Today's Fishkeeper

JUNE 2003 £2.95

FROM BEGINNER TO ADVANCED

BEAUTIFUL BEASTS

Flower Horns explode onto the scene pg26

WIN!
£1000 worth of Oase pond filters

TROPICAL COMMUNITIES

The ultimate guide to getting them right

EQUIPMENT
Lighting for plants

HOW TO
Breed Bandit corys

Andrew Caine: Marine Expert

- Answers your questions
- Spotlights Mandarins

Designed & Published by

TRMG

TRMG Magazines Ltd
Winchester Court
1 Forum Place Hatfield
Herts AL10 0RN
Tel: 01707 273999
Fax: 01707 276555

Editor
DEREK LAMBERT
(01673 885352)
Design
KRYSTLE MULLIN
Group Art Director
JON SLOANE ext.279
Production Manager
SIMON LATTER ext.213
Advertising Production
JANET O'SHEA ext.234
Advertisement Repro Manager
BARRY JONES ext.237
Advertisement Repro Assistant
ANNE FALLON ext.233
Advertisement Manager
KAYLEY LONG ext.235
Classified Sales Executive
MIKE WALKLEY ext.220
Classified Sales Manager
CHRIS LAWRENCE ext.272
Marketing Executive
ALISON NORTH ext.231
Publishing Production Manager
PAULA SKINNER ext.282
Publisher
KRIS HOLLUND ext.279
Advertisement Director
CHARLIE WISE
Director
ANDREW STEVENS
Commercial Director
JONATHAN FELLOWS
SUBSCRIPTIONS
Colour Repro
DIGITAL CONCEPTS
Printed by
WILLIAM GIBBONS & SONS
Distribution
COMAG

Welcome

EDITORIAL CONTACT INFORMATION
Tel: 01673 885352
E-mail: derek@trmg.co.uk
Fishkeeping answers:
fishkeepinganswers@trmg.co.uk

Have you noticed how its not just political parties that conduct opinion polls now, but in almost every area of life you are asked for your opinion. If you have Sky TV then you are constantly being asked to vote on this question or that question. It's called being interactive and people like to have their say. With our new *Points of view* column we are doing exactly the same. So if you haven't already done so, put pen to paper and send in your point of view or tap in an e-mail and send it to the usual address. Dick will happily include them in the first available slot.

Thinking of being interactive and surveys, have you ever wondered why they sometimes produce such daft results? Well it's all down to the question asked. If you want people to vote a certain way you pose the question in such a manner that you get the person to vote the way you want them to. This is great if you have a particular 'axe to grind' and want the support of the general public to justify it. Of course, if the public are given the full facts, rather than a snippet designed to manipulate them to vote a certain way, then the result will probably be totally different.

New introductions

In this month's issue we have gone to town on new introductions. Erwin Schraml has been trawling through some more new imports which will be turning up in your local aquarium shops in the coming months. The Zambian barbs make great additions to a community aquarium and once they settle down have some pleasing colours. Likewise L 108 would make a good community fish, however, at 46cm it grows way too large for most aquarist's tanks. Another new introduction which is a non-starter for your average community aquarium is featured by Max Gibbs. Max has swapped his camera for a pen and written a fascinating article all about the new Asian craze for Flower Horn cichlids. I've been trying to figure out what the numbers are along the side of the fish pictured in his article, for this week's lottery, but have had no luck so far. Perhaps I should go out and buy one of my very own. That way I can stare at it for hours and decipher my lottery numbers and win a fortune! Read the article and you will realise I haven't finally cracked!

News just in

As I am writing this, I have just had a phone call from one of the organisers of Aquarama (the largest aquatic trade show in the world) saying that because of SARS they have had to put the date of the show back to October/November this year. This is such a shame as it has taken them almost 2 years to organise the event, and now everything has had to be put on hold. I hope everyone who was planning to go managed to get their flight dates transferred to the new dates or a full refund from the insurance companies concerned. Knowing how hard it is to get money out of some insurance companies and to get airlines to put customers' needs first, I suspect quite a few people will end up out of pocket over this.

Happy fishkeeping,

Derek

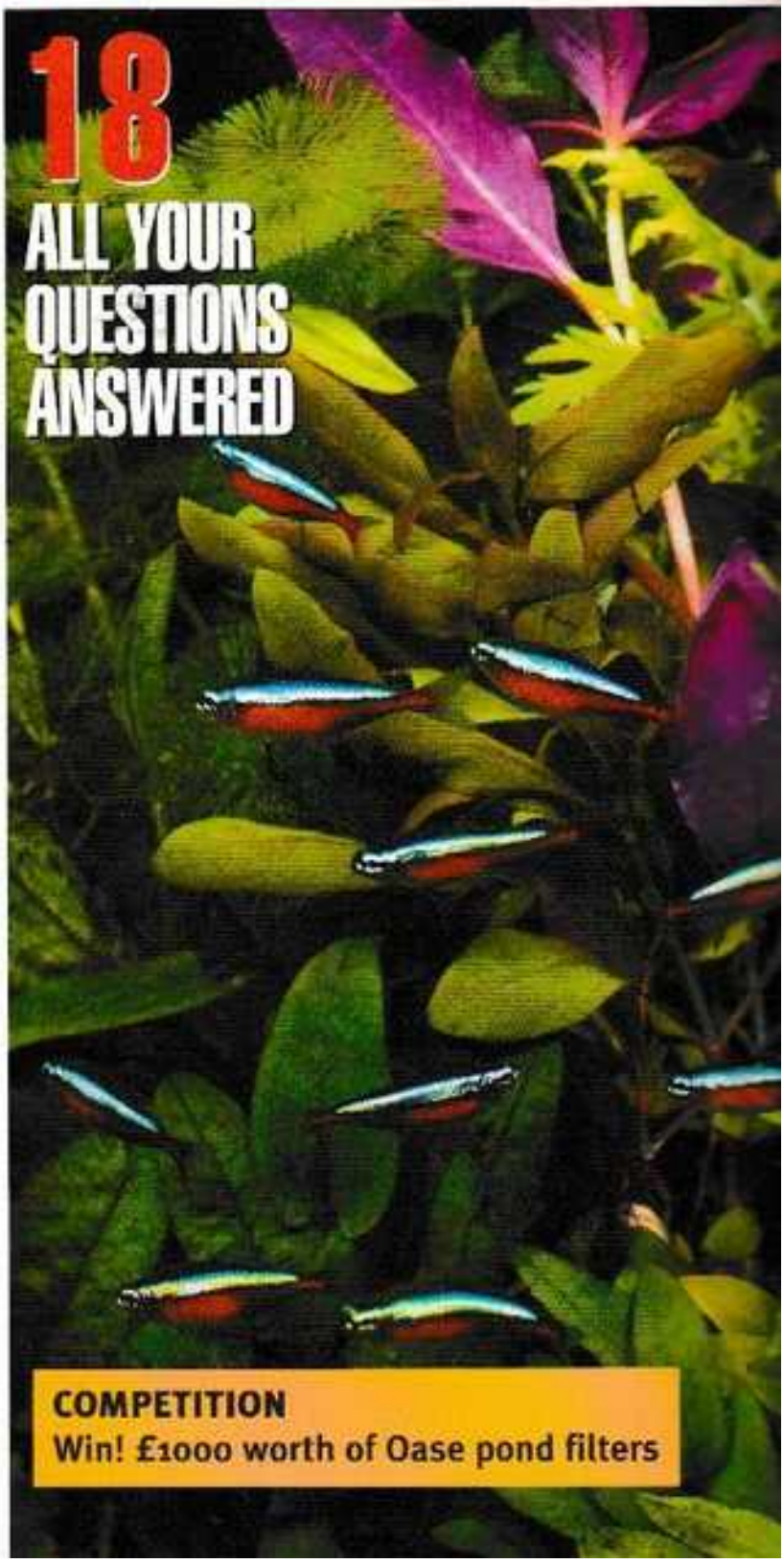
Derek Lambert.

JUNE inside this issue

TROPICAL/MARINE/COLDWATER

MARINE

PONDS & COLDWATER



Today's Fishkeeper

TROPICAL

BEGINNERS

NEWS & PRODUCTS

REPTILES & AMPHIBIANS

REGULARS

KEY TO SYMBOLS:

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

Starting Point...

Pat Lambert has some handy tips on how to catch fish and looks at the most popular pet in the world - the Goldfish.

When I joined a fish club we used to go on our annual pond hunt in June. Trestle tables were erected near the river side with fish tanks laid out on them so that we could take a close look at what we had caught in our nets before returning the creatures to their river home. We certainly learned how to catch fish under the reedy river banks and out in the 'freezing' cold, flowing waters mid-stream. The weather was not always kind, as summer evenings in England can be quite chilly, particularly if one is dabbling, wading, and sometimes sitting in the cold waters. These experiences, however, proved to be very useful. If you can catch fish in the wild, catching tank fish should not create too many problems (it's a slightly different technique though).If you go pond hunting in England and enjoy it, then under the sunny skies of a tropical clime your enjoyment will be that much greater.

One of the coldest experiences is fishing for North American darters. These are among the most beautiful of all coldwater fishes (unfortunately no longer imported into UK). This fishing was not an experience to be repeated, the water was so cold and there was poison ivy around the river banks at the location we visited which added to our 'enjoyment'! Exploration of our home waters can be a truly worthwhile experience and teach you a lot about our native species. Go on! Why don't you try it.

I am not about to abandon my tropical fish readers but this month, when many of us are enjoying the great outdoors, I am focusing in on coldwater fishes. I think that many of us started in fish keeping with the Goldfish, whatever else we wandered into later, so it's a good bet that many of you keep, or have kept, some common or not so common Goldfish.

WARNING

Weis catfish are not very scavenging!

PREDATORY MONSTERS

Weis catfish, predatory monsters that can grow to 2.5metres, are the largest European fish and can live for 80 years. I have seen them offered for sale for garden ponds and this spells disaster for the buyer, for a large one of these will make a meal of a full grown Koi. They are found in European waters but not in the UK. They are a popular food fish in Russia where they are found in lakes and large rivers. The Weis catfish is totally unsuitable for a garden pond so don't touch it with a barge pole.The same applies to the Channel catfish- avoid this one as well. These fish are just too big - by far!

On the lookout for Goldfish

The Common goldfish, hailing from China, is not a native species but how well it has adapted to pond life is attested by its popularity with pondkeepers, for this is the most popular pet in the world. Easy to keep and feed, it comes in a wide variety of colours and being members of the carp family they are happiest in a group.

The deep red coloration is the most widely available and you really cannot beat a deep, blood red Common goldfish. None of your fancy shapes here, look for a slightly convex upper surface mirrored by a matching slightly convex underside. Tank raised fish are a paler red, but this coloration can deepen to deep blood red when the fish are kept in outdoor ponds year round.The deep red colour of the body should extend throughout the finnage in good specimens. Young fish are also paler with the deeper coloration developing with maturity. There is a lemon coloured Common goldfish that is also very popular. Look for paddle shaped pectoral,pelvic and anal fins of moderate size and a short, broad and very slightly forked caudal fin.

The colour on this Goldfish is a lovely deep blood red.

A fish for outdoor summer living

Known as the poor man's Neon tetra, White cloud mountain minnows will live quite happily in a small pond or large container during the summer months. Coming from a natural habitat of cool mountain streams, the English summer outdoor life suits them well. Their pretty colours (enhanced by outdoor living) make them a worthwhile inhabitant for a large water barrel. Bear in mind that they will need to be brought indoors for the winter and will be easier to catch from such a container. They can be housed in unheated tanks indoors over winter. These small, lively, shoaling fish will only grow to 4cm and need to be kept as a group and with others of a similar size and temperament.


White cloud mountain minnows love living in a shoal like this.

Lateral line sensations

Other creatures depend on sight and hearing, but fish have a system unique to them and the aquatic stages of amphibians and this is known as the lateral line system. Some species, such as Lampreys, only have sensory receptors in the skin but most fish have a system of canals beneath the skin as well. These channels often branch and reach out along the head.

The importance of the lateral line to fish cannot be stressed enough. It offers the fish its greatest protection, for it is sensitive to vibrations, water movement and the movements of other fish. In murky waters it is more precious than sight for it is a warning system when predators are near. It is a homing system when there is a need to reach the protection of the shoal. Blinded fish use the system and so ensure that blindness is not a major handicap. When you look at the lateral line of a fish you are seeing the visible sign of a system which is essential for the fish's survival.


The lateral line can be clearly seen on this Silver dollar as a line running from the gill plate back to the tail.

LOST FOR WORDS

Ectoparasite: These parasites live on the surface of the fish and feed from there as opposed to endoparasites which live inside the fish and feed from there.

Heating mats: These mats are placed underneath the tank as a form of heating. They heat the substrate that can be beneficial to plants. They are also useful for heating small quarantine tanks that lack permanence. These temporary homes are easy to break down if the heating fails.

Loricariids: These are sucker mouthed catfish, the sucker mouth being on the underside of the head. This enables them to attach themselves to rocks so they are not carried away by the fast flowing waters of their natural habitat.

Macreous fish: These fish do not have a metallic sheen or reflective tissue in their scales. The scales are iridescent allowing many colours to be seen. Blue, brown, yellow, red, violet and black spread throughout the body and fins and these colours are overlaid with black speckles.

Prophylactic treatment: This is medication or other kind of treatment given to prevent disease. Injured fish are often given prophylactic treatment to prevent secondary infections such as fungus.

Permanent and temporary hardness: KH is the measurement of calcium and magnesium bicarbonates in the water, this temporary hardness can be eliminated by boiling which leaves lime scale deposits as seen in kettles. General hardness GH cannot be removed in this way. A low GH is needed for fish like Discus whereas Malawi cichlids like it high. Total hardness is the measurement of temporary and permanent hardness together.

TOP TIPS FOR CATCHING FISH

Never charge after the fish chasing it around the tank with the net as the fish will always out swim the net and become stressed by the chase.
Always use a large, fine meshed net. We use a 20x15cm net even for very small fish.
A second small net can be used to move the fish from back corners and difficult trapping areas but the dominant hand should always hold the big net.

1. **See where the fish is.**
2. **Move the net deliberately and slowly towards the fish.**
3. **Gradually manoeuvre the fish towards the left hand front corner (left handers to the right front corner) and catch it there.**

NB. It is much more difficult to catch fish out of a heavily planted, furnished tank than it is in a sparsely planted or bare tank.
Some fish have spines that can be spiked through the net. Allow the fish to escape underwater, do not attempt to free it by force as you may seriously damage 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.

a) Manufacturers often provide free booklets about fish care.

b) Inexpensive books provide information on setting up.

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

THE WATER

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

Temperature norms:
Freshwater tropicals 21-27°C
Marines 28°C
Coldwater 13.0-21°C
Some delicate species have very specific requirements, read up on them before you purchase.

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

THE FISH

Stocking levels: For freshwater tropical we recommend 12cm² of surface area per 1cm of fish.
Marines: For a fish only setup we recommend 2.5cm of fish for 9l of water and for Reef only setups we recommend 2.5cm of fish per 27l of water.

Ponds to a maximum of 250cm of fish per 4500l of water.
Measurements should be based on the optimum adult size of the species not the size at the time of purchase. **NEVER OVERSTOCK**

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

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

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

THE ROUTINES

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

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

Cleaning filters: These should be cleaned once a week. If they work by biological filtration (bactera 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.

A Sense of Community

Mary Sweeney lays down some ground rules so you can try to create the perfect community.

Danios (this is a Leopard danio) of all types are essentially the perfect community fish, however, even these hardy fish need to be housed with the right species.

THE COMMUNITY AQUARIUM CONCEPT IS appealing to almost every beginning aquarist simply because they always see a lot of different fishes that they would like to keep. This is a bit of a conundrum because the community aquarium will always present more of a challenge than a tank that contains only a single species of fish, however many of that species may be in the tank. Every fishkeeper must learn how to maintain good water quality, how to gauge the correct stocking level for the tank, how to moderate food portions, and much more. There's fun with filters and waiting for water to go clear again. Yes, there are many challenges on the road from novice to accomplished fishkeeper, but none are more sticky than the nature of the fish themselves. Some fish are the feeders and some are the eaters and more fish are lost to incompatibility and its consequences than any lack of water changes or care on the part of the fishkeeper. Let's examine what it takes, as far as the fish choices are concerned, to create a thriving community aquarium.

While Oscars can be housed with other fish you have to be very careful what you keep with them.

THE PECKING ORDER

Personality is something usually associated with beings of a higher order. "Normal" people often challenge fishkeepers who talk about their fish being bright or spiteful or happy to see one. Never mind. We know that fish who live with humans are often surprising. They're cute enough to get our attention to feed them regularly and they're rude enough that they generally don't bash tank mates while we're looking. When we select a group of fishes of peaceful demeanour to live together, we generally assume that everything will turn out well. There are loopholes to this kind of thinking. Individual fish of the generally peaceful sort can become monitors in a tank where they suddenly find themselves to be the most aggressive fish. Not always of course...but there's no harm in keeping an eye open for signs of aggression. If you have a fish that seems to be less well every day, that turns up with ragged fins or scale damage, it's not jumping to conclusions to suspect the tank mates. If circumstances allow, segregate the less dominant fish and treat its wounds while you watch the aquarium to see which fish is causing the trouble.

Compatibility

There is no substitute for suitable tank mates. You cannot train a fish not to harass its companions if that's what it has a mind to do. If a fish is a fish predator in the wild that's just what it's going to be in your aquarium. Even fishes that are not considered "predators" will thank you for the tasty treat in the form of a baby guppy if one happens to show up. There is the odd exception of the feeder goldfish that somehow remains unmolested in the Oscar's tank, but that is a rare and wholly unplanned event. I have had this experience and it was really a very curious sight to see a 30 cm long Oscar cohabiting with a Goldfish of nearly the same size, this Goldfish having grown along with the Oscar. There was never any sign of threat from the Oscar nor sign of fear or avoidance on the part of the Goldfish. What was even more curious is that this particular Goldfish was always avoided by the Oscar, even when other feeder Goldfish were fed to the Oscar through the years. (By the way, I don't advocate the use of feeder fish when other foods will do, but you see, I have these brothers and they were always good for a bag of Goldfish on a Saturday morning.)

Hardy species are quite charming

Unfortunately, compatibility involves more than the old predator and prey relationships. There are also compatibility issues that involve water conditions and feeding as well. This nearly always involves compromise. Unless the fishes involved occupied the same body of water in the wild, there will be differences in their keeping conditions. It is more usual that the fishes come from different continents, never mind that they should come from the same body of water. Each species is perfectly adapted to live in its own natural habitat. What we are expecting is that the fish will somehow change its requirements to live in our aquariums. Fortunately, many fishes will comply and accept conditions that are not perfect, provided they are within a range of allowable conditions for that fish. Some species are more forgiving of a wider variety of conditions than others, and these fishes are referred to as "hardy" in the aquarium hobby.

DIETARY DIFFERENCES

Who would have thought that different fishes would so stubbornly insist on varied menus? It's true. While most aquarium fishes go for high-protein diets (alas, often in the form of smaller fishes), there are also herbivores that will waste away to nothing if they are fed only traditional high-protein diets with no consideration given to their need for vegetables in the diet. The herbivores will eat high protein foods, make no mistake there, but their digestive systems are not designed to process this type of food. Herbivores do fare best on large amounts of vegetable matter.

If you are keeping both herbivores and carnivores or omnivores, be sure to add vegetables to the diet. A favourite among aquarists who keep vegan fishes is a slice of zucchini weighed down in the tank. Zucchini lime is sometimes the only time one can see some of the more inhibited vegetarians. By the same token, carnivores often have a need for living protein, on the fin as it were, and lose their zest for life when kept on flake or pellets alone.

Delicate species don't want variety

One of the things that makes hardy fishes hardy is that they are generally found in areas where water conditions are changeable over the course of the year. The delicate species enjoy stable water conditions year round, requiring very little in the way of adaptability on the part of the species. Variations on this theme will be read as stress-inducing and low levels of stress over time will cause the fish to weaken and die. Constant low levels of stress in the form of diet, water quality, or choice of tank mates will compromise the health of all fish, delicate and hardy alike. How much stress for how long is the deciding factor.

Port hoplo's (*Hoplosternum thoracatum*) will tolerate a temperature range from 18-28°C and a pH between 6-8! This is one of the fish world's really hardy fish.

Not all water is created equal

One would think that all water is the same; it's just not so. Water changes. Some water is hard, some soft; some acidic, some alkaline. It is up to you to determine what kind of water prevails in your area and select your fishes according to whether they will thrive in your local water conditions or whether you are willing to do the necessary work to adjust water conditions to suit a special fish you would like to keep.

It is fairly easy to match preferred temperature levels for different species. If the fish that interest you can be kept in the same range as the others in your aquarium, you're in the clear. Some may be more demanding. Sometimes it is necessary to increase or decrease the heat to induce spawning, but breeding fish in a community aquarium is generally not very productive.

Changing pH is generally not difficult when you are working to increase the pH as one would to keep African rift lake cichlids for example. There are many products and techniques that work very well and without much expense. Reducing pH, however, can be a nightmare if you happen to live in an area where the water is naturally high in pH. High pH is generally associated with hard water, and the processes required to reduce pH and water hardness are only for the stout hearted. Still, if it is the only way that you can keep your favourite fish, you will do it. It is not unheard of that tropical fish hobbyists look for housing with their water test kits in their pockets.

The best community aquariums develop over time, sometimes a long time, depending on the learning curve. Sometimes mistakes are made, but as long as you learn from the mistakes, all should be well in the end. Happy fishkeeping.

MIDNIGHT SNACKERS

Lest we forget, there are many nocturnal species and some of these are even predators. It is important to remember to make plans to have one last feeding right before "lights out" if you are keeping nocturnal fishes whether they be carnivores or vegans. The nocturnal feeders are generally those fish that stay out of the limelight all day. You'll know them by their increase in activity when the lights are all off for the night. Since nocturnal fishes locate their food by smell and feel and daylight fishes eat on sight, there is little worry that the daytime carnivores will snatch all the food before the nocturnal fishes have a chance at it if you place the food in the tank right before turning all the lights.

The Wine-red betta (*Betta coccina*) needs soft acidic water to do well in captivity. In hard alkaline water it is stressed and will fall victim to a range of diseases.

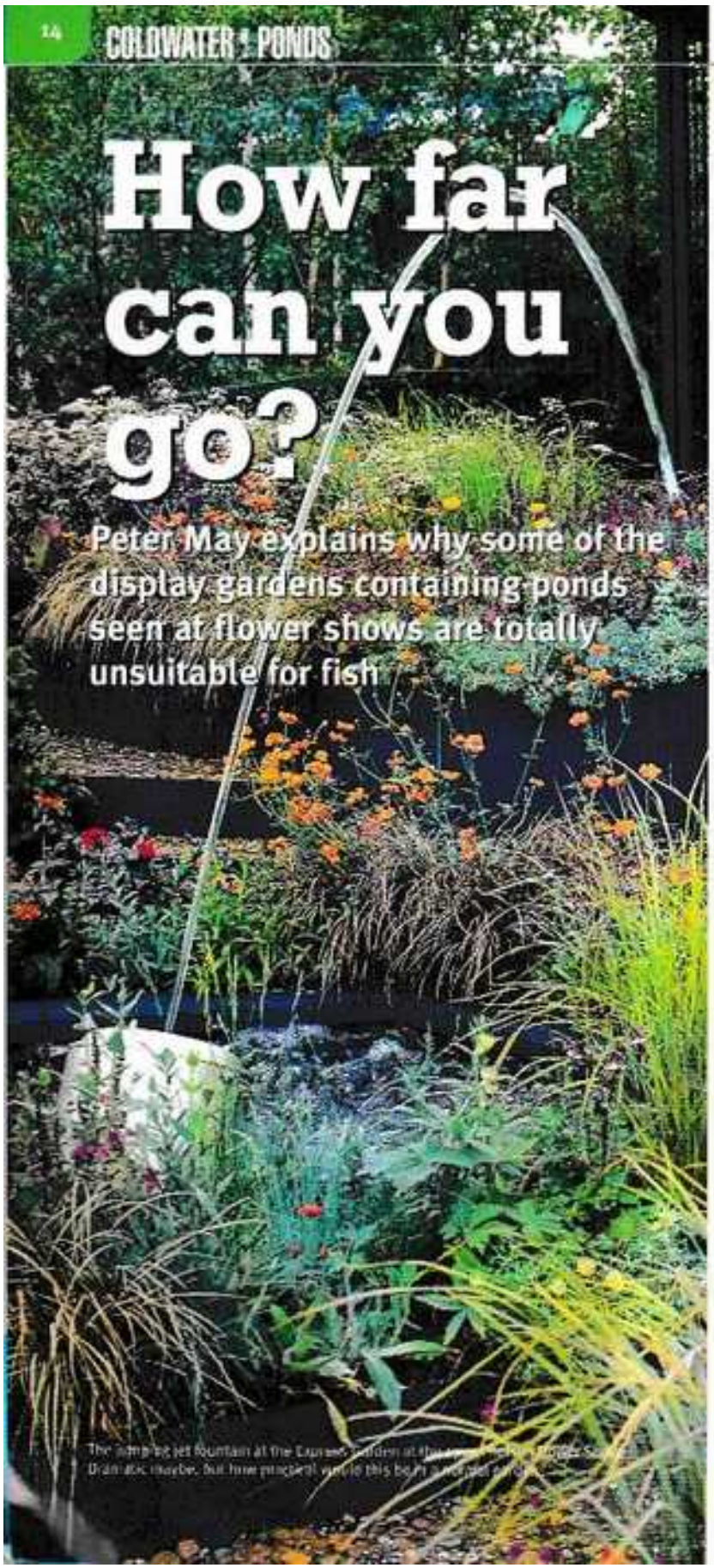
PREDATORS AND PREY DO NOT HAVE A RELATIONSHIP

The first clue that two fish are going to be incompatible is when there is a vast size difference. Did I say vast? What was I thinking? The difference in size need not be vast at all. Fish-eating fish can often consume prey that is very nearly the same size as itself. Most fish have mouths that can open much wider than one would ever expect just looking at them. In Discus for example, the fry from a spawn just two weeks younger will be consumed by the youngsters of a previous spawn. No fuss, the younger fish will be gone the minute you turn your back. And Discus are not known for being particularly predatory. Usually the cautions are to avoid keeping them with other fish that will harass them.

