby. Like many other species in the Amazon, they usually spawn during the rainy season when large areas of forest floor are covered by water.



air is a great advantage when it comes to surviving the lean times, and some fishes, such as the hardy plecs, will even move short distances across land from drying pools in search of a better home. For those who stay, the decreasing volume of water results in an increased fish population, and the inhabitants are subject to predation both from other fishes and animals and birds. It is when Piranhas become trapped in these small pools that they live up to their notorious reputation, and birds that have come looking for an easy meal can find the tables turned, as they themselves become part of the menu. Temperatures in the shallow pools can change rapidly, as the water warms and cools with sunrise and sunset, and the fishes must be able to cope with these rapid changes.

TOP GEAR — PRODUCT REVIEW

Complete systems like Hagen's new Fluval Duo 800 are rapidly becoming the most popular way for first time fishkeepers to begin in the hobby. But just how good are they? We took a close look at the set we installed in Alexis Tower's home and were well impressed. All the components are of good quality and have proven reliable over time.

The glass aquarium is made to a good standard with the edges nicely finished off. The canopy contains two light tubes with one specifically designed to encourage plant growth. This is a really nice touch and one which one of the most popular complete system on the market really needs to look at. It costs a little more but starting with the right equipment prevents problems later on.

The Fluval 2 plus filter is at the core of this set up, so we have had one on test for many months now to see how it performs in a real aquarium set up. So far it has performed very well and looks to be a reliable piece of kit. Cleaning it out is easy and the build quality up to a reasonable standard.

The new Fluval Duo 800 is an easy option for the beginner.



OUR VERDICT

Well done Hagen! Beginners buying this sort of set do not hardly go wrong. The only minor quibble we have is with the design which looks a little old fashioned for a new product, but that is very much down to personal taste and this design is a safe middle of the road one which will appeal to the bulk of first time fishkeepers.

The heater / stat supplied is well up to the job, as is the thermometer. All the chemicals needed to start your aquarium up are there, including a water conditioner, filter booster, fish food and even some artificial plants. Most important of all is a beginner's guide to fish keeping so you know how to put it all together and run a successful aquarium. All in all a complete set up which really is complete and at a very reasonable price. All you need to buy is the substrate which is down to personal taste.

TOP GEAR

Today's Fishkeeper reviews Hagen's new Fluval Duo 800 complete aquarium set up in a box and Andrew Caine visits Glee the UK's largest aquatic trade show and reports on new products for the mariner.

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- New aquarium guide
- 20cm Jungle valisneria - plastic
- 12.5cm Red ludwigia - plastic
- 10cm Dwarf / nobilis - silk
- Echinodorus (3 pack) - plastic
- 12.5cm Dwarf hairgrass

Aqua-Medic put on a great show with a whole range of new products. The mini chiller designed for 150 litre systems was brilliant. The new peristaltic pump for dosing with easy to fit tube connectors also caught my eye, and at £55.00 what a product!



IMPRESSIVE RANGE OF PRODUCTS



Too many products were launched to mention but I will report on them in a special later.

Aquatic Solutions showed a range of new skimmers with a different impeller (interesting) They also displayed calcium reactors, pumps, T5 compact fluorescents and Brine shrimp culturing kits to name a few.

Red Sea showed their range of tried and trusted products including the new Prizm pro, currently under test with very good results.

D & D Aquarium Solutions were there with their range of Deltac products, Lighting range, Rowa products and many more.

To be honest I must apologise to all the companies I cannot mention due to lack of space this month. I will be very busy over the next few months and I must say privileged to be able to report on such a successful and innovative show. — AC

A GLOWING REPORT FOR LIGHTING

Well what a difference a year can make. Only 12 months ago I was complaining about the lack of new and innovative products. This year I was privileged to view many new and exciting products for the marine aquarist. This represented great efforts and expense from companies in research and development and sourcing of new products from abroad.

Arcadia were displaying a vast range of T5 lighting, over tank luminaires and new Halide lamps and luminaries. T5s are available with single or twin ballasts, in the same principle as your normal fluorescents. A 4 tube over tank luminaires is also available, allowing an open top aquarium without suspended pendants. New 14000K halide bulbs were shown with an important development in 400W lighting. It is an addition to the series 3

pendants, a 400W pendant in single, twin or triple lamps with twin fluorescents and timers, brilliant for the serious aquarist.

Currently I am testing the T5s and 150W 14000k halide lamps, very, very nice.

TMC showed us a new compact ozoneiser, less than half the size of your normal unit. What a design! Where space is often at a premium this has to be a winner, especially when prices instead of rising are actually going to fall. Their new range of lighting was impressive to say the least, halides, T5 mixed with halides and T5 pendants. The Maxima pendants design just blew me away, magnificent but top of the range prices as you would expect from such a product. New foods are also on the way, the more variety the better. — AC

GLEE is the most important trade show for the UK aquatic industry with most new product launches timed for this exhibition.



GREAT QUALITY

My favourite piece of kit was TMC's Maxima T5 pendants, the design just blew me away as quality screams at you. It's a lot of cash, but it is the tops in looks. I cannot wait to get one over the top of my Deltac aquarium. — AC

NEW PRODUCTS ON SHOW AT GLEE

London Aquatic Centre is a UK manufacturer which has slowly been gaining a reputation in the trade for having innovative new product lines well worth looking at. This year was the first time they had exhibited at GLEE and the first time many shop owners had come across their products. What we find

remarkable is that they have built up a portfolio of thousands of products in what has been a fairly short period of time. Everything from heater/stats right through to chillers, filters of all types to a huge range of lights. You name it and they have it.

It was the tanks which caught our eye

though. Modern new designs, some complete with lights and filter systems, which really knocked your eyes out. It wasn't just our team that was impressed though. All the shopkeepers we have spoken to after the show have mentioned these new tanks and many plan to stock them in the near future.



Both the R331 and R338 series come in five colours, grey, silver, purple, green and orange.

MINI TANKS

Right at the smallest end of the range are the R331's and R338's. These are only 31 and 38 cm in length but come complete with lighting and filters. The stylish curved front (no they are not plastic but glass) and coloured canopies really make them stand out. Ideal for children and adults these little gems are a great starting point for fish keepers with both a limited budget and space.

TOP GEAR

Most significant new launch!

What a show! GLEE has always been an important trade show but this year Pet Index combined with GLEE to make one huge exhibition which most of the trade supported. Over 40 companies had aquatic products of one sort or another on display. Over the coming months many of these will be featured in our Top Gear section but to start the ball rolling we have picked out what we think was the most significant new launch

NO LONGER BOXES

Another interesting design for an aquarium is the R550. The front slopes back from the bottom up to the top. With this aquarium you must remember the stocking level will be dictated by the surface area not the base size. The dimensions are 52 x 25 x 57.5cm



This different version of the open top aquarium has the filter sitting on the top. Plants can still grow up and out of the tank. The dimensions are 38 x 25 x 57.5cm.



At 90 x 48 x 61cm the Aquarium R380Ex is the ideal size for most homes. The see through cupboard doors create an attractive display area and the lovely curved aquarium front takes that "boxy" look away from the design.

The R 6100 is a great looking open topped aquarium. At 103.5 x 45 x 57.5 cm it is a good size for the average lounge. In the upper portion plants can be grown joining the aquatic habitat to the terrestrial one.



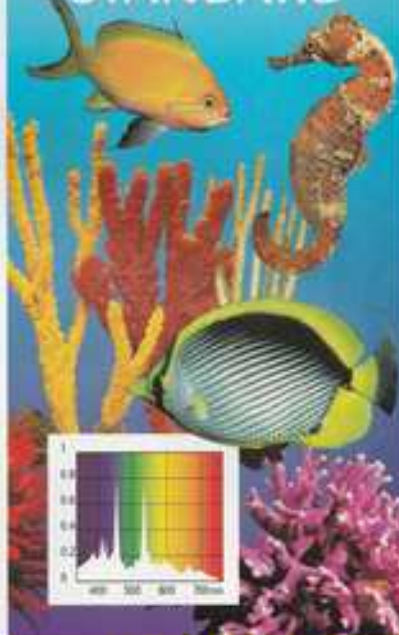
These stylish beauties caught more shop keepers eyes than any of the other tanks. As with all the LAC tanks it is made of glass but here it is bowed 180° to form a curved end. This is ideal for positioning at the end of a wall or work surface. At 126 x 47.67 cm it will make an impact in any room although similar designs come in larger and smaller sizes.

We were hit right between the eyes with how LAC have managed to design a whole range of aquaria which no longer look like boxes but are actually pieces of furniture which will enhance any room they are placed in.

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NEW CO₂ FERTILISER SYSTEM

For those of us who love plants, CO₂ fertilisation is often dreamt about, but rarely employed. Why? Firstly cost, even the cheapest systems usually run at over £100. Secondly ease of use, installing and using a pressurised CO₂ cylinder and control unit can be more than a little tricky. Even finding someone to refill your cylinder can be difficult.

Now Hagen have come up with a new system that solves both problems. At under £20 it is well within the affordable bracket and for ease of use it beats everything else on the market.

Unlike bottled CO₂ it works by using a fermentation process. Sugar and two powders are mixed with luke warm water in a fermentation canister and the top screwed back on. Within a short time CO₂ will be generated as the fermentation process gets underway. The gas then travels down a piece of tubing and into the bottom of a plastic baffle in the aquarium. From here bubbles move through the maze of plastic ridges back up to the surface. This gives the bubble as much time as possible to be absorbed into the water column where plants can use it.

The Output Nozzle can be locked in 3 different positions. The first position is for aquariums up to 70 litres while the third position is for 20/30 litre aquariums. Depending upon temperature the unit will produce gas for up to 28 days and Hagen say they guarantee results will be seen in only 15 days of usage. The kit comes complete with 2 sets of powders (you add the sugar) and a bottle of aquatic plant food containing Iron.

This looks like a good piece of equipment for all aquarists who actually want to grow their plants.



TOP GEAR

THE EFFECT OF CO₂ INJECTION

CO₂ injection will affect water chemistry. When carbon dioxide dissolves in water, some carbonic acid is formed which will tend to reduce pH and KH. Test these parameters regularly and try to maintain pH values of between 6.8 to 7.0 with a KH range of 70 to 90 mg/L. Adjust KH with a pH Stabiliser which will provide natural bicarbonate buffering to stabilise pH while furnishing plants with potassium, an important macro-nutrient. Carbon dioxide is the most easily assimilated carbon source for plants. Approximately 40 to 50% of dry weight composition of a plant is carbon. Through the invigorated growth of aquatic plants you can expect a higher degree of water quality. Many undesirable elements such as nitrates and phosphates are consumed by plants, providing a strategy that effectively starves algae, preventing and/or controlling its' growth. CO₂ injection benefits fish due to improved water quality, and also provides a safe and gradual method of reducing pH values. Many aquatic plants thrive in mildly acidic pH ranges, and suitable species of fish for planted aquariums often prefer these water conditions.

All the new products and a few real gems which are often overlooked

A GREAT LITTLE GADGET

This little piece of kit saves fishes lives and has been available for several years now and yet you wont see it for sale in many aquarium shops, which is a real pity. What it does is constantly monitor free ammonia in freshwater and marine aquaria.

Simply place it in the aquarium using the suction cap provided and read it every day when you check the temperature. It will correctly read free ammonia levels even when removers are in use. The unit consists of a waterproof reference colour card and a replaceable sensor. The sensor, located in the centre of the reference scale, changes reversibly from yellow to green to blue relative to the ammonia concentration. Properly maintained, the sensor has a useful life of over a year.

Contact Casco on 07000 393940 for a stockist near you.

Every aquarium should have an Ammonia alert fitted.



MARINE WHITESPOT CURE

The big problem when treating marine fish for Whitespot has always been that most cures contain copper which is lethal to invertebrates. Kent Marine have recently introduced RX.P parasite treatment for marine fish. This contains no copper or carcinogenic dyes. It may be used with most invertebrates although they do warn that this product will stress all invertebrates in the aquarium. It should not be used on Starfish, Sea urchins, Sea cucumbers, Sea apples, Medusa worms, Nudibranchs or similar animals. Contact Aquatic Solutions on 01553 776788 for a stockist near you.



SOMETHING TO GET YOUR TOES IN

When setting up an aquarium, one of the last things most first time fish keepers think about is the substrate, and then it is more a case of which colour rather than what substrate will grow your plants best. Yet if you want to grow plants well and get the best out of your aquarium then you need to create your substrate carefully. AB Aquamedic have an excellent product (Terralit) which you combine with normal aquarium gravel. This is a long term fertiliser depot which guarantees an optimum supply of nutrients through the soil base. Terralit bonds nutrients so producing rapid growth of the plants.

Contact AB Aquamedic on 0845 090 3500 for a stockist near you.



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01622 817692
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THE COMPLETE ANSWER
KOI CARE

FROM EGG TO ADULT

In 1994 Tropical Marine Centre established the first commercial hatchery of its kind in Europe based entirely on a synthetic seawater recirculation system. This still remains the leading

centre of excellence in marine propagation, offering customers a tank-raised and disease-free alternative to a number of popular wild caught reef species.



