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Today's Fishkeeper

FROM BEGINNER TO ADVANCED

NEW SECTION

Fishworld – All the news, views, new fish and products from around the world of fishkeeping

PLAYING DEAD

Clown loaches in the aquarium

REVEALED

7 Synodontis from Lake Tanganyika – page 50

THINK BIG

Giant marine tanks made even easier – page 34

PONDS

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Welcome

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Regular readers who stop off at the editorial on their way to the real articles will know I have had a few funny situations arising out of GM fish. One of the most bizarre was being interviewed over a mobile phone by an Irish radio station in a supermarket car park near Biggleswade. A couple of weeks ago I had another call about GM fish, this time from the science editor of the Observer newspaper wanting some background information on GM fish and asking if he could quote me in the article. Nothing unusual in that, but it was where and when it took place. At the time I was in the middle of dinner, so asked him if I could call him back in an hour. No way – he was on a deadline. So, I ended up juggling the mobile in one hand, a fork in the other, whilst trying to block out all the noise around me and come up with a sensible quote for the newspaper. I don't know why I bothered because as usual they didn't get the quote right, but at least they spelt the magazine's name correctly. In the same article Keith Davenport of OATA is also quoted fully supporting our position that there is no place in the ornamental fish hobby for GM fish. It is good to know we even have the full support of the trade association as well as that of most aquarium shops and fishkeepers around the country.

What's in this month's magazine?

Well summer has well and truly arrived, the BBQ's in full swing, but the garden pond looks just that little bit sad and tired. Time for a makeover! Peter May has been giving us a whole range of ideas during his series on pond design and this month's article contains some really original ideas connecting the ocean with your garden.

Looking at the marine side of things Anthony Calfo has loads of good advice for those people who are dreaming of a BIG tank. Although aimed at the marinist, Anthony's article has a lot in it for any fishkeeper thinking of a giant tank for their living room.

For the freshwater enthusiast Erwin Schraml has painstakingly tracked down and photographed all 7 of the known species of Synodontis from Lake Tanganyika and in the process probably unearthed a couple of new ones. With Leaf fish, Flag cichlids, Livebearers and Killifish all featured this month, the tropical enthusiasts are certainly well catered for.

Enjoy!

Derek

Derek Lambert.