Silver scaled piranha (Serrasalmus gibbus) is a well known predator but other fish may not be so obvious.

How far can you go?

Peter May explains why some of the display gardens containing ponds seen at flower shows are totally unsuitable for fish



The jumping jet fountain at the Laurent-Perrier garden at Chelsea [illegible] Dramatic maybe, but how practical would this be in a real [illegible]

IF YOU ARE STILL CONSIDERING HAVING A water garden outside in which to keep fish, and you have been looking at the garden shows like Chelsea and Hampton Court for inspiration - take care. A designer's idea of water in the garden can be very misleading.

Is anything possible?

As you have probably seen, nothing seems impossible when it comes to water in the garden. You can have fountains that shoot cylindrical blocks of water across the garden, or shallow pools just 3 or 5cm deep to make a reflective carpet of light, you can use the dramatic foliage of a single plant on the water's edge to add a drama to a minimalist scene (if that is not a contradiction in aims), you can use any material you like, from crushed glass to stainless steel and Perspex. **BUT** it all costs money and needs persistent and careful maintenance, and as far as you are probably concerned, it would be useless, because these things don't work that well in the real world and they certainly don't mix with fish!

Garden designers working on show gardens are not there to create sustainable gardens that would look just as good in a month, let alone six months. When a garden designer designs a garden for a show, he or she is after impact, something to turn your head and to create that feeling they call the 'Wow! Factor'. 'Originality' comes up on the top of the list of methods of trying to inspire you, often resorting to using new materials or new gizmos, both for functional purposes or decoration. Usually these materials are used in conjunction with water as a reflective surface or water is run down them to animate the surface, creating movement over them and sound that grabs your attention.

The thing is, water is next to life itself. It is the magical ingredient that sustains all life. Leave it lying around anywhere for a few days, life begins to arrive around it, in it and consumes it. In a water garden, you are working with this fact, and it is something to enjoy. With some of these visually appealing ideas that we see at the shows.

MINIMUM SIZE AND DEPTH

If you are going to have a pool with fish in then it has to be at least half a metre deep. For most types of fish, anything deeper than one metre is over doing it, but Koi enthusiasts are usually prepared to go to twice that depth and more. It needs to have a surface area of at least 3 square metres. This will enable you to maintain a balance within the pool environment that is less immediately affected by the weather or outside environmental pressures.

The current trend for placing cobbles or pebbles around the edge of the pool and down into pool water to help hide the pool liner and the whereabouts of the pond fish keeper's nightmare when it comes to the big clean out. In fact it is 'gilding the lily' somewhat to put anything in the pool beyond the marginal shelf as within a month or two it is pretty much obscured by detritus.

Good plant choices

Most importantly, you want oxygenators, plants that have underwater foliage releasing oxygen by photosynthesis during the day. This is not only used by the fish but also the bacteria in the pool that help break down organic matter and the chemicals of decomposition to simple nitrates that are further taken up by the plants. *Lagarosiphon major* otherwise known as *Elodea crispa* is the best. You will want 5 bunches per square metre.

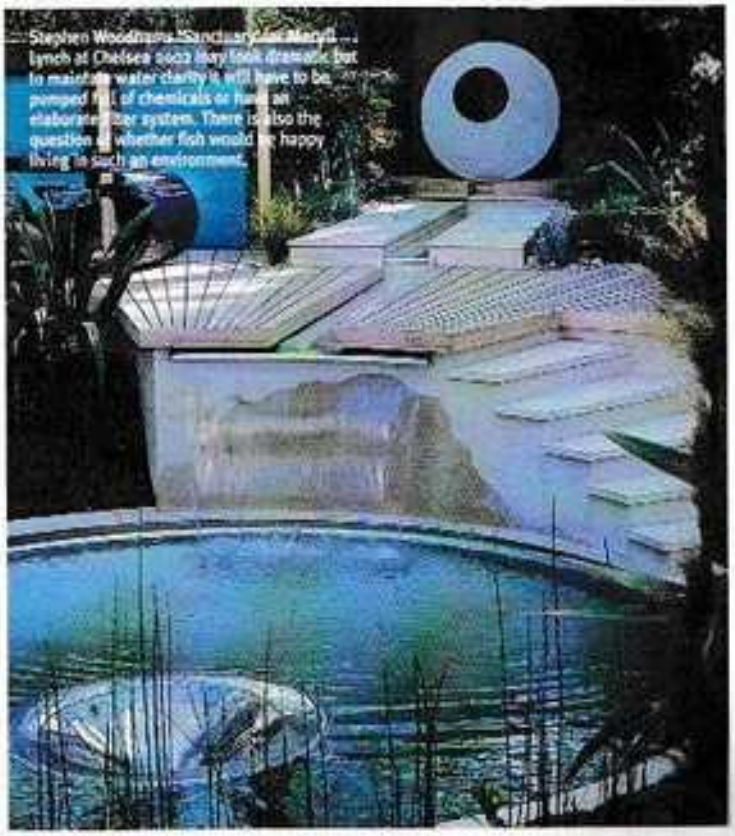
Deep water aquatics or lilies provide pool cover that inhibits the growth of algae and they all use up all those nitrates that are going spare from the break up of organic matter in the pool. Get plants of suitable size and vigour for the size and depth of your pool. Don't get unnamed varieties, give-aways are rampant. Allow one for every 1 square metres of pool surface, two if they are fairly reserved. Apart from *Nymphaea* varieties of lily there is the Water hawthorn (*Aponogeton distachyos*) a fragrant deep water aquatic from South Africa that makes a very useful early flowering addition to any pool. Water snails love it too unfortunately.

Floating plants are good for shading and mopping up excess nutrients in the pool. Some like the Water hyacinth (*Eichornia crassipes*) seem inordinately effective at →

you would have to work against nature to achieve the effects you were after, and if you want to sustain the effect, you have to spend a lot of money on something you don't see. Fountain ornaments need water stacked with chemicals like Sodium dichloroisocyanurite, or hefty algicides. Five centimetre deep pools need the same or a complex filtration system.

Lack of plants

Quite often you see an impressive display for a garden and the water feature doesn't contain any plants. Sometimes, just for dramatic effect, it may have just one variety of one species. When it comes to water plants, particularly the marginal plants that inhabit the shallow regions around the edge, these are never plants that can be considered as reserved. Some in fact could quite easily be classified as a danger to gardens and water gardens, like the Reed Mace (*Typha latifolia*), Norfolk Reed (*Phragmites australis*) it's taken over Norfolk, the Parrots feather (*Myriophyllum proserpinacoides*) and more. But despite this, water plants are essential to a naturally balanced pool environment and they need to be there in considerable quantity, with representatives from the different types of water plant that grow in different levels in the pool. In this way they can keep each other in check, whilst carrying out their important roles in the water garden environment.



Stephen Woodhams' Sanctuary at Margot Lynch at Chelsea 2002 may look dramatic but to maintain water clarity it will have to be pumped full of chemicals or have an elaborate filter system. There is also the question of whether fish would be happy living in such an environment.

The Greater spearwort (Ranunculus lingua), is taking advantage of the lack of competition, a small plants grow to this in one season.

keeping away algae. Their long fronds of root hairs that are the base of boaters in South Africa and Florida seem to harbour a secret. Water soldier (*Stratiotes aloides*) is worth a try. It is an indigenous floater whose only wild home in this country is in parts of Norfolk. Avoid the likes of the Duckweeds and Fairy moss (*Azolla filiculoides*). Ask anyone that's got them.

Then there are the marginals plants that make a backdrop to the water and landscape the pool into the rest of the garden environment. Some of them take up pollutants in the water whilst providing cover for wildlife and a little bit of shade for the pool. Certain people like to classify deep water marginals separately from others, but if you plant them all at the same level, up to their necks, just over soil level, in water, then the deep water crew will find their own level. Allow 2 marginals for every metre of pool surface. Some people plant 2 per basket, a creeping type like Creeping jenny (*Lysimachia nummularia*) with perhaps a Japanese water iris (*Iris laevigata*) or flowering rush (*Butomus umbellatus*). There are good ones and bad marginals but that is the subject of many more reams. Suffice it say that variety is the spice of life to enable you to get that natural balance and to keep everything under control, and the water clean enough to swim in.

You can get away without plants and use filtration and mechanical aeration instead. Many serious keepers of Koi carp do, partly because Koi love to mess around muddy planting baskets, and partly because technology allows Koi keepers to have a more exact scientific control over the conditions that their valuable investments live in without worrying about the effects that weather, light and seasonal temperatures have on plants and water. ■

STRANGE MATERIALS AROUND THE POOL

So, once you have all these essential ingredients and parameters set up you can indulge in your strange materials. Stainless steel is good because it does not taint and does not get permanently tainted. Beware of copper and brass, ensuring that it is well lacquered in the presence of water. Small amounts of copper and nickel in water will kill fish. Plastic is generally fine as long as it is sealed with a non-toxic sealant. Check that it is UV stable, including its colour. Fibre glass needs to be well cleaned to remove the toxins from the surface.

DO YOU NEED FILTRATION?

All serious fish keepers embarking on creating a pool for fish should consider filtration. Even though you may not need it or be able to afford it straight away, it is worth making provision for the installation of a biological filter system. Once the total length of fish in the pool is getting to around half a metre for every square metre of pool surface, then the only amount of plant life that is going to help you keep the pool clear is a coverage of two thirds. Any less planting, any more fish, the only recourse is biological filtration. This means making provision for enough spare electrical power and switching for a filter pump and an ultra-violet clarifier. The least you can do now is to mentally reserve a site for the filter box that is hidden and allows for easy 'back flushing' (a quick and easy method of cleaning the filter that sucks out the debris from the filter medium). The size and 'thru'put' I'll talk about next time when I'll also tell you how to make friends and influence people with fountains waterfalls and other things.

The Anglo swimming pond at Hampton Court Flower Show 2003 shows how to plant up a pool or pond to keep the water clean enough for swimming in without even filtration. This sort of pond is actually becoming very popular on the continent.

Q&A


Lynn has a breeding pair of Bolivian rams.

Star Letter

PACKED FULL OF FISH

My aquarium is 120x37.5x45cm (48"x15"x18") and has been established for three years. The water conditions are pH 6.5, temperature 25°C. It is furnished with live plants, bogwood, gravel, and has two internal power filters.

My fish consist of two Corys 3-5cm (1.5-2"), four Giant danios 5cm (2"), one Clown loach 7.5-10 cm (3-4"), two Pictus 10cm (4"), one Columbian catfish 7.5-10cm (3-4"), 10 Serpae tetras (full size), three Bolivian ram cichlids (full size) one a breeding pair, five Sajica cichlids, (almost full size) two of which are a breeding pair, six Angelfish 7.5cm (3"), one Bristlenose catfish, (full size), and one Saiffin pleo 7.5-10cm (3-4"). All fish are healthy, no problems. I intend to pass on the Saiffin pleo. I seem to have quite a variety of fish , maybe too much. I want to take some out and concentrate on certain fish. I would like to keep the breeding pairs. How many fish should I approximately, have for the size of tank (in inches)? Which fish would you take out? Would you add any others?
Lynn Murphy, via e-mail

Your tank can safely hold 152cm (60") of fish. This is always calculated on the full adult size, not the size of your fish at present. Excluding the Saiffin pleo, I calculate you will have about 300cm (118") of fish when they are all fully grown! So you will have to reduce numbers and species a bit. The other problem is your breeding pairs. Personally, I would set up another two aquaria 60x30x30cm (24"x12"x12"), one for each pair. That way you will have the pleasure of watching the adults rear their families up. If you don't, mayhem may well ensue when the Sajicas spawn and few, if any, fry of other species will survive in the aquarium. Of course if they did survive, your tank would become even more overcrowded.

Which fish to take out is difficult as all the fish are living together happily so there is no need to take any out, other than the fact the tank will become very overcrowded. This means that the filter will not be able to cope, or the oxygen level in the water will become dangerously low one hot summer's day and most of your fish will die. As I say, personally, I would remove the breeding pairs to new quarters. If you can only have one new tank, then remove the Sajica pair and pass on the other three Sajicas. The Serpae tetra shoal could probably be cut back to six fish, the Clown loach has the potential to be a big fish and you can certainly remove several of the Angelfish. Otherwise it is very much up to you which fish you want to hang on to and which will have to go. Please don't leave this situation for too long or you will have a major disaster on your hands.

Derek Lambert

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

Breeding a bubble-nest builder

Q **After getting a tank three years ago, it has gone through many ups and downs. Ups, such as my first breeding success through Kribs. Downs, such as my Dad wiping out a two year old filter culture. After keeping a low maintenance community set up (Platys, Guppies, Corys & Tetras etc.) for about a year, my dad suddenly found a new hobby...fish keeping! This new found enthusiasm for the tank resulting in him washing the filters for me. While this would normally be seen as a great sharing of the maintenance load, the vital word is washing, not cleaning. Yes my dad washed and scrubbed away a mature filter culture. This accidental error resulted in New Tank Syndrome! Within a week a thick carpet of slim algae had covered all surfaces and I had lost many inhabitants. I lost Scats, Danios, Lemon tetras and a lonesome Indian gourami. This cleared the tank for a new angle. We decided (yes from now on it was a joint decision) upon a set-up with six Boeseman's rainbows, three Corydoras (the originals, now three years old), an L66 plec, two Khuli loaches and many shrimps. While this tank has been entertaining and we have had success in raising about 30 Rainbows, their appeal is waning on me. I have got rid of them and my tank is virtually empty. I now want to experience the breeding of a bubble-nest breeder. I am interested in keeping and breeding one of these species: *Betta imbellis, Macropodus ocellatus,Parosphromenus deissneri, or Malpulutta kretseri*.Which would you suggest and do these have any specialist traits I should look out for?**

Stevenger, *via e-mail*

A The first thing to say is that one of the species you mention; ***P.deissneri*** is not really much in the way of a bubble-nester. It tends to stick its eggs to the roof of an underwater cave often without bubbles. Secondly, I'm afraid none of the species you list is very common in the trade, excluding exceptional outlets such as BAS in Bolton or Wholesale tropicals in London, although all are available through the Anabantoid Association of Great Britain.

But the crux of your question concerns the specialist traits of the fish in relation to your set up. *P.deissneri* requires an acid environment of less than 5 pH, so unless you are going to change the gravel (usually acid) and settle for the few acidophilic plants that are available - then its not a great candidate. All the others will do OK in neutral water (but it needs to be soft for breeding) but only ***M.ocellatus*** will thrive in top water.

M.kretseri is somewhat secretive so if you want to actually see the fish you are keeping, then the choice narrows to ***B.imbellis*** and ***M.ocellatus***.

Obviously one thing a bubble-nester needs is relatively calm water, so the output of the filter will need to be reduced or a quiet area of aquarium engineered. For ***B.imbellis***, it might be a good idea to use inert gravel to ensure soft water, but ***M.ocellatus*** is a bit susceptible to disease in soft water and additionally doesn't like too high temperatures or too low temperature for too long a time – 28°C will be fine, maybe raising it 2-4°C for a few months for breeding attempts. I hope this begins to answer some of the issues you have raised.

David Armitage C. BIOL. M.I.BIOL.

What fish can I keep with Axolotls?

Q **I have Axolotls and I want to put a couple of fish in with them. Its very hard to get information about these animals so could you please tell me which species I can put in with them?**

Karl, *via e-mail*

A Axolotls are usually kept on their own. Presumably your aquarium is at room temperature and most coldwater fish will feed on worms which is a staple diet of Axolotls, there will be competition. With Axolotls being somewhat slow moving they may loose out in the food stakes. We have never heard of anyone keeping the two together and it is usually recommended that these species are not mixed.

Bob and Val Davies

Today's Answers Expert Panel

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

Questions by Post

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

Internet Service

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

Tropical Q&A

GASPING CORY

All Corys can absorb oxygen across the gut lining. This helps them survive periods of low oxygen content in their native habitats which kills many other Amazonian fish.

Q One of my four Peppered corydoras seems to be unwell. It is making trips to the surface once or twice a minute to get oxygen. I know that they will do this if there is not enough oxygen in the water, but I tested the oxygenation levels which are fine, and none of the other three catfish are making trips to the surface for air. I don't know if this is just coincidence, but one of my female Guppies seems to have something wrong with her left eye, which appears clouded over white. I have four females and two males. Could this be an injury or some sort of infection?

Having not had the fish long, it would be a real shame if anything happened to any of them. They are in a 136 litre tropical tank with four real plants, the rest are silk / plastic. The only change to the water recently would be my putting two root tabs into the gravel for the plants to feed on.

Daniel, *via e-mail*

A With the Peppered catfish I would be concerned that there may be something affecting its gills. The catfish may be trying to compensate for this by taking in air from the surface which it is then able to absorb across the gut lining. My guess would be a bacterial infection, so try something like **Melafix**, but it could be parasitic such as gill flukes or even white spot. As an aside, check your temperature. Peppered corydoras (*Corydoras paleatus*) do not like high temperatures and appear to be much happier at temperatures of 18 - 22°C, they will happily tolerate much lower.

The whitish covering over the eye of the female Guppy could be the result of damage. If the cornea (the transparent "window" at the front of the eye is damaged it turns cloudy) or it could be due to an increased mucus covering over the eye, which again could be bacterial or parasitic. Again try **Melafix**, and if that does not appear to work consider using an anti-parasitic product. I doubt that the root tablets would be the cause of this problem.

Lance Jepson MA VetMB CBiol MIBiol MRCVS

Disease "cluster"?

Q **I have recently noticed that one of my Harlequin rasboras has a large cluster on the root of its tail. Another resident of the tank (Neon tetra) also has one and has had it since November 2002. I've read numerous books and internet sites trying to diagnose and treat it, (with no success).The fish are very active and don't seem stressed, however, it is slightly affecting their swimming. What is this cluster? Is it treatable?**

Jake O'Farrell, *Norfolk*

A Unfortunately it is difficult to be precise from the information that you've given me. What colour is the cluster? Has it got any bigger? Is the cluster made up of thin strands or larger, thicker pieces? Based on what you've told me I would hazard a guess that it is either a fungal or protozoan infection. Fungal infections are likely to be of whitish appearance and look as if a piece of cotton wool has been stuck on to the fish. There may be some reddening of the skin at the bottom of the cluster. Treat this with a proprietary anti-fungal treatment. Salt baths can also be used but I would be concerned that fish such as Rasboras and Neons could be sensitive to salt. If it is a protozoan infection it could be Heteropolaria or Epistylis.These are tube shaped parasites that are almost microscopic. Small colonies will establish themselves and do look a lot like a fungal infection. Use a proprietary anti-parasitic infection. Again this is sensitive to salt baths as well.

Either way please double check your water conditions and stocking densities as both of these conditions are commoner in aquaria with high stocking densities and poor water quality.

Lance Jepson MA VetMB CBiol MIBiol MRCVS

Which Tetras can live with Kribensis?

I have a 90x60x45cm tank with an Interpet Prime 20 and an Eheim Aquaball filter. It is also heavily planted. I was just wondering what Tetras will be suitable with *Pelvicachromis pulcher* also known as Kribensis?

Adam Scott, *Milton Keynes*

You can keep several Tetras with the *Pelvicachromis pulcher* (Kribensis).

I would suggest a smaller species such as Neon tetra (***Paracheirodon innesi***), Lemon tetra (***Hyphessobrycon pulchripinnis***) or Cardinal tetra (***Paracheirodon axelrodi***), but there are many more to choose from. Tetras are, however, a schooling fish and you ideally need to buy 6 to 10 fish to make them feel more secure and show better colours.

Alf Stalsberg

Do *Juwel* tanks have an adequate filter system?

I have had a tropical fish tank now for a year in order to see if my interest could be sustained, and I have now decided to take the hobby a bit more seriously. I am buying a new 125cm *Juwel* tank (240 litres) that has a built in filter system but I am being given conflicting advice. One shop is saying that the internal filter is adequate for the tank and another saying that I should also add an external filter to compliment the one supplied with the tank.

The tank is intended to be a community set up, with Angel fish, being the largest inhabitant apart from a Pleco (currently about 15cm in length). I am also changing over from plastic to real plants. Can you clarify the filtration requirements for this set up. Also currently I leave the filter and air pump running 24 hours a day apart from when I feed the fish, is this correct?

Allan Skerrat, *via e-mail*

Juwel tanks have an adequate filtration system for the type of fish you have in mind providing you don't over crowd the aquarium. Messy feeders like large Cichlids or even goldfish would need the addition of a canister filter. I usually leave the filter and air pump on even when I feed, the simple reason being I have forgotten to turn it back on after feeding. The filter crashed and it took ages to get back up to speed.

Derek Lambert

Star Letter Prize from Hagen

This month the writer of our star letter wins a selection of Nutrafin Max treats and a handy feeding ring.

Nutrafin Max with Pre-Digested Plankton provides balanced nutrition for aquarium fish. Pre-Digested Plankton is a 100% natural additive high in protein that enhances colours and is very palatable. Nutrafin Max's low fat content makes it the healthy choice, its low moisture content makes it better value, its low phosphorous content means less algae and the low ash content makes less waste to pollute your tank.

Feeding Nutrafin Max means healthier fish, less algae, fewer water changes and LESS WORK!

The new Nutrafin Max Feeding Ring attaches to the side of your tank with a suction cup and is designed to ensure it is always floating on the surface. The ring controls food dispersal and results in less food being wasted.

www.hagen.com

Marine

Q&A

How much for a Scorpionfish?

Star Letter

Weedy Scorpionfish (*Rhinopias aphanes*) do not come cheap

Q Could you tell me if there would be any chance of getting a Weedy or Merlets scorpionfish (*Rhinopias aphanes*) for my 530 litre marine aquarium?. I have been trying for some time but have had no luck. The only one I have seen advertised was on an American web site and they were looking for $1500 for it! I knew it was going to be expensive, but is this really how much I am going to have to pay for it ? I realise that this species may soon like an unusual choice but I have totally fallen in love with it. Also could you tell me of any similar species that would be more readily available. Any help would be greatly appreciated.

Jamie Collins, *via e-mail*

A You have chosen a wonderful fish and a personal favourite of mine, I could go on for hours and hours about this beast. However, as you have stated, availability is very limited because the fish is so well camouflaged the collectors cannot see them. A good retailer will be able to source one but expect a bill between £650 - £850. I think they are worth every penny, but you could be waiting quite a while for one. There are other species within the genus, however, you could be waiting even longer and the price tag could be horrific. Besides, any other Scorpionfish would be a disappointment as I think you have selected the best.