The hatchery has been extremely successful in rearing large quantities of several species of Clownfish and various species of Goby and has significantly reduced the company's reliance on natural fisheries for these popular species of aquarium fish. By avoiding the use of antibiotics and chemical therapeutics the aim is to produce fish that are true to nature with regards to behaviour and colour.

Ensuring Sustainable Resources

Research work is also carried out in the hatchery on a much wider range of more difficult species including shrimp and anemones and much of this work is made available to other research groups who have close links with TMC ensuring a better understanding of the biology and requirements of reef animals in general. This knowledge will ultimately assist in the successful management of the natural resource.

In partnership with a wide range of research organisations, conservation groups and other NGOs around the world including the World Commission Monitoring Centre and the Marine Aquarium Council, TMC actively promotes the aim of a sustainable and environmentally responsible trade from a well managed, fairly sourced and properly understood natural resource. As part of its support for the Marine Aquarium Council, TMC is contributing to the Marine Ornamental Information System (MOIS) created by WCMC which includes the establishing of a database for industry and government on the trade in ornamental marine fish.



Tropical
Marine
Centre



Tropical Marine Centre
Solebridge Lane, Chorleywood, Herts WD3 5SX
Tel: 01923 284151 Fax: 01923 285840
Email: tmc@tmc-ltd.co.uk
Web: www.tmc-ltd.co.uk

Today's
Guide to...

AQUATIC SUPPLIERS

All the contacts you need to find any aquatic product

Aquariums

Aquamedic Tel 01865 556623
 Casco Tel 07000393940
 Classic Cabinet Tel 01482 581666
 Clearseal Tel 0121 7710296
 Deltac Tel 0208 5012492
 Dupla Tel 0116 2706010
 Fit Filtration Tel 01332850345
 Hagen Tel 01977 556622
 Juwel Tel 01953 606383
 Seashell Aquarium & Cabinets
 Tel 01621 742922
 Underworld Tel 01509 610310

Books

Interpet Tel 01306 873818
 TMC Tel 01923 284151
 Underworld Tel 01509 610310

Cleaning equipment/Maintenance

Algarde Tel 01159614984
 API Tel 01865 556623
 Aquatic solutions Tel 01553 776788
 Eheim Tel 01284 755051
 Interpet Tel 01306 873818
 JBL Tel 01284 755051
 Hagen Tel 01977 556622
 Tetra Tel 02380 628863
 Underworld Tel 01509 610310

Decor/accessories

Interpet/Blagden Tel 01306 873818
 Hagen Tel 01977 556622
 Tricol Tel 01205 358058
 Underworld Tel 01509 610310

Filters

Algarde Tel 01159 614984
 Cloverleaf Tel 01277 366002
 Eheim Tel 01284 755051
 Hozelock Tel 01844 292002
 Interpet/Blagden Tel 01306 873818
 Nathura Tel 01952 883408
 Oase UK Tel 01264 333225
 Petmate Pond Tel 01932 700000
 Hagen Tel 01977 556622
 Tetra Tel 02380 628863
 Trident Tel 02476 660012
 Underworld Tel 01509 610 310
 World of Kol Tel 0208 4629479
 TMC Tel 01923 284151

Fish foods

API Tel 01865 556623
 Aquamedic Tel 0845 903500
 Aquarian Tel 01684 410000
 Aquatic Solutions Tel 01553 776788
 Dupla Tel 0116 2706010
 Exra Tel 0031433632397
 Interpet/Blagden Tel 01306 873818

JBL Tel 01284 755051
 JMC Tel 01246 415275
 King British Tel 01427 810231
 Nishiki Tel 01371 851424
 NT Labs Tel 01622 817892
 Oase UK Tel 01264 333225
 Omega Tel 0208 9496100
 Pettex Tel 020 8501 1033
 Phoenix Tel 01159 614984
 PPI Tel 0115 9823900
 Hagen Tel 01977 556622
 Seachem Tel 07000 393940
 Sera Tel 020 8665 0026
 Tetra Tel 02380 628863
 TMC Tel 01923 284151
 Underworld Tel 01509 610310
 Vitakraft Tel 01484 866422
 Waterlife Tel 01753 682487
 ZN Tel 01962 856050

Heaters

Algarde Tel 01159 614984
 Dupla Tel 0116 2706010
 Interpet Tel 01306 873818
 Nathura Tel 01952 883408
 Hagen Tel 01977 556622
 TAP Tel 01275 810522
 Tetra Tel 02380 628863
 Underworld Tel 01509 670310

Liners/Underlay

Interpet/Blagden Tel 01306 873818
 Tetra Tel 02380 628863
 Trident Tel 02476 660012

Lighting/Aquarium

Aquatic solutions Tel 01553 776788
 Aquamedic Tel 08450 903500
 Arcadia Tel 0208 2515522
 Deltac Tel 0208 5012492
 Dupla Tel 0116 2706010
 Interpet Tel 01306 873818
 Hagen Tel 01977 556622
 Underworld Tel 01509 610310
 Zoo med Tel 00180 55429988

Lighting/Pond

Blagden Tel 01306 873818
 Oase Tel 01264 386500
 Hagen Tel 01977 556622
 Trident Tel 02476 660012
 TMC Tel 01923 284151

Marine Equipment

Aquamedic Tel 08450 903500
 Aquatic Solutions Tel 01553 776788
 Casco Tel 07000 393940
 D & D Marines Tel 0208 5012492
 Fit filtration Tel 01332 850345
 Red Sea Tel 01306 873818
 Nathura Tel 01952 883408
 TMC Tel 01923 284151

Turze Tel 00498 8562022
 Underworld Tel 01509 610310

Medication

API Tel 01865 556623
 Interpet Tel 01306 873818
 N T Labs Tel 01622 817892
 Sera Tel 0208 6650026
 Tetra Tel 02380 628863
 Waterlife Research Tel 01753 682487
 Vitakraft Tel 01484 866422

CO2 equipment

Aquamedic Tel 08450 903500
 Dupla Tel 0116 2706010
 JBL Tel 01284 755051
 Sera Tel 0208 6650026

Pond Cleaning

Hozelock Cyprio Tel 01844 294528
 Oase Tel 01264 386500
 Rotoflush Tel 01297 560229

Pond Pumps

Blagden Tel 01306 873818
 Draper Pond Tel 01264 386500
 Fishmate Tel 01932 700000
 Hozelock Cyprio Tel 01844 292002
 Oase Tel 01264 386500
 Hagen Tel 01977 556622
 Tetra Tel 0115 9823900
 Tetra Tel 02380 628863
 Trident Tel 02476 660012
 TMC Tel 01923 284 151

Pumps and Powerheads - Aquarium

Algarde Tel 01159 614984
 Aquatic Solutions Tel 01553776788
 Eheim Tel 01284 755051
 Hagen Tel 01977 556622
 Tetra Tel 02380 628863
 TMC Tel 01923 284 151
 Turze Tel 004 988562022
 Underworld Tel 01509 610310

Reef Tank Supplements

Aquamedic Tel 08450 903500
 Aquatic Solutions Tel 01553 776788
 Casco Tel 07000 393940
 Deltac Tel 0208 5012492
 Interpet Tel 01306 873818
 NT Labs Tel 01622 817892
 TMC Tel 01923 284151
 Underworld Tel 01509 610310
 Waterlife Research Tel 01753 682487

Salt

Aquatic Solutions Tel 01553 776788
 Interpet/Red Sea Tel 01306 873818

SEACHEM Tel 07000 303940
 Sera Tel 0208 6650026
 TMC Tel 01923 284151
 Underworld Tel 01509 610310
 Waterlife Research Tel 01753 682487

Tapwater Purification

All Clear Tel 01277 214911
 API Tel 01865 556623
 Aquamedic Tel 08450 903500
 Aquatic Solutions Tel 01553 776788
 Deltac Tel 0208 5012492
 Nitrogen Tel 01708 744880

Test Kits

API Tel 01865 556623
 Aquamedic Tel 08450 903500
 Aquatic Solutions Tel 01553 776788
 Casco Tel 07000 393940
 Exra Tel 0031433632397
 Interpet Tel 01306 873818
 NT Labs Tel 01622 817892
 Hagen Tel 01977 556622
 Sera Tel 0208 6650026
 TAP Tel 01275 810522
 Tetra Tel 02380 628863
 TMC Tel 01923 284151
 Waterlife Research Tel 01753 682487
 Vitakraft Tel 01484 866422

UV Clarifiers (Pond)

Hozelock Cyprio Tel 01844 292002
 Interpet/Blagden Tel 01306 873818
 Oase Tel 01264 386500
 Petmate Tel 01932 700000
 Hagen Tel 01977 556622
 Trident Tel 02476 660012
 TMC Tel 01923 284151

UV Sterilisers (Aquarium)

Aquatic Solutions Tel 01553 776788
 Aquarworld partners Tel 01925 483979
 TMC Tel 01923 284151

Water Treatments & Dechlorinators

API Tel 1865 556623
 Aquarian Tel 01684 410000
 Aquatic solutions Tel 01553 776788
 Deltac Tel 0208 5012492
 Interpet Tel 01306 873818
 Hagen Tel 01977 556622
 NT Labs Tel 01622 817892
 Oase Tel 01264 386500
 PPI Tel 0115 9823900
 Schuran Tel 01923 284151
 Sera Tel 020 8665 0026
 TAP Tel 01275 810522
 Tetra Tel 02380 628863
 Turze Tel 004988562022
 Waterlife Research Tel 01753 685896

Manchurian loach

Leptobotia mantschurica



British Aquarists Festival fishkeeping exhibition



This lovely high quality Black moor won Best goldfish at BAF 2005.

THE END OF the 2002 season is upon us and BAF is one of the last hobby events of the year. *Aquarist and Pondkeeper* (now *Today's Fishkeeper*) has been associated with the British Aquarists Festival since its earliest days, this being its 51st year. It is no longer the enormous festival that it was in its heyday, times have changed, but the welcome to all fish keepers by Arnie and his stalwart team of Federation of Northern Aquarium Societies members has never changed. This festival is now a more intimate occasion, the frenetic activities and bustle are no longer to be found. However, caring aquarists will be present all weekend to answer your questions.

Children are being encouraged to bring their fish along for inspection and have their own show on the Sunday.

The main feature of this event has always been the Champion of

Champions competition. Fish which have won top awards in Open shows all over the UK compete to win the supreme award as the best of the best.

The Federation of Northern Aquarium Societies is well known for its breeding programme and fish keepers will be on a stand selling home bred fish and dispensing any information that you need about the fish they are selling.

The Catfish Study Group UK will also have an information stand and Ian Fuller *Today's Fishkeeper's* Catfish expert will be manning this and will be available to answer your questions. Derek Lambert *Today's Fishkeeper* editor will also be attending all day Sunday and Viviparus - The Livebearer Information Service will be holding a show and auction along with the general auction which will be held at this event.

Meet the aquarists

One of the best things about an event like this is the opportunity to meet fellow hobbyists

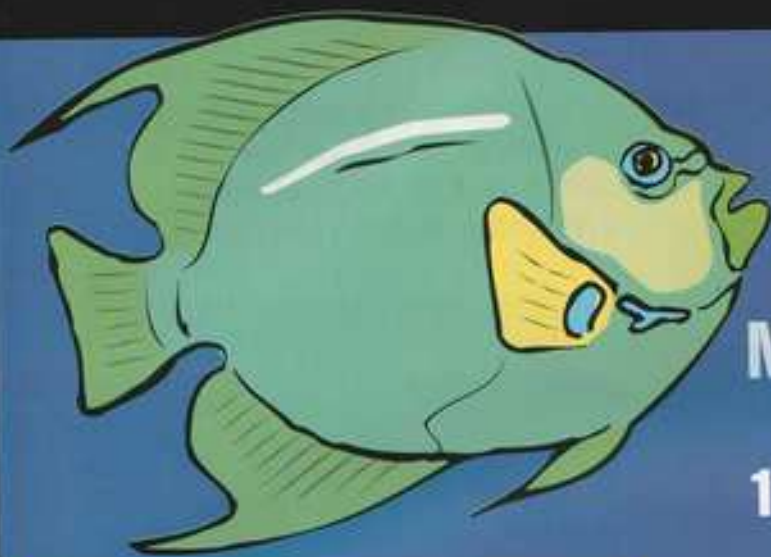


Derek Lambert has been a fish keeper since childhood. He has travelled extensively, lecturing, fish hunting and promoting the hobby internationally. Derek is the chairman of Viviparus, the Livebearer Information Service founded in 1988, and livebearers are his particular area of expertise. While specialising in livebearers he has bred hundreds of species of aquarium fish.



Ian began fish keeping in 1970 and from the beginning had an interest in *Corydoras* catfish. He has spawned and raised more than sixty species of *Corys* and has kept detailed accounts of all of them. His book *Breeding Corydoras Catfishes* records his experiences. He is chairman of Catfish Study Group UK.