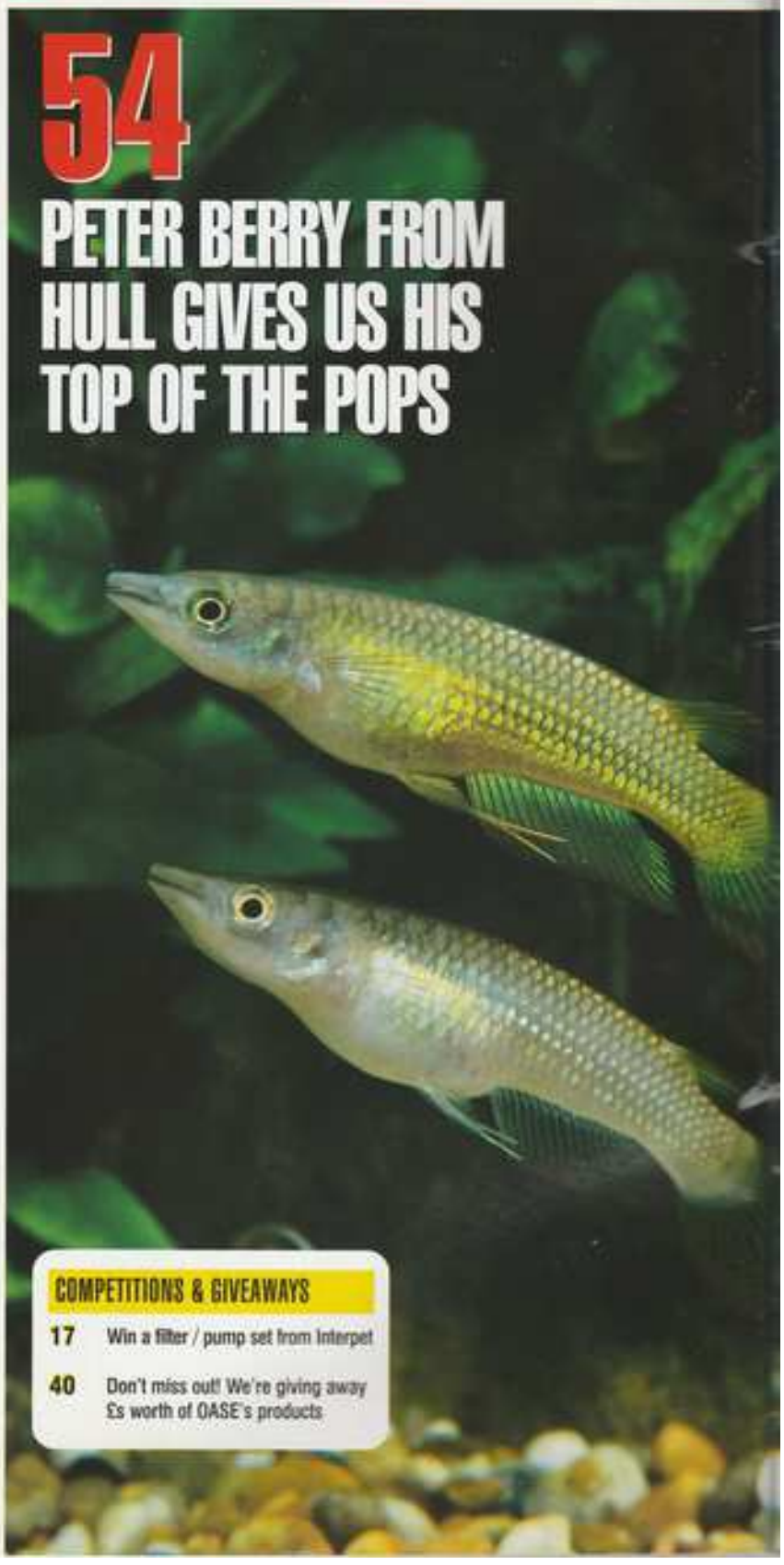
AUGUST inside this

TROPICAL/MARINE/COLDWATER

MARINE

PONDS & COLDWATER

54 PETER BERRY FROM HULL GIVES US HIS TOP OF THE POPS



COMPETITIONS & GIVEAWAYS

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Today's Fishkeeper

TROPICAL

BEGINNERS

TODAY'S FISHWORLD

REGULARS

CUT OUT AND KEEP

REPTILES & AMPHIBIANS

PLANTS

KEY TO SYMBOLS:

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

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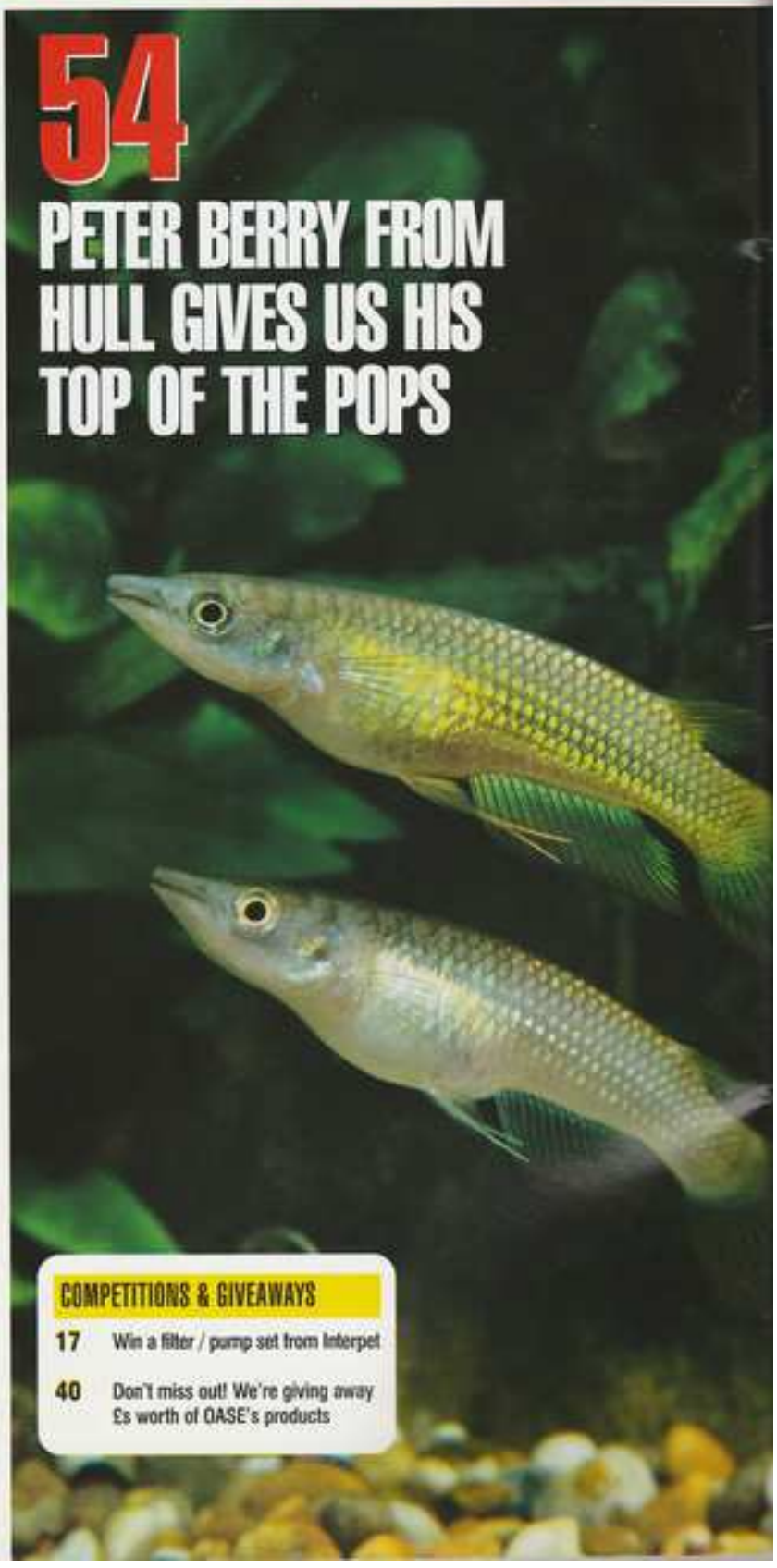