Andrew Caine

Minimum maintenance

I am interested in keeping a marine tank that does not require constant water changes and maintenance. The pet shop I visited told me that the way to go is to use a plenum cavity, which does not require high maintenance. I have done some research and found that opinion is divided regarding the effectiveness of the NNR (Natural Nitrate Reduction) plenum cavity system. I am still quite unsure if the plenum is the best way to go. The pet shop that I visited told me that by employing a plenum system water changes are only carried out every six months, is this true?

Some people claim that because the plenum dissolves the calcium in the substrate, that substrate will need replacing from time to time, is this true ? If so, doesn't this defeat the purpose of using a plenum system for low maintenance and is it also potentially dangerous by the release of toxins from the cavity area?

Toxins are said to accumulate (due to NNR diffusion) in the dead water cavity area, many say that while toxins do gather in the cavity area it does not escape into the tank, while others say that it is dangerous? Which is correct?

Joe Tang, *via e-mail*

Please keep away from plenums, they are too much of a risk. Try going for a deep sand bed if you like the idea of denitrification in a natural system. Please go to www.marinefishuk.co.uk for good advice on this area. As to low maintenance, I must say that maintenance is an integral part of the hobby and there is a direct relationship between how good the aquarium looks and the amount of effort put in. A low maintenance system results in a poor aquarium, a little effort in this game goes a long way. Never fall for the fallacy of 6 month water changes, monthly is the longest time between changes.

Andrew Caine

What equipment

I am thinking about setting up a 225 litre marine tank. I wish to incorporate a deep, live, sand bed and large quantities of live rock.I will have a sump with a protein skimmer fitted and possibly a calcium reactor. Does the calcium reactor need to be controlled by a computer and what do they cost? A second sump would contain purely reverse osmosis water for topping up. Are there any ways to make this automatic? In this tank I wish to keep many varied soft corals and invertebrates. As for fish, I will keep it very low stocked with possibly only one or two specimens no more than a few centimetres in length.Do I need to invest in metal halides or can the new T5 lamps suffice for soft corals? Initially, my plan is to buy uncured rock and simply observe what develops off it, possibly buying some "cleaning squad" animals if large volumes of hair algae develop. With this in mind, would you suggest a protein skimmer,calcium reactor, power heads, lights, control unit for calcium reactors and a control unit for evaporation top up?

Louis Rogerson, *East Yorkshire*

Buying uncured live rock is a good way of keeping the cost down, but if you utilise live phytoplankton when you put the live rock in the results will be very good. This is a new area in which we are working at the moment and producing some very good results. Tip in 500ml of phyto on rock introduction and watch! In a soft coral tank you do not really need a calcium reactor. Instead place a Kalkwasser reactor in line with an automatic top up system, this will introduce calcium rich water to replace evaporated water, buffering the pH at the same time. Four T5s will do the job of lighting with ease. Aqua-Medic 0845 090 3500, Aquatic Solutions on 01553 776788, Arcadia on 020 8951 5544, and D & D Aquarium Solutions on 0208 501 2421 will all be pleased to forward information on their products for your proposed set- up. A good web site where you will get accurate information in setting up a deep sand bed is www.marinefishuk.co.uk.

Andrew Caine

Confusing nitrate readings

Is it possible to get different nitrate readings because I am using RO water? I have a 454 litre marine set-up, which has been running for 8 months now without any problems. The filter consists of bio balls, sponge, ehfisubstrat, calcium plus and a polyfilter. I also have a UV and protein skimmer all in a sump. The tank only has 6 fish and 2 shrimps in it and I do a 45 litre water change once a week. Everything looks fine so far. The problem is, depending on which make of nitrate test kit I use, I am getting a different reading. These range from OK to very high. Could this be because I am using RO water and ,if so, is there a test kit available that is designed for use with RO water? I don't see how it could be this, but I am sure it is not my water as my livestock are happy and not flicking about, and surely my shrimps would be the first to suffer if my nitrate was high?

Paul Leeman, *via e-mail*

There are a few issues here. You are not testing RO water, because as soon as salt is added then it becomes re-mineralised and is, in fact, salt water. Test kits are a rough indication not an exact reading due to their low cost, and you will get varying results with different makes. Since there is nothing we can do about that, it is a good idea to test with a few different kits and take the median to give you a rough indication of the true value. Changing 45 litres a week should keep the nitrates down but there are many other considerations. Increase your shrimp population to clean missed food and feed smaller amounts more frequently, but only up to the same total amount as you are currently feeding. Nitrates in an aquarium can slowly creep up to high levels and the animals within do not seem to suffer. New additions, however, do. Although shrimps in your aquarium would not be affected too much by 50ppm, new introductions might drop dead on the spot.

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.**

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

Q&A

Coldwater BREEDING GOLDFISH

Once successful in breeding your own goldfish, you may find you have a nice group of young Orandas like these.

I have recently taken up keeping Goldfish. I currently have 1 Black moor, 1 Japanese ryukin, 1 Celestial, 1 Lionhead, 1 Comet goldfish and 1 Bristol shubunkin. I am interested in breeding goldfish and would like some advice on starting this. I currently have live plants in my community tank they are Elodea, *Echinodorus osiris*, *Echinodorus* x *barthii*, *Bacopa monnieria* and a purple/brown fern. Is it best to set up a separate tank for breeding and what is the best set up? I live in Stoke-on-Trent, so where is the best place for me to go and invest in a decent breeding pair of goldfish?

Philippa Mountjoy, *via e-mail*

If you want to breed goldfish then you are going to need to set up another aquarium in which to spawn and raise the fry. Ideally it would be a good idea to have a small pond (this can be a temporary) where you can grow on youngsters during the summer months as well. The breeding tank should be at least 90 cm long and be filtered by several air operated sponge filters. These only need to be installed once the fry are a week old but should be left running in your main aquarium for a month before then, so the bacteria needed to break down ammonia and nitrite will have a chance to establish themselves on the sponges. The ideal place to buy your breeding stock is a private breeder. Good quality fish are sold in normal aquatic outlets now, but you don't know their genetic background and it may be difficult to sex them when you buy them. A good private breeder will know the complete background of his/her fish and will sell you a true pair or group of young fish to grow on. One of the largest private breeders in the UK is T.J.Sutton in Birmingham. Telephone 0121 749 3711. You should also contact the Goldfish Society of Great Britain for details of breeders in your area. Most breeders only work with one or two strains, so depending upon which variety you want you may find your nearest breeder is an hour or two's drive away.

Which book?

The book I have at home only touches briefly on the different types of ways fish breed. Is there a particular book on goldfish that would help me to provide my fish with the optimum conditions for breeding.

Brian Bradshaw, *via e-mail*

Two books that deal with the specifics of breeding goldfish are ***Fancy Goldfish*** By Johnson & Helso. This is published by New Holland Publishers (UK) Ltd., Garfield House, 86 Edgware Rd., London, W2 2EA. The other book may be easier to obtain because it is published by TFH who have a good distribution network into aquarium shops. It is called ***Goldfish Breeding and Genetics*** by Smartt & Bundell.

Central heating pump problem

My pond is powered by a central heating pump but it keeps getting clogged up, how can I stop this happening as I have to clean it out every month as it's full of crap and instead of a decent waterfall all I get is a trickle.

Craig, *via e-mail*

A central heating pump is designed to recirculate very clean, sediment-free water around a pipe work system at a relatively low turnover rate (and head). When installed in a pond system, they must be provided with the same water conditions and used with the recognition that they are primarily a recirculating pump. I know of ponds where they have provided many years of virtually uninterrupted service, where they were installed at or below the water's surface in a final dry chamber of a multi-chamber filter system, recirculating clear and clean water against minimal head.

I would suggest that you look at improving the pump's pre-filtration or look at replacing it with a purpose built pond pump, most of which are now sold with a free 3 year guarantee.

Ben Helm

Flowers from the Orient

PHOTOS: MAX GIBBS

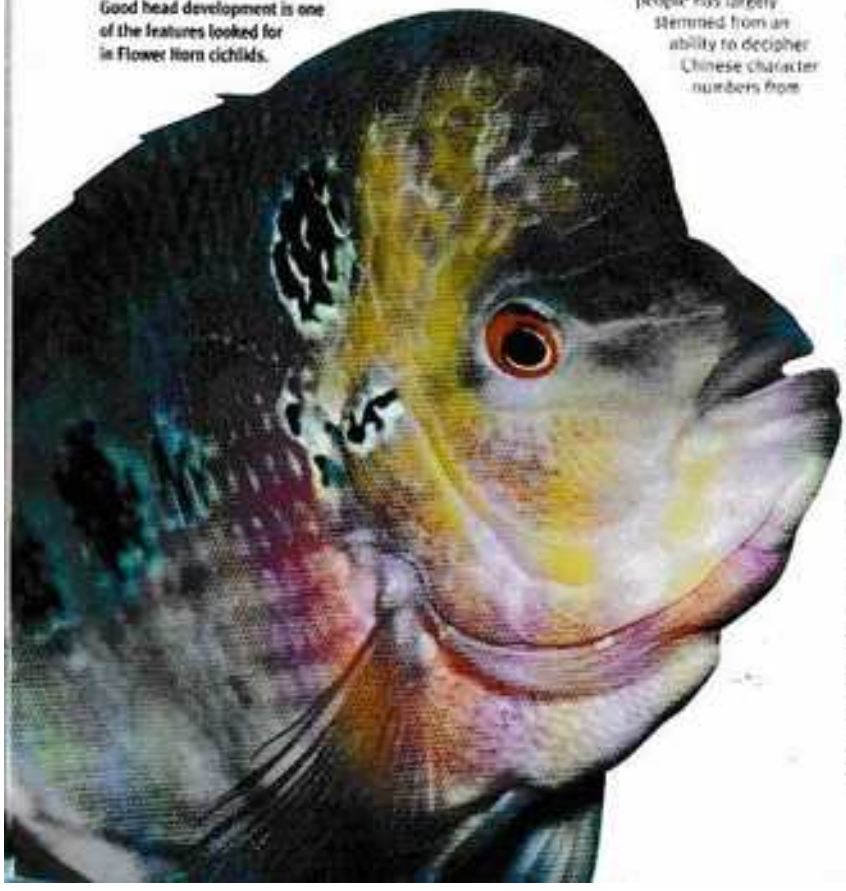
Max Gibbs introduces the controversial Flower Horn Cichlid.

I AM A REGULAR VISITOR TO THE AQUATICS sector of Bangkok's Weekend Market. Wandering through the narrow alleyways lined with countless stalls selling all manner of aquarium equipment and teeming with fish, I am able to get a clear impression of what is the "flavour of the month" fish wise. I have seen a predominance of Guppies, later replaced by Discus, then these in turn have been displaced by fancy new Betta/Fighting fish varieties. But within the last year or so there has been a dramatic change to embrace a new and exciting fancy, centred on a hybrid fish dubbed "The Flower Horn" Cichlid. Being a hybrid has caused some controversy, but that has arisen here in Europe and America, not in the Orient where the craze has exploded onto the aquarium scene big time!

What makes them so popular?

So what is the attraction of these big, colourful, aggressive yet companionable, Cichlids? For the dedicated oriental fishkeeper it is probably largely to do with just those qualities. They are big enough to warrant the sole use of their aquarium, aggressive enough to demand that status as a necessity, but intelligent enough to recognise their owner and project a companionable nature. The colourful nature of the individual fish is part of their attraction, and not purely from a visual aspect.

Indeed, the main spur to cause the tremendous interest among other South-East Asian people has largely stemmed from an ability to decipher Chinese character numbers from the markings on the body. These numbers are then collated into a form that can be used to enter in a lottery. This feature of the Flower Horn fish is what has had such an immense impact on the South East Asian aquarium market. In Malaysia alone it is claimed that the number of licensed aquarium shops has gone from 112 in the year 2000 to 153 in 2002, and there were another 207 applicants awaiting licenses as at 1st January, 2003. These figures are according to the Agrifood and Veterinary Authority of Malaysia. The supporting army of breeders is said to number around 2000. We can only guess wildly as to how many additional fishkeepers this cult has attracted to the hobby in Malaysia and other South East Asian countries, albeit within a restricted and focused area of interest. But having got them there and the need to be in regular contact with the aquarium dealers for food etc., one wonders how many Flower Horn keepers may be tempted to expand their horizons and become aquarium hobbyists in the true sense. It is not unreasonable to suppose that the enjoyment and satisfaction gained from their prized Flower Horns might well persuade them of the further joy to be had from a decorative aquarium in the home.



Good head development is one of the features looked for in Flower Horn cichlids.

Origins of the Flower Horn

So how did this "new" fish arrive on the aquarium scene? It is not clear just how far back the origins of the present strains were produced, but it seems to be around the mid-1990's that Malaysian breeders began to develop them in earnest. This hybrid was evolved from cross-breeding several different species of Central American cichlids. The actual method of persuading two different pure species to cross breed is not revealed, the breeders who developed the first hybrid stocks are not telling. But what is a fact is that the hybrid offspring do spawn quite naturally and the eggs are fertile - an unusual phenomenon when hybridising between two different species. *Cichlasoma synspilum*, *Herichthys bifasciatus*, *Herichthys citrinellus*, and *Herichthys maculicauda* are all said to have been used in the process. The Chinese called the resulting first generation "Flower

Flower Horn cichlids are always curious and aware of what their owners are up to.

Horn" cichlids Qing Jin Hu and Jin Gang Ying Wu. Enthusiastic Malaysian breeders have produced many variations of the fish. It is because the Flower Horn cichlid is said to bring its owner good luck and fortune that they have become so very popular in the Far East, where many households now own one or more of these special fishes. They are sometimes referred to as Feng Shui fish.

Popular names for the various varieties now available are quite fanciful! Absolute wonder, Guardum Grace, Coronation Link, Exotic Marvel, Golden Charm, Deer Hunter, Royal Degree, Scarlet Passion, Desert Kingdom, Marble head, Hibiscus, Creative Measure, Tornado Effect, and Monkey Face, are just some of the named varieties currently available.

NOT UP TO THE MARK?

So what happens to those fish that fail to deliver any promise as valuable possessions, for whatever reason? It appears they have another feature that makes them quite desirable. When steamed and fried with onions, ginger, and soya sauce with garnish of parsley and chopped carrots, they may be transformed into an oriental culinary delicacy. The flesh is quite firm but delicious, and sweeter than other similar species of fish!

Huge shows, high prices

My business partner, Barry Allday, recently visited two Malaysian Flower Horn exhibitions and competitions held in November. One of these at Plaza Metro in Kajang showed over 2000 fish and more than 10,000 visitors attended the exhibition. The value placed on the exhibits was more than £330,000, and cash prizes were worth more than £6,500. The entries are judged according to their body shape, colour patterns, most bulbous head, and largest fish. Some of these prized show fish were valued at about £5000 each.

Selecting Flower Horn cichlids

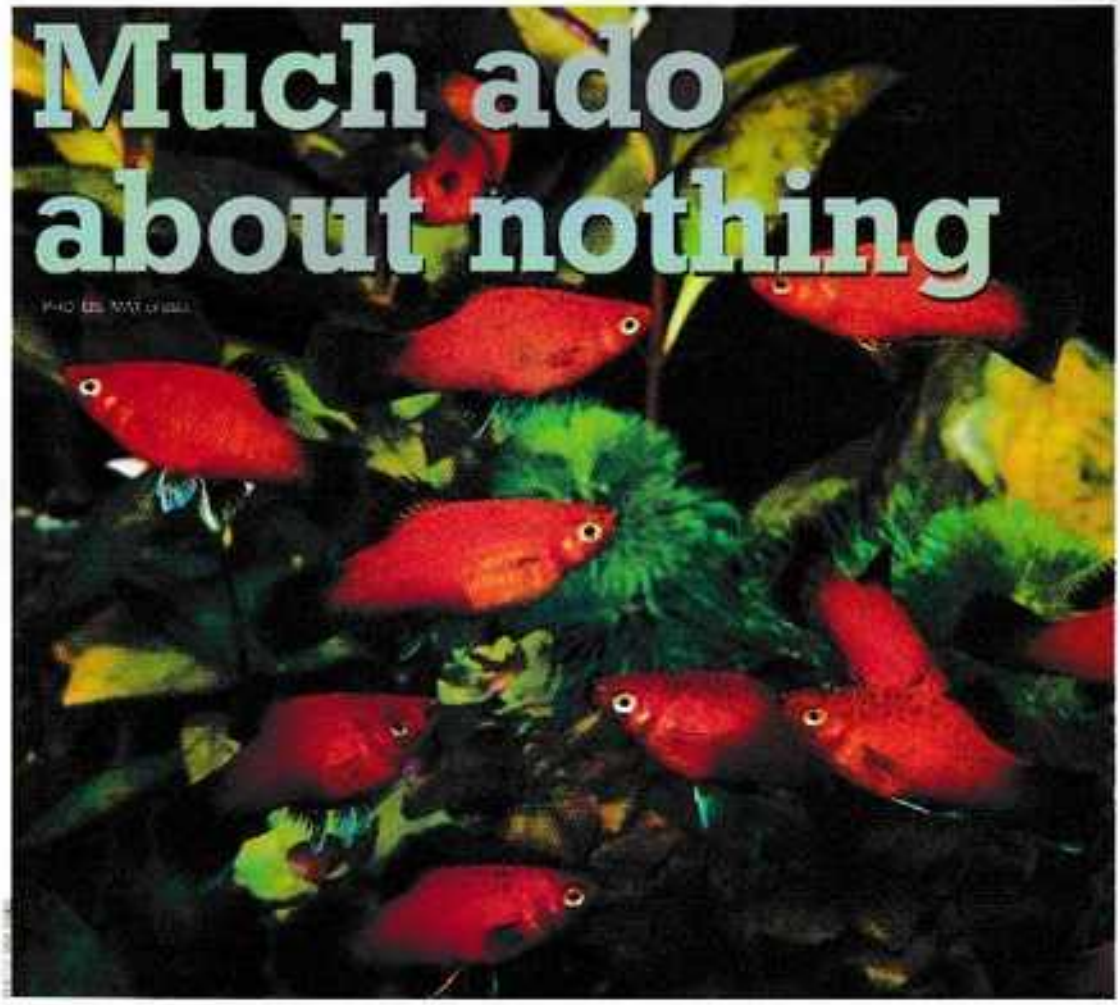
Breeding the "Flower Horn" is relatively easy, but choosing the few top quality fish for growing on is the skill required. When making that choice the overall impression the fish creates is what is important, as there are no sure guide-lines for assessing beauty in the fish. But a very important feature to look for is the potential development of the head's cranial growth, the most striking feature. The head should be rounded, with a high protrusion. However, not every "Flower Horn" strain is developed to have a protruding forehead, but depending on the species it has been crossed with. Body size of a mature, fully grown fish rarely exceeds 30 cms, but more particularly attention is paid to the good proportioning of the body. Normally the male fish has the large, protruding forehead. The female's dorsal fin has an obvious black line on the front edge in about 80% of the fish.

Pearl spots on the fish have become increasingly popular, and they should be evenly distributed across the body, except on the belly region, which should be devoid of any spot markings. Some fish have red spots covering the "cheeks" and head, and this is considered a good feature. The fins vary considerably, depending on the variety. Normally a good feature is to have elongated tips to the dorsal and anal fins, but these should be in proportion to the rest of the body. Markings on the fins should be beautifully coloured, and the markings should be fan shaped. Drooping tails are to be avoided, as they make the fish appear unbalanced. The most sought after colour among their keepers is red, of a good quality. But other colours may be silver, orange, yellow, green, blue, or black. The colours and markings should be balanced and the same on both sides of the body, but not necessarily all over the body. The important area to be marked is the forward part of the body.

WARNING

Flower Horn cichlids should not be kept with any other fish in view of their extremely aggressive nature.

Much ado about nothing



All platies and Swordtails which have the wagtail pattern (black fins and lips) are the result of hybridisation

Derek Lambert explains what a hybrid is, which fish are hybrids and the role they play in the hobby and trade today.

GRABBING MY TRUSTY DICTIONARY AND turning to the H's I found this definition of a hybrid: *The offspring of genetically dissimilar parents or stock; especially, the offspring produced by breeding plants or animals of different varieties, species, or races.* Well that's sorted that! End of article and story! Well obviously not, unless I intend to fill the rest of the pages with pictures of beautiful plants and animals that are hybrids. Make no mistake, I certainly could do that and have plenty of pictures left over to fill the rest of the magazine. Hybrids are simply everywhere, and yet most of us are totally unaware of which fish are hybrids and which are not, and it is this lack of knowledge that I believe has allowed this controversy to spring up around a beautiful hybrid fish called a Flower Horn cichlid.

I remember, some years ago, talking to a well known fish judge who was bemoaning all these new fangled colour varieties of Platy that were coming in through the trade. He declared that the Micky Mouse platy was obviously a hybrid and he much preferred the true species. When pushed as to what he thought was a true species he replied, "*The old ones like Red wagtails*". Now the interesting thing about this is that the Micky Mouse platies he was moaning about were actually very similar to wild caught Platies (grey bodied, blue iridescent scales, one large spot and two small spots in the caudal peduncle looking for all the world like Micky Mouse's head). Any Platy or Swordtail with the wagtail colour pattern has to be a hybrid because the comet pattern (a black stripe top and bottom of the tail) which occurs in wild Platies, when combined with a gene from a Swordtail becomes the wagtail pattern we all know and love. In fact all the colourful Platies and Swordtails that appear in aquarium shops are of hybrid origin and are various combinations of *Xiphophorus helleri*, *X.maculatus* and *X.variatus*.

Mollies are another case in point. The history of the orange colour pattern seen in many Mollies sold in aquarium shops gives us pointers to track back to its origins. This


The orange colour on these Mollies was derived from a cave dwelling short finned Molly from Mexico.

colour has been a recent introduction to the Molly world, and was actually derived from a population of cave dwelling Mollies (*Poecilia sphenops*) in Tabasco state, Mexico. They were originally a pale yellow colour and had been collected by Ross Socolof who had been trying to collect the blind form which is known to exist in that population. When he realised the fish he had collected had normal eyes, he shipped them off to Dr Joanne Norton who is one of the world's greatest Molly experts. She crossed them into some of her cultivated sailfin strains and out came the lovely orange Mollies we have in the shops today. At least 3 species went into those original fish and possibly as many as 5 - Joanne lost count. What is interesting about this new coloured Molly is that no one kicked up a great fuss about this new, highly coloured, hybrid fish.

Moving on from livebearers and looking more closely at the Cichlid world we come across cultivated Angelfish. These are also hybrids and come in many different colours, Koi angels being the most recent

DO HYBRIDS OCCUR IN THE WILD?

Yes, and sometimes the hybridisation creates fascinating results. Taking the livebearer world again as an example, we have the famous Amazon molly. This amazing creature is a naturally occurring hybrid between *Poecilia latipinna* and *Poecilia mexicana*. The result is an all female population of Mollies which uses any close relative's sperm to fertilise its eggs, but the genetic material in the sperm is rejected so only the mother's genemome is present in the offspring. In other words it clones itself! There are several other examples of this happening in the *Poeciliopsis* genus and one complex involves three different species. Again all female hybrids are produced.

Another thing that happens in nature is where two closely related species, which have developed in isolation, are suddenly thrust into the same environment. Without this geographic separation the two species breed together and create a hybrid swarm. This is exactly what happened to *Hypselecara temporalis* and *Hypselecara coryphaenoides* when the Volcano de Colima erupted and lava changed the flow of rivers in that area of Mexico. They ended up in the same river system where a hybrid swarm now exists.


Modern cultivated Discus are the result of hybridising four different species of wild Discus.

Black beauties regularly fetch high prices in specialist livebearer auctions despite being hybrids.

introduction. Once again, we had absolute silence when it was introduced. Some preferred them to the old colour forms, others preferred the original, but no one condemned them as appalling hybrids.

The other very visible and beautiful Cichlid hybrid is of course the beautiful, incomparable, king of the aquarium world - the Discus. A product of hybridising four different species of Discus and many different strains, the modern Discus represents the pinnacle of hybridisation as an art form.

So the Cichlid world is already full of hybrids and up until now nobody has really cared.

ARE HYBRIDS A THREAT TO CONSERVATION PROJECTS?