BRITISH AQUARISTS FESTIVAL FISHKEEPING EXHIBITION



**SATURDAY &
SUNDAY**
2nd & 3rd
NOVEMBER 2002

Saturday
10-30am to 5-00pm
Sunday
10-00am to 5-00pm
MANCHESTER

**A MUST FOR
ALL FISHKEEPERS**

FESTIVAL FEATURES

ON THE SATURDAY

- Open Show
- Champion of Champions Tropical Contest

ON THE SUNDAY

- Children's Goldfish Show ● Goldfish Open Show
- Champion of Champions Coldwater Contest
- Livebearer Open Show & Auction
- Grand Auction of Fish and Equipment

ON BOTH DAYS

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AT A PRICE TO SUIT YOUR POCKET
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- Guest Speakers ● Trade Stands

Plus ● Society Display / Sales / Information Stands

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VENUE IS TWO MINUTES FROM JUNCTION 7 OFF THE M60 -on the A56 Chester Rd.
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FOR FURTHER DETAILS CONTACT SHOW ORGANISER A. CHADWICK 0161 652 6207
OR B. WALSH 01254 776567

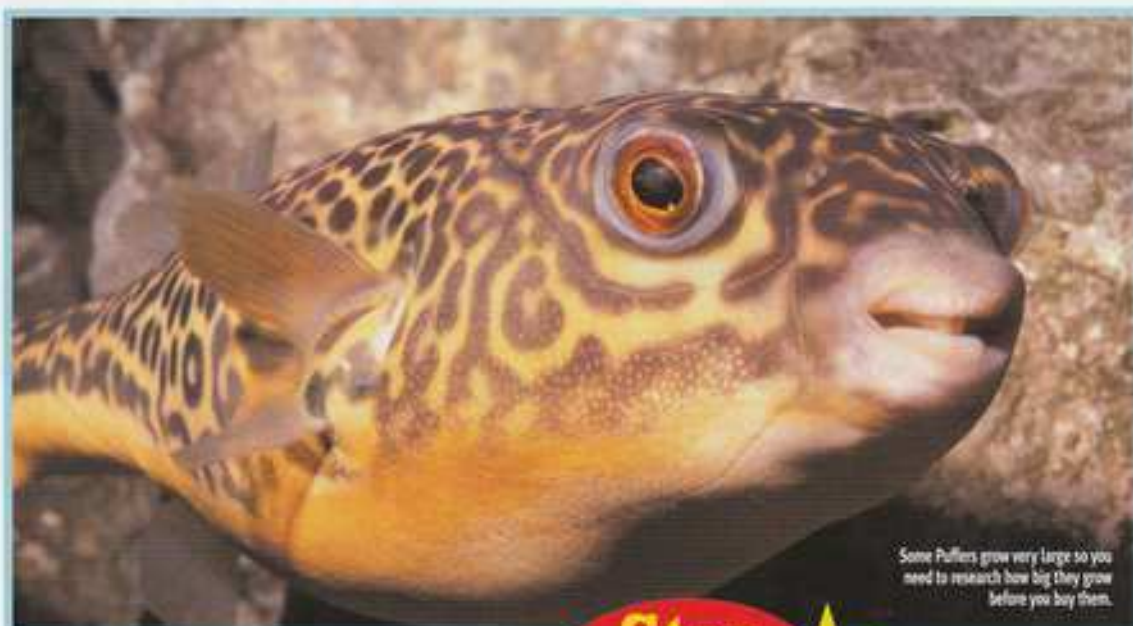
ORGANISED BY THE FEDERATION OF NORTHERN AQUARIUM SOCIETIES

Letters in association with Tetra

Today's Postbag



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



Some Puffers grow very large so you need to research how big they grow before you buy them.

Please think before you buy

Star Letter

About 18 months ago I bought Clarence, my Mbu Puffer, with a 113 litre tank - in fact he was virtually given away as part of a package, with the assurance he wouldn't get bigger than 15cm for a long time. (fortunately the unscrupulous retailer has since gone out of business). The last 18 months have been somewhat of a crash course in fish keeping, but he now happily and peacefully lives in a large (1130 litre) heavily planted tank with a shoal of Glass cats and Clown loaches. He seems very

happy and has now trebled in size to just over 45cm length, eats voraciously and is very active.

After my experience with Clarence I'd like to urge people to always find out about a fish they are going to buy before they buy it. I was fortunate enough to have the money and space to significantly upgrade my aquarium with little harm done to my fish, otherwise I hate to think how he might have suffered.

Marc Woolward, Brighton.

Childproof caps drive me nuts!

Dear Today's Fishkeeper,
Having just flung an unoperable bottle of Liquify marine across the room (of course its not just interpet at fault) can we please have a **COMPLETE BAN** on childproof caps and return to containers we adults can get open? After all if the little sprogs did access the stuff and swallow it, it would probably be good for them.

John Abbott, Devon.

Editor's note:

Having just wrestled with an unopenable jar of pickles, I totally agree with John. A person could starve to death with childproof caps and plastic rims which seems to resist even the sharpest knife blades!

www.tetra-fish.co.uk

In the wake of the "Moonrakers"

Regular *Today's Fishkeeper* reader, Brian Begg, visits John Toomer's aquatic centre in Marlborough, Wiltshire.



John Toomer's aquatic centre is right in the heart of Marlborough.



There is a wide variety of food and equipment on sale including some complete aquarium kits for the beginner at prices ranging from £40 for cold water species to £70 for tropical species.

A CENTURY OR two ago the village ponds of Wiltshire were filled with something even more exotic than ornamental fish, if historians are to be believed. Catch of the day then was brandy, by the barrel-load, hidden in the village ponds to avoid confiscation by the hard-riding men from "The Revenue", forerunners of today's Customs & Excise inspectors. The brandy was eventually retrieved by local villagers with large rakes in the middle of the night, warning for all true Wiltshire men the romantic name 'Moonrakers'. But enough of history, well almost. Some prominent local shopkeepers who began trading in garden products in 1850 under the family name of Toomer, decided to open an aquatic centre in the delightful



Some 100 species are carried in the attractive array of tanks that line the centre. The fish themselves are imported from China or Israel, with the biggest supply coming from the Czech Republic. All are quarantined before going on sale.

old country town of Marlborough. That was around Millennium time, some two years ago. The decision itself was against the trend, which showed a decline in business for the small independent shops in favour of the larger chains of pet and aquatic outlets. But a recent progress report showed that the decision to open in Marlborough was well founded and thoroughly justified.

West Country manager, Shirley Dowley, has a number of anecdotes and no small amount of repartee to share with her customers. When asked by children how the Goldfish are caught, Shirley will laughingly reply 'with rod and line of course'. Marlborough is a bit new to fish keeping you will gather and Shirley has lost count of the number of customers wanting to purchase 'gourmet' fish rather than 'gouramis', and 'angel' fish rather than 'angel'. Soon after opening the centre a 12 year old Marlborough fanatic walked in to purchase fish, but was smartly rejected by Shirley with the news that he had to be sixteen years old to make such a purchase. Undeterred, the little lad went home and came back to the shop

next day in disguise, which apparently resembled a cross between a Halloween mask and a Groucho Marx kit. Again, he suffered instant rejection, but earned full marks for enthusiasm. Although business is growing at a highly satisfactory rate, there is not yet a huge demand for ornamental fish for ponds in the county, but that's the attitude that any self-respecting Moonraker would adopt, wouldn't he? ■

What's your favourite shop

We want to hear about your favourite aquarium shop. It might be the best place to buy rare and unusual fish in your area or have some great people working in it. The prices might be the best for miles around or they could have been so helpful you want everyone to know about it. Send your letters to the usual address or e-mail derek@trmg.co.uk

Shop details: John Toomer, 127 High Street, Marlborough, Wiltshire, SN8 1LZ. Tel 01672 515651.

Shop opening hours: 9.00 - 5.30 pm Mon - Sat, Sun 10am - 4pm. Manager Shirley Dowley

Which groups of fish do you sell? Freshwater Tropical and Coldwater.

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New introductions

Top German aquarist **Erwin Schraml** has some more recent introductions to the aquarium hobby. PHOTOS: ERWIN SCHRAML

IF ONE LOOKS through the scientific literature you will see many species of fish have been described from Ecuador, yet this country is little known for its exportation of ornamental fish. Among these are some mailed Catfishes, which are very popular at the moment, but there are also plenty of

other species. Aquarium Glaser (Rodgau/Germany) has recently made efforts to introduce ornamental fish from Ecuador to the aquarium hobby. At the moment no Catfishes have arrived but several other species have which are new to the aquarium hobby.



This Electric eel was one of the first new species to be exported from Ecuador. Many more new species to the hobby are expected in the coming years.

Ecuador electric eel

Sternopygus aequilablatus (HUMBOLDT, 1805), has several subspecies including *S. a. arimatus* (EYDOLX & SOULEYET, 1841), which is described from Ecuador. The type species originates from Colombia and two further subspecies, *S. a. pejerator* from Venezuela and *S. a. danensis* from Panama. Following

ALBERT & FINK (1995) these subspecies, however, are only synonyms of the typical form, which has a very extensive distribution area.

Up to now, only very little is known about these fish. Even the final adult size has not been noted, although they are almost certain to reach over 30 cm. In the aquarium, the animals take all types of frozen foods and larger live foods. The species could live in a community

Spiny eels from the Congo

Occasionally, some Spiny eels appear in the trade from the former State of Zaire, which is today called the Republic of Congo. A recent shipment, however, contained four species never before seen in Europe. Emmanuel Vreven, is a specialist working on Spiny eels at the Africa-Museum in Tervuren/Belgium and kindly identified them from photographs. The first of these were *Caeconomastacombelus greshoffi* which was originally described by Boulenger in 1901 and are distributed in the lower and middle Congo-basin. They are very strikingly coloured and appear to differ very little in their patterns. According to FishBase they can reach 35cm in total length. They occur over rocky bottoms in rivers and lakes and are also found in rapids.

The other three fish, each with a slightly different body pattern belong, according to Vreven, to one single species: *Alvonomastacombelus congoicus* (Boulenger, 1899). This species is widely distributed in the Congo basin and has many different colour variations. It grows to 36cm in total length. FishBase has almost no information available on this species, so now it is up to us aquarists to find out more.



Chelonodon patoca can be distinguished from *Takifugu oblongus* by the bright yellow streak, which extends on the underside from the cheek to just before the anal fin.

with other larger fish. The specimens which were imported measured about 15 cm. When first introduced to the aquarium they looked for hiding places in caves. Pipes were made available and they proceeded to hide away in these during daylight hours. They may only become active in twilight or at night.

Two frequently confused pufferfish

In the past *Takifugu oblongus* was often called in the literature

Chelonodon patoca (e.g. Aquarium-Atlas Vol. 2, p. 1160). Both species are imported occasionally for the freshwater aquarium, although both are true marine fish. The confusion no longer exists since the aqualog "The puffers of fresh and brackish-waters" from Klaus Ebert became available. All species, including these two, are presented in excellent colour photos. Care and breeding, suitable aquarium companions, and many other aspects of most of the known species are considered in this well researched book which includes the new nomenclature. On

publication of this aqualog many more unusual puffers were imported and some of the imports included these two species.

Chelonodon patoca (Hamilton, 1822)

Originating from coastal waters of the Indo-pacific, it lives in the sea and prefers the mangrove areas, however it also swims far into rivers. Unfortunately, these are fin biters and can only be kept in captivity in a single species tank. They are relatively peaceful with

their own species members, and they reach a final size of up to 30cm.

Takifugu oblongus (Bloch, 1786)

Is very similar to the above-mentioned species, but it is missing the yellow streak, the silvery dotted pattern is limited to the upper side which appears only from the nape to the dorsal fin. The stripes from the back extend to one third of the body sides. The belly is predominantly monochromatic silver in both species the colour patterns change during growth.

T. oblongus is also a fin biter and cannot be kept with other species. Among themselves they are peaceful. The species has a similar distribution as *Ch. patoca*, however, it should become even larger reaching 40cm.

Crossoloricaria cf. cephalaspis

Another new import was a plated Catfish from Colombia, which had not imported previously. It might be a mouthbreeder of the genus *Crossoloricaria*. These plated Catfish are extremely flattened. Their eyes lie high on top of the head. They camouflage themselves by burying in the sand, with the

Judging by the thicker body on this specimen, it is probably a female *A. (Coccomastacombelus) constrictus* while the other two fish imported were males.



It was relatively simple for Wever, to determine the first species as *Coccomastacombelus greshoffi*.



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Males and females appear to reach approximately the same size; the animal in the picture measured a SL of 9.5 cm. The females of this species can be clearly distinguished from males because they don't have bristles on the snout.

New Bristlenose

A pretty "new" bristlenose-catfish has been available in the trade for a short while. The species is listed as *Ancistrus "Dolichopterus Rio"*. Because these animals were shipped via Recife, it was unclear where exactly in Brazil they were found. Is "Rio" the city of Rio de Janeiro or any Rio (= river)? The name "Dolichopterus" implies whoever distributed this name, must have known that there is also an *Ancistrus dolichopterus*. Luckily, Ingo Seidel could help. He gave me the following information:

"The *Ancistrus* from Rio is well known to me because I have personally

caught it there. It is *Ancistrus albocinctus* (see listing in DAZ - special-edition "Mamischweise 2"). Fry and freshly caught animals have a vertical light band at the caudal peduncle, which gave the species its name. The species was for long time in *Hemancistrus*. I know from "Trop Rio", that this is the only *Ancistrus* in the area of Rio with such a pattern, so the identification is beyond doubt."