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Starting Point...

In this month's column **Pat Lambert** introduces a couple of Cichlids and has a warning about rogue fish.

MOST PEOPLE WHEN THEY START KEEPING fish begin with a community tank, but as Mary Sweeney so eloquently pointed out in the May issue of Today's Fishkeeper choosing compatible fish for a community tank certainly has its problems. Not least amongst these are the problems caused by a 'rogue' fish. I have, in the past, given lists of the 'perfect' community fish and recommended them as suitable for the beginner tank. In most cases these peaceful, adaptable species can be kept with no problems at all. However, occasionally a 'perfect' community fish can turn into a pugilist of the worst possible kind.

Murderers in my tank

Siamese fighters are not on my lists but a single Siamese fighter can be kept in a community tank where it is usually timid, often hiding in plants to avoid trouble. It is well known that two males will fight to the death, so only one should be kept. This having been said, a Siamese fighter I kept in my early fish keeping days went on the rampage and decimated my first community tank of small fish. It's no wonder it's not on my list, but many fishkeepers have kept a single one in a community with no trouble at all.

PHOTO: MIKE CARTER

Although Platies (this is a beautiful Hi-fin sunset variatus platy) are the perfect community fish, occasionally one will turn out to be a rogue.

However, a fish that is tops with me and heads my list of perfect community fish is the Platy. The Platy is a very peaceful, placid community fish but I kept one that was a 'rogue' fish causing death and mayhem in my tank. To this day I don't know why. Certain individuals stand out in a crowd and this Platy may have thought it was a Piranha! The scientists would probably call it an abnormal pattern of behaviour but I call it plain cussedness.

Overcrowding can be an intense provocation for some fish to kill or injure others as they jostle for space, but some fish cause situations that are not your fault and cannot be avoided. You just have to be aware that trouble can come from some unsuspected sources and be prepared to remove the 'rogue' from the crowd.

Observation is the key to it all


Dolphin cichlids are a large but peaceful Cichlid.

A balancing act

We have all at one time or another experienced the sight of a fish unable to maintain its equilibrium in the water. A fish that swims in an abnormal manner and has difficulty in rising from the substrate often has a defective swim bladder. This organ allows the fish to maintain its natural buoyancy in the water, for fish need this lift as their bodies are slightly denser than the surrounding water and without it they would sink to the bottom.

The bladder walls are thin and flexible and the fish is able to control its intake and output of gas and thus maintain its balance in the water. The swim bladder is a very important organ in most fish for if damaged in any way movement through the water becomes uncontrollable and the fish constantly struggles to rise from the substrate. Sometimes the condition is only temporary and can be affected by water conditions. When normal conditions are restored the swim bladder will work properly again.

The first act of a new born livebearing fish is to rush to the surface to fill its swim bladder with atmospheric air. Some of my baby livebearers are born without a functioning swim bladder, these are known as belly sliders and need to be culled if they do not recover within a few days. Some bottom dwelling species have little use for this organ since they do not need this lift and their swim bladder is much reduced, whereas in most fish it is quite a large organ.

"Dolphin cichlids need a BIG tank- minimum length 120cm"

One of the big boys

If you like large fish, particularly large Cichlids, and want to keep them in a community tank of large species why not try the Dolphin cichlid (*Crytocara moorii*). This is a relatively peaceful species that grows to 23cm This fish has a beautiful blue coloration and thick red lips that make it look as though lipstick has been applied. Sexual differences are difficult to determine. This is not a territorial species like many Cichlids, as no breeding ground is marked out. Eggs are laid on the substrate where they are fertilised by the male and the female broods them in her mouth. They should not be kept with Mbuna type territorial Cichlids which are much too aggressive for tank mates.