Absolutely not. All the conservation projects involving captive bred fish are run by people aware of the risks of obtaining stock through normal trade outlets. Indeed none will accept any fish from normal aquarists because they want to know exactly when, where and how many fish were originally collected. The provenance of the stock has to be provable. Looking at those projects underway in the UK all the founder stock was provided by scientists or field researchers like myself. Even for a fish like *Skiffia francesae*, (which has probably been extinct in the wild for over 20 years), the provenance of the founder stock had to be proven. For this reason I went to the Belle Isle Aquarium in Detroit to obtain the founder stock. These fish had been donated to the aquarium by Dr Robert Rush Miller who was the discoverer of this species and we could provide all the essential data needed for any meaningful conservation project.

Are hybrids a threat to 'pure' aquarium strains?

Yes they are. But it is not fish like Flower Horn cichlids that are a threat to the pure aquarium strains, but fish which accidentally cross in a fishkeeper's tank. These are often sold on to other fishkeepers in an auction as a true species that leads to disappointment when they grow up. This is the reason why you need to check out the provenance of the fish you are buying if you require pure strains. At most specialist auctions the name of the seller is available if you want to find out. It is interesting to see how the prices for the same species can vary hugely depending on who is selling them. By asking around, you can find out who has the reputation for good fish true to type. Ideally the collection data should be included on the label. Indeed I have just spent a few days sorting out labels for all the species I keep and breed so that the collection data is included on the bag. This way people know exactly what they are buying.

Obviously when it comes to normal aquatic outlets, where most of the fish come from commercial fish farms the situation is different. In this case the shopkeeper will know which farms supply good quality fish true to type and source his fish accordingly.

ARE HYBRIDS THE SAME AS G.M. FISH?

No! Genetically modified or genetically engineered fish are something very different. Hybrids occur in nature on a regular basis and can be produced by breeding two closely related species together in a normal aquarium. Genetically modified fish have genes, taken from totally different organisms (sometimes insects but invertebrates have also been used). These are inserted into the fish in a laboratory. They could never occur in nature and are usually designed to be incapable of breeding in a normal way.

Why are the prices so high on Flower Horn cichlids?

The price of a fish is usually a reflection of the work that has gone into producing it. Flower Horn cichlids are the result of years of careful cultivation and experimentation. Harking back to the livebearers, which I know best, we have a similar situation with the Black Beauty. This fish was created by hybridising *Skiffia francesae* with *Skiffia multipunctata*. This produced a larger animal than either parent species and one with areas of black on the males. By careful selection over many generations the black was expanded over almost the whole of the male's body and bit by bit females with black patches were developed. Over 20 years (about 50 generations) later we have Black Beauties in which both sexes are almost totally black. Compare this with obtaining a few broods from a wild form fish and rearing the babies up to adulthood. No wonder the highest priced fish in most specialist livebearer auctions in the USA and UK are Black Beauties. In some European countries, however, you find it a very unpopular fish because it is a hybrid Goodeid, yet the cultivated Platies and Swordtails still fetch very high prices for good quality fish!

In conclusion

The fact is that there is absolutely no difference between this new Cichlid and large numbers of other hybrid fish already in the hobby. I know some people in the Cichlid world will be horrified at the thought. But, in reality, this is very much a case of "*Much ado about nothing!*" ■

Going under

Alf Nilsen goes diving on the Great Barrier Reef.

ALL PHOTOS: ALF NILSEN

MY FIRST TRIP DOWN UNDER CAME BACK in 1992, when I joined three friends for a 5 weeks stay in Australia. It was a dream coming true! Even since I was a child, this huge and remote continent had fascinated me. Its animals hold a key position in the history of evolution and the Great Barrier Reef housed more life than anywhere else in the underwater world. Our journey would contain diving in the Coral Sea and along the outer Great Barrier Reef, and we would spend weeks in the Australian outback - no wonder we were all excited when the plane landed at Cairns international airport at four o'clock in the morning.

Townsville is a city in the tropical sun on the Queensland coast. Built on the banks of Ross River and a portal to the Great Barrier Reef , this was to be our home for the first days of our journey. With its 120,000 inhabitants and absolutely glorious weather, with as much as 300 sunny days a year, Townsville is a town "to fall in love with".

Heading out to sea

Our dive vessel left from Port Douglas, about 5 hours drive north of Townsville. Our journey took us to the outer Great Barrier Reef where we were going to dive along the Ribbon Reefs, which form a border between shallow lagoons and back

PLACES TO VISIT

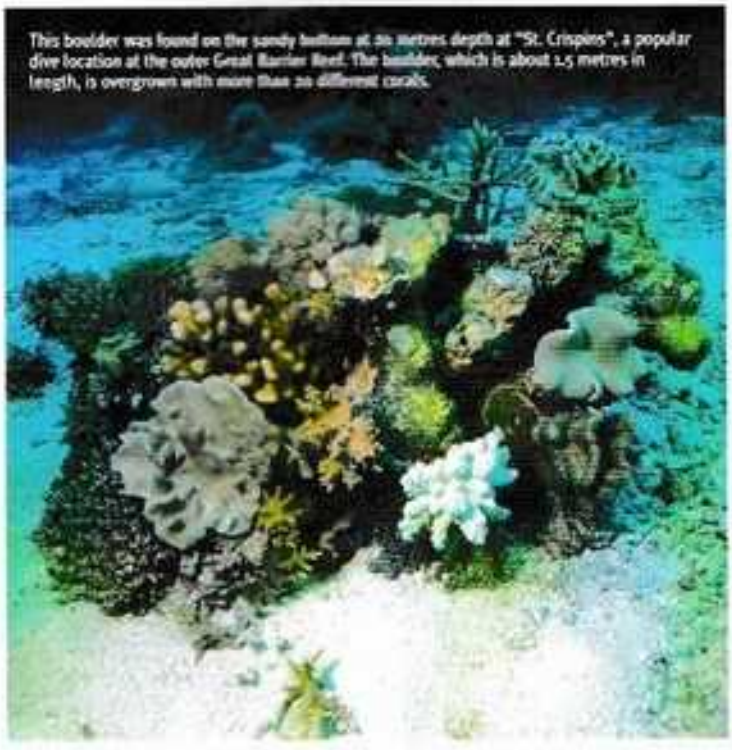
The Great Barrier Reef Aquarium is located as a part of the Great Barrier Reef Wonderland in Flinders Street. It is the world's largest coral reef aquarium, and was opened on 24. June 1987. One would think that Australia, a country that houses the largest reef on the earth, should not need to bring corals into an aquarium, however, the Great Barrier Reef is situated very far from land and is in fact very difficult to explore even if one is a SCUBA diver. You would need to operate a boat or join a commercial trip to the barrier reef. The distance is very long, and in practise the reef is "unreachable" to the majority of people in Australia. So the major goal with the Great Barrier Reef Aquarium is "*to bring the reef to the people*".

When you enter the entrance of GBR-Aquarium, you will understand that the complex is much more than just the large reef and predatory tank. You walk through a dark corridor with several very high quality slides on the walls - slides that tell you about the development and the life at the Great Barrier Reef. You can also visit a small cinema and look at a 15 minute show that takes you through the history of, and the life on the Great Barrier Reef. Then there is a hall full of smaller tanks containing among other things Sea-snakes and even an aquarium with a Box jellyfish (*Chironex fleckeri*), the most poisonous Cnidarian in the world. A sting from this animal can kill you! In nature the jellyfish live in fresh and brackish water on the northern coast of Queensland. This is one of the reasons that you do not see many people swimming in these waters, although the beaches are awesome. Another reason is the presence of salt-water crocodiles, one of the most dangerous creatures in the world. The Box jellyfish specimen in the GBR-Aquarium was introduced to the tank as a juvenile and has grown to an adult there. In this area there are Anemone fish and small Gobies in other tanks, but perhaps the very best thing about this section is the great "touch-tank" opstairs where people can touch the reef animals. Here Sea cucumbers and Blue starfish (*Linckia laevigata*) crawl, and there is even a small shark in the touch-tank - a very wise thing to put in such a tank to underline that sharks are in fact not as harmful as we are often told. Another unique room is the "*investigating room*" where visitors can examine objects from the reef, use binocular lenses, microscopes and read literature to find facts about reef organisms.

Further inside the building you enter the "*Viewing tunnel*", which is actually inside the large reef aquarium. The tunnel is made out of acrylic and has a shape like half a circle. On your left is the reef-aquarium and on your right is the predatory tank. You walk under water.

reef slopes on the landlord side, and the abyssal sea on the ocean side. They stretch for approximately 100km from due east of Cooketown up to near Lizard Island. The Ribbons are right on the edge of the continental shelf and attract a huge diversity of marine life including Shark and Manta rays.

Characteristics of the Ribbon Reefs are lush coral gardens and many spectacular pinnacles and bommies surrounded by schooling fish. The variety of fish is impressive: Anemone fish, Damsels, Parrotfish, Cuttlefish, Puffer fish, Maori wrasse, Napoleon fish, name it - it's there! You also see smaller pelagic fish like all kinds of Reef Sharks, Trevally, Tuna, Mackerel and Barracuda. There are heaps of other marine creatures around, such as Molluscs, Crabs, Nudibranches, Crustaceans and Sponges. The variety of life is stunning and produces a very colourful picture. The dives are normally done in the 10 to 30 metre depth range. The reefs come up to about 4 metres below the surface, ideal for safety stops and snorkelling in between dives. If the conditions are right, some spectacular wall dives are possible along the outer edges of the Ribbon Reefs. Visibility is very much influenced by the daily water exchange with the tides and by run-offs from the land after strong rainfalls. Anything between 12 and 30 metres is possible.



This boulder was found on the sandy bottom at 20 metres depth at "St. Crispins", a popular dive location at the outer Great Barrier Reef. The boulder, which is about 2.5 metres in length, is overgrown with more than 20 different corals.

COD HOLE

Cod Hole is a world-class dive site, famous for its Giant potato cods (*Epinephelus tukula*). These huge cods, which can grow up to 3 metres long, came in really close and gave us some good photo opportunities. The dive master brought down a case of bread and fed the cods right in front of our faces. Can you imagine what it feels like to be close to 3 or 4 huge cods, a couple of metres long, Moray eels and a bunch of other fishes - including several groupers - when the whole bunch of creatures want to catch the bread simultaneously? If feeding fish is not your favourite activity watch the whole spectacle from some distance!

Our dive sites included famous locations such as "Cod Hole", "Steve's Bommie", "Pixie Pinnacle", and "Harrier Reef", but also spectacular sites on the back reefs of "Ribbon Reef #9" where we also did night dives.

Pixie Pinnacle was one of our favourite dive sites. It is a column of coral, 15 metres wide that rises from a depth of 40 metres to about 2 metres below the surface. It is located in an opening between two ribbon reefs and experiences regular currents, which feed the enormous variety of life here. The pinnacle is covered with big varieties of soft and hard corals, gorgonians and sponges. It is a very colourful dive, which impresses every diver. Small reef fish are to be seen here, such as Anemone fish, Damsels, Lionfish, Hawk fish and many more. Pelagic fish also cruise around the pinnacle such as Trevally, Tuna, Mackerel and sometimes Barracuda. On Pixie Pinnacle you can spot seven different species of Anemones! ■

MY BEST DIVE

To me perhaps "Harrier Reef" was the very best dive. Never before or since have I experienced such a growth of table-shaped Acropora colonies. The picture tells the story much better than any word. Diving in such a site is difficult. The corals are several years old and rather fragile. A false step or careless use of the flippers, can easily result in the ruin of some of these beautiful colonies!

Bandits on the make

Linda Lewis has a surprise spawning from her Bandit corys in a community tank.


Bandit corys are one of the more skittish members of the genus.

SINCE I STARTED KEEPING TROPICAL FISH I have had a particular fondness for the Corydoras group of catfish. These useful, often inexpensive, long lived little fish have charm - they even wink at you from time to time. Now, having kept a number of different species, I find that they differ not only in looks, but in their behaviour. Peppereds (*Corydoras paleatus*), for example, are always on the move, even during the daylight hours, and are gregarious and hardy, whilst the Bronze cory (*Corydoras aeneus*) is much more sedate.

Bought for their looks

When I bought *Corydoras metae* it was for their looks. I had no idea of their temperament. They are sometimes called the Bandit cory, thanks to the dark, almost black stripe through the eye which resembles a mask. The dorsal fin is also black at the base. In some individuals, the entire fin is sooty, whilst in others the edges are left colourless. The dark band then extends from the dorsal fin along the back, finally turning downwards at the base of the tail. The tail, like the remaining fins, is transparent. The basic body colour varies from grey to fawn and, when mature, females sometimes show a pinkish hue, with their bellies taking on a rosy tint. At other times, females can be identified by viewing the fish from above. A male's body tapers evenly from behind the gill covers, whereas the female's body widens behind the gills, and then tapers off.

The first clue regarding the fish's behaviour came when I bought them. Even before the net entered the tank, the fish went wild with panic. I have subsequently found *Corydoras metae* to be a very skittish fish indeed. The slightest movement or disturbance can cause them to race wildly about, crashing into anything in their way, as they make a mad dash for cover. In order to take a look at them at all, I have to approach very slowly, almost on tiptoe. I started out with four fish. As usual I quarantined them for two weeks. Unfortunately this meant that they had to undergo the ordeal of being caught for a second time. Two fish became poorly very soon after the move into their permanent quarters. Their breathing rates increased and they seemed to lose the ability to hold a position in the water. I used to spot them upside down among the plants, or standing on their heads just below the surface. Later they would right


One of the survivors from Linda's original four fish at home in its permanent accommodation.

themselves and for a day or so seem fine. Then the problem increased in frequency until finally the fish were unable to swim properly at all. Eventually I had to put them down. A few days before this, I noticed a third fish begin to do head over heels. I despaired and expected to end up with no survivors. Then, after another couple of months, the topsy turvy sessions dwindled, and finally stopped. I breathed a sigh of relief but decided not to try to buy any replacements. I prefer to keep Corys in groups of four or more, but these would have to remain just a pair. The wonderful thing is that I was left with two fish – one male and one female.

However, I never dreamt that they would breed.

I'm the kind of fishkeeper who delights in peaceful community tanks. I have no fish house, (although I would like one!) or separate breeding tanks, just an extra 45 x 25 x 25 cm tank that acts as a multi purpose spare, quarantine, hospital, or growing on tank for any livebearers that I manage to retrieve from the main tanks.

Surprising find

Since moving to Devon, my tanks have been 'temporarily' arranged on industrial shelving in a bedroom, whilst we (slowly) do up our very neglected house. This means that I don't spend as much time as I used to in just watching the fish, to see one tank properly requires lying flat on the floor! Fortunately I still make it a rule to check each tank every day, just to make sure all is well. It was during a spell of very hot weather, when water in the tanks had reached 28°C, that I was stunned to notice four eggs on the glass of the Bandit's tank. I had seen no signs of spawning activity, although I'd noticed that the fish often swam together, and that the male sometimes stroked the female's back with his barbels – something often seen in Corydoras courtship. After I'd had the fish some three months or so, the female always appeared much plumper than the male, even from a normal viewing angle, so that gave me no clues as to the impending spawning. I looked for more eggs, but only found another two, attached to glass at the side of the tank, near the filter.

Corydoras catfish can lay more than a hundred eggs in one spawning, so there must have been more in the tank somewhere, but these had probably been laid amongst the plants where, thanks to their muddy brown coloration, they would be hard to spot. I had no wish to uproot the plants and risk disturbing the fish, so settled on trying to raise just the few eggs I'd found. Earlier experiences breeding Peppereds (*Corydoras paleatus*) taught me that eggs can be removed without accident once they are at least an hour old. Before this, they are too easily punctured and destroyed. I have an algae scraper that incorporates a razor blade, which is used to remove stubborn algae. If this is slowly and very carefully pressed firmly against the glass, just beneath the eggs, and then scraped gently upwards at →

THE BREEDING TANK

The two Bandit catfish were housed in a 60x30x30cm aquarium with my Glass catfish (*Kryptopterus bicirrhis*) and several guppies. The low density of fish is to allow my (equally skittish) Glass catfish to live out their final years in relative peace. I have had them for about eight years now, and know what kind of company they prefer. This tank is lit for eleven hours each day by a single 15 watt tube yet manages to sustain a more than healthy planting of water ferns, some rooted in the gravel, and some left to float. Floating beds of crystalwort (Riccia fluitans) give extra cover for new born livebearers, and two terra-cotta pots, laid on their sides, offer shelter. One acts as semi-permanent residence for the Glass catfish. Large pebbles and rocks provide additional hiding places.


This photograph was taken when the eggs had just hatched. At that time the baby was all yolk sac and little else!

14 days after hatching the young look like speckled tadpoles.

an angle of at least 90 degrees, the eggs will be detached from the glass and stick to the blade. A beaker of tank water serves to keep the eggs submerged for the transfer to the rearing tank. I keep my spare tank going all the time, with a few livebearer young, so that if needed it can be pressed into action.

Fry tank set-up

A thin layer of gravel covers the floor and filtration is provided by a Fluval 1. With this turned so that its outflow is directed back against the glass, and not out into the tank, I find that fry do not become caught in it. This would not however be the case with any eggs. So, after transferring the Guppies to other quarters, I pulled the filter out towards the middle, then rested a net across the corner of the tank, so that its bottom 5cm were immersed in water. Very carefully, the catfish eggs were then stroked on to the inside of the net. With the flow of the filter directed at the net, the eggs would be supplied with oxygenated water that helps to keep them fresh and viable. Should I miss the hatching, the fry would, once the yolk sac had been used up, be small enough to swim through the mesh into the tank itself. The temperature at this time was still over 27 °C, and the pH 6 - 6.5.

At first the eggs were a muddy brown, but three soon turned white, indicating that they were not fertile. Such eggs are best removed before they are attacked by fungus. I discovered the eggs on a Friday morning and the first one hatched on the Monday, about 80 hours later. The hatchling seemed to be 90% egg yolk! After a couple of days this food supply was about used up and it was then time to begin feeding. I began with newly hatched Brine shrimp. As I didn't need vast quantities I merely sprinkled a pinch of eggs onto some salt water in a teacup. This was covered to keep it dark, and placed on the cover glass of an aquarium for warmth. In about 24 hours the eggs began to hatch. When a light was shone into the cup, the shrimp gathered near it, making it easier to catch many in one dip of a pipette. I strained the catch through a piece of tissue to remove most of the salty water, and floated the tissue briefly in the tank allowing the shrimp to swim free. At this stage I could not see the catfish fry, I simply had to hope they were still alive. Eleven days after finding the first few eggs, I was amazed to find three more eggs had been laid. I repeated the process of transferring these to the rearing tank. The temperature at this time was 25°C. Of these three, two hatched successfully.

Tadpoles!

My first sighting of the youngsters came two weeks after hatching. The fry bore very little resemblance to their parents and looked more like tiny, speckled tadpoles. The dorsal fin ran all along the length of the body, and joined onto the tail. There was no sign of the distinctive banding. Gradually over the next ten days or so, the beginnings of the mask and band appeared, and the barbels could be seen clearly, but the fry remained very speckled. This is an effective camouflage, making the fry difficult to spot against the gravel.

After about a week I began to feed finely powdered flake food, and newly hatched Mosquito larvae, as well as fine shrimp. At less than three weeks old the young catfish had progressed to eating catfish tablets, fed a quarter at a time. After two months, the young fish, now almost 2cm in length, were recognisable as *Corydoras metae*, but remained lightly speckled. The speckling faded gradually as the fish grew in size.

For me, one of the joys of fishkeeping is watching tiny fry grow, to see their shape and colours develop - I still keep Guppies and Platies for that very reason. It took time and effort to rear my four *Corydoras metae*, but the pleasure gained was well worth the cost. ■

[illegible] old the young begin to look more like their parents, but still have a lot of speckles on them.

Green Away

Ann Telford of *All Clear Water Purifiers* explains how to make the most of a UV Clarifier.

AN EFFECTIVE METHOD OF CONTROLLING green water is to use Ultra Violet Clarifiers (UVCs). I classify this as a safe, natural method as UVCs do not add anything to the water, nor do they alter the structure of the water. For this purpose, it is reasonable to describe them as targeting those green water causing, single-celled algae only. As the water passes through the unit, the ultra violet light causes the chlorophyll sac in the individual algae to burst. Hey presto, what appears to be the green discoloration of the water disappears.

Today's top tip

Never succumb to the temptation of substituting your green pond water with tap water, as this nutrient-rich water will take you back to square one, turning green again in a matter of weeks.

Getting the most out of a UVC

To give a UVC the best possible chance of being effective, it is useful to know some tricks when installing it. First of all do not install the UVC on the water feed pipe taking water from a pump in the pond to an external filter box, it is better to install the UVC on the water feed pipe carrying the water from the filter box back to the pond. This water will be clearer because there will be little or no solid waste in the water to interfere with the UVC light rays.

Secondly, once the water leaves the filter box on its way back to the pond, split the water return into two. Install the UVC on one of these split returns. Over a period of time all the pond water will eventually pass through the UVC and the slower water passage will be more effective.

To keep a UV Clarifier working at its optimum it is important to change the bulb at the beginning of the season.

UV CLARIFIER MANUFACTURERS

Hozelock Cyprio	Waterdale House Theme Rd, Haddenham, Aylesbury, Bucks HP17 8JD Tel [illegible]
Interpet/Blagdon	Vincent Lane, Dorking, Surrey, RH4 3YX Tel 01306 [illegible]
Oase (UK) Ltd	Unit [illegible], North Way, Walworth Industrial Estate, Andover, Hants, SP10 5AZ Tel 01264 [illegible]
Petmate	Lion Rd, Hersham, Surrey, KT12 3PD Tel [illegible]
Hagen	Hagen, California Drive, Whitwood Industrial Estate, Castleford, WF10 5QH Tel 01977 [illegible]
Trident	Tel [illegible]
TMC	Sunbridge Lane, Chorleywood, Herts WD3 5SX Tel [illegible]

tropical | marine | coldwater & ponds | plants | reptiles & amphibians | reptiles

Top Gear

New from *Tunze*

Tunze have introduced a new range of circulation pumps which have been designed to enable aquarists to recreate the hydrodynamic conditions of various reef zones in their aquariums. Up to now most conventional aquarium pumps produced high flow rates yet in the peripheral areas the flow rates were too low to generate parallel flow lines in the aquarium. In order to be able to reproduce every zone of a coral reef *Tunze* has developed the new *Turbelle®* stream circulation pumps. These produce low water speeds at larger water volumes and parallel flow lines in the entire aquarium. They are also comparatively cheap to run requiring only 45 W for about 12,000 l/h water flow and are very compact and quiet.

Turbelle® stream circulation pumps are available in different variants, i.e. with a constant performance: *Turbelle®* stream 6060 for 6,000 l/h at 11 W or *Turbelle®* stream 6080 for 8,500 l/h at 19 W. *Turbelle®* stream 6000 or 6100 for 2,500 to 12,000 l/h which are electrically controlled by *TUNZE®* single or multi controllers. The *Turbelle®* stream pumps can be used as basic pumps or in complete flow kits which consist of one or several pumps with a control device rendering performances of between 7,000 and 48,000 l/h.

The *Turbelle®* stream circulation pump helps you recreate nature's sea currents.

FURTHER INFORMATION
For more information check out the News section at www.tunze.com

Three great new books from Interpet.

New books from *INTERPET* Publishing

Three new exciting books can give gardens the ultimate in luxury and 'Wow!' Factor.

Building a Koi Pond is a complete introduction to the practical aspects of creating a pond for koi carp. The authors, Keith Holmes and Tony Pitham are managers of a large Koi Company in the UK and have wealth of experience in all aspects of the koi-keeping hobby.

Koi Colour Varieties is a superbly illustrated survey of all the major koi colour varieties, with expert guidance on how to build a fine collection of these enchanting fish. The author, Nick Fletcher, is a regular contributor to *Water Gardener* magazine and koi have been his main interest for many years. This attractive new book is packed with stunning photographs of koi making it a sheer delight to browse.

Pond Plants and their Cultivation is an essential guide to choosing the best plants for various settings in and around the garden pond, plus advice on their cultivation and propagation. The author, Derek Lambert, has been a passionate pondkeeper for many years. He has written books and articles on ponds and water gardening and taken part in TV and radio programmes. With his wealth of experience he advises on the use of plants in and around the garden pond, explaining their important roles and, with the help of stunning colour photographs, how a colourful selection of marginal plants can add style and interest all season long.