After my current, but short aquaristic experiences with the species, the fish cannot tolerate cold. In the winter, when transporting them, good insulation is essential. They enjoy flaked food and should be offered the usual vegetables (cucumbers, sweet potatoes, salad, etc.).

Up to now only *Crossoloricaria rhombi* from Peru has been introduced to the aquarium. The coloration is very similar to that of the fish shown here, so I would have identified it as this species, if it did not originate from Colombia.



eyes only sticking out of the sand. Therefore they are also called Flounder catfishes, because flounders show a similar behaviour. Because the imported animals originate from Colombia, the species might be *Crossoloricaria cephalopsis*. This species has not been introduced as an aquarium fish yet, so we do not know exactly how it will behave in an aquarium. According to Evers & Seidel (1996) the *Crossoloricaria* species belong

to a group of mouthbreeding plated Catfishes. The males carry the egg bunches between the enlarged mouth disc and the body, until the larvae slip. However, *Crossoloricaria* species have not yet been bred in captivity. ■

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Cichlids of Lake Malawi

Cichlid expert **Ad Konings** examines some of the fish that dwell in the intermediate habitats of Malawi

THE INTERMEDIATE HABITATS OF MALAWI include those sections of the coast that have both rocks and sand. These regions form the transition zone between the pure rocky habitat and the sandy (or muddy) lake floor. The intermediate habitats can extend to very deep levels where they harbour an entirely different cichlid community to a similar region in shallow water.

The most common intermediate biotope, however, is found in shallow water, usually no deeper than 25 metres. The quiet, shallow bays that have muddy bottoms and vegetated areas are not included here, nor are the extremely shallow intermediate habitats (no deeper than about 3 metres), which have a cichlid community of their own. Although some species dealt with in this article are also found around the small heaps of rocks in such areas. Each intermediate shore has its own mixture of cichlid species, and the Mbuna in particular show extensive geographical variation.

The zebras

The zebra complex has many representatives that are found only in the intermediate habitat; so many that, for convenience, I have divided them into several groups: the 'black-dorsal group', the 'aurora group', and the 'kingsizei group'. This division has no phylogenetic basis (the kingsizei group is not considered to be part of *Metrioclima*). This grouping has been made chiefly according to male breeding coloration, even though the groups also have different distributions. The members of the black-dorsal and aurora groups are located mainly in the southern half of the lake, while the kingsizei-type Mbuna are found chiefly in the north. The kingsizei group nevertheless has large areas of overlap with the other two groups.

I have tried to define these groups so that each locality harbours only a single representative of each group; so we do not find, for example, two different aurora-types at one place. Although this may seem highly artificial, most members of each group do in fact appear to have some kind of relationship with the others of the same group.



Male *M. phaeos* from Cobwe.

THE "BLACK-DORSAL GROUP"

A very large and attractive Mbuna, *Metrioclima phaeos* (previously known as *P. sp.* "Black dorsal shaun"), has a rather wide distribution along the central east coast of the lake. It occurs in the intermediate habitat at Lundo Island in Tanzania and along mainland shores to the south as far as Cobwe in Mozambique. *Metrioclima phaeos* is rare at Lundo Island, but at Undu and Hai Reefs, and throughout its range along the Mozambique shores, it is very common. Females at almost all localities are bright yellow, but at Londo, Mozambique, they are beige with yellow fins. The males at Londo have a slightly different pattern as well: the black bars on the bodies of most (but not all) individuals do not extend onto the dorsal fin and nape. *Metrioclima phaeos* is among the more popular Mbuna exported regularly from the Tanzanian shores of the lake.

THE "AURORA GROUP"

The name of this group is derived from *M. aurora*, a very popular Mbuna among aquarists. Like all members of this group it lacks a black band in the (yellow) dorsal fin. *Metrioclima aurora* inhabits the shallow intermediate habitat and rarely ventures into deeper regions. It has been regularly exported and given trade names such as 'Pseudotropheus lucema' (a totally different species) and 'T. pengoldi'. *Metrioclima aurora* is among the many species that were transplanted

to Thumbi West Island by the first exporter of Malawi cichlids, in order to create an easily accessible population for exportation. The introduced population has become firmly established and is found at several places around Cape Maclear. The natural distribution of *M. aurora* includes Likoma Island; it is also quite common at Mara Point, Mozambique, and a very attractive geographical race is found at Mbweca and Tumbi Point, both in Mozambique. Males of the latter exhibit broad brown bars superimposed on the usual colour pattern.

TODAY'S Reader Offer



Despite its *P. 'kingsize'* name, this species reaches a maximum size of only 7.5 cm. This is a mature male, females are light brown and have yellowish fins.

THE "KINGSIZE" GROUP

Pseudotropheus sp. "kingsize", named after the nickname of a small but energetic diver working for one of the exporters, is endemic to a very small area between Malungano Island and the 'mainland' of Likoma Island. The trade name 'kingsize' has been used for another Mbuna, in particular *Cymatopoma axelrodi*, but confusion with this species is likely to be restricted to the name as the two can be easily told apart. Kingsize-type Mbuna with a remarkable resemblance to the species found at Likoma are found at two different locations, Ngwazi (Tanzania) and Londo (Mozambique), which are approximately 125 km apart. Kingsize-type Mbuna also occur all along the north-eastern shores of the lake, north of the Ruhuhu River.

The population at Ngwazi lies within the range of *P. sp. 'kingsize lupingu'*, found from Lupingu to Lutara Reef, and is considered part of that species, whereas the form at Londo is named *P. sp. 'kingsize londo'*, with a range extending from Londo to Ntumba. A few populations of *P. sp. 'kingsize lupingu'* near Lupingu are polymorphic. This consists of differences in male breeding coloration. Some are light blue and others completely orange, with intermediates present as well. The orange males have been selectively collected and exported as 'Pseudotropheus Solid Orange'. Another interesting feature of this small Mbuna is that most populations are very dense, with females and non-territorial males schooling in mid-water while feeding on plankton.

Between the range of *Psp. 'kingsize lupingu'* and that of the most northerly kingsize type lies a sandy bay, the northern bay of Lupingu. The kingsize-type Mbuna found north of the bay, *P. sp. 'kingsize north'*, is all blue with a variable pattern of narrow, dark bars.



M. aurora, male photographed at N'kolongwe. Between this locality and Tumbi Point no *M. aurora* type cichlid could be found.

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 (U.K.) to offer a selection of these publications.



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Fish safari to Sulawesi Utara



In Alf Nilsen's last "Fish safari" he travelled to Southern Thailand and explored the reefs and the culture there. From here he moves eastwards to Indonesia, one of the largest and most densely populated countries in the world

THE ISLANDS OF INDONESIA ARE SPREAD in a wide arc, more than 5000 km long, stretching from mainland Southeast Asia to Papua New Guinea. No-one really knows the true number of islands in Indonesia. The most commonly given figures are 13,677 islands where about 6,000 are named and about 1,000 inhabited. Another figure, more recently taken, gave the total number of islands to be over 18,000, though! Whatever the true number of islands are, the Indonesian people are for sure right when they refer to their country as "tanah air kita" - "our land and water". The people have always considered the seas as part of their country.

Largest coral reef

Indonesia is not only one of the world's biggest countries, it is the world's largest coral reef nation with more than 50,000 square kilometres of reefs (Spalding & al., 2001). This is 18% of the world's total reef area. Located in the central Indo-Pacific, Indonesia has the most diverse marine biodiversity imaginable. About 500 species of Stony Corals, close to 2000 species of fishes, 45 species of mangrove trees and 13 species of sea grass are found here. The coral reefs are inhabited by an unknown number of invertebrate species covering all known phyla, and a vast number of

invertebrates - here like on other corals reefs - remain to be described.

Fish and invertebrate collecting and export for ornamental purposes has been going on in Indonesia since the early days of marine keeping. Today the Indonesian export of corals listed under CITES (Convention on International Trade in Endangered Species of Wild Flora and Fauna) is around 500 tons per year, which is 41% of all coral exports world wide since 1985 (Spalding & al., 2001). Indonesia also exports a lot of marine aquarium fishes.

Bunaken National Park

Indonesia is an explorer's paradise. Big cities, jungle, volcanoes, remarkable villages, coral cays and beautiful coral reefs are all there to be explored. Our journey goes to "Sulawesi Utara", to westerners better known as "North Sulawesi". We are going to explore the area around Manado, a chaotic tropical city situated at the coast on the very northern tip of the island of Sulawesi, formerly known as Celebes.

Most of Sulawesi's 227,000 square kilometres is highland stretching more than 500 metres above the sea. The area has 17 active volcanoes, most of which are found in the northern part of the island. The island of Sulawesi took its unusual shape about 3 million years ago. A result of the island's unique shape is that no part of the island is more than 100 km from the sea. Sulawesi has 6,000 km of coastline, several offshore islands, most of which are ringed with reefs. Among these are the islands that make up Bunaken National Park, a

INDONESIA FACT FILE

Official name: Republic of Indonesia

Size: 1,904,443 square kilometres (373,350 square miles)

Population: 2204 million (2001)

Population density: 115 persons per square kilometres

Capital: Jakarta (population about 11 million, 1997 estimate)

Life expectancy: 63.4 years (2000 estimate)

Languages: Bahasa Indonesia (modified

form of Malay; official), English, Dutch, Sundanese, Arabic, Chinese, local dialects, especially Javanese (about 300 languages and dialects are spoken)

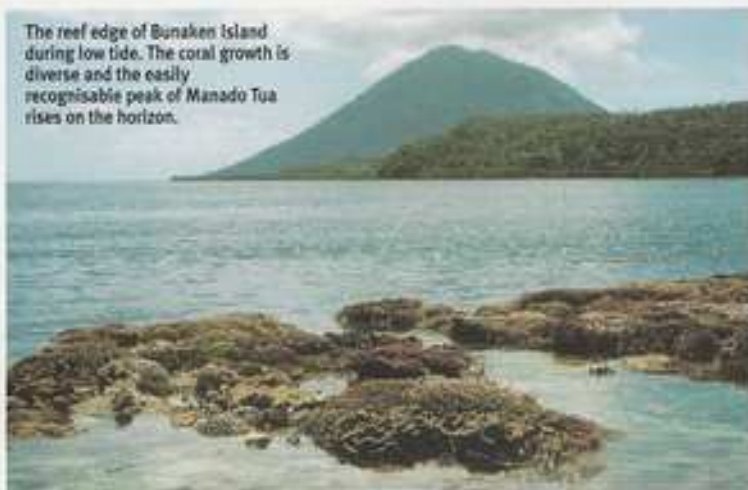
Religions: 87% of the people are Muslims.

Ethnic divisions: Javanese 45 per cent Sundanese 14 per cent Madurese 8 per cent Coastal Malay 7 per cent Other (350 distinct ethnic groups) 26 per cent

Gross domestic product (US\$): 94,156 million (1998)

Monetary unit: 1 Indonesian rupiah (Rp), consisting of 100 sen.

The reef edge of Bunaken Island during low tide. The coral growth is diverse and the easily recognisable peak of Manado Tua rises on the horizon.



world class diving site.

The Bunaken area consists of 5 islands: Bunaken, Manado Tua, Mantehage, Siladen and Nain. The Islands and the adjacent mainland were originally protected in the early 1980's by governor's decree, upgraded to a Strict Nature Preserve in 1986 and by the Ministry of Forestry given the status as National Park in 1991.

We arrived at Manado on a flight from Singapore. As we flew in we had a marvellous

view of the hills as our plane jumped up and down and it found its way down to the airfield situated among the hills and valleys.

Plenty of dive resorts

Bunaken NP lies about 15 kilometers north-east of Manado harbour. There are plenty of dive resorts along the coast northwards from the city. Search the Internet for "Dive Bunaken" and you end up with all the

information necessary for planning a dive holiday. Our stay was at "Manado Seagarden Adventure" situated next to Kolongan Beach Hotel in the bay just opposite to Bunaken Island. To the rear of the hotel we could see the 1331 metre high top of Mt. Mahawu, an active volcano with a smoking crater lake inside. If you want to take a break from diving, climbing the volcano is a nice one day trip.

Bunaken has a humid equatorial tropical region climate. There being two rainy seasons within this region, namely the west-monsoon (from October to March) and the east-monsoon (from May to August). The west-monsoon is wetter than the east-monsoon. The average temperature is 27°C and the frequency of strong wind is relatively low. The condition of the sea is generally calm so that small boats are able to sail to the islands at any time. Only on a few days in the year is the sea so rough that the boats cannot leave harbour.

First dive – an aquarists paradise

We left on the dive boat for our first dive at Bunaken Island early in the morning. The 823 metres high peak of Manado Tua - a dormant volcano called "Old Manado" - was a landmark on the horizon. After about half an hour crossing the peaceful lagoon, we →



When we jumped into the water for our first night dive at Bunaken, we stumbled upon this Crocodile Fish (Cocillir sp.).