African Cichlids large and small

This month the fishes I have chosen are both Cichlids. They are both African cichlids but one is a Tanganyikan cichlid and the other is from Lake Malawi. These fish are very attractive to the beginner and as long as you are careful there is no reason why a beginner cannot keep them, after all many beginners start with marines and keep only them.

Pearly treasures


Shell dwellers make interesting additions to a community aquarium.

The shell dwellers from Lake Tanganyika are a very interesting group of fish. If you enjoy breeding fish then this could be the species for you. In the past they were considered difficult but now that their environmental needs are understood they have become much easier to keep and breed. Some fishkeepers are so fascinated by their interesting behaviour that they become the focus of all their fish keeping. *Neolamprologus meleagris* is a lovely shell dweller that only grows to 6cm. One of its common names is Pearly ocellatus which aptly describes the pearly spots that adorn its fins and the scales on the body. This species can be kept in a community tank as long as each individual has its own shell. It's also best to keep one male but you can have several females. A small aquarium about 45cm long will be needed to keep a pair of these for breeding. They need a temperature 23-27°C and a high pH. Acidic water can kill as can temperatures of 29°C upwards. Best kept as a pair, it is interesting to watch the way in which the couple move the shells around until they are in a position that suits them. If you are interested in keeping a pair of fish in a small tank and watching their antics, treat yourself to a pair of these lovely little shell dwellers, you won't regret it, provided that you read up on them first.

→

LOST FOR WORDS

Silver hatchets will take flight if frightened, do make sure their aquarium is well covered.

Chemical filtration The water flows through a filter medium which changes the chemistry of the water. Carbon adsorbs dyes and chemicals used in treatments, some media soften the water, others deal with phosphates, others take out ammonia but they are all used to change the chemistry of water in some way.

Copepods These are tiny crustaceans up to 3mm long. Free swimming ones like Cyclops hop around the tank and make tasty titbits for fish. Parasitic ones such as gill maggots can occasionally be introduced in food collected from ponds which contain fish. Gill maggots are rarely found in aquaria but they can be introduced with a wild caught host.

Cuckoo spawner A fish that lays its eggs in other fish's nests.

Gasteropelecidae This is a long name for some cute fish and the name refers to their shape for these are the Hatchetfishes which swim just below the surface and are prone to take flight using their large pectoral fins - so keep a tight lid on them.

Gravel Tidy Plastic netting buried horizontally in the gravel to prevent fishes from digging.

Malachite green This used to be widely used particularly in the treatment of Whitespot. It is less commonly used these days because of possible harmful effects to humans. It is still, however used in its liquid form in aquarium and pond remedies.

Methylene blue This is a dye which stains everything blue but is an active ingredient in treatments for Whitespot. This chemical has been widely used for many years and has proved to be very effective if the manufacturer's instructions are carefully carried out. It is also an effective bactericide and fungicide. Nowadays other medications are available without its disadvantages

The ten golden rules of fishkeeping

For your free beginners guide please call 0845 677 6770 or visit our website www.aquarian.com

AQUARIAN

Read all about it

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

a) Manufacturers often provide free booklets about fish care.

b) Inexpensive books provide information on setting up.

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

THE WATER

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

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

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

THE FISH

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

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

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

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

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

THE ROUTINES

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

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

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

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

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Here Come the clowns

Mary Sweeney creates a community around the comical Clown loach that likes to play dead.

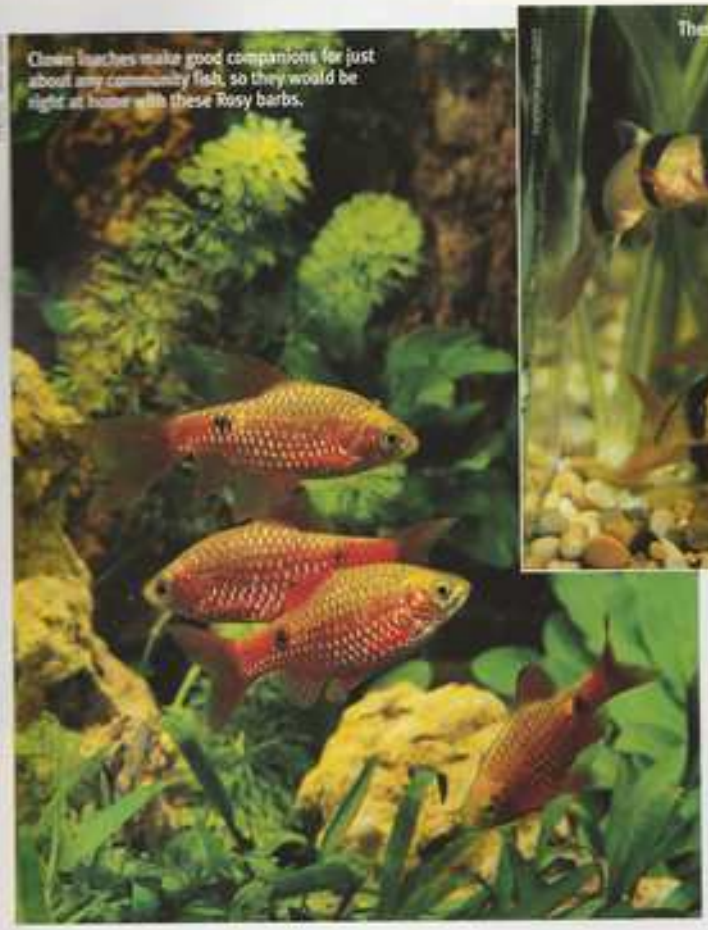
When in good colour Clown loaches are one of the most colourful of all freshwater fish.