FURTHER INFORMATION
contact the Interpet Sales Office on 01306 873814 or email publishing@interpet.co.uk

New dosing pump from AB *Aquamedic*

AB Aquamedic has introduced a new dosing pump, the SP 3000. It is designed to pump small volumes of water and for dosing additives. It is a peristaltic pump in which liquid is transported by repeatedly kneading the pump hose and can be used wherever small amounts of liquid have to be pumped in the aquarium. The pump can be used for two purposes. Firstly as a feed pump for low flow reactors, like Nitratereductors, Calciumreactors or Phosphate Filters. Alternatively as a dosing pump for fertilisers in fresh water aquariums and for trace elements, calcium and bicarbonates in salt water aquariums. The dosing pump can, of course, be run continuously but it should be remembered that like all pumps they have a finite life. With this one the motor is designed for around 10,000 hours usage (or just over a year if continuously operated). Similarly the Santoprene® hose and the cruciform arm and rollers have an operational life of around 2500 hours so must be regarded as consumable items. It consumes 4.5 watts and has a maximum flow rate of 3 litres/hour (50 ml/min) with a maximum head of 10m.

Make dosing your aquarium easy with *AB Aquamedic's* new dosing pump.

Some of the ...

Fake logs from *Interpet*

The new Nautic Treasures "Log" collection contains five new designs: Fallen Oak and Fallen Tree (both of which are available in a small and large design), the Tree Stump, Curved Log and Straight Log. The ornaments are made from non-fade, non-toxic poly-resin and make useful replacements for bogwood in those aquaria where acidic conditions would harm the fish.

FURTHER INFORMATION

Available now from all good pet and aquatic stores with prices starting from as little as £6.99, alternatively call Interpet on 01306 743747

NEW POND WHITE SPOT TREATMENT

The life cycle of the White spot parasite only leaves it open to treatment in two of its four stages; this is when the parasites are free swimming. It is then vital to have a treatment that is as effective as possible. Traditionally the best idea was to use high doses of powerful chemicals.

This often left a weakened fish very stressed by the treatment. The new *Interpet Pond Anti White Spot* uses a unique new treatment enhancer, *Procell*™, to maximise the effectiveness of the treatment whilst using lower levels of active ingredients.

White spot is a killer so an effective treatment should be on hand at all times just in case you need it.

FURTHER INFORMATION

The new treatment is available in the following sizes: 250ml - RRP £5.99, 500ml - RRP £9.69 and 1000ml - RRP £14.25. Available now from all good pet and aquatic stores alternatively call Interpet on 01306 743747

Cochu's blue tetra

Boehlkea fredcochui

Today's Diary Dates

June's show, auction and club meeting dates.

Copy for Today's Diary Dates

Copy for Today's Diary Dates should be sent to: Today's Fishkeeper, Wentworth Court, [illegible] Place, Harpenden, Hertfordshire, AL5 4RN. Telephone 01582 [illegible], fax 01727 [illegible] or e-mail derek@tmg.co.uk. Copy deadline 6 weeks before publication date.

Sun 1st	**Caer Urfa A.S. Open show and Auction** Contact 0191 523 7464 **Erith Open show** Contact 01634 221291
Mon 2nd	**Kirkcaldy A.S. meeting** Contact 01738 634689 or 01592 205565 **Solway A.S. meeting** Contact 01387 750606 **St Helens A.S. meeting** Contact 01942 671463 **Ayrshire Fishkeepers Association meeting** Contact 01294 605272 **Reigate & Redhill A.S.** Contact 01293 781282 **Merseyside Aquarist Society meeting** Contact 0151 260 3664 **Warrington A.S.** Contact 01925 483979 **Ilford &D A&P Society meeting** Contact 0208 550 7329
Tues 3rd	**Southend Leigh & D.A.S.** Contact 01702 305740 **Paisley & District A. S. meeting** Contact helenburns@thefreeinternet.co.uk. **York & Dist. A.S. meeting** Contact 01904 414272 **The Irish Tropical Fish Society meeting** Contact 01456 1836 **Halton A.S. meeting** Contact 0151 289 8190 **North Bucks A.S. meeting** Contact 01908 377333 **Oldham A.S. meeting** Contact 0161 283 3725 **Preston A.S. meeting** Contact 01772 321145 **Lang Toun Aquarists and Pondkeepers Group meeting** Contact 01592 555825 **Wyke A.S. meeting** Contact 01482 445563
Wed 4th	**Corby & D.A.S. meeting** Contact 01536 790932 **Oasis Fish Club (Sunderland) meeting** Contact 0191 384 1633 **Perth A.S. meeting** Contact 01738 631704 or 01506 510458 **Clacton Fish Keeping Club meeting** Contact 01255 428065 **Portsmouth A.S. meeting** Contact 01673 885 352 **Bracknell A.S. meeting** Contact 0118 973 2874 **Ryedale A.S. meeting** Contact edmurskab@freeone.net
Thurs 5th	**Glenrothes meeting** Contact D. Smart, 4 Lochty Ave, Kirkcaldy, Fife. **Fairclty A.S. meeting** Contact 01738 561291 or 07714 388507 **Sandgrounders A.S. meeting** Contact 01704 541177
Friday 6th	**North West Cichlid Group meeting** Contact 01942 270 7593
Sat 7th	
Sun 8th	**Federation of Northern Aquarists Societies Covention @ Chester Zoo** Contact 0161 652 6207 **Yorkshire Cichlid Group auction** Contact PF3 for more info on 01924 367086
Mon 9th	**Kirkcaldy A.S. meeting** Contact 01738 634689 or 01592 205565 **Bristol Aquarist Society (Goldfish) meeting** Contact 01792 207467 **Grimsby & Cleethorpes meeting** Contact 01472 345178 **St Helens A.S.meeting** Contact 01942 671463
	Otley A.S. meeting Contact 01274 531458 **Robin Hood A.S. meeting** Contact mdtalbot@corydoras.freeserve.co.uk
Tues 10th	**Darwin A.S. meeting** Contact 01254 701525 **Northwich A.S. meeting** Contact 01606 882966 **Caer Urfa A.S. meeting** Contact 0191 523 7464 **Telford & D.A.S. meeting** Contact 01952 409721 or 01952 616410 **Lang Toun Aquarists and Pondkeepers Group meeting** Contact 01592 555825 **Northern Goldfish and Pondkeepers meeting** Contact 0161 962 7567 **Greenock D.A.S. Meeting** Contact 01475 704219 **Bangor Aquarists & Breeders Society** Contact 0289 187 3559 **Clyde Aquarist Society meeting** Contact john@lanark.freeserve.co.uk **Hull A.S. meeting** Contact 01964 562387 **Strood & D.A.S. meeting** Contact 01634 221291 **Dunstable & D.A.S. meeting** Contact 01582 707280
Wed 11th	**Linlithgow Aquarist Society meeting** Contact 01506 510558 **Halifax A.S. meeting** Contact 01274 880471 **Tameside A.S. meeting** Contact 0161 339 6593 **Bradford A.S. meeting** Contact 01274 657543 or 0113 257 7709 **Hounslow D.A.S. meeting** Contact 0208 890 6933
Thurs 12th	**Mid Sussex A.S. meeting** Contact 01924 602407 **Kings Lynn Fish Club meeting** Contact 01553 769522 or 01553 763743 **Fairclty A.S. meeting** Contact 01738 561291 or 07714 388507 **Isle of Wight meeting** Contact 01983 721246
Fri 13th	**South East Marine Aquarist Society** Contact 01279 301542 **Yorkshire Cichlid group meeting** Contact 01924 367086 **Basingstoke A.S. meeting** Contact 0118 970 1461 **West Cornwall Fishkeepers meeting** Contact 01209 614158
Sat 14th	
Sun 15th	
Mon 16th	**Kirkcaldy A.S.meeting** Contact 01738 634689 or 01592 205565 **Thorpe & D.A.S. meeting** Contact 01953 601 394 **Solway A.S. meeting** Contact 01387 750606 **Merseyside Aquarist Society meeting** Contact 0151 260 3664 **Ayrshire Fishkeepers Association meeting** Contact 01294 605272
Tues 17th	**Southend Leigh & Dist A.S.Auction** Contact 01702 305740 **Greater Manchester Cichlid Society meeting** Contact 01706 810284 01706 353363, 0161 766 4457 or 01422 942 155 **Midlands Marine Aquarists Society** Contact 0121 359 4469
	Oldham A.S. meeting Contact 0161 283 3725 **Lang Toun Aquarists and Pondkeepers Group meeting** Contact 01592 555825 **Wyke A.S. meeting.** Contact 01482 445543 **South Park Aquatic Study Society** Contact Eric 0208 679 2680
Wed 18th	**West Yorkshire Marine Aquarist Group meeting** Contact 01924 470101 **Clacton Fish Keeping Club meeting** Contact 01255 428065 **Tongham Aquarists Society meeting** Contact 01252 25686 **Portsmouth A.S. meeting** Contact Gill Gill 65 9, Inverness Rd,Gosport,Hants. **Perth A.S. meeting** Contact 01738 621704 or 01506 510558 **Bracknell A.S. meeting** Contact 0118 973 2874 **Workington A.S. meeting** Contact 01900 67951 **Workington A.S.** Contact 01900 67951
Thurs 19th	**JULY 2003 TODAY'S FISHKEEPER ON SALE** **Glenrothes meeting** Contact D. Smart, 4 Lochty Ave, Kirkcaldy, Fife. **Bristol Tropical Fish Club meeting** Contact 0117 973 2145 **Sandgrounders A.S.** Contact 01706 541177 **Fairclty A.S. meeting** Contact 01738 561291 or 07714 388507
Fri 20th	**Discus Ireland meeting** Contact 061 358593
Sat 21st	
Sun 22nd	**Preston Open Show and Auction** Contact 01772 321145
Mon 23rd	**Kirkcaldy A.S.meeting** Contact 01738 634689 or 01592 205565
Tues 24th	**Northwich A.S. meeting** Contact 01606 882966 **Lang Toun Aquarists and Pondkeepers Group meeting** Contact 01592 555825 **Greenock D.A.S. meeting** Contact 01475 704219 **Croydon Aquarist Society meeting** Contact 0208 654 0984 **Strood & D.A.S. meeting** Contact 01634 221291
Wed 25th	**Hounslow D.A.S. meeting** Contact 0208 890 6933 **Halifax A.S. meeting** Contact 01274 880471 **Tameside A.S. meeting** Contact 0161 339 6593 **Workington A.S.** Contact 01900 67951
Thurs 26th	**Mid Sussex A.S. meeting** Contact 01273 602407
Fri 27th	**West Cornwall Fishkeepers meeting** Contact 01209 614158 **Eastbourne & District Pondkeeping** Contact 01323 733369
Sat 28th	
Sun 29th	**Tameside Open Show and Auction** Contact 0161 339 6593 **Workington A.S. Open Show and Auction** Contact 01900 67951
Mon 30th	

Sad News

The happy Easter period – even the weather was kind – was somewhat marred by the sad news of the death of Dorothy Ford.

THE WIFE OF DR DAVID FORD, 'DOT' TO ALL WHO KNEW HER WAS A familiar figure at the many aquatic Shows at which Aquarian had a display stand, both here and abroad. With the Aquarian brand of fish food celebrating its 75th Anniversary not so long ago, you then realise how involved Dot must have been with David's work during his research and development of the famous flake food.

Whilst many 'fish widows' stayed at home as their other halves indulged their interests, she gallantly accompanied David on his travels - they even spent some years in Spain setting up the development of the food there. Many fishkeepers will have met Dot as she stood in for David on the Aquarian stand as he took time off to chat to exhibitors and traders alike; this was a job she undertook willingly for she loved meeting and chatting to people.

A typical northern, warm-hearted person - everyone was made very welcome should they have had the opportunity to visit the Fords at home - she was simply a person you looked forward to seeing. Despite failing health, she happily joined in David's Farewell Party celebrations as he eventually (and reluctantly) 'retired'; she was a great hostess on the night, chatting to everyone without exception. A mother of three sons Stephen, Gary and Russell (and soon surrounded by even more male grandsons!), Dot finally achieved that extra bit of happiness with the arrival of a granddaughter Rebecca. David and Dot had been together for 50 years, and obviously shared so many happy memories both of family and business life. Of course, David's life will be empty without Dot, as will that of fishkeepers everywhere - for the privilege of knowing her. Dot's funeral took place on April 23rd - St George's Day and Shakespeare's birthday - with appropriate 'Dot' weather - warm and sunny.

This tribute was written by Dick Mills.

Dot and David presenting the Best Trade Stand Award to the then 'Aquarist & Pondkeeper' (now Today's Fishkeeper) magazine at a past YAAF Festival at Doncaster.

NEW DATE FOR BAF

The **British Aquarist's Festival** has moved its date from a cold and damp November weekend to what is hoped will be a warm and sunny August weekend. The festival will be open Saturday August 2nd from 10:30am - 5.00pm & Sunday 3rd August from 10:00am - 5.00pm. The venue is St. Matthews Church Hall, Stretford, Manchester.

This year's festival features a full Open Show and the Champion of Champions tropical contest on the Saturday, whilst on the Sunday there will be a Goldfish Open Show and the Champion of Champions Goldfish Contest.

Both days

On both days there will be club stands selling home bred tank raised fish at a price that will suit your pocket. There will also be trade stands selling a wide range of equipment and fish all at bargain prices. More events are planned so watch out for further details in ***Today's Fishkeeper*** magazine or check out the FNAS website at www.fnas.co.uk .

It's Terry's,
but not as we knew it!

Today's Fishkeeper visits *Wholesale Tropicals* in Bethnal Green, London.


Never much to look at from the front, Wholesale Tropicals has still to organise a new sign.


Several tanks contained the new Flower Horn Cichlids and a poster on the wall depicted the range of varieties of these new beasts.

In recent years it had become a bit of a standing joke that Terry was sorting out a massive extension to his shop. Some of us never thought he would start it, let alone finish it! In the end it has happened and the transformation has been startling. Wholesale Tropicals has always been the sort of shop you visited to pick up rare and unusual fish and have a natter with one of the UK's most knowledgeable shop owners. It was not the biggest of shops, in fact it was tiny in comparison to many others. With the new building all that has changed. Looking from the front, however, you wouldn't have a clue. The new building is directly behind the original shop but also goes back behind the shop on the right.

Entering from the main road you come into the dry goods section. A much wider range of goods were on sale here than before. Moving back into the new building you are hit by the space and large numbers of good sized aquaria. This is in total contrast to the old shop where you got to know the other customers very well as you shuffled past them. Unlike many large shops these tanks are not filled with endless varieties of "bread and butter" fish. Instead we were treated to the widest variety of fish we have ever seen on sale in an aquatic outlet.

Off to the side was a bank of small tanks. These contained weird and wonderful little gems: Rare Bettas, Killifish, Rasboras, Danios etc. etc. etc !! It was truly amazing to see this stunning variety of fish in one place. Since many of the fish on sale are out of the ordinary, you are unlikely to find them in your average aquarium book - or any book come to that. So how do you know if they are suitable for your tank? Simply ask. Either Terry(father or son) will tell you all they know about them and guide you in the direction of those that will fit in to your aquarium.

Right at the back of the shop are a couple of newly installed vats for Koi and about 12 tanks for coldwater fish. This section is divided off from the rest of the shop with clear plastic curtaining to keep the heat out, since the new building is space heated. The system is actually a proper air conditioning unit, so it will keep the temperature down in the summer as well as up during the winter. Sounds like the perfect place to be at any time of the year.

Don't miss the upstairs display room. In the past Terry could get you any make of aquarium on the market, or have a tank made to your own specifications. He still can, but now you can see all the major brands on display before you purchase.

So ended our visit to Terry's new shop. We had to keep pinching ourselves to make sure that we were awake because this was so unlike the old shop, it felt like we were dreaming. A quick look in the tanks, however, and it was obviously Terry's shop, but not as we knew it!


Terry has the largest display of LAC tanks I have come across so far. From smallest to largest they are all there.

Getting there

Luckily the congestion charge starts a little further in towards the centre, so driving in from the east you won't have to pay it. Alternatively, with all the colourful market stalls which line Bethnal Green Road, it really is an interesting stroll from the station.

Shop details: Wholesale Tropicals, 226 Bethnal Green Rd, London, E2. Tel: 0207 739 5366 Fax: 0207 729 2444

Shop opening hours: 10.30am - 6pm Mon, Tues, Wed, Fri, Thurs 10.30 - 2.00pm, Sat 9 - 6pm & Sun 9.30 - 1.30pm

Proprietor: Terry Jones

Manager: Terry Jones (Jnr)

Number of tanks: 330

Vats & Holding facilities: 3 Vats 50 quarantine tanks

Specialities: Rare and unusual fish of all kinds Particularly "L" numbers, Killifish & Corys

Brands stocked: All major brands

Which groups of fish do you sell?: Tropicals and coldwater

Our verdict

One of the UK's very best shops for rare and unusual fish. Also an excellent shop if you are just starting out since you have both father and son's years of practical experience to call on.

Terry's verdict on the manufacturers

Which manufacturer has the best range of products in your opinion?
Eheim, Tetra & Hagen.
Which company gives your customers the best service?
Eheim & Hagen.

tropical | marine | coldwater & ponds | plants | reptiles & amphibians | regulars

Zambian barbs and Ecuadorian cats

Top German aquarist **Erwin Schraml** examines another clutch of new Barbs from Zambia and L 108 makes its return.

PHOTOS: ERWIN SCHRAML

Continuing on from last month's four new Zambian barb imports at *Aquarium Glaser* here are another three in the same shipment. As with the previous four, the animals all originate in the Kafue River system, specifically, from the Mwambashi River near Kitwe. I could identify about nine different species in this collection. A comparison with illustrations in FishBase and Skelton (1993a) yielded only an imperfect match for some of them. Unfortunately a systematic reference on the fishes of Zambia still does not exist, and without comparing these fishes to preserved material, it is impossible to make exact determinations. It is also quite possible that this batch of barbs includes some undescribed species.

Barbus afrovernayi Nichols & Boulton, 1927

This species is known from southern Africa, more exactly from the upper Zambezi, Cuneme and Kafue River, and also from the Okavango, Lualaba, Liperriba, Luapula-Moero and from the Congo system. It was described from Capelongo, Huila province in Angola. It reaches a length of only about 5.7cm. A particular characteristic is the single oval spot at the base of caudal fin, which however is also seen on *Barbus poechii*. The latter species is clearly more robust and should reach about 12 cm.

Barbus cf. *afrovernayi*

Barbus bifrenatus FOWLER, 1935

This species has a pattern very similar to *B. lineomaculatus*. However, the interrupted lines are much thinner and do not dissolve into points at the caudal peduncle. In the drawings in Skelton (1993a), the interrupted line proceeds in an upwards oval and an even thinner bow stretches from there on downwards. This is only implied in the fish photo where the bow is weakly stretched, but this may be due to the condition of the freshly imported fish, which have to catch up a bit in terms of nourishment. *B. bifrenatus* will reach about 7 cm (SL), and is according to FishBase widespread in the northern parts of southern Africa, including the Cuneme, Okavango, upper Zambezi, Kafue, Zambian Congo and Limpopo systems. Isolated populations exist in Malawi and at the eastern shores of Lake St. Lucia in Natal. The fish is commonly misidentified as the bowstripe barb, *B. vivipparus*, Weber 1897 (with which it is even synonymized by Lévêque & Daget, 1984).

Barbus cf. *bifrenatus*

Barbus barotseensis Pellegrin, 1920

The drawing of this species in Skelton (1993a) shows a fish with small circular spots. In contrast, both of the fishes shown below have oblong oval dots, which again puts the identification in question. One of the two fish has been parasitised by a fish louse, which adheres to the head directly above the eyes. However I detected this only with hindsight when looking at the photos. The number of spots on the body appears to be variable. Could this be because the animals in the photographs represent two different species? *B. barotseensis* reaches about 5 cm (SL) and according to FishBase, is common in the Cunene, Okavango, and upper Zambezi River (the type-locality is at Léalui, in the upper Zambezi in Zambia). The species is likewise known from southern tributaries of the Congo system. It is closely related to or even identical with *B. annectens*.

Barbus cf. barotseensis

Barbus cf. barotseensis. This fish has a fish louse on its head.

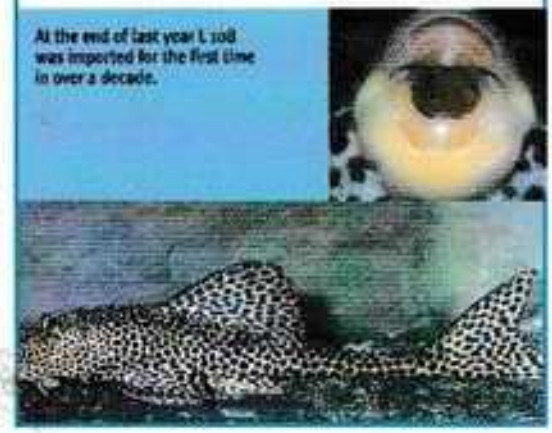
L 108 re-introduced

L 108 has been imported only once up until the end of 2002. That was in September 1992, when the L number was first assigned. At that time, it was seen as similar to *Hypostomus emarginatus* (placed in Squaliforma by Isbrücker et al., 2001) and also to the L numbers L 11 and L 35. *Transfish* had received the catfishes at the end of the year 1991 from the Ecuadorian Amazon lowlands, presumably from the area around the city of Coca.

At the end of the year 2002, these catfishes were imported for the first time by Aquarium Glaser, again from Ecuador. Having studied this recent import, I can now assert that these animals are very similar to *Isorineloricaria*. *Isorineloricaria festae* (BOULENGER, 1898) is described from the Rios Vinces and Perips in Ecuador. A superficial comparison with the original description confirms the suspicion that L 108 is identical with this species. Of course, it would be necessary to compare preserved animals with those of the types in order to arrive at a firm conclusion. But I think it is justifiable to refer L 108 as *Isorineloricaria* cf. *festae*.

On the other hand, *I. festae* has been recently been reclassified, because of a still unpublished work (Weber, 2001?), as junior synonym of *I. spinosissima*. It is assumed that *I. festae* describes young animals, because *I. spinosissima* is one of the largest plated catfishes of all, reaching at least 56.5 cm (TL). However, the largest specimens described as *I. festae* already measured 46 cm. The thought that *I. festae* could be a synonym of *I. spinosissima* is not new. Isbrücker (1980) already refers to Eigenmann (1922), who also mentioned this possibility. I am still sceptical at the moment, and suspect we are dealing with two valid species. But let's see which arguments Weber cites, if his work is finally published.

At the end of last year L 108 was imported for the first time in over a decade.



References

Isbrücker, I.J.H. (1980): Classification and catalogue of the mailed Loricariidae (Pisces, Siluriformes). (Verst. en techn. Geg., Inst. v. Taxonomische Zoöl. (Zoöl. Mus.), Univ. Amsterdam). Isbrücker, I.J.H.; Seidel, I.; Michels, J.P.; Schraml, E. & Werner, A. (2001): Diagnose vierzehn neuer Gattungen der Familie Loricariidae Rafinesque, (1815). In: DATZ Sonderheft Harnischwelse 2: 17-24. Verlag Eugen Ulmer. Stawikowski, R. (1992): Neu importiert: Harnischwelse aus Ecuador. (DATZ 45(9): 552)

Weber, C. (2001?): Loricariidae - Hypostominae. pp. to [Editorial list.]. Checklist of the Freshwater Fishes of South and Central America. In preparation.

Skelton, P. (1993a): A Complete Guide to the Freshwater Fishes of Southern Africa.

Skelton, P. (1993b): Scientific and common names of southern African freshwater fishes. Special Publication of the J.L.B. Smith Institute of Ichthyology No 56, 3499.

Eschmeyer (Catalog of Fishes - online version): http://www.calacademy.org/research/ichthyology/catalog/fishcatsearch.html

FishBase: http://filaman.uni-kiel.de/search.html

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.

Star Letter

I am writing to you about an amazing pet I have. He is a Japanese Fire-bellied newt. I appreciate you generally are interested in fish of course but as my little pet is amphibious I felt you might be quite interested in him. His name is 'Krwit' I took him on in 1979 when I rescued him from a somewhat badly kept pet shop in London, so he is now at least 24 years old! In a book I have on amphibians it gives the record for this particular species as 28 years, however I can only hope he will exceed that as he is very loved and well looked after. His home is a large propagator with pebbles, rocks, plants and water at one end. His 'room' is a half brick turned upside down and he goes in it to rest and sleep. 'Krwit is fed on ***Tetra Fin*** goldfish flakes and obviously thrives on them. When I gave him live Daphnia recently he enjoyed them but did not go for them as eagerly as the Tetra. He sheds his skin regularly and likes to climb on his plants. He makes little clicking sounds. He is dark brown colour on top and bright orange with brown spots underneath. Lots of people think he is amazing.