MARINES: ALF'S COLUMN

approached the reef edge of the fringing reef surrounding the north side of Bunaken Island. What a sight! Through the crystal clear water huge corals of all shapes and sizes were visible from the very reef flat and down the reef slope as far as we could see. The coral cover was just unimaginable! What was planned to be a dive, turned out to be a reef walk. Luckily our approach at the site matched that of the extreme low tide occurring at the full moon, and as we anchored the diver boat, the tide had dried out the reef flat almost completely. The corals lay there in the baking sun. Only a few tide pools were scattered in between the corals and in them were fishes, molluscs, shrimps and all sorts of other invertebrates. This was an aquarist's paradise!

We spent the afternoon walking the beach, doing some skin diving on the shallow reef flat when the tide returned after a couple of hours. What was planned as a midday dive was changed to a night dive along the reef wall of Bunaken, at spots known as "Lekuan I, II and III". And what a dive! After having dived many reef locations all over the world, I have yet to make such a diverse dive as this. When we entered the water and slowly approached the bottom only some 5 metres deep, we stumbled upon a huge Crocodile

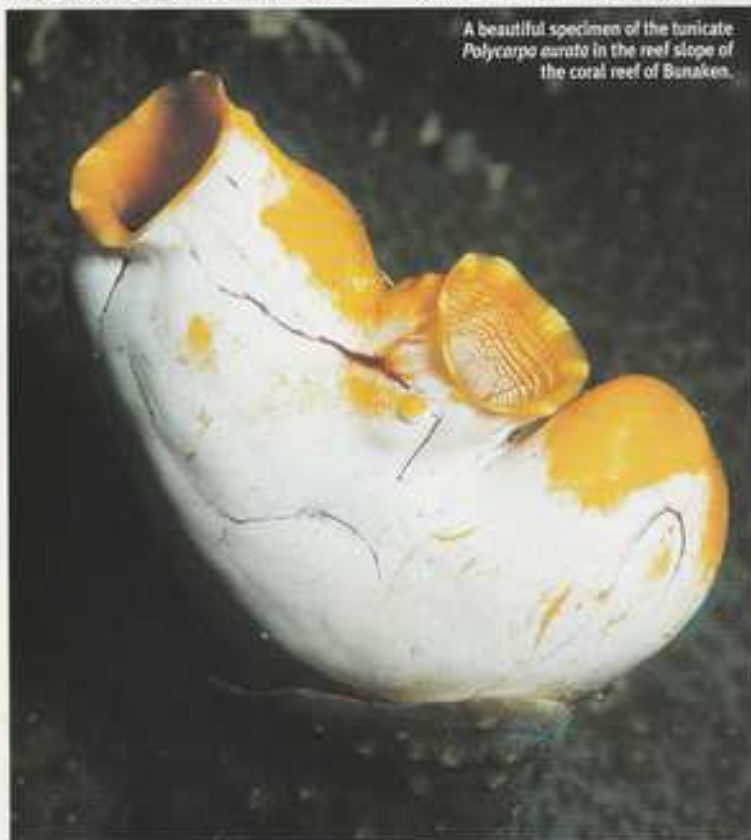


A male Soron memmories in the reef wall of Bunaken Island during a night dive.

fish. The weak current carried us along the reef wall at about 30 metres depth. The camera was fully loaded with film, but 36 exposures are not much when there are new and exciting organisms

to see and photograph for every metre along the reef wall! Shrimps, Nudibranches, nocturnal fishes, corals of all kinds with fully expanded polyps, strange anemones, delicate worms and impressive tunicates - the reef was completely full of life! This was a night that I shall never forget!

The reefs of Bunaken NP are known for their great diversity and there are a number of protected species here, such as the Dugong (*Dugong dugong*), Hunchback whale (*Megaptera novaeangliae*), Spinner dolphin (*Delphinus longirostris*), Green turtles (*Eretmochelys imbricata*), Giant clams (*Tridacna titan*), Triton (*Charonia tritonis*), Shellfish (*Thracus niloticus*), Hollow shellfish (*Nautilus pompilius*), Black coral (*Anthipathes* spp.) and even estuary crocodiles (*Crocodylus porosus*) which are usually found in river mouths or mangrove areas. Unfortunately we did not see any of these animals, but did find the rare Stony Coral *Acrhelia horrescens* in the reef slope of Bunaken, at about 10 metres depth. ■



A beautiful specimen of the tunicate *Polycarpa aurata* in the reef slope of the coral reef of Bunaken.

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DIPPING DEEPER

The Great pond snail is probably the commonest of the freshwater snails and with its pointed shell approaching 40 mm in length is one of the largest. Mainly herbivorous, they can chop their way through large quantities of pond plants.

They have fewer enemies than most pond creatures, although the larva of the Great silver beetle eats them almost exclusively, consequently they can take over a small pond reducing the plants to tatters. If there are large irregular chunks missing from the water plant leaves then it is

usually snails which have caused the damage. During the spring and summer the snails lay eggs in batches of up to 80 in a clear jelly which is used to fix them to the under side of the leaf. As soon as they hatch the tiny snails start feeding, firstly on the algae coating the plants and then the plants themselves.

They are time consuming to control, removing the batches of eggs helps together with a concerted netting operation through the autumn will reduce numbers, giving the plants a chance next spring.



In common with their land based cousins Great pond snails always seem to go for the most tender, least common plants first

POND PROBLEM – THAT SINKING FEELING

All summer the pond level has been dropping, requiring frequent topping up. It must be evaporation due to the hot weather you think! After all, this is the least cost, least effort explanation. Now the hot weather has been and gone (if it actually came at all this year) and the pond level is still dropping and you get that



Fortunately there is still time - just, to sort out a leaking pond before winter sets in.

sinking feeling as the only answer is a leak.

A leaking pond is one of the worst problems faced by the Pondkeeper, whatever the type of construction. Leaks can be difficult to locate and even more difficult to repair. However, if the problem is not addressed then you will be storing up a pond full of problems for next spring. Continual topping up with tap water adds additional nutrients to the system so expect an algal explosion with pea soup water followed by lots of stringy blanketweed.

Your fish will be settling down for winter and continual water level changes can be stressful, which coupled with the effects of water additives like chlorine lowers the effectiveness of the fishes immune system leaving them open to disease.



Ponderings

In his regular look at ponds and pond life **Dave Bevan** has a tasty treat for your pond in the shape of a Trout



Green water like this can be caused by nutrients added months before.

GREEN WATER

The water level in the pond is dropping - evaporation or a hole in the liner! I reach for the hose and top up the pond from the mains. It's good enough for me, so it must be good enough for my fish! Of course the water itself is not poisonous, but surprisingly it can contain significant amounts of nitrates and phosphates - plant fertilisers by another name.

By topping up with tap water throughout the autumn and winter we may be storing up trouble for next spring. With all the additional nutrient in the pond an algal explosion becomes a distinct possibility. Warm water, plenty of light and little competition and the unicellular green algae will make the most of the situation, multiplying rapidly to turn the crystal clear water into a pea soup.

TROUT FACTFILE

Species: Brown trout (*Salmo trutta*)
Rainbow trout (*Salmo gairdneri*)

Other names: None

Other forms: Sea going Sea trout (related to Brown trout)
Sea going Steel head (related to Rainbow trout)

Size: Up to 80 cm in large lakes

Weights: Up to 10 kilos but rarely more than 500gms in small streams

Availability: Buy them by the kilo from commercial fish farms

Habitat: Fast flowing streams or lakes containing oxygen rich water

Identification: Colouring varies with habitat, age and sex but the Brown trout can be identified by the rows of red spots

along the flanks. Rainbow trout are even more striking fish having a wide pink or mauve band along the flank.

Habits: Trout are carnivorous, territorial fish with the biggest fish always having the best hiding and feeding places. Some forms are migratory and will eventually move to the sea.

Pondfish value: Can only be considered for top quality water with low BOD levels and plenty of oxygen. Suitable for a natural pond with a continuous water flow in and out. The Rainbow is less sensitive than the Brown and will become relatively tame, taking food from the surface. Both species will soon outgrow a small pond.



Trout make an interesting subject for a well filtered large pond.



Even popular trees like the Weeping willow can develop large and complex root systems and will easily damage a pond liner.

Trees look great round the pond and help give it structure and to blend in with the rest of the garden. Unfortunately trees bring their share of problems to the pond.

Every autumn deciduous trees loose their leaves and where do they end up! - in the pond. My pond seems to act like a magnet, collecting leaves from all corners of the garden and beyond. The result is an increase in oxygen demand and an out of balance situation. Trees will also significantly reduce the light levels of the pond causing a reduction in plant growth.

Possibly one of the worst and costly to remedy problems that trees can cause is the displacement and possible puncturing of the pond liner by the roots in their continual search for water. Even well built concrete ponds are not safe and may develop hair line cracks as the roots grow and exert considerable force on the concrete.

All large trees should be avoided or not planted within 30 metres of the pond. Trees and shrubs which lend themselves to planting closer to the pond include the evergreen Rhododendrons which are shallow rooted but do require an acid soil.

DRIVING YOU QUACKERS

The Mallard duck has become a common visitor to the garden in recent years. If there is an accessible garden pond, then they will probably stay for several weeks and often outstay their welcome.

If your interest is fish or wildlife then right from the outset these birds should be discouraged. While dabbling in the water small fish and other pond life quickly disappears to feed their rapacious appetites whilst the droppings are an unpleasant addition to the pond and make a significant contribution to the deterioration of the water quality. Established plants will be damaged and recent plantings uprooted and left floating on the surface of a now muddy pond. Once established, particularly if there is plenty of food, they can be very difficult to remove. Putting them to flight at every opportunity usually works after a few days but they will often sneak back during the early morning or late evening.

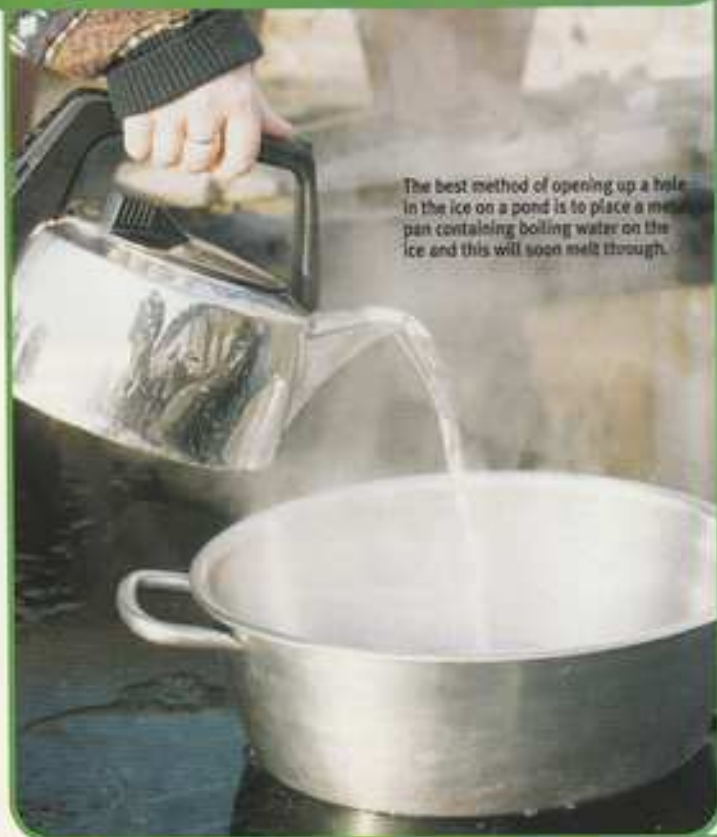


The Horse leech feeds on open small pond creatures (this one is eating a tadpole) and swallows them whole.

**FASCINATING
Fact**

The Horse leech is our largest native leech with an extended length of around 10 cm. It probably got its name from a belief that it could suck blood from Horses. Actually nothing could be further from the truth because this leech does not suck blood.

EQUIPMENT CORNER



The best method of opening up a hole in the ice on a pond is to place a metal pan containing boiling water on the ice and this will soon melt through.

If there is any chance of your pond freezing over for any length of time, then it may be worthwhile investing in an electrically powered pond heater which will be guaranteed to keep a small area of water free from ice. Why? A thick layer of ice prevents the exchange of gasses, resulting in a build up of poisonous gasses in the water which in extreme circumstances can lead to the death of fish.

There are other ways of keeping a small part of the pond ice free. A light plastic football left floating on the water moves around stopping the ice from forming unless the temperature is very low.

Top tip

Never smash the ice on a pond. It will sound like a large explosion to them.



Koi world



Bernice Brewster checks out the equipment on show at GLEE.

EARLIER THIS MONTH, I SPENT SEVERAL days at the annual Garden and Leisure Exhibition which has the delightful acronym 'GLEE', a trade show which includes the fish keeping hobby for both pond and aquarium. This particular exhibition gives the manufacturers the opportunity to display products, old and new for the retailers with which to stock their shelves for us, the fish keeping public.