PHOTO: MAX OWEN

WHEN I WOKE UP THIS MORNING, I WAS A wee bit depressed. I didn't have a fish in my head, and I knew Derek would soon be dunning me for an article. Yuck! I don't really want to spread this mood around any farther than I already have: the Labrador is staying out of my way (I did nothing to her, I swear. She's just very empathetic.) The Jack Russell couldn't care less, she still wants to sit on my knee-okay, we'll a bit higher-and conform my body to her comfort. The other two I live with, husband and son, aren't paying any attention at all, not wanting to be accused of distracting me. I'm thinking now, hard, what shall I write about today? The television is running an ad for "*Cirque de Soliel.*" Aha! Now I have it.

There be clowns

If there's one fish in the universe that will bring on a smile and an outpouring of words, it's got to be the Clown loach, *Botia macracanthus*. Now that's a fish that will make everybody feel better, no matter how dour the day. It's all right now, everybody



Clown loaches make good companions for just about any community fish, so they would be right at home with these Rosy barbs.

These baby Clown loaches may need coaxing to start feeding.

can relax, I've had my idea.

For starters, the Clown loach is a community fish *par excellence*. There are very few communities where they wouldn't be welcome. As long as the fishes in the tank can get along with each other, they're fine companions for Clown loaches. I really don't think there is anyone who doesn't like a Clown loach. They are clowns, not mimes, right? And they are very funny: they wink, they pose, they roll over on their sides and play dead. One would think they were doing it on purpose, but that would be self-indulgent anthropomorphism, wouldn't it?

Description

Clown loaches have the typical loach shape, that is, they are straight along the bottom and have a large head with a convex back. The mouth faces downward which is ideal for this dedicated substrate feeder. One thing to watch on the Clown loach is the razor sharp spine in the cheek. Be especially careful when netting the fish. You may have to cut the net to release the fish if things get panicky.

The Clown loach has an orange body with bright red fins. There are three thick black bands that run vertically through the eye, at the dorsal, and at the caudal peduncle. When the fish is in good condition, the colours are deep and true, making this one of the best-looking of the freshwater fishes.

The only problem

The Clown loach found in pet shops is generally a very young fish, an infant really. As they can grow to about 30 cm, one can easily see that the tiny 5 cm clowns generally on offer are no age at all. They are delicate at this stage of their lives and even so, a bit pricey, though not out of the reach of most of us. The best way I have found to get them past these early days is by feeding them live worms. If they don't eat, they will literally starve to death surrounded by foods they don't yet recognise as food.

Don't worry, it won't take long to acclimate them to just about any aquarium food after a couple of weeks, so a few portions of live Tubifex, Blackworms, Bloodworms, Glassworms, and the like are excellent investments for the years of pleasure you will enjoy in the company of the Clown loach. This is a good practice with almost any delicate species, just to get them feeding. Once their bellies are full, you can be pretty sure they will be fine for the future.

The only problem number two

'Ich'. When Clown loaches are chilled, as is often the case during transport, they will surely develop a nasty case of Whitespot (*Ichthyophthirius multifiliis*). This would not be much of a problem with any of the scaled fish species, but for our scaleless clowns, the usual therapies like methylene blue, formalin, and malachite green are worse than the original Whitespot infestation. This leaves us with two options: increasing the water temperature and adding salt. It's a simple therapy and it works. This is where the quarantine concept works wonders, the last thing you want is 'ich' in the main tank. It's a real nuisance, especially when you have a nice planted tank and a collection of fishes, scaled and unscaled. For the little Clown loach, you really don't need a very large container for quarantine and treatment, but you do need an accurate thermometer, a reliable heater, and an air stone. Oxygen levels need to be increased in warmer water, and then there's the →

You'd love the octopus garden

Peter May looks at an imaginative garden ideal for a marine fishkeeper!

PHOTOGRAPHS BY PETER MAY UNLESS OTHERWISE INDICATED

IF DECKING LEAVES YOU HIGH AND DRY and blue stained trellis turns you green. If nothing in the fads, fashions and hype that seems to surround the world of gardening appeals to you, don't despair. A garden is a place to express yourself and not just your interest in gardens. It could say something about your interests in fish for instance and those interests don't have to stop at the edge of the pool.