Sherita Rashdally, *Bexhill-on-Sea*

So Jealous

I are so jealous of David Clarke winning the Rio Xingu trip. I sent several entries in and tried the hardest I could to come up with a good reason for you to pick me. But no, my entries were passed over ! Seriously though, I would like to wish David all the luck in the world on this trip. He sounds like a fishkeeper through and through and a well deserving winner of what has to be the best prize offered by an aquatic magazine in years. I checked my pound coin jar in the hopes that I had enough stashed away to pay for the trip, but sadly came up short, despite the government saying over 300 million £1 coins have gone missing since they were first minted!

John Ashfield, *Leeds*

Who's qualified?

I am a little concerned as I recently found out my local shop keeper has never been to college to obtain any fish keeping qualifications. This surprised me a great deal as he has always given me sound advice and seems to know what he is talking about. The fish in his shop always appear healthy and the tanks well maintained. Can you tell me what the situation is with regard to qualifications and running aquarium shops. Are there any rules on this?

Peter Jackson, *via e-mail*

The editor replies

There are those who would like you to think qualifications are the most important factor when it comes to running an aquarium shop or dispensing good advice about fish keeping. The fact is it is only in the past few years that any courses orientated towards aquarium fish keeping became available. When I left school and looked around for college courses there was nothing on this subject, although good courses in horticulture were available. If I had been a little less into the fish and more into plants at that stage I would have certainly gone down that route. It is a short cut to the basic information needed to work in aquatics. So my advice to anyone thinking about working in the industry now, is to go to college and get a qualification. Looking at the industry as a whole today, it is a fact that many of the best aquarium shops are owned and run by people who have no formal qualifications whatsoever. They provide an excellent service to their customers and have a wealth of fish keeping knowledge no college course can provide. They are what is known as "O.B.E." - Qualified By Experience, and experience is the greatest teacher of all.

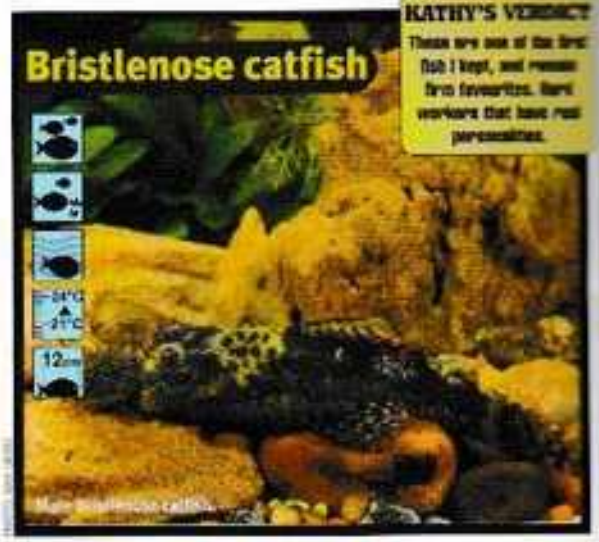
Top of the Pops

Everyone has their own "Top of the pops" in the fish world. Here is **Kathy Jinking's** personal choice.

WHAT ARE YOUR "TOP OF THE POPS"?

Send in your own list of "Top of the Pops" fish to Today's Fishkeeper and say why they are your personal favourites. We will then create your very own "Top of the Pops" feature. Send your list to: "Top of the Pops", Today's Fishkeeper magazine, TRMG magazines Ltd., Winchester Court, 1 Forum Place, Hatfield, Herts. AL10 0RN, or email derek@trmg.co.uk

Bristlenose catfish



KATHY'S VERDICT

These are one of the first fish I kept, and remain firm favourites. Hard workers that have real personalities.

Scientific name:	*Ancistrus temminckl*
Aquarium type:	60x30x30cm
Distribution:	South America.
Diet:	Primarily vegetable matter but commercial foods as well.
Companion species:	Other small to medium sized fish.

Guppies

Neon blue Guppy

KATHY'S VERDICT

The first fish I ever bred- yes, I know its not hard, but the first time was special. Hardy and beautiful.

Scientific name:	*Poecilia reticulata*
Aquarium type:	45x30x30cm
Distribution:	Originally South America and the Carribean, now world wide.
Diet:	Flake, granular, frozen, and live foods. Easy to feed.
Companion species:	Other small sized community fish.

Bitterlings

Chinese bitterlings

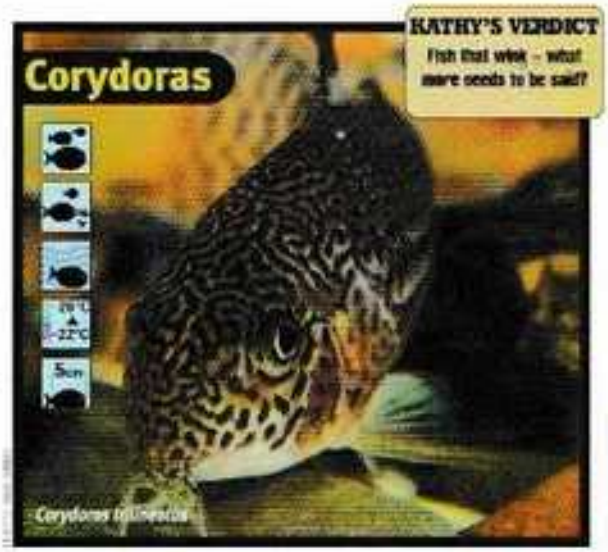
KATHY'S VERDICT

You don't see these often now, because of the flowering, but they are one of the most beautiful fish, as well as fascinating.

Scientific name:	*Rhodeus amarus* but there are other species available
Aquarium type:	60x30x30cm
Distribution:	Europe and Asia
Diet:	All commercial foods plus some live.
Companion species:	Other small to medium cool water community fish.

SEE KEY TO SYMBOLS ON PAGE 5

Corydoras



Corydoras trilineatus

KATHY'S VERDICT
Fish that wink – what more needs to be said?

Scientific name:	*Any Corydoras*
Aquarium type:	60 x 30 x 30cm
Distribution:	South America
Diet:	All foods including commercial flake and granular providing the sink.
Companion species:	Other small to medium community species.

Dragon gobies

These fish love to perch on a rock

KATHY'S VERDICT
Cute, pretty, fascinating to breed and the inspiration for the first article I ever wrote for A&P so TFH was there.

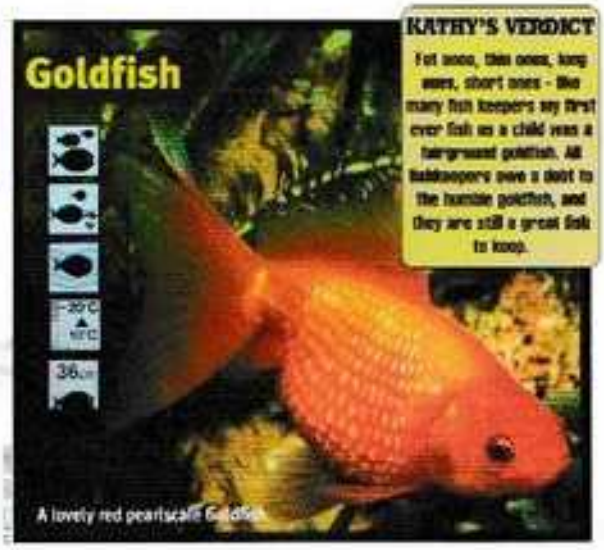
Scientific name:	*Rhinogobius wui*
Aquarium type:	45 x 30 x 30cm
Distribution:	South China & Hong Kong
Diet:	All meaty foods including live and frozen.
Companion species:	Other small sized peaceful species.

Violet goby

KATHY'S VERDICT
Astonishingly ugly, bright purple these gentle giants never did eat all the little fish as I was warned they would.

Scientific name:	*Gobioides broussonetii*
Aquarium type:	150 x 30 x 30cm
Distribution:	From Georgia (U.S.A.) down to Brazil.
Diet:	Meaty foods including live and frozen.
Companion species:	Said to eat smaller fish but Kathy's didn't and lived happily in a community tank.

Goldfish



A lovely red pearlscale Goldfish

KATHY'S VERDICT
Fat ones, thin ones, long ones, short ones – like many fish keepers my first ever fish as a child was a fairground goldfish. All fishkeepers owe a debt to the humble goldfish, and they are still a great fish to keep.

Scientific name:	*Carassius auratus*
Aquarium type:	90x30x30cm
Distribution:	Asia.
Diet:	All foods.
Companion species:	Other medium sized cool water community fish.

tropical marine coldwater & ponds plants reptiles & amphibians regulars

Sea view

Andrew Caine starts a new series on Coral health and has a fussy fish and a lovely coral for you

Andrew's Weedy scorpion fish will happily sit on a Bubble anemone, *Entacmaea quadricolor*! See page 22 for a picture of a Weedy scorpionfish.

FANS OF STAR TREK WILL KNOW THAT IN the future the human race will no longer require money to structure their whole way of life, people will work for the good of all and not for money. Until that time comes, however, we will witness innumerable coral deaths and disease in the wild and aquarium. Why? The simple fact of life is that there is a lack of funding to support scientific research into this area of study so, in the true meaning of Star Trek, we are only beginning 'to go where no man has gone before.' OK, so that isn't strictly true, many esteemed aquarists have identified different diseases, but we are only just beginning to identify the true causes and only when these are known can we find a true cure.

Aquarists play a major role in research

This area outlines the importance of our hobby and how, as a community, we can further scientific understanding of animals in our care. Some will argue that once in the aquarium the animal is not in its correct environment, so any results cannot be applied to the wild. We have, however, a situation where little wild study is ongoing, so we have to make observations and other studies in aquaria to scratch at the surface of understanding.

A little tale about aquarists' observations is worth noting here. My Weedy scorpion fish, *Rhinopias aphanes*, living happily in my reef aquarium, noticed a new addition, a nice Bubble anemone, *Entacmaea quadricolor*. The next day I looked into the aquarium and, to my horror, my prize fish was resting on the anemone. Panic went through me, but then I noticed that the fish was in no distress. Has this fish evolved the same defence against anemones that the Clown fish has? It seems so. This is the first time, to my knowledge, that this behaviour in this species of fish has been observed. My male Clown went missing that day, so good predatory behaviour has been established. I have since tried three different anemone species but the fish kept its distance. Observations are on going but back to the corals.

When we look at health, disease, and death we are in fact looking at three different but related areas that all go hand in hand. A healthy coral has a good immune system to fight disease, but if you accidentally drop it in the aquarium it's damaged and secondary infection occurs (disease) followed by death. So anything can happen at any time to cause the loss of an aquatic friend. We all have a responsibility to look closely at this area, not just brush it aside but actively strive to reduce the overall loss, and increase the overall health of our charges.

In this series we will look at a few areas to try to gain an understanding, no matter how limited, of the diseases that affect our corals, how they occur and how, with good husbandry, we can avoid or reduce the incidents in coral mortality within the confines of a closed system.

STRIPED MANDARIN SYNCHIROPUS SPLENDIDUS

This baby is an absolute cracker in every sense of the word. It's also a heartbreaker and a fish with special requirements for aquarium life. If this was a wine I would be shouting about Arabian sunsets and Californian nutmeg, but it's a fish and let's face it, just by looking and studying the beast, it has to be described as a truly visual delight, one of the wonders of the ocean.

Apart from the obvious beauty, the way in which the fish has evolved brings visual wonder to the aquarium as the pectoral and ventral fins have migrated together, and the anal fin has migrated forward to under the gill cover providing a point for the fish to rest on. But why have the pectoral and ventral fins shifted? These work together and act as fans which are constantly beating, allowing the fish to hover above the rock work taking its time to look for bugs hiding in the nooks.

The slow movement of the fish and coloration all scream 'don't eat me' to other fish. This fish is well protected, for it will secrete a toxin over the skin and any predator will soon learn it alone. Added to this, very sharp spines exist over the opercula plate (gill cover) so care must be taken when netting, as they can get caught which causes stress and damage.

Males have an elongated first dorsal spine which makes acquiring a pair very easy ;(but only one pair per aquarium though). These are the most peaceful fish one could dream of until two males are looking at each other. Ding! ding! round one of the world welterweight championship of the aquarium begins and this could well be a fight to the death. Spawning has been achieved in the aquarium but, to my knowledge, commercial breeding has never been established.

Your aquarium must have large amounts of livestock to provide a natural home for our beast but, most importantly, be a breeding ground for a healthy zooplankton population, as it needs millions of bugs. Our fish will look at its food for 10 minutes before eating,this is a very fussy little fish. Under normal aquarium feeding conditions it will starve to death as the tank mates out compete it for food. This means is that your aquarium must be at least 9 months old and teeming with life. Introduction too early will result in the zooplankton population being unable to reproduce fast enough in response to predator pressure. Slowly, the natural food source will decline along with the health of the fish. Feeding your aquarium with live phytoplankton will really boost the zooplankton population, so you will be indirectly feeding the Mandarin.

This is just one fantastic fish so you might expect to pay at least £70. Looking at it you would think so, but at between £15 and £25 it has to be the bargain fish of the aquarium world. When purchasing, choose only fish with a fully rounded gut, any signs of starvation and you need to leave it alone.

PROFILE

Family
Callionymidae

Name
Synchiropus splendidus

Location
Western Pacific

Size
8 cm

Feeding
Live food only, natural populations a must.

Reef compatibility
One of the best

Difficulty
Very easy if the food is there

The Striped mandarin may be one of the most beautiful fish in the world, but don't try to keep it unless you can provide the right diet.

A fish for you

An invertebrate for you

A Hedgehog coral colony growing in the wild. Depending upon the conditions this coral will grow in different ways and may look totally different.

Hedgehog coral - *Echinopora lamellose*

When is a coral not a coral, when it's an Echinopora. What on earth am I rambling on about! Of course, this beauty of the tropical ocean is a coral and it's cracker. But do you have one or do you not?

Many different forms, many different names

This coral can be described as an uncommon import under its own name, but it can resemble many species of more desirable corals. Easier to keep than others, it is often misidentified... How can such a thing happen? Well, this beauty not only displays a wide variety of colours from brown to sky blue to vivid greens but, to throw a spanner in the works, it can display a huge number of growth forms. As with all hard corals, examination of the corallite (the hole where an individual polyp lives) is the only true way to identification at species level, but you have to kill the polyp for that, so we won't bother!

The plating forms are the most common but even these display many growth forms in the plating. Why? It's all to do with the physical environment that the animal is subjected to. Commonly found in shallow waters with intense water turbulence, the colony has to grow to the pressures exerted upon it. Take a big boulder, and two larval corals settle on opposite sides. The water flow at these two points is different. Hey presto! two different colony shapes develop but it's the same species.

Provide it with plenty of light, feed this beast animal based /off the shelf products daily or feed live phytoplankton to develop a large natural zooplankton (little bugs) population in the aquarium for it to feed on. Moderate to high water flow and quality is essential and 'bingo!' a happy coral.

It's a fast grower, so when your prize is established try a little experiment. Take one pair of pliers and snap a bit off, then place the frag in another part of the aquarium with a different water flow. Then sit back and watch, you should see a different growth form develop which brings another visual wonder to your aquarium.

As an aquarium animal this should be high on the list for the hard coral nut. The plating nature brings a wonderful dimension to the aquarium and provides an array of micro habitats for other animals to take advantage of. It's easy to keep and grows very fast, so why are you still reading this, when you should be running for the car to try and find one? If you do, is it really what it seems or is it an impostor? ■

PROFILE

Phylum
Cnidaria

Name
Echinopora lamellose

Location
Indo-Pacific

Feeding
Animal based coral foods

Size
Can grow and grow, but is limited as storms break off sections on a regular basis

Water flow
High to moderate

Lighting
T5s or Halides

Difficulty
Easy if all its requirements are catered for. As always, needs very good water quality

Ponderings

Dave Bevan asks the question *"Have you got a lurking monster in your pond?*

Pike are an obvious predator but there are other less well known predators which can sneak into a garden pond without the owner realising they have bought a bag of trouble.

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

So which fish are predatory? Amongst our native fish, Pike and the now established Zander are obvious predators, but less obvious are the Perch and Trout particularly when they get bigger. It also pays to be wary of what's on offer at the local aquarists centre. Catfish like the Wels are occasionally on offer. Resist the temptation unless you want a pond with only one occupant that you rarely see!

BELOW THE SURFACE

Many creatures, some of them very small, live in the accumulated debris on the bottom of the pond. At certain times of the year these creatures can multiply very rapidly, none more so than various worm like creatures. They may take the form of Bloodworms, larvae of midges or small segmented worms closely related to the Earthworm. A sure sign they are working the bottom, and helping to reduce the levels of rotting material, which contributes to poor water quality, is the presence of worm casts on the bottom.

FASCINATING Fact

It is not often that you get something for nothing but a venturi does just that. It is a simple little device that can be fitted to the return flow from a pump or filter. As the water passes through it draws in air from the atmosphere thus increasing the oxygen level in the water. With no moving parts a venturi will not wear out.

The water flow draws air through this venturi's sponge

ROACH FACTFILE

Species:	Roach (*Rutilus rutilus*)
Other names:	None
Other forms:	Occasionally hybridises with Rudd or Bream
Size:	Up to 30 cms
Weight:	Around 1 kilo
Availability:	Occasionally available through specialist outlets
Habitat:	Large shoals in slow running rivers and large lakes
Identification:	Roach have a dark rounded back with silvery white sides and reddish eyes.
Habits:	Roach eat a large range of water animals including Caddis and Mayfly larvae and can survive on relatively low amounts of oxygen when necessary. Between April and May each year they produce up to 50,000 eggs and may hybridise with Rudd or Bream.
Pond fish value:	Roach adapt well to pond life and are particularly at home in ponds with some running water. They are peaceful, shoaling fish which will happily mingle with Goldfish in the middle of the pool.

Roach make a good addition to the garden pond.

EQUIPMENT CORNER

Feeding pond plants in order to maximise their size and flowering capacity can have detrimental effects on the pond if the fertiliser dissolves in the water, this dramatically increases the nitrates and phosphates so that the resulting algal bloom takes weeks to clear.

Laguna have introduced the *Once-a-year* fertiliser pond spike that helps to overcome these problems. Simply remove the cellophane cover from the black plastic tube and push it into the planter close to the plant roots. The tube contains tiny granules of a balanced fertiliser, low in phosphorus so it does not impact on water quality, and is also non-toxic to fish and other pond creatures. It is also temperature activated so that fertiliser is only released when the temperature rises above 10°C which is during the peak growing and flowering period.

Designed to last a full 12-month period the spikes contain 16% nitrogen, 9% available phosphate and 12% soluble potash as well as traces of magnesium, sulphur, boron, iron, manganese, molybdenum and zinc. Pond spikes can be used with any water plant contained in a planting medium within a container. They are also suitable for hanging baskets.

Laguna fertiliser pond spikes are an ideal method of fertilising your pond plants without causing water quality problems.

DISCUS PROBLEM SOLVER

Tony Sault solves another round of your problems

I have been keeping Discus for 3 years now and find them fascinating. I have obtained two pairs from my original fish and these have both bred and reared their young. I would like eventually to try to create a new strain but can you tell me what this would entail?
L Moors, *Bedford*

For any new colour variant to be classified as a strain, a number of years of cross and back breeding are required to fix the particular colour or trait the breeder requires and, most importantly, the progeny of any male and female from that particular strain must inherit and exhibit all the characteristics of the strain. If they do not meet all these criteria then they can only be classed as 'sports' or 'crossers' and not a new strain. For example, the progeny of crossers will not only exhibit the characteristics of the two parents but also the characteristics of the four grandparents as the strain has not been fixed for any particular trait.

The time it takes to fix a strain is determined by the life cycle of the fish in question. As Discus are relatively long lived fish, they do not become sexually mature until they are approximately one year old for females and 15 to 18 months old for males. So having bred a pair of Discus, the fry have to be reared to maturity to observe the inherited characteristics before suitable partners can be chosen for cross breeding in the first filial or F1 generation to produce the F2 generation, or back breeding to the original parents to enhance the desired characteristic. As it usually takes at least 5 generations to fix a particular trait genetically, then it can be seen that the time involved can be up to 7 or 8 years to achieve the desired effect. Some breeders will release a new strain on to the market when the progeny are breeding 50% true, and this is certainly more acceptable than sales one generation with a new name. Most 'short term' developed strains carry the recessive genes of undesirable traits and will produce 'throw backs' to the original stock. It takes a lot of time and effort to create a new strain so may I be the first to wish you a lot of patience in your efforts and a lot of luck. Please let me know how you progress.

A solid blue pure strain male which is the result of many generations of line-breeding and inbreeding.

TWO FOR THE PRICE OF ONE

I have set up a 200 litre tank for Discus which is now maturing. Before I introduce a shoal of 8 young Discus I would like to know what temperature is best to keep them at as I have been told conflicting things from various people and would like your opinion
Keith Miller, *London NW1*

My Discus are normal colour and do not appear to be unhealthy but they used to eat all their food in a few minutes and then look for more, now they only pick at their food and I often have to syphon it out. This is causing me concern, so I am wondering if a medication or tonic is required. I have also been advised to try 'heat treatment' Can you tell me what this is?
Dave Barnes, *Derby*

In answer to both your questions and to allay any fears you may have, I hope the following will help. The optimum temperature at which Discus should be kept is still a debatable subject among hobbyists, but, in my opinion, Discus kept at 29-30°C or higher than the normal tropical range always fare better than those kept in the lower temperature band.

Benefits to Discus of higher temperatures are numerous. Young Discus tend to be more energetic and lively and their growth rate is increased due to their increased metabolic rate. A temperature rise of 2-3°C can work wonders with a breeding pair inducing them to spawn, this should be timed to occur after a few days of increased feeding and water changes.

A widely recognised treatment for Discus problems is high temperature. For example, if the Discus become lethargic and genetally picky with their food, a week at a temperature of 32-33°C is as good a tonic as any, but first check that all conditions are normal and that there is no obvious reason for a change in attitude of the fish. Two weeks at a temperature of 32-33°C can cure many Discus ailments without resorting to the use of medications, as a lot of pathogens are not viable at this temperature.

Naturally, there is always a down side but with a little care the potential problems that can occur with 'heat treatment' can be avoided. Never increase the temperature rapidly. As a rule of thumb 1-2°C per hour will be tolerated. Always remove temperature sensitive fish such as catfish to another tank before increasing the temperature. Always ensure adequate surface water movement by adding air stones if necessary, as oxygen depletion can occur at higher temperatures. Always ensure adequate filtration, as the metabolic rate of the Discus increases they use more energy and require more food that in turn produces more waste for the filter to handle. In my opinion the advantages of keeping Discus at the top end of the tropical temperature range far outweigh the disadvantages.

Take Shelter Part 2

Last month **Anthony Calfo** outlined the fundamentals of refugium size, placement and general attributes. Now he moves on to the different types of refugium and their functions.

REFUGIA CAN ESSENTIALLY BE DIVIDED into six main types. These are:

1. **Vegetable filters**
2. **Animal filters**
3. **Plankton generators**
4. **Natural nitrate reducers**
5. **Mud systems**
6. **Ornamental and alternative**

Vegetable filters

In the broadest definition of refugia as "vegetable filters", we have the deliberate culture of a plant or algae for the purpose of concentrating and exporting nutrients from the system. Nutrients taken in by a plant or algae may be fixed in the growth of a stable organism like a mangrove tree, or they may volatile as when bound in the fast-growing, but precariously short-lived cycle of the noxious algae, *Caulerpa*. The best "greens" for a vegetable filter instead are more even keeled with moderate to fast growth, and very stable masses like *Chaetomorpha* "spaghetti algae" (there are many other fine genera too).

Nutrients are exported from a vegetable filter simply by pruning or thinning the biomass on a regular and systematic schedule. Diligence with harvest is crucial not only for nutrient export, but to interrupt the life cycle of some algae to prevent an act of sexual reproduction or vegetative fission, which can be a tremendous burden on water quality. Be mindful that some plants and algae can be literally cut (seagrasses and most multicellular algae) while others need to simply be thinned (removing whole fronds of large single-celled *Caulerpa* as unbroken, for example). Also be aware of discolorants from algae that may tint water clarity and reduce the penetration and quality of light for the system overall. This can be a serious issue in reef aquariums with corals, but is easily remedied with small frequent exchanges of carbon and regular water changes.