I strongly believe we pay too little attention to the aeration of Koi ponds and filter systems, so the Evolution Aquo demonstration of their Nexus filtration system was entrancing. The mechanical filtration is comprised of the Answer, a very effective means of removing solid waste from the pond water, before the water passes through a biological moving bed filter, which is heavily aerated. The moving bed filter is self cleaning, allowing for enhanced bacterial activity, the aeration allows the bacteria and other microscopic life to break down the fish waste more efficiently. As the filter matures and the beneficial bacteria colonise the Kaldnes media changes in colour from white to brown. A very compact unit, which will treat up to 7,500 gallons of water! The Nexus filtration system is an excellent system. Of further interest to me was that Evolution Aquo will be installing on line monitoring of pH, dissolved oxygen and ammonia concentrations in the filter as it passes through the outlet of the filter system. The Nexus filtration system is on sale at a number of Koi retailers, details of stockists are available from Evolution Aquo Ltd., Evolution House, Keltett Close, Wigan WN5 0LP. Tel. 01942 216554 www.evolutionaquo.com

The second filtration system demonstrated at GLEE was the BubbleBead filter, another efficient means of filtration

but within a sealed unit. There are 600,000 beads per cubic foot and which have been processed to promote bacterial growth on their surface. The water passes in through a screen at the base of the chamber and through the bead mass and exits at the top passing through a second screen. The screens retain the solid waste within the filter system. The incorporation of an ultraviolet light unit into the BubbleBead is optional. The addition of a timer unit to the BubbleBead filter allows the backwashing operation to be done automatically on a daily basis. There are 6 models available, which treat from between 2,400 to 22,000 gallons of water, these figures are for lightly stocked Koi ponds. A very interesting concept, which has been well tried and tested in the aquaculture industry, where it works well. Further details and information on stockists is available from Aquatica International, telephone 020 8669 6643.

Safety first

Ponds are a serious potential hazard for young children, Sofapond, have produced a DIY grid called the SAFA-DECK which can be installed on any garden pond, irrespective of shape or size. Black plastic grids clip onto aluminium beams which are locked in place with retention cords and rigid support legs. The grid has been designed to support the weight of an average eight year old child falling onto it. Although designed as a DIY product the SAFA-DECK can be installed by one of the Sofapond installation teams. Information on the SAFA-DECK can be obtained from Sofapond Ltd., Unit 47, Block 7, Farmway, Old Mill Lane Industrial Estate, Mansfield Woodhouse, Notts NG19 9BG, 01623428873 website www.safapond.com



In the BubbleBead filter the solids are removed by backwashing the unit, as the waste water flows from the outlet, an air inlet opens, which tumbles the beads in the flowing air to clean them.



SALE OF GOODS ACT APPLIED TO FISH

Finally, a Koi hobbyist who suffered the loss of an entire collection of Koi after the introduction of a new Koi infected with Koi herpes virus (KHV) has successfully sued the company who sold the fish. The judgement makes it clear that fish are included in the Sale of Goods Act, which in turn has the potential to impact heavily on the coldwater, aquarium, coarse and game fish industries.

More recipes

Anthony Calfo has some more ingredients for success with growing reef corals

Buying the most up to date lights for your reef tank (like this aquascope light) is useless, if you don't keep the glass clean and free of salt creep.



GROWING REEF CORALS IS AN ENDEAVOUR for which there are many wonderful paths to success. Last month I proffered so-called "recipes" for feeding reef invertebrates, yet I am sure that there is no single "best" recipe overall for success, only good ingredients.

The basic ingredients for growing reef corals successfully are: appropriate light, food, and water flow. Please remember, though, that all three ingredients depend on good water quality and competent husbandry to make a successful recipe.

The delivery and care of reef light and hardware

Of the three main ingredients, lighting is the most commonly addressed parameter in reef keeping. In popular literature, it shadows the importance of proper food and water flow to the extent that some aquarists seem to focus only on this parameter to any significant extent. But again, success with aquarium corals is dependent on all ingredients addressed in concert.

It would be fair to say that most popular corals recommended to the average coral gardener are photosynthetic and depend on proper illumination for the bulk of their sustenance. Symbiotic species (with zooxanthellae) are generally easier for most aquarists to care for in contrast to the aposymbiotic filter feeders. Most symbiotic corals derive more than half of their nutrition from the products of photosynthesis. Lighting hardware, therefore, is one of the most important decisions you will have to make in an effort to grow reef invertebrates successfully. Choosing the right lamps first depends upon making a list of targeted species for the display. The identified corals can then

be evaluated to make a proper choice of lighting equipment to serve them.

Once you have determined if you have low, medium, or high light needs and then have selected the appropriate hardware, good aquarium husbandry must support the effective delivery of light. Regardless of how well suited your lamps may be above the water, all is for naught if the penetration of light is persistently compromised by poor water clarity (yellowing agents, turbidity, etc.) or if the lenses and lamps are routinely coated with dust and salt creep. Good protein skimming, proper use of chemical filtration (small doses of media changed

frequently), regular partial water changes ("Dilution is the solution to pollution.") and ozone are all helpful for maintaining optimal water clarity.

Another consideration is that the shock of a sudden increase in light from a tardy address of water clarity can be stressful and ultimately fatal to some corals. It is an underrated cause of "bleaching" (the expulsion of pigmented symbiotic algae) and duress in many captive corals. You can imagine that it wouldn't take much to cause such an event. Consider the hectic schedule that one has in the weeks before, during and after a holiday combined with some neglectful oversights with the rotation of carbon or care of the protein skimmer, it is possible for a spell of three or more weeks to go by with little or no significant export of discolorants from the water. After this expended period of time and the escalating "yellowing" of aged water, a large water change and exchange of fresh filter media may send some invertebrates into light shock with the suddenly improved water clarity!

FRESH FOOD IS VITAL

You need to give similar consideration to your fish food as you would to items fit for human consumption. The most basic rule is freshness. The nutritive value of all foodstuffs degrade in time with critical vitamins waning first and fast.

Few if any foods keep well much past six months of age under the best circumstances. Ideally, buy prepared foods in portions that can easily be used in two to four months. Frozen foods and opened packages of dry food should be discarded after 6 months. Dry foods should be stored in a cool, dry place in tightly sealed containers. They must be protected from extremes of temperature and humidity. It is inevitable to want to keep food containers near to the aquarium, but few places close by are suitable. Light from the aquarium quickly degrades the quality for foods stored in clear or translucent packaging. Atop the hood or light canopy is a dreadful place to keep a tin of coral or fish food. Furthermore, the fluctuating

temperatures near the top of the aquarium from day/night cycles of the lamps will also shorten the shelf life of foodstuffs tremendously. This reality is compounded by the humidity surrounding the aquarium which can quickly lead to spoilage of freeze-dried, flake and pelleted fare. An even worse place for food storage is underneath the aquarium in an enclosed cabinet where the humidity can build high enough for moss and orchids to sprout spontaneously. The best place for dry aquarium foods is simply in the refrigerator in a tightly sealed container. When this is not convenient, keep only small portions at room temperatures that can be used within weeks. Frozen foods should be stored with like consideration in tightly sealed packages (zip-lock bags are fine) and used within just a couple months. Any money saved on buying foods in bulk that must be stored for extended periods of time is lost on the degradation of food quality in time and the subsequent compromise to your animal's health.



When Fungids, this is *Fungia scutaria*, have been fed well they will excrete a dark waste.

is being stung and digested. In some cases, excrement from the coral is an unmistakable dark, stranded expulsion and proof positive that feeding was successful.

Bottled phytoplankton

Beyond dry and frozen foods, liquid suspensions are available to aquarists too often ill prepared to use them properly. Some bottled phytoplankton products are very useful indeed but they are commonly misapplied and some may be lacking in instructions for proper application altogether. I have not personally conducted studies on phytoplankton and bottled substitutes, but I have been enlightened by the reports of those that have. Notably, Dr. Rob Toonen has described that even the best bottled phytoplankton is effective in a very narrow range of application (whatever

"best" is varies by species or nutritional composition for your individual purpose). The limitations of bottled food supplements have to do largely with "clotting" or coagulating of the matter as it ages, rendering the prey/product size too large for many of the fine polyped feeders.

Most aquarists tend to feed more of the suspension hoping for the best. In this manner, bottled supplements unfairly earn their reputation as "pollution in a bottle". The overwhelming practical and anecdotal evidence shows us that the abuse of liquid coral foods serves largely to fuel nuisance algae growths.

The best solution for aquarists in need of feeding fine zoo- or phytoplankton but unable or unwilling to whisk prepared liquid substitutes is to employ an upstream fishless refugium. Vessels with coarse media and regular feeding can generate larger

zooplankton like amphipods and mysids. Sugar-fine sand or muddy substrates will encourage copepods while surge-pounded seagrasses can proffer epiphytic material and possibly phytoplankton. Dedicated aquarists might set up food culturing stations instead for rotifers or unicellular algae and drip feed their corals for optimal feeding.

There are indeed many options for feeding your corals but always take heed of particle size and prey suitability. The ultimate irony about the above mentioned misapplication of bottled foods is that many of the targeted animals are unlikely to even eat phytoplankton. The fact of the matter is that most of us have corals that decidedly favour meaty fare (zooplankton). So unless you have a herd of Gorgonians or a gaggle of Nephtheids, I would resist dispensing bottled phytoplankton in my tank like it was fertiliser. ■

SOME RECOMMENDATIONS FOR USING LIQUID FOOD/PHYTOPLANKTON PRODUCTS:

- 1 They should ideally be packaged, transported, sold and kept refrigerated throughout the entire chain of custody for the longest shelf life. Phytoplankton is especially sensitive to deviations and storage at room temperature. Spoilage can occur within days.
- 2 Like most foods, the shelf life of bottled supplements is arguably six months at best after which time the efficacy degrades dramatically (particle size increases significantly). Such products are used best in two to four months.
- 3 With every application, the liquid food sample should be whisked in an electric blender to reduce particle size... hand shaking is largely ineffective. Mechanical whisking is critical for bottled phytoplankton in particular.

Next month
Anthony explains
water flow - the
other vital
component for
growing reef
corals in
captivity

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Our resident vet,
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at the most vital element
to life - Oxygen



Goldfish, like this Shubunkin, are better able to cope with oxygen starvation than many fish.

DURING NORMAL RESPIRATION IN MOST fish, synchronised movements of the mouth and operculae (gill covers) create a very effective pump that draws water in through the mouth before being exhaled past the gill covers. This inhaled water is drawn through the gills and between the lamellae, which are thin flaps of gill tissue. Each lamella contains minute blood vessels for the uptake of oxygen and release of carbon dioxide. The gill lamellae are borne on a series of four or five gill arches on each side. Oxygen is then bound to a molecule of

haemoglobin found in the red blood cells, and it is in this combined form that oxygen is delivered to the tissues.

Oxygen constitutes 20% of atmospheric air, but because it is relatively insoluble in water there is 20 to 30 times less oxygen in a given volume of water than in an equivalent volume of air. Almost all of the oxygen dissolved in water gets there by dissolving into it at the surface, but oxygen is not very soluble in water and so the available levels are much lower than in atmospheric air. Other sources of dissolved oxygen are a

LOW OXYGEN LEVELS - PREDISPOSING FACTORS

- **High stocking densities.** The more fish there are, the more oxygen is consumed. But it does not stop there.
- **High plant numbers.** Plants in the same system also use oxygen throughout the day during their normal respiration, although because they photosynthesise during the hours of daylight they produce more oxygen than they consume. At night time however, plants are no longer photosynthesising but respiration continues and so significant falls in oxygen levels can occur, which reach their lowest levels just before dawn. Filter bacteria are also consuming large quantities of oxygen.
- **High temperatures.** Oxygen solubility decreases as temperature increases. At 10°C oxygen levels are 11.28mg/l, whereas at 20°C it will be reduced to 9.08mg/l. For many marine and freshwater tropicals, a temperature of 23 - 25°C is more than adequate for general maintenance. Higher temperatures may be just unnecessary.
- **Salinity.** Salt water holds less oxygen than freshwater, a fact that must be considered when stocking marine aquaria. In water at 10°C with no dissolved salt, oxygen levels are 11.28mg/l, whereas in a 2% NaCl solution (a salinity of 20ppt or 20g/l) oxygen levels fall to 9.93mg/l. Oxygen levels can be maximised by lowering the salinity. Many tropical marine fish will readily tolerate lower salinities and so fish only set-ups can be kept at a specific gravity of 1.020 instead of 1.025 - 1.025 that can be found in their native waters.
- **Altitude.** With increasing altitude there is less atmospheric oxygen, therefore its partial pressure will be reduced and so less oxygen will dissolve into the water. Net result - higher altitudes reduce oxygen levels. This rarely becomes a consideration.
- **Atmospheric pressure.** Sudden fish deaths in ponds have been associated with periods of thundery weather, with low atmospheric levels triggering a fall in dissolved oxygen.
- **Treatments with certain chemicals.** Formalin removes oxygen from the water.

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bioproduct of photosynthesis from submerged aquatic plants during daylight hours. For the record, some commercial trout and salmon farms pump liquid oxygen into the water, timed to coincide with episodes of low dissolved oxygen.

Recommended levels of oxygen are above 6.0mg/l at 25°C for freshwater fish, and 5.5mg/l for tropical marine fish.