There are millions of people out there just making their gardens to suit themselves and they have been doing it for decades, nay centuries. For many of our forbears, certainly those of us from peasant stock, a garden was a place to provide food for the table, herbs for flavour, for medication and a whole plethora of other uses. But essentially, looking at the garden a peasant or artisan laid out was a digest of interests and tastes of the resident family. Nowadays with less emphasis on sustenance and self-sufficiency, particularly in the urban environment, there is room for self-expression. I wish more people would do it!

Marney Hall did it brilliantly

The Chelsea Flower Show is the Flower Show event of the year that sets the standard of excellence that all other flower shows in the world can only aspire to. It has not got the glamour of the midsummer show at Hampton Court, but at Chelsea you see excellence without equal from the whole spectrum of British horticulture, and a few other places tag along too.Chelsea influences the trends in horticulture, particularly in garden design and peoples' choice of plants for their gardens. All eyes are always on the Chelsea Flower Show and what the band of exceedingly carefully vetted designers and exhibitors are going to create for our delight or the nurserymen have on offer. This year was no exception.

Marney Hall is considered one of the top designers in the UK and with a long background in ecology and nature conservancy, she has a particular penchant for creating scenes of natural habitats using mainly wild plants, which have been a passion for her since childhood. This year at Chelsea her inspiration came from a little further than the wilds of British nature. It came from the dive sites in the Red Sea and the Indian Ocean off the coast of the Maldives, where there are a range of different underwater environments under severe threat from many varied human activities in their regions. Here Marney had been amazed to see in these fragile marine environments the similarity in shape, structure and colour that the underwater flora and fauna has with many terrestrial plants. This gave her the idea that a garden could be created that could parallel some of the environments in order to make a heart felt plea for preserving these threatened landscapes. The garden was an expression of a personal passion shared with the directors of Hasmead plc who sponsored it. Combined with Marney's talents, resources and contacts the net result was a garden that Chelsea never had seen the likes of; 'The Hasmead Octopus Garden'

Three different types of marine environment were symbolised - a shallow reef, a coral garden and an eel garden below the octopus cave.

The garden

Because of the slightly tender nature of some of the 160 trees and shrubs and other plants in the garden, the garden was supposedly one that would be sustainable in the Scilly Isles, although all the plants are available in the UK. Three different types of

Patty Clapton, Ringo Starr, his wife Barbara Bach, Marney Hall and Jon Todd, Managing Director of [illegible] plc whose garden it is.

In this area of the garden Marney has tried to imitate a coral garden.

fragile marine environment were symbolised or imitated - a shallow reef, a coral garden and an eel garden below the octopus cave. The flowers represented the beauties of the underwater world, so colour was such a vibrant mix that no other garden designer would dare to emulate it. This garden was unique. It was a garden for the imaginative fish fanatic.

The shallow reef coral forms were shown in cabbages, lettuce, Primula and Arum lilies, also Hostas, Cryptomeria, Proteas and even Junipers. Wisterias and daisies were soft corals and there was a carpet of small corals in the forms of succulents and Sempervivums. Passion flowers represented jellyfish.

In the Coral Garden in particular, balls of topiary were like the huge brain corals and upright yews were like columnar types. Aquilegias represented the trailing dorsal fins of banner fish.. Irises represented fish whilst Iceland poppies were bright red and orange antheas.

In the Eel Garden where deep water has strong currents, grasses *Miscanthus* 'Morning Light' indicated movement and spiky fescues →

CORAL REEF

Whether it is environmental stress from global warming or the activities of human beings in over exploitation and poorly conceived coastal developments, there is no doubt that the world's coral reefs could disappear within the next 30 to 50 years. Already a quarter of those in existence have been degraded beyond recovery. Because coral reefs are so sensitive to any environmental change or pollution they are always the first to show signs of suffering.

The full importance of these reefs can only be guessed at, but what is known is that they are home to a vast diversity of life that lives nowhere else. There are over 4,000 species of fish that live among 700 species of coral along with thousands of other plants and animals. They are also the nursery area for many of the pelagic species that swim elsewhere in the oceans.

Man's dependency on these reefs was illustrated by the facts that 500 million people are dependant on coral reefs for food and their livelihood. As our knowledge of them grows as they decrease, scientists are beginning to see the potential they have for providing life saving medicines, like the reef derived drug AZT that is the life line for AIDs victims.

In brief, the cumulative causes of decimation of this fragile environment:-

Global warming causes coral polyps to 'bleach' or die because they have such a narrow tolerance of temperature change. The effects of a higher sea level and increased CO_2 in the environment don't look good either. Coral diseases that have particularly affected Caribbean reefs have come from the intestines of humans.