Refugia as Plankton Generators

Also known as a plankton "reactor", the hobby and trade have created several fancy names for refugia designed specifically to produce plankton. Few are more than simple, remote aquaria devoid of predators that would otherwise eat that which will bloom and grow naturally in your system. The three types of plankton produced include Zooplankton, which are animal plankters. Of these more than half of all in the ocean are copepods. We also commonly see amphipods and mysids in aquaria. The other two types are phytoplankton that includes algae plankters and protoplankton that includes the ever important but oft overlooked bacteria.

This algae scrubber under Gary Thomas's reef tank removes surplus nutrients from the water so preventing nuisance algae.

Harpacticoid copepods are small crustaceans that eat bacteria and detritus and in turn are eaten by many fish species.


Caulerpa is just one of several different genera of algae which can be used in a vegetable filter

ANIMAL FILTERS

These are an interesting and novel vehicle for the export of nutrients. The very notion is a testimony to how far and fast the hobby has evolved in such a relatively short period of time. Not quite twenty years ago most people would tell you that it was very difficult, if possible at all, to keep corals and other reef invertebrates alive in an aquarium. Nowadays, we are so successful in keeping reef animals that we are farming some attractive and ornamental species as living bio-mass for nutrient export mechanisms! The premise is very simple and we must abide by essentially the same limitations that one would with the above-mentioned plants and algae in a vegetable filter. Ideal animals will be fast growing but stable, easily harvested and maintained, weakly noxious and efficient in nutrient uptake (feeding aggressively by absorption, suspension and organismally, as the case may be). *Xenia* polyp corals have been a safe and popular favourite for their fast growth, weak aggression and salability. Many other creatures are used too like sponges, polyps, and corallimorphs. Although many of these creatures will be a burden on plankton populations, they can be very useful filter-feeders in systems with heavy bio-loads with a more pressing need to address excess organics from food and metabolites.

Most plankton currently produced in marine aquaria falls into one of two size categories. The largest and most conspicuous plankton to us is macroplankton, which includes most of the micro-crustaceans that we see with the naked eye and fish larvae. Ever more common nowadays is the production of microplankton (smaller than macroplankton, of course), which largely includes invertebrate larvae. As the hobby evolves, however, and we seek to keep more challenging filter feeders that demand smaller prey and particles, we must strive to naturally produce more nanoplankton (smaller still than the aforementioned planktons).

Zooplankton "reactors" are of the easiest and most useful to employ. Their purpose is to produce large populations of micro-crustaceans. The process is achieved simply by having any dense physical matrix to support the growth of creeping and crawling amphipods, copepods, mysid shrimp and the like. The matrix can be wire algae, hair algae... or artificial media like plastic fibre pads! Of course, if you use living algae for habitat to cultivate micro-crustaceans, you will have all of the merits, challenges and limitations of the living medium (lighting, water flow, nutrient base, etc). If you choose an inert and artificial media like fibrous pads instead, however, there is almost no maintenance to speak of. The refugium can simply be an unlit and empty vessel full of openly stacked or threaded (hung on strands like a clothesline) pads that are bathed in reasonably good water flow. For this purpose aquarists commonly utilise bonded filter pad, dish scrubbing pads, pond filter pads or pre-filters, and even very coarse foam blocks. About all one has to do to encourage the production of these wonderful crustaceans is to offer the colony a source of food. Various natural substrates also can be employed with the similar results instead of algae or floss. A zooplankton refugium is one of the best for aquaristics because most popular fish and coral in the hobby are zooplankton feeders.

Phytoplankton "reactors" are vessels dedicated to the culture of "greenwater" (unicellular algae). Most phyto- species fall into the category of nanoplankton by size. They have great appeal and potential in the hobby as food for some challenging corals and other reef invertebrates that until recently have been too discriminating in their feeding habits to keep. Phytoplankton is also a fundamental foodstuff for numerous micro organisms in the reef, like copepods which are in turn crucial in the overall food web. There is always some concern that too much "phyto" introduced in to an aquarium can lead to a stressful "greenwater" bloom in the display. In most →

DEEP SAND BED (DSB) REFUGIA AND NATURAL NITRATE REDUCTION (NNR)

The essential mechanics for accomplishing nitrate control with sand at depth is really a straight forward matter. The size of the refugium that you need to accomplish this depends entirely on your particular system's propensity to accumulate nitrogenous matter. With that said, a very basic guideline is that a DSB refugium should be at least 20% of the display's volume in size while closer to 40% would be ideal. Sand is to be maintained at more than 10cm depth with 15cm or more ideally. Some of the most effective applications use sugar-fine sand and they are kept unlit. The absence of (dedicated) light reduces the ability for autotrophic nuisance algae to gain a foothold. It also spares the need for much or any support from detritavores (sand-stirring creatures such as Hermit crabs, Sea cucumbers, Starfish and Shrimp). Good water flow and occasional sand-stirring (manually) will work well if detritavores are not employed. A deep sand bed will also facilitate the development of numerous polychaete worms and micro-crustaceans that become priceless natural plankton. Once installed, nitrate reduction on an established aquarium will often be evident in as little as 2 weeks.

healthy systems with a judicious application of phytoplankton dosing, however, there is little cause for concern. Refugia for phytoplankton range from simple pop-bottle cultures (manual dosing) to elaborate metered systems with UV sterilising filters on the effluent to prevent the proliferation of green water in the aquarium. The protocol for culturing live phytoplankton is well documented and very straightforward. *Nannochloropsis* and *Isochrysis* species have been quite popular commercially, but numerous viable genera exist.

Some aquarists regard the endeavour to grow and maintain green water as tedious, while others find it to be simple enough. For those that fall in the former category, various live, semi-live, liquid and concentrated paste products are available commercially to spare you much or all of the work of building and operating a live phyto refugium or food station. More ambitious hobbyists can begin their search for live cultures, kits and information from aquaculture supply houses like Florida Aqua Farms, and the reference, "Plankton Culture Manual" by Frank H. Hoff and Terry W. Snell.

Mud-based substrates in refugia

Methodologies for employing 'mud' and soil-like products in refugium substrates has been a tremendously interesting and progressive area of development in the marine hobby. The application has many potential benefits and limitations in kind. There are quite a few dubious marketing claims about its potential though. I would simply recommend an approach with judicious experimentation. Aquarists interested in true marine plants like seagrasses and mangroves are especially encouraged to experiment here. Some of the benefits of using mud as a refugium substrate (with or without fine sand mixed in) include the unique nutrients provided by mud which are not readily furnished by other marine substrates. The medium of mud supports the production of unique plankton not readily cultured in other substrates and supports various plants and algae that may not grow as well in coarse or purely calcareous substrates.

Some of the concerns with using mud in refugium substrates including compositional nutrients are not clearly defined, easily monitored or standardised... thus success for casual aquarists with the methodology is difficult to promise or predict relative to claims made about the application. Extra attention paid to water clarity may be necessary via carbon, ozone, water changes, skimmers, etc... The expense of commercially prepared mud can be dear and hard to reckon without clearly defined benefits, and unused nutrients imparted by the substrate can fuel the growth of nuisance organisms.

Mangroves like this one growing in an experimental aquarium might well grow better with a mud-based substrate.

Ornamental & alternative refugia

The application of refugium methodologies at large is indeed still a highly experimental endeavour. Even in the light of the many styles already listed above, we can say that we have only begun to realise the benefits and potentials of these ancillary vessels. Casual aquarists can be satisfied to employ traditional styles described. Progressive aquarists may wish to consider some innovative display and filtration interpretations of refugia like intertidal vessels (replicating tidal states), multi-tiered systems (to display and culture species by zonation), and twilight and cryptic zones (sponges, tunicates and deep water biotopes). There is no doubt that in time, refugia will be as indispensable as live rock and protein skimmers are for the casual aquarist. And just as the introduction of live rock dramatically changed and improved the state of marine keeping, refugia are exponentially expanding the diversity and vitality of reef life in captivity. ■

Today's Surgery

IN ASSOCIATION WITH
AQUARIUM PHARMACEUTICALS (UK) LTD

Some diseases seem to be associated with certain groups or species of fish. This month **Lance Jepson**, our resident vet, explains which diseases are associated with cichlids.

As with the previous article, the aim of this one is to provide a résumé of the diseases and conditions that afflict Cichlids. This huge and successful group of fish are found throughout the tropics with strongholds in Africa and South and Central America, although they are also present in the Holy Land and southern United States of America (where the true Texas cichlid *Herichthys cyanoguttatus* is endemic). Asia is poorly represented with only a few species (the Chromides, *Etroplus* spp.) found in India and Sri Lanka. Madagascar also has an endemic Cichlid population, many of which are threatened, but fortunately some of these species are now becoming available in the hobby including *Paratilapia bleekeri* and *Ptychochromis* spp.

From our point of view these fish are important as aquarium fish, with one of the most popular of all aquarium fish - the Angelfish belonging to this group. More recently two Cichlid hybrids have become significantly important in the aquatics industry - the Parrot cichlid (probably, but not certainly, a cross between the Red Devil or Midas Cichlid *Amphilophus*

This Bolivian ram (*Mikrogeophagus altispinosus*) has lymphocystis viral disease which is sometimes called 'Cauliflower disease' because of the white growths.

Ulltimellus and the Quetzel cichlid *Vieja synspilus*), and the Flower Horn, a cross involving several species of Central American cichlids.

We should not forget their global significance in aquaculture, with enormous numbers of tilapia and tilapia hybrids being farmed around the world as a cheap source of protein. Much of the basic work on cichlid disease has been done on these farmed tilapines, augmented by some research on commercially important aquarium species such as discus (*Symphysodon* spp) and their hybrids. I shall try to restrict this article to aquarium species only, although many tilapine fish are kept by aquarists and so arguably this boundary, by definition, must be blurred.

Water quality

In general, Cichlids are truly tropical fish with only relatively few species able to withstand prolonged temperature drops. Aside from such notable exceptions as the Texas cichlid and Port Acara (*Aequidens portalegrensis* – which has become naturalised in Portugal) that tolerate seasonal cool spells, temperatures in the mid-twenties centigrade are required, increasing to the high twenties, even low thirties for some species such as Discus. Of interest is that tilapia exposed to low temperatures showed a fall in blood antibody levels and a reduction in white blood cell activity compared to those kept at a more normal temperature. In commercial Tilapia hybrids (*Oreochromis niloticus* x *O. massambicus*) growth rate, food consumption and utilisation of that food was at it greatest at 28°C, with these decreasing when measured at either 22°C and 34°C.

Most species are relatively tough with regard to other water quality parameters as long as ammonia, nitrite and nitrate are kept at recommended values. Some Cichlids such as the Rift lake species are found in very hard water of high pH (especially Lake Tanganyikan with a pH range of 8.7-9.4 and a total carbonate hardness of 200 to 240 ppm). That's not to say that they cannot adapt within reason - I had a pair of *Neolamprologus leleupi* repeatedly spawning and raising young in Pembrokeshire tap water with a pH around 7.2 and hardness of 100ppm.

Many popular Cichlids such as the Angelfish (*Pterophyllum* spp.) and Dwarf cichlids (*Apistogramma* spp) are Amazonian in origin. Here the water is often extremely soft with very low levels of dissolved salts and low pH's to boot. However these waters are rich in high levels of dissolved organic molecules (such as tannins that give their native waters its characteristic brown colour) that may help to protect the delicate gills from these low pH's. Tannins and other dissolved plant derived compounds may also have antibacterial, antifungal and antiparasitic properties as well.

KILLER DIETS

Inappropriate diet can have both direct and indirect effects upon Cichlid health. A classic example of this can be seen with Lake Malawi's Mbuna cichlids. Many of these are adapted to feed on algae, especially blue-green algae, plus the small and in some cases microscopic invertebrates that inhabit this algae - a diet commonly referred to as *aufwuchs*. This is a fairly poor quality diet and so the fish must spend a lot of time feeding in order to take in enough energy. It may well take these fish some time to build up the necessary energy reserves needed to produce eggs and sperm so at any point most of the fish in a given population may not be reproductively active. The gut of such fish is adapted to deal with this diet. Cichlids such as *Labeotropheus trewavasae* have relatively longer intestines than fish-eating species and their bowels will be naturally populated by a variety of bacteria and other organisms adapted to live in the fishes' gut. If these fish are fed on a standard commercial fish food, the high protein (45%) and low fibre (2.0%) content of these appears to cause a change in the environment inside the gut, probably killing off beneficial organisms found there and allowing the build up of disease-causing ones such as *Cryptobia iubilans*. This is a direct effect. For an indirect effect just watch these fish grow on commercial foods. *Metriaclima zebra* will reach sizes in captivity not seen in the wild, and the bigger the fish, the bigger the territory it will attempt to stake out bringing it into conflict more often with other aquarium inhabitants. Also these fish become constantly reproductively active, and we've already mentioned what that can do to an immune system. For general maintenance, feeding these fish sparingly on the newer spirulina-based foods with a protein content of 36% and fibre of 3% (doesn't sound much I know, but its a 50% increase on most flaked foods!) should help to reduce these problems.

Viral Diseases

Lymphocystis is an iridoviral infection that is occasionally seen in Cichlids, often establishing itself through bite wounds and abrasions received during typical cichlid conflicts. More disfiguring than a serious health risk to the fish, it is usually self limiting and will disappear of its own accord. Typical signs are the large grey-white or yellowish nodules (which always remind me of small cauliflower's) on the fins and skin. Occasionally these growths can occur internally and cause problems but this appears to be quite rare. Using ultraviolet sterilisation may help to reduce its spread. ■

STRESS

Stress is a common underlying cause of disease in Cichlids, and much of this is linked to their natural behaviour. It is difficult to truly generalise about Cichlid behaviour, but the vast majority of species do become territorial at some point in their life cycle - usually when spawning and rearing young. Compared to the wild situation, life in aquaria offers an abundance of energy-rich foods, optimum temperatures (along with other water quality parameters) and so most species spawn readily in captivity. In the confines of aquaria this can spell disaster to other fish in the aquarium. Many Cichlids in aquaria are in a perpetual state of readiness to breed. This again is different from the wild where breeding is often limited to certain seasons because external factors such as food abundance, spawning sites and temperature dictate when the fish are able to breed. In Tilapia, some sex hormones (both male and female) have been found to suppress the fishes' immune system, suggesting that periods of prolonged sexual readiness (and so constant high levels of sex hormones) will leave the fish open to disease. Even in non-breeding groups, "pecking orders" can be established and it has been demonstrated that in those fish which are subordinate, their immune systems do not function as well as in more dominant individuals. Even the stress of netting and being taken out of the water has been linked to falls in blood antibody levels and an increased risk of cardiac arrest.

Identification of some imported Botias is difficult. This fish is similar to *B. robusta* but without proper scientific examination it is impossible to say for sure.

Botias galore

In the second part of our new in-depth series on Botias **Dr. Peter A. Lewis** looks at their aquarium needs.

Many of the Botia species we keep in our aquaria are accustomed to protecting themselves in the wild by rapidly burying themselves in the mud or gravel of the stream in which they live. For this reason the aquarist is well advised to provide for loaches by choosing an appropriate fine-grained, well washed gravel or substratum for the aquarium that is devoid of sharp edges likely to damage the fish as they inevitably disappear beneath the bottom layer of the tank in search of food or shelter. The tank should also contain selected pieces of well washed driftwood or appropriate roots and non calcareous rocks such that the water remains soft and mildly acidic. Plants are welcome since even the most vigorous digging specimens are unlikely to uproot a well planted tank of Cryptocoryne or Vallisneria. Personally I use a low amperage, low throughput, power filter in the corner of each of my loach tanks that provides a small current throughout the tank. This can be filled with activated carbon or similar filter medium to assist in keeping metabolic wastes at low levels within the tank. Typically I will use a samp power filter with a flow of 250-300 litres/hr in a 120-150 litre tank.

Hiding places vital

Critical to the successful keeping of any loach is the provision of several suitable hiding places or caves throughout the tank to afford a level of security to the fish and to enable them to retire should the lights get too bright or fellow tank mates become too robust. Failure to accommodate a loach's shy and retiring nature will most likely result in the rapid deterioration of the loaches health often leading to an untimely death.

An ideal set-up for Botias is an established tank with well rooted, broad

leafed, plants featuring ample hiding places among the rocks and driftwood used as decor. A tank set up specifically for loaches need not be deep, indeed a feature tank constructed to resemble a slow moving stream, with a depth no more than 20cm. A constant flow of water provided by a suitable power filter from one side of the display to the other to simulate a shallow stream would be a fitting tank for any loach.

Most species are shy and retiring ,often preferring to spend their day hiding out beneath a piece of driftwood or in a dimly lit cave. An aquarium stocked with loaches of any species should indulge their need for subdued lighting. Alternatively the aquarium can be stocked with floating plants such as Ricci a or Water lettuce to obtain subdued lighting in a more natural manner. I have also seen some specific set-ups where artificial lighting of the tank has been achieved using a red bulb. While this is never going to be adequate for a planted tank, it does allow the hobbyist to witness the behaviour of his "nocturnal" charges during the hours of daylight. On the subject of tank covers, it is wise to leave very few avenues of escape for Botias in an aquarium, they just haven't learnt that life outside of the aquarium just is not for them and they will constantly make a bid for freedom given half a chance.

FEEDING YOUR BOTIAS

As to feeding, please remember to feed your Botias, even though they have the reputation of being scavengers this does not mean they can exist only on what the other tank occupants miss. Most loaches are not choosy about what they eat, being perceptive, omnivorous foragers in the extreme. In the wild they graze algae from rocks and roots if necessary for survival, but their main diet consists of small worms and insect larvae. They particularly relish a feeding of any type of worm, be it Earthworm, Red worm, White worm or Tubifid worm. In fact they excel at removing an infestation of Tubifid worms that have become established in an aquarium. A decided advantage from my perspective is that many of the Botia species will resort to eating snails should the food supply dwindle for any reason. As a result, when I travel and my fish are not fed for a day or two, the snail population in my Botia tank dwindles noticeably.

Breeding

Given well conditioned, mature specimens it is not unusual to witness external sex differences exhibited as one of the loaches becomes more rounded and fuller bodied at certain times of the year giving the impression that this is the female of the species. Very few accounts have been recorded of "natural" breeding, where fry have been raised without the use of hormone injections. Breeding accounts in various publications available to the hobby are vague at best with reports that vary from typical egg scattering being the norm, to accounts of loaches building a "bubble nest" in the manner of the Siamese fighting fish or the armoured Callichthys catfish, *Hoplosternum thoracatum*. Many aquarium publications suggest that it takes several years for tank maintained Botias to reach sexual maturity, at which time females can be identified as those fish that are deeper and more rounded in the belly region. In →

This Botia *helodes* has found a great place to tuck itself away under during daylight hours. Rockwork and caves of all sorts should abound in a tank with Botias in it.

Even sexing Botias can be tricky. The lower fish of this pair of Clown Botias is almost certainly a female because of its fuller body shape and slightly paler colours compared to the upper fish.

Thailand where loaches are commercially bred, the breeder merely lets several loose into an appropriately established pond and leaves the rest to Mother Nature.

Botias are long lived and hardy. They are generally not aggressive, though exceptions do exist. They are toothless scavengers, being able to root out even the most intractable tubifex worms or tightly lodged morsel of food. They make an excellent addition to an aquarium that is missing a fish known to be a bottom feeder or forager. ■

WATER CONDITIONS

Water with a hardness of less than 10° DH at a temperature range of from 24 - 28°C is ideal whilst a pH on the acid side from as low as 5.5 to just over neutral at 7.5 is certainly endorsed. Additionally it is advisable to periodically run a check on the water's nitrate content since many species are sensitive to high levels of this product of the nitrogen cycle. Hard alkaline water is most certainly not appreciated. Regular and partial water changes, coupled with an efficient biological filtration system, either power or air operated, are the keys to success with loaches.

At certain times of the year female Botias will fill up with eggs and appear to be ready to spawn, however, almost no reports of captive spawnings in aquarists' tanks have been published.

Koi world

Bernice Brewster highlights the dangers of 'new pond syndrome'.

Starting right

FOR THE NEW KOI HOBBYIST, commissioning the pond and switching the pumps on to see the system working for the first time is a very exciting occasion. Even more exciting is the purchase of the first Koi with which to stock the pond. Hopefully any novice Koi keeper will have been warned of the dangers of 'new pond syndrome'. The biological filtration system is effectively a small treatment plant for breaking down the harmful nitrogenous waste produced by the Koi. The Koi produce nitrogenous waste in the form of ammonia, which in a mature filtration system is broken down to nitrite and then nitrate through the activity of bacteria and other micro-organisms. Both ammonia and nitrite are very poisonous to Koi.

In the new filtration system, there are usually insufficient bacteria and other microscopic bugs present to carry out this important task of breaking down the ammonia. The result is the ammonia concentration in the pond increases and the level of this pollutant can increase to dangerous levels. High levels of ammonia in the water will affect the Koi, causing distinct physiological changes, which may result in death. The survivors suffer stress and are subject to secondary diseases such as fin rot, white spot, fungus and ulcers. As the ammonia concentration begins to subside the nitrite level increases and similarly if left unmonitored can also lead to outbreaks of disease and mortality. Depending on the water temperature and time of year, it can take several months before the filter is finally working efficiently. Of course, in the summer time the Koi will also be very active and this will have a further effect on the amount of waste they are producing.

Testing vital

Routine testing of the pond water and regular partial water changes are clearly one way of controlling both ammonia and nitrite. It is also usually recommended that feeding the Koi is stopped to reduce the amount of ammonia produced. This gives me a problem! Here we have a number of Koi, in a stressful situation, which means they utilise more energy, plus the poor water conditions have an effect on the tissues of the animal, so they need repairing and at this point, we stop feeding them. The logic behind fasting the Koi, is that excess protein from the food cannot be stored and therefore is removed as ammonia, yes, this is quite true but the Koi really needs the protein and other nutrients in the food to help them through this stressful time. Another point to consider is that even if the Koi are starved, they still produce ammonia waste. The reason the ammonia production continues in simple, just day to day body processes produce waste amino acids and proteins, which the liver breaks down to ammonia. Just to make a comparison, if we are unwell and stop feeding for several days, we still produce urine, which is our way of voiding nitrogenous waste. If the Koi are starving, they need nutrients for energy from somewhere. In mature females this may come from the eggs in the ovaries,in both males and females by breaking down the body muscle. Yes, in times of food shortage, animals, including Koi and ourselves literally feed off our own bodies! Bear in mind that in the summer months the Koi are more active and their feed requirement is greatest in warm weather because of the energy they are using. So, what I would advocate is that in the summer when the Koi are active, rather than cease feeding them altogether if there is a problem with the water quality, it is better to feed them sparingly. This way the Koi will get the essential nutrients they need but without losing further condition and becoming run down and prone to secondary infections. ■

Even when stressed by water pollution Koi will still need to be fed - but very sparingly. These healthy Koi, however, are "pigs on fins" and will come right up to the pond edge to be fed.

Our readers Write

Dick Mills is 'in the chair' for your opinions.

As mentioned in the first 'Points of View' (May issue, TFK) this column will be very much what you make it and, with its resurrection, it has a distinct advantage over its predecessor. Thanks to modern communications, you can pick up *Today's Fishkeeper* on its release date and, by means of electronic mail, just about get your views in for publication in the very next issue! How's that for immediacy? Everyone is as close to the editorial office as their keyboard or Cyber Cafe (anyone fitted a Cyber Cafe with an aquarium?). Don't worry, we'll keep a space for snail-mail replies too.

David Ford's koi have been fed only on Aquarian flake food for 15 years.

Continuous feeding

With regard to Andrew Caine's feeding regime suggestion, it seems quite logical. Many fish, such as Cyprinids, use a continuous digestive system rather than a 'store it up for later' stomach equipped method, so these opportunistic eaters could well benefit by the 'little and often' feeding programme.