Treatment

Most oxygen enters water at the air/water interface - the surface to you and me. So we need to turn our attention to the surface layers. Actual surface area is important as this is the main area for oxygen uptake. So it is surface area rather than water volume which will govern stocking densities. Creating turbulence, such as waves, air bubbles, water currents and even the action of wind on the surface of ponds will increase oxygen

DISEASE LOOKALIKES

Severe gill disease may mimic this condition, so consider Gill flukes (*Dactylogyrus*), Whitespot (*Ichthyophthirius*) and so on. Mass mortalities may occur overnight in thunder weather, so consider lightning strike as another possibility. Nitrite poisoning blocks the oxygen carrying abilities of haemoglobin so fish that are affected will show oxygen-deficient behaviour. However the gills of nitrite affected fish appear brownish.

NOTES

- Malachite green can produce the signs of hypoxia but it is actually working on the respiratory enzymes so dissolved oxygen concentration is not affected.

- Redox Potential.

Large amounts of decaying material can reduce the available dissolved oxygen content. This is a measure of a sample of water's ability (or potential) for reduction or oxidation (hence Redox).

In reality it is a measure of the electrons in that sample of water, but its relevance to fish keeping is that a body of water with a high redox potential is considered to be of high quality, having plenty of surplus oxygen. Low redox potential waters however have low oxygen levels, with excessive waste materials incompletely oxidised or broken down.

Redox is measured on the p scale, for 0 to 12, with 0 as the lowest oxidising (highest reducing) ability and 12 the most powerful

DIAGNOSIS

Species susceptibility.

Variable. Those fish adapted to fast flowing rivers will often suffer readily from low oxygen levels, whilst those adapted to low oxygen environments such as Crucian carp or many of the Anabantoids can withstand much lower levels.

Recognisable signs of disease

Larger fish with greater body weight have disproportionately higher oxygen demands and it is these that show signs first, and in the worst cases will die. If oxygen levels fall too low the fish become hypoxic (low blood oxygen) and will start to gulp at the surface. It is thought that they are not gulping for air, but are trying to access the extremely thin laminar layer of water at the

surface that will be relatively rich in oxygen. They may well congregate around filter outlets and other areas where the increased water turbulence will create a localised area of oxygenation. Many species such as Carp and Goldfish are able to switch to alternative anaerobic biochemical pathways, although prolonged exposure to these conditions risks a build up of lactic acid. Heart rate slows and the amount of water pumped over the gills also increases. Should the fish become progressively more hypoxic it may show a frantic escape response. Once oxygen levels reach critically low levels the fish will respond by increasing its ventilation rate, which in itself incurs an oxygen debt. If all these are unsuccessful the fish will become comatose and die. Classically, fish which have died in this way, have flared operculars, wide open mouths and pale gills.

uptake by increasing the surface area available. These events will also thin the water surface layer (known as the laminar layer), to allow easier gaseous exchange.

Over time, water currents also bring more of the water volume into contact with the air/water junction. They displace oxygenated water from the surface layer, bringing new deoxygenated water to the top where it can "re-stock" with more oxygen whilst better-oxygenated water is distributed throughout the volume. This is primarily how air stones help to improve oxygen levels - the amount of oxygen absorbed from the bubbles is negligible,

indeed only 1% of oxygen is absorbed from these bubbles per metre rise in the water column, so this effect would only be significant in deeper waters. These effects can be enhanced by bubbling air through an air stone, using submersible pumps or powerheads, or directing filter outlets at the water surface. In ponds, fountains and waterfalls perform a similar function.

- Correct stocking densities.
- Improve water circulation and increase water turbulence with air stones, venturis, fountains and the like. Do not turn these off at night.
- Reduce plant growth and treat algal blooms as necessary.
- In aquaria consider the feasibility of reducing high water temperatures by floating plastic bags containing ice in the tanks.
- Install trickle filters if possible, thereby allowing the filter bacteria to use atmospheric oxygen rather than dissolved oxygen. ■

oxidising potential. Normal values range from around 7 to 12.

- Supersaturation.

In some circumstances water can become supersaturated with oxygen. Because oxygen is so insoluble in water, any event which causes a decrease in pressure in such waters will trigger oxygen to come out of solution. Such supersaturation with oxygen often results in Gas Bubble Disease. This manifests itself as obvious bubbles forming in the blood vessels, especially of the fins with a resultant fraying and haemorrhage, and occasionally behind the eye, although they may occur on all body surfaces. If the swimbladder is involved the fish may lose its balance. Usually the fish come to no harm. Classic causes of supersaturation would be:

- Exuberant photosynthesis during daylight hours.
- Mixing of air and water under pressure. In nature this would occur at the bottom of waterfalls.



In their natural habitats, tropical fish enjoy ideal conditions. However, in the confines of an aquarium, it is important to properly condition your aquarium water to keep your fish healthy. **Stress Coat**® water conditioner protects and heals fish by forming a synthetic slime coating on the skin of fish that is often interrupted by handling, shipping, fish fighting and other forms of stress. **Stress Zyme**® is a biological filter additive containing live bacteria that improves the development of the biological filter. **Stress Zyme** helps clean a dirty fresh or marine aquarium. Use them together for a healthy and balanced aquarium.



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Plant profiles

Growing plants in an aquarium is relatively easy, if you have the conditions right, but what are the right conditions? All four plants featured here will fail if the lighting is not good enough, otherwise they should do well in most aquarium conditions



Giant hygrophila is an undemanding, fast growing plant for large aquariums, where it will thrive in almost any conditions including brackish.

Giant hygrophila (*Hygrophila corymbosa* "Stricta")

Giant hygrophila will grow right up to the water's surface and beyond, where it forms dark-green leaves and produces beautiful blue flowers. This makes it particularly suitable for the new open topped aquariums. It is best grown in groups, but each stem must not be planted too close to the others because this will prevent light reaching the lower leaves. It will easily achieve a height of from 30 to 50 cm and a spread of 15 to 20 cm. It belongs to the family Acanthaceae and comes from India, Malaysia & Indonesia.

AQUARIUM REQUIREMENTS FOR GIANT HYGROPHILA

Light: Medium to very high

Temperature: 20 to 28 °C

Hardness: Very soft to hard

pH: 5.5 up to 8

Creeping ludwigia (*Ludwigia repens*)

Ludwigia repens is a common and very beautiful aquarium plant. It is generally a very fast growing species which tolerates a wide range of conditions. When the single stems are cut back it develops countless side shoots and becomes much more bushy. It is best grown as an intermediate or background plant in large groups where it will grow to between 30 and 50 cm in height and 5 to 8 cm in spread. It belongs to the family Onagraceae and comes from North America.

Under bright lighting the red colour of Creeping ludwigia will become more pronounced and intense.

AQUARIUM REQUIREMENTS FOR CREEPING LUDWIGIA

Light: Medium to very high

Temperature: 15 to 26 °C

Hardness: Very soft to hard

pH: 5.5 to 8

Cardinal flower (*Lobelia cardinalis*)



The Cardinal flower is more a bog or marsh plant than it is a true aquatic. In these conditions it forms dark green leaves which are purple underneath.

Once submerged the leaves of this plant turn a beautiful shade of light green and the purple colour of the emergent growth fades away. In submerged conditions, however, it is a difficult and slow growing plant. It is in open aquaria where it really comes into its own, growing above the water's surface as well as below it. The leaves regain their dark green and purple colour above the surface and the plant also produces very beautiful scarlet flowers. It grows to a maximum height of between 20 and 35 cm with a spread of up to 15cm. This plant can also be used in garden ponds but usually dies during the winter. It belongs to the family Lobeliaceae and comes from North America and Mexico.

AQUARIUM REQUIREMENTS FOR THE CARDINAL FLOWER

Light: Medium to very high

Temperature: 15 to 26 °C

Hardness: Soft to hard

pH: 6 to 8

Red Alternanthera (*Alternanthera reineckii* "roseafolia")

The purple colour underneath *Alternanthera reineckii* "roseafolia" leaves provides an effective contrast to the many green plants in an aquarium. This is particularly true when it is used in large groups. As with many red leaved plants, good light will encourage the best colour in the leaves. It is very easy to propagate by taking cuttings of the top 5cm and terminal bud. These are then planted in the substrate where they quickly root. The mother plant will send out new side shoots and become more bushy. It grows up to a maximum height of 50 cm and will spread out to between 10 and 15 cm if pruned back to produce side shoots. Red *Alternanthera* belongs to the family Amaranthaceae and comes from South America.

AQUARIUM REQUIREMENTS FOR RED ALTERNANTHERA

Light: Medium to very high

Temperature: 17 to 28 °C

Hardness: Soft to hard

pH: 5 to 8



Although most *Alternanthera* are difficult to grow, Red *Alternanthera* is relatively undemanding, although growth will remain only moderate even in the best conditions.



Pete's Parade

Pete Liptrot introduces you to another selection of fish. PHOTOS: OLIVER LUCANUS

Galaxy pike cichlids have not been described by science yet so have no scientific name.

**PETE'S PICK
OF THE MONTH**



GALAXY PIKE CICHLID, *CRENICICHLA* SP. 'GALAXY'

Pike Cichlids have enjoyed a burst of popularity over recent years as new and beautiful species became available due to increased collecting in certain areas of South America.

Although there currently seems to have been a slight reduction in popularity, with fish like the Galaxy pike being collected it must surely only be temporary.

Found in the Rio Tapajos it can be treated like most other medium to large Pike cichlids with a maximum length of around 30cm. Many people still shy away from this large, diverse and fascinating group of fish because of their undeserved reputation, but in fact they do make very good aquarium inhabitants, and outside of breeding are unlikely to pose a threat to tankmates they are unable to swallow. This means that this species would make a marvellous addition to a

community of medium to large fish from South America, including Characins, Catfish and other Cichlids.

The only cautionary note must be when combining this fish with other Pike cichlids, particularly members of the same species. It is known to be very intolerant of any fish that it may regard as a territorial threat. As yet no breeding reports are available.

Husbandry standards should be of the highest quality. Pike cichlids are prone to the disease known as hole-in-the-head if there are any lapses in water quality. Feeding also plays a large part in preventing this, and a wide range of 'chunky' foods should be offered to ensure a balanced diet. Live fish should not be offered, even though this probably constitutes a large part of their natural diet, since the feeder fish can introduce diseases.

CARIBE PIRANHA, *PYGOCENTRUS CARIBA*

A fish for the real aficionado of Piranhas, this is one of the true potentially dangerous species. In their native habitat in the floodplains of the Orinoco river system, they are regarded as a definite threat to wading livestock at certain times of the year.

Growing larger than most Piranha species seen in the hobby at up to 40 cm, they require an extremely large aquarium in order to maintain a group, and care must be taken during maintenance. A bite from a fish like this would be serious. They have extremely powerful jaws that are designed to remove a large piece of flesh, which does not grow back.

The minimum aquarium size that should be considered for this species should provide at least 230 litres of water per fish, and filtration should be substantial to deal with the amount of waste produced. A sump filtration system would be ideal, this then allows the aquarist to do the majority of husbandry work without needing to put their hands in the aquarium.

Water chemistry parameters for this fish are probably not that important, as on the Orinoco floodplain conditions vary greatly over the course of the year. A neutral pH, low to moderate hardness and a temperature in the 24-26°C range would be ideal. Lighting is of little importance for this fish, but enough to support the growth of floating plants would be beneficial, as these would help to maintain water quality and also allow the fish to feel more secure.



Ornate gourami, *Malpulutta kretseri*, are a beautiful yet under-appreciated little fish.

ORNATE GOURAMI, *MALPULUTTA* *KRETSEI*

This is a fish that has been known to aquarists for a long time, but is now considered under threat in nature due to habitat destruction in its native south western Sri Lanka. It is restricted to forested areas where it lives in shaded, slow flowing acidic creeks and streams in the shelter of marginal vegetation.

Although this fish is rightly protected in nature, and wild collected specimens are therefore no longer available through the trade, captive-bred fish do appear infrequently and if seen are well worth considering for a breeding project. It can be treated like the liquorice gouramis, living quite happily in small aquaria as a pair or a small group. Females are unlikely to grow over about 3cm, and males will only rarely attain 5cm. As long as shelters are available, they are not known to be overly aggressive with each other. The aquarium should be planted to provide security, but because of the lower light levels preferred by this fish, Java Fern, Java Moss and Cryptocorynes would probably be the most suitable.

The water should be soft and fairly acidic, with a pH between 5.5 and 6.5. A temperature around 26°C should suit this species, and feeding should largely be of small live or frozen foods. It is possible that quality dry foods, particularly some of the fine granular food now available, will be taken, but this should not be relied upon as the main source of nutrition.

They are a bubble-nest breeder, building their nest in a small cave or under a secluded curled leaf. Short lengths of pipe or empty film canisters will provide suitable sites in the aquarium. The male will care for the nest for a few days until the eggs hatch, and the fry should be raised separately once free-swimming (about three days after hatching). The fry should feed immediately on newly hatched artemia, although other fine live foods can be used if this is not available. It should be a simple matter to move well-grown young on to retailers or to aquarists.



Caribe piranhas are very dangerous fish both in the wild and in captivity.

Meal times

Bob & Val Davies explain how to feed your reptiles

ALONG WITH PROVIDING SUITABLE accommodation and conditions, feeding is of vital importance for the successful maintenance of your reptile. One point to consider before taking on a creature is whether you would object to feeding live insects as some people are somewhat squeamish about this and even handling live insects. Feeding is a complex subject and there is a lot of variation in the types of food that some reptiles will accept.