Over fishing has indirectly caused the proliferation of algae and coral eating starfish. Also the methods of fishing have left a lot to be desired particularly in South East Asia, the Philippines and Indonesia where the use of cyanide and dynamite has destroyed many reefs.

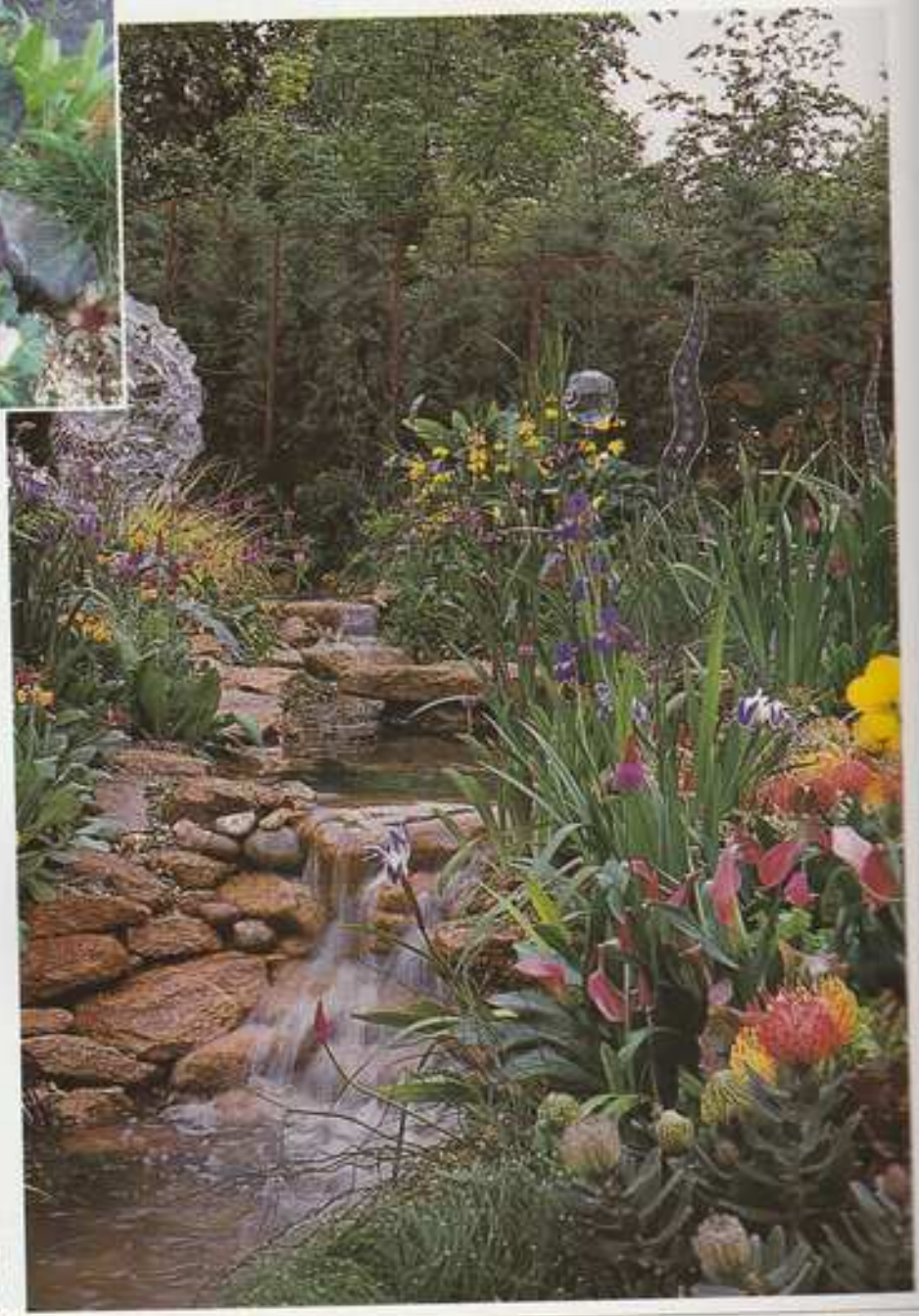
Coastal developments have meant the destruction of habitats that are ecologically linked to the reefs, such as mangrove swamps that provide nursery protection for some coral reef dwellers. These have been cut down and the land is farmed or built on resulting in polluting runoff or sedimentation from the farm land, or effluent from habitation. Boats and ships pollute, whilst debris they leave at sea like old tangled discarded fishing nets causes untold harm to marine life.

For more information telephone Project Aware (UK): 0117 300 7313 or visit their web site: www.projectaware.org.