The talk so far has been on a continuous feeding regime, but we've had a view regarding a continuous diet regime also. Dr David Ford, Consultant to Aquarian, writes, *"I was interested to read your reply to Mike West of London's question: can goldfish live on flake food alone? (25 April 2003). You said you know someone who has successfully fed Fantails with only flake food for 5 years. I can certainly beat that! As many readers will know I was Head of the Waltham Aquacentre before retirement, where the Aquarian range of flaked fish foods was developed. As part of that work I installed half a dozen pedigree Koi in my home pond and fed them daily, and exclusively, on Aquarian flake, which is 'hoovered' up from the surface. The fish feed exclusively (they have been fed nothing else at all for all 15 years) on this diet from March through to November, when they sink to the bottom in hibernation. In the spring time pairing and spawning occurs each year too."*

Many fishkeepers are loyal to one brand of food and some even go to the extreme of only using, say, flake food to the exclusion of others types for fear perhaps of introducing disease (especially with wild-caught, waterborne live foods). Do you swear by one particular brand or type of food, or do you ring the changes to ensure your fish get a balanced and varied diet?

How far do you go?

Now that Spring has sprung, the popularity of a Sunday drive out somewhere will be in full swing and, with the proliferation of large retail parks offering instant retail aquatic therapy, the urge to spend has never been more likely to be satisfied. If you are like me, it is all too easy to 'accidentally' come across an aquatic outlet en route to somewhere else, and keeping up to date with new fish and equipment is reasonably easy to do. Are you an impulse buyer or do you spend only after first fully researching your needs? Once decided, how do you find the aquatic stores (large or small) cater for your needs? Bearing in mind the likely difference in local water conditions between that of the store and your aquarium, how far would you travel to get that 'must have' species?

Would you travel over 100 miles to visit a shop like Home Marine? Our editor, Derek, would!

Do fish feel pain?

In an effort to keep this column's most recent subject matters on track, we've had a response to that of fish sensitivity to pain (or not as the case may be). Pain, but not as we know it seems to be the opinion of Chris Cobley, from Shepherds Bush in London in response to*Points of View* (May,2003). He says *"I cannot accept that fish do not feel pain but I am quite prepared to believe it may be on a different 'appreciation threshold' than our perception of it. Take the example of two male fishes locking jaws over some territory (or female), how does the loser know when to give in and admit defeat if there's no pain involved? How would any superiority ever be proved - or are all male fish absolute gentlemen playing by the rules - if every threat was likely to be unsubstantiated?"*

The longevity of fish

The question of longevity of fish appeared in January 2003 where it was mentioned that the late Dave McKay had a Corydoras that lived for 28 years and Linda Lewis had a Harlequin that lived for 10 years. Of course, the more 'senior' fishkeepers amongst us (me included) will remember Clarissa the Carp which lived in the London Zoo Aquarium for many years after her capture by Richard Walker at Redmire Pool in Hertfordshire in 1952. Although she weighed a record breaking 44lbs (20 kg) at the time, she lost nearly half of this during her next 20 years in captivity until her death in 1972. However, the subject of longevity did lead to the following response from Marie-Paul Pinnoir, the brilliant aquatic photographer whose work regularly adorns the pages of TFK. She writes *"We talk to friends about the longevity of theirs and our fishes, but it would be interesting to find out examples of fishes that lived a long time in aquarists' tanks. Please give the scientific name (so we all know what we're talking about) and the age."*

Coincidentally, the age of fishes is more often associated with 'neglected' tanks. You know the sort of thing *"Oh, I've had a tank in the back room for donkey's years - never touch it and I found this fish that I'd forgotten I had; must be a tough species."* Recently, I had a conversation with a marine fishkeeper who cheerfully admits to not changing the water for something like 18 years! Taking that statement with a pinch of salt (pardon the pun!) seems to be a highly *appropriate action.* However, Jeff Barrow, from Kirkby, Merseyside would like you to consider his *Point of View*! *"It is said in many places that you should do 20-25% water changes every week or so, but I never do any water changes - only top up the water sometimes - and the fish are happy and healthy. One tank is 135cm long (approximately 54 inches) which is run by a Fluval 304. It is home to some large cichlids and has been running for 3 years. My 60cm long tank is running on a thermo-filter and has had no problems, no lost fish or diseases. So is doing water changes as important as everyone says because, to me, doing water changes is taking all the goodness out of the tank!"*

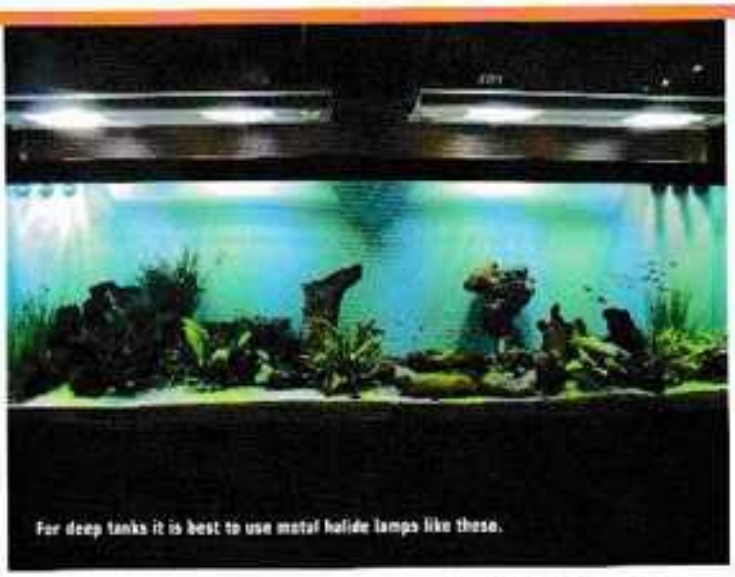
Jeff's point should bring out the protagonists from both sides. Personally, I only ever grew luxuriant plants in a poorly maintained tank and, at that time my reply to grumbles from my ever-neat-minded wife was *"Have you ever seen a tidy natural pond?"* to which her reply was *"No, but if you want a pond then I'm sure we'll come to some arrangement!"* Seriously though, regular maintenance has to be a balance between keeping things pollution free without unduly disrupting the tank too often and stressing the fish in the process. There are so many variables to take into consideration too - number of fishes, their type of lifestyle and feeding, your style of feeding them, planned tank or not, quality of source water, stocking levels and tank size. Jeff's opinion may simply reinforce that old adage, find what works for you and stick to it! I'm sure you'll let us know your views.

Contact *Points of view*

Have your say in the magazine! Send your letters to Dick Mills, *Points of view*, Today's Fishkeeper, CMG Magazines Ltd., Winchester Court, 1 Forum Place, Hatfield, Herts, AL10 0RN, or e-mail derek@cmg.co.uk with *Points of view* in the subject line.

Shine a light

Peter Hiscock explains how to light your aquarium correctly to grow plants successfully



For deep tanks it is best to use metal halide lamps like these.

UNLIKE OTHER ORGANISMS THAT DERIVE their energy from consuming organic material, plants obtain their energy from sunlight and carbon dioxide. Sunlight provides a natural energy source which plants are able to harness through special cells in their leaves (Chloroplasts). The energy of sunlight is used to break down carbon dioxide and water, which is then used to create glucose, a form of sugar, or storable energy. This process is called photosynthesis, and without it, complex life would have never evolved on Earth.

In an aquarium, natural sunlight is difficult to manage and often brings more problems than solutions so we must look at artificial light sources. The vast majority of aquariums use fluorescent tubes which are cheap to run and easy to install and maintain. To effectively use fluorescent tubes, the right type and number must be used and maintained in a correct manner.

Choosing the right light tube

White light is made up of a number of different colours; each colour represents a wavelength of light. The wavelengths, or colours of light are collectively known as the light spectrum. Only certain wavelengths or energy can be utilised by the special photosynthetic cells in plants, green light for instance, is not used by plants and is reflected, this is why plants appear green. Red light has a long wavelength and loses its intensity as it travels through water. Although plants can efficiently utilise red light, they receive a lower quantity of this light in nature. Blue light has a short wavelength and passes through water easily; both plants and algae use this type of light heavily. A good spectrum for aquatic plants would therefore peak in the easily utilised red areas and penetrating blue areas.

There are many types of fluorescent bulbs available for aquariums and some are specifically designed for plant utilisation such as the Hagen Flora-glo. These tubes can be used individually or in combination with a full spectrum tube to provide a more aesthetically pleasing balanced light. It is worth checking to see which type of tube you have, many aquariums come complete with household fluorescent tubes that are cheaper but unsuitable for plants.

TOP LIGHTING TIPS:

- Use a mix of specialised plant tubes and full spectrum tubes for a balanced light.
- Reduce light loss by using reflectors and regularly cleaning cover slides.
- Replace light tubes every 12 months
- Provide around 12 hours of full lighting per day.

Duration of lighting

Simply increasing the duration of light in the aquarium may at first glance appear to be a good method of increasing a plant's supply of light. Plants however, require a rest period of darkness to function properly. Increasing the duration of light also encourages algae to grow, which is undesirable. For most plants, a period of 12-14 hours of light is sufficient.

Light and algae

Although it is true that an incorrect light spectrum and duration can promote algae, the causes of most algae can usually be attributed to other factors such as nitrates, phosphates, or a build up of organic debris. In an aquarium with plenty of healthy growing plants, algae is rarely a problem regardless of the type of lighting employed.

DEEP DOWN

As light passes through water, its energy is absorbed and its intensity reduced. For aquariums that are deeper than 45cm, a greater number of tubes will be needed to provide enough light for low growing plants. As a rough guide, for a 30cm depth, one tube will suffice, up to 45cm will require two tubes, and 60cm will require at least four tubes. For really deep aquariums, it may be worth investing in high intensity light sources such as metal halide or halogen lamps that will push light through water with ease.

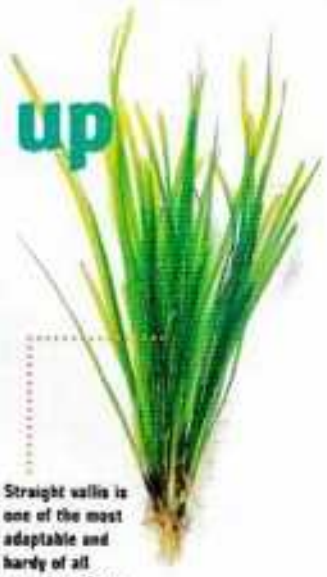
Underwater carpet

Glossostigma elatinoides is a tiny foreground plant that can be grown to produce a thick carpet of vegetation across the substrate. It produces tiny leaves on runners and requires strong lighting and a good rooting substrate. The plant should be regularly trimmed to create the desired carpet effect, if runners become dislodged from the substrate they will grow upwards, blocking light to the lower leaves and causing them to die back. Planting can be difficult because of the tiny size of the runners and leaves; I have used tweezers and some patience with good success. With a damp substrate and humid air, this plant can be well used in a paludarium above water. Water conditions are unimportant providing suitable nutrients, carbon dioxide and bright light is provided.

Glossostigma elatinoides does not have a common name but is an excellent foreground plant.

Straight up

Straight vallis (*Vallisneria spiralis*) is a popular aquarium plant that is an excellent addition to any aquarium. It is hardy enough to be kept in a wide range of water conditions and temperatures, and even slightly brackish water, although it sometimes suffers in very soft water. The leaves can grow up to 60cm so the plant is best kept in the background and edges of an aquarium. The plant can be grown in a dwarf form by using a shallow (5cm) sandy substrate which appears to limit growth whilst producing otherwise healthy plants. Once established the plant will produce numerous daughter plants on runners that can be divided and replanted to suit. A tiger variety is sometimes available which sports thinner leaves similar to many *Sagittaria* species.



Straight vallis is one of the most adaptable and hardy of all aquarium plants.

Frogbit is an excellent plant to include in a wildlife pond.

A MINIATURE LILY

Frogbit (*Hydrocharis morsus-ranae*) is a small native plant which produces floating leaves, normally around 2.5 - 5 cm in diameter. It has the appearance of a lily and is ideal for small pools and large water features. Although the plant is free floating, it will do better in shallow areas where it can root in a little soil. The plant produces white flowers with a bright yellow centre during the summer. When winter arrives the plant will produce buds that fall to the bottom and overwinter. The plant is undemanding and should thrive in most conditions. Best placed in areas of full sun and minimal water movement.

PROBLEM CONTROL – BRUSH ALGAE

The Siamese algae eater (*Crossocheilus siamensis*) grows to 18 cm and is one of the only fish which will eat Brush algae.

Brush algae, also known as beard or red algae are one of the most difficult groups of algae species to control. It appears as small fur like tufts up to 1cm high, usually black, brown, grey, or purple in colour. Because of its small size it is difficult to remove without removing the entire plant leaf or object it is growing on. Various reasons for its occurrence have been presented although in truth, it will grow in almost any conditions once established. Traditional methods of algae control such as reducing nitrates, phosphates, organic matter, nutrients and lighting control are ineffective, and even many algae treatments have little effect. The first action to take is always prevention – check any new plants and decor for the algae and remove any trace before introduction to your aquarium. For experienced fishkeepers, bleach solutions can be used to kill the algae on new plants and decor before introduction. If the algae is already established in the aquarium, the best method of control is to introduce the only two popular algae-eating species that seem to eat brush algae – The Siamese algae eater (*Crossocheilus siamensis*) and the Algae shrimp (*Caridina japonica*). Algae shrimps, also known as Amano, Japanese or Japonica shrimps, should be used in large groups and providing there is not a large amount of preferable food, they will soon begin to reduce the brush algae.

Slithering to success

PHOTOS: BOB AND VAL DAVIES

Ever thought of keeping a snake? This month **Bob and Val Davies** suggest a few easy species to start with.

A normal banded California king snake. Both striped and aberrant forms also occur naturally.

CORN SNAKES, KING SNAKES AND MILK snakes are attractive creatures and relatively easy for beginners. They are all popular among keepers and available as captive bred specimens which means you are not causing any pressure on wild populations. Try to buy them slightly grown on to ensure they are feeding regularly. Further advantages of captive bred animals are that they will have been handled and therefore quite tame; they should also be free from parasites such as ticks and mites which can be a problem for the novice keeper.

Housing

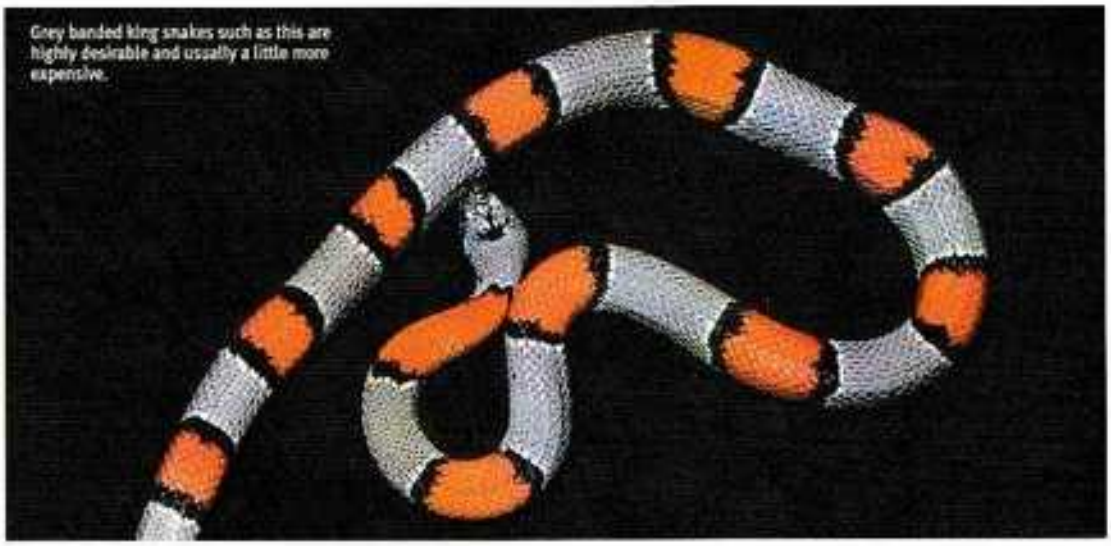
Corn snakes, King snakes and Milk snakes belong to the Colubrid family and require similar treatment and conditions. Depending upon the actual species, sizes of adults range from about 90cm to 150cm so vivarium size required will differ slightly. For a 90cm snake a minimum size should be 75x30x30cm or taller. Since most people buy their snakes as babies a suitably smaller vivarium is required but as the snake grows it must be moved to larger accommodation. A front opening vivarium with sliding glass doors is more convenient especially for cleaning. If a normal aquarium is used the lid must be secure as snakes are stronger than you might think (including babies) and are often able to push loose fitting lids up in order to escape. You also need to be careful with hatchling snakes because they could squeeze through the gap in sliding glass doors so a plastic file binder should be fitted to the edge of one door to prevent this.

Furnishings

These can be relatively simple. Some keepers use newspaper as a substrate since it is easy to remove when soiled although snakes do have a habit of burrowing underneath it and churning it into an unsightly mess with the faeces being deposited on the cage floor underneath the paper. Hardwood chips are another commonly used substrate material. To avoid

HOW TO FEED YOUR SNAKE

Practically all breeders will have used defrosted pink mice that are available at most dealers and can be stored and readily thawed when needed. Frozen mice must be completely thawed and warm before being fed. However they should not be micro waved as this can lead to some partial cooking of the tissues causing the snake to reject the food. The best way is to leave the food in a warm place. Discard any uneaten food - do not refreeze or offer to another snake. A small water bowl should also be provided and kept very clean. Large water bowls are often used by the snake as a bath but this can lead to slopping over of water causing damp conditions.



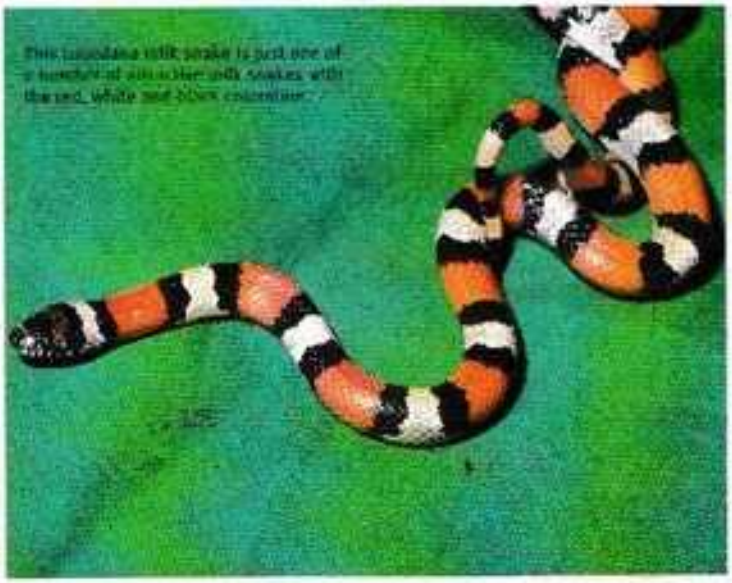
Grey banded king snakes such as this are highly desirable and usually a little more expensive.

particles of this adhering to the food, the food is better offered on a saucer, lid or flat stone. The old method of using aquarium gravel on the floor has fallen out of favour because unless it was thoroughly washed and dried on a regular basis small particles of faeces adhering to it would cause the vivarium to smell. Quite often faeces do end up in corners or on walls and must be scrubbed off, preferably using a suitable vivarium disinfectant which your dealer will be able to recommend. It is important to remember that failure to maintain hygienic conditions in the vivarium can lead to disease. Apart from a hide no other furnishings are required although some securely fixed branches will probably be used by at least some of the snakes and gives them additional crawling space. A rough stone will be used by the snake when it starts to slough.

Sloughing/shedding

As they grow all snakes periodically slough the skin. A sign that the snake is preparing to enter the sloughing phase is when the eyes turn a milky blue. The body then also develops a milky hue. During this time most snakes do not feed. Several days later the eyes clear and the snake rubs its snout against an object to start peeling the skin off. A healthy snake should be able to slough without difficulty but occasionally the slough may be incomplete. This can occur if the snake is in poor condition or the atmosphere in the vivarium extremely dry (too hot). These pieces of skin must be removed but should first be softened by moistening - do not try to peel off firmly fixed dry pieces. Holding the snake in a wet cloth or kitchen towel, allowing it to crawl through several times, will wet the skin and may help to soften the dry pieces. Sometimes a light spray or some damp sphagnum moss will produce the same effect but the vivarium must never be left damp for more than a day or so. For really stubborn cases, placing the snake in a damp cloth bag for several hours or overnight will generally solve the problem. It is important to remove all the shed skin from the cage.

The above gives basic care but detailed breeding of these Colubrids, together with others, will be discussed in a later issue. ■



This Lampropeltis triangulum sinaloae is just one of a number of attractive milk snakes with their red, white and black coloration.

HEAT AND LIGHT

A spot lamp controlled by a dimmer thermostat is sufficient to heat the vivarium. Dimmer thermostats, whilst being a little more expensive, are preferable to models that flick the light on and off all the time. Generally speaking ultra violet tubes are not necessary for snakes, although a low-rated tube could only be beneficial. Required temperature range for this group of snakes should be 30°C at the hot spot, 24°C cool end during the day, 20°C - 22°C at night. The photoperiod should be 14 hours. If necessary in cold weather and for overnight heating a heat mat can be fastened to one wall of the vivarium - not on the floor. It has been known for snakes to suffer severe burns to the belly when huddled onto a heater mat when the ambient room temperature has been low.

...End Point

Kathy Jinkings spotlights one of her favourite Corydoras – the Bearded cory.

Bearded corys require a much cooler temperature than many of their cousins.

CORYDORAS BARBATUS ARE VERY different from most Corydoras, so much so that periodically arguments erupt about whether they belong in the Corydoras group at all. So far they still remain brethren of the other Corydoras, but have many features that make them out as unusual. They are one of the largest Corydoras, reaching a length of about 10 cm, and are one of the few Corys in which the sexes are easy to differentiate even for the novice. The male's head is black with various spots and gold blotches and a golden streak runs from the forehead, down the centre of the head to the tip of the snout. The body of the fish has an intricate pattern of black on gold, which gives rise to its occasional common name of filigree cory. The underside of the fish is cream-coloured. The females are nowhere near so striking as their spouses, having a pale underside and a pattern of black and grey blotches along the flanks. The males also grow beards! Along the cheeks appear a row of short bristles. As if this was not enough, when they reach maturity the males have increased pectoral fin spines. All this adds up to a very unusual fish.

Corydoras barbatus have one last surprise for the Corydoras keeper. While many Corydoras come from the inland Amazon basin, where the water temperatures can become very high, the Bearded cory dwells in the cooler coastal drainage areas, especially around Rio de Janeiro. Although you could keep these fish in a standard tropical community, they prefer cooler climes of around 23°C, although occasionally they can be found in waters of temperatures up to 28°C. This does not debar them from a community, but the selection of tankmates should not be drawn from the heat-loving fish that usually make up a South American community. There are many temperate fish that will thrive in such temperatures. Their preferred pH is between 6 and 8, with a dH between 2 and 25, so this should not limit the selection of other fishes too much.

There is, however, a good reason for keeping these fish in a species tank, as they are more fussy when it comes to starting a family. To be successful the water needs to be slightly acidic, and soft (between 1 and 3 dH). Although the fish may spawn in harder waters, the fry may have difficulty breaking out of the eggs. Obviously if you keep your Corys in harder or more alkaline water normally and then wish to start a breeding programme, they should be acclimatised to the new conditions slowly. If you are successful in spawning them it is best to remove the adults, as they may well eat the eggs and/or fry. The new arrivals require plenty of food (Brine shrimp nauplii are ideal) you will be able to see that they are feeding well by their distended pink tummies) and scrupulous cleanliness in the aquarium, especially the tank bottom. At three months they will all look like 2 cm long copies of their mother. This does not mean that your spawn are all females – the males will develop their colour pattern within another month or so.

Since they are so easy to sex, it should be easy to select a pair – one male and one female. Even if you do not intend to try to spawn them, this is still the wisest choice. One fish may be nervous, whereas two territorial males will fight. These hostilities may escalate to the death of the weaker male, especially if the fishes start to feel like spawning.

These are one of the most beautiful and fascinating of the Corydoras. In an ordinarily warm British home you won't even need to splash out on a heater! They usually cost a little more than some of their relatives, but their beauty and unusual attributes easily justify their higher price.

PROFILE

Name
Bearded cory, Filigree cory or Banded cory

Scientific name
Corydoras barbatus

Size
8 - 10 cm

Aquarium type
Community of peaceful fish with similar requirements or species tank

Distribution
Brazil; coastal drainages from Rio de Janeiro to Santa Catarina

Diet
Sinking pellets, tablets, sinking live (or frozen) foods

Temperature
18°C