LIZARDS

Most lizards are insectivores and for these the main diet is Crickets which are commercially available. Locusts will also be accepted but tend to be more expensive. Mealworms, Waxworms and Moths (sometimes called Giant mealworms) will be accepted, but should be restricted to occasional use only as they tend to be fattening and the hard, chitinous exoskeleton can cause digestive problems particularly when a lot are fed at one time - they are often regurgitated. Some insectivores will accept bits of sweet fruit which can be useful in that it may provide extra vitamins/minerals. Others will accept small portions of tinned cat foods. It is claimed that dog foods contain more fat and are, therefore, best avoided. However, do not use cat food as a main part of a diet (except for Pink-tongued skinks). Some larger lizards will readily accept small, thawed mice which provide a complete meal.

Commercially available insects tend to lack calcium and other nutrients, but this deficiency can be made up by dusting the Crickets with a good quality (fine grain) multivitamin/calcium supplement

available at reptile shops. Crickets can also be gut-loaded i.e. fed on a nutritious diet prior to being given to lizards e.g. good quality flake fish food/trout pellets.

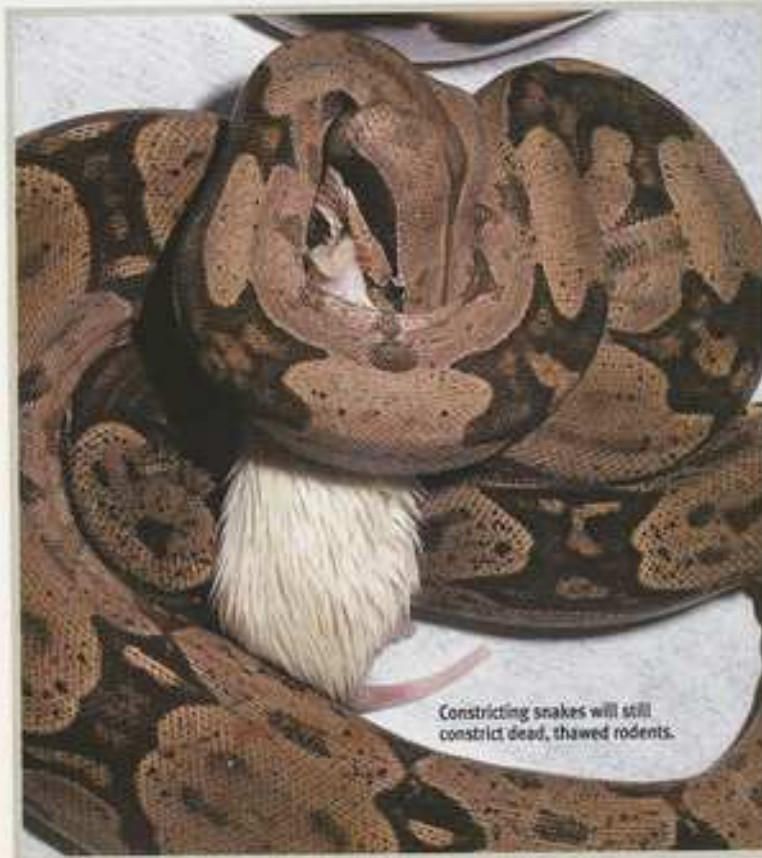


Pink-tongued skinks are a specialist snail and slug water in nature.

Top tip



To dust Crickets place in a jar or polythene bag in which there is already a small amount of vitamin powder. Close the lid/neck and swirl until crickets are coated. It is important to note that the longer crickets remain uneaten in a vivarium the more powder they will lose.



Constricting snakes will still constrict dead, thawed rodents.

SNAKES

The majority of snakes feed on mammals, although there are specialist feeders that eat such things as lizards, other snakes, insects, eggs, slugs, salamanders, snails etc. It is advisable to check on a snake's natural diet before purchase to avoid possible disasters such as placing two King snakes together, since in the wild their main food is other snakes. In captivity they feed readily on mice.

Top tip



Feeding two snakes of disparate sizes in the same vivarium can be a recipe for disaster, especially if left unattended, since the swallowing mechanism is automatic and if both seize the same food item there is a good chance the smaller snake will be swallowed as well.

Feeding most snakes is relatively easy. A supply of frozen rodents can be kept in the freezer. However they must be completely thawed and warm before using. It is generally unnecessary to feed live rodents. With patience and perseverance most snakes can be weaned onto thawed rodents. Check with the vendor that the snake you want to buy accepts thawed rodents. Rodents are a complete food and do not require vitamin dusting.

Baby Pink-toe gued skinks will accept cat food, although initially it will need to be scented with snails or soft, brown slugs.



Top tip



Do not handle a snake immediately after it has fed, you may cause it to regurgitate the food. Never handle a snake after handling its food without washing hands first - the scent from the food will be on the hands and a hungry snake will bite what it thinks is its food.

Insectivorous snakes such as Rough greens do well on a diet of dusted crickets. The popular Garter snake feeds on fish, frogs, tadpoles, Earthworms and pink Mice. Although whole fish, such as whitebait, contains all the nutrients and is easily stored in the freezer they also contain an enzyme which destroys B vitamins. This can eventually be fatal but warming the fish for approx. 20 minutes at over 28°C (82°F) destroys the enzyme. Commercial frozen Garter foods are available.

TURTLES

Freshwater turtles tend to be mainly carnivorous, although many species will accept vegetable matter such as soft-leaved aquatic plants e.g. *F. Jodei*. Some species tend to become almost totally herbivorous as they become older. In the

HERBIVORES

Primarily tortoises, but this includes some lizards. Herbivorous diets are probably the most complex and need careful thought. It is too easy to rely on one type of food which the creature will eat, but does not supply the necessary range of nutrients.

SOME BASIC GUIDELINES FOR HERBIVORES

- 1 Provide as varied a diet as possible.
- 2 Try to use wild plants in preference to supermarket produce.
- 3 Always use good quality food not rotting food.
- 4 Food should be dusted with a good quality supplement and powdered cuttlebone. The latter is especially important for tortoises which have a high calcium requirement.
- 5 Some food such as carrots and apple may need to be grated - they are too hard in chunks.
- 6 Do not feed human foods such as bread and butter, toast, and pizza even if the animal will eat it - this is asking for trouble.



When adult, *Uromastyx* are practically complete herbivores.

Testudo and *Agrionemys* species of tortoises should not be given meat although some older books recommend it. They may eat it but it is not good for them and the effects of an unsuitable diet take a long

time, sometimes years, to become apparent - these include shell deformity and kidney problems. The above is merely a guide, there are many minor variations depending upon species. ■

wild, turtles will feed on aquatic insects, tadpoles, frogs and fish. In captivity calcium, together with UV light is important if soft, deformed shells are to be avoided. Many species will accept small pieces of cuttlefish bone floated on the water. Turtle pellets, which claim to be a complete diet, can be purchased. Feeding raw, lean beef and fish flesh i.e.

without bones, should only be used in an emergency when no other food is available. Both lack the necessary vitamins and minerals and can lead to obesity and deformed shells. Some keepers use whitebait (which is complete), but it quickly fouls the water. Water plants can be supplied for normally carnivorous turtles.

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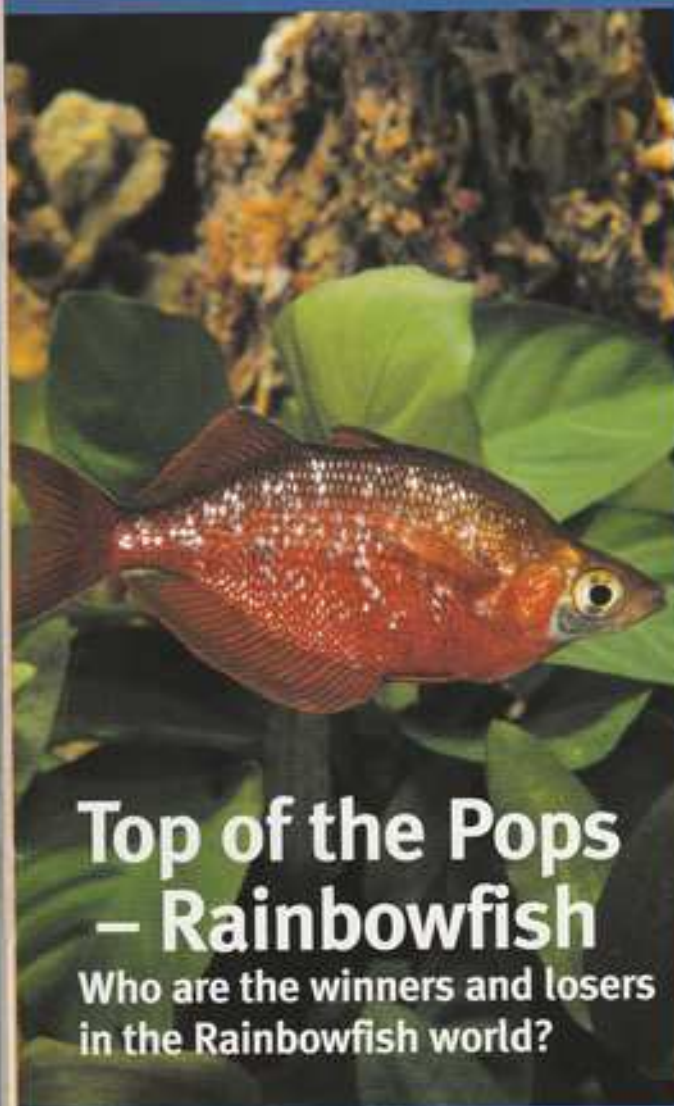
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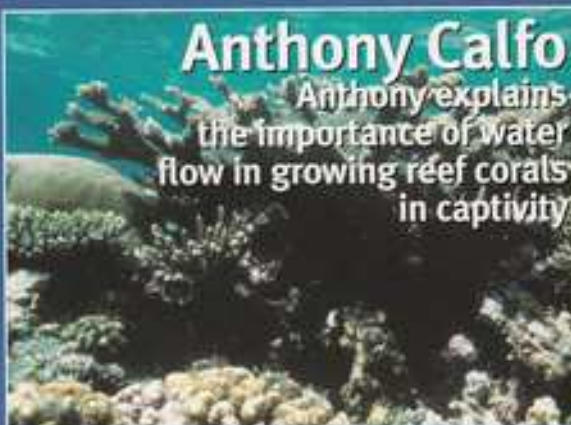
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Today's top tip



Whilst these are a peaceful schooling fish they tend to fight if kept in a confined space. This is a particular problem when they are being transported, so ask for your purchases to be bagged separately. That way all your fish will arrive home alive and well

There are many beautiful Killifish but few of them are good community fish. The African Lampeyes, however, make excellent community fish and deserve a place in any peaceful community aquarium. **Derek Lambert** has selected one of his favourites



DESPITE THEIR GORGEOUS COLOURS, IDEAL size and pleasant temperament, few Killifish are kept in normal community tanks. There are two reasons for this. Firstly, many species need very specific water conditions and the other reason is that most Killifish tend to hide away in plants. One group, however, will spend all their time out and about in full view and are tolerant of a wide range of water conditions, these are the Lampeyes from Africa.

These belong to the *Procatopus* genus and have an average size of between 5 and 6.5 cm. Of all of them my personal favourite is *Procatopus obermans*. The males of this species have a beautiful blue sheen to his body. The fins are enlarged and are blue with fine red spots. The female tends to be smaller and has a much plainer silvery grey body.

They come from Cameroon and Nigeria where they usually live in flowing streams. They eat all foods and do fine on commercial flake, granular and pellet

foods with the occasional feed of live food for variety. While they are not picky about the pH or hardness they will not tolerate poor water quality. Ammonia and nitrite must always be kept at zero and even high levels of nitrate will weaken them and leave them open to infections such as Fish TB.

All *Procatopus* are a peaceful schooling fish that can be kept in any small to medium

fish community aquarium, although they like plenty of swimming room so an aquarium of at least 90cm is best. They like some plant cover in the tank but will spend most of the time swimming in the open water areas of the aquarium. The only time they dive into the planted areas is when they are frightened or in the process of spawning. ■

BREEDING

In nature this species is supposed to lay its eggs in cracks in wood or stones but will also place them in the roots of floating plants. In captivity they will spawn into a spawning mop and try to place their eggs in the tightest part of the mop. They take two weeks to hatch and are best gently removed from the mop every day and placed in a bare tank

to hatch out. The fry are large enough to take newly hatched Brine shrimp as soon as they are free swimming. At this time they will be seen swimming just under the waters surface but will go down to the bottom in search of food. Finely ground fry foods can also be fed. Unlike most other Killifish the water conditions can be anywhere from soft and acidic right through to hard and alkaline without any noticeable difference in hatching rates or times

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Weyale Garden Centre, Crookford Bridge Farm, New Has Road, Addlestone, Weybridge, Surrey KT15 2UB. Tel: 01832 821198
- BRIDGEMOUNT**
Weyale Garden Centre, Egley Road, Woking GU24 5PH. Tel: 01483 740190
- BRIDGEMOUNT**
Weyale Garden Centre, Littlehampton Road, Ferring, West Sussex BN12 6PD. Tel: 01853 244332