Arum lily *Zantedeschia* 'Pink Mist', *Primula vialii*, lettuce and cabbages were used for the shallow reef coral forms.

like *Festuca* 'Elijah Blue' represented sea urchins. As you went up the garden on some natural steps of Ham stone from Somerset, effectively towards the surface of the sea, there was the surf on the beach in the form of a swathe of Cow Parsley, Green Alkanet and Spiraea. To your right and below the 'surf' was the Octopus cave in the cliff face. Inside the rabbit wire creation of Rupert Till resided a representative of one of the most intelligent forms of marine life. Rupert also created the metal fence.

A stunning glass fountain sculpture from Iestyn Davies was a central feature of the whole show, particularly when it was lit up at night. Other glass sculptures were commissioned from Gill Hobson and Owen Bush and some big sea urchins came from the sculptor Dennis Fairweather. A recycled glass and shell mulch reflected the colours of the ocean floor.



The whole scheme was linked and brought alive by waterfall and stream that emerged from the cave.

Competition

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Q&A Tropical

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Bumblebee gobies so often end up dying through ignorance

What do Bumblebee gobies need to thrive?

Having discovered the very interesting Bumblebee goby a year ago I was wrongly informed by my local pet shop that they would thrive in my small 60 cm freshwater tank. Although they lasted for 4 months I was disappointed with this and did a little research and found that they require brackish water. I really like this little fish and at the moment I have a spare small tank (45 X 30 cm). I intend keeping around 6 of these fishes together in this tank and was wondering what kind of conditions they need. How much salt, plants, food, substrate and filter.

Peter O'Brien from Dublin, Ireland.

I am sending you the text from an article Kathy Jenkings wrote on Bumblebee gobies earlier this year. Just to re-cap for other readers who may have missed this feature, these are brackish fish that need a S.G. of about half that of sea water. Use a proper marine salt mix to produce this. They require live food in their diet. Rarely will they eat flake. Frozen bloodworm and like foods will usually be taken. Plants are a problem but Java Fern can tolerate some salt, otherwise, use plastic plants. Sand is probably the best substrate for them and an internal power filter should be ideal. Add lots of rocks and create caves so they can sort out their own territory.

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Breeding Red parrot cichlids

Q **I currently have a 'breeding pair' of Red parrot cichlids that have laid and are protecting eggs in a cave. I realise that parrots are a hybrid of the Severum and Red devil but that they are also fertile. Literature states that it is possible (however difficult) to breed them in aquaria but reports also suggest that males are radiated in their 'native' China before release. Any information/ confirmation regarding such a situation would be much appreciated.**
A. Milner, Liverpool.

A Red parrot cichlids have been known to produce viable fry in aquarists' tanks. It is doubtful that they would have been irradiated to sterilise them before they are shipped out since a large number of fish farms are breeding this variety now. The greatest area of production is in fact Sri Lanka, where Red parrot cichlids and their other colour forms (lots of these now) make up a huge part of that country's ornamental fish industry. I am surprised that they have decided to breed in a cave as neither of the suggested parent species are cave spawners, but with the scrambled set of genes these fish have it is no wonder that they would breed in a totally different way to their ancestors.
Derek Lambert.

They may be very deformed but Red parrot cichlids are still capable of breeding.

Drifting pH problem

Q **Please, can you help. I am really getting desperate. I have a 120cm tank, that I have had for many years. I live in Torquay a fairly soft water area. In the last 6 months, I have had problems with my fish dying and Black algae. I tried everything and then when I went and asked my local tropical fish shop, they tested my water and found the pH was 6.3. So I purchased phosphate (little stones). They said they treated their tanks once a year with this. I ended up putting several bags into the tank. I cleaned the tank, and let it settle and restocked again.**
I have been watching the pH like crazy and I can't seem to get it up to 7.0. I have now purchased Proper pH 7.0 adjuster (powder) and now and again add in some spoonfuls. However the pH drops every few days or so. The only thing that I have done during the last 6 months, was to purchase two Powerhead 301 filters. One has been attached to an up pipe, the other just sits on the side of the tank and produces bubbles. I also replaced the Bog Wood. I read that the bog wood can drop the pH, but I had to replace the old one as I couldn't get rid of the algae. Can you tell me what am I doing wrong? I haven't changed my method of looking after fish and can't understand why I am having these problems now. I also noticed that on the tank lid I get little black flea like things. I keep cleaning the lid to get rid of them but they haven't gone away. I would be very grateful for any help you can give.
Norma Payston via e-mail

A An acidic pH can prove to be quite unstable, and as a result, stressful to your aquarium fish. However, many fish species prefer (and indeed thrive in) acidic water. Your water's pH can be buffered very easily (and inexpensively) to become slightly alkaline by adding crushed limestone/cockleshell to your gravel/filter media. In fact most 'pea gravel' contains a fraction of lime that consequently buffers aquarium water, so your case is quite rare.
Once your pH is brought above neutral, it will be more stable, but may not necessarily lead to the end of your problems. Your fish losses may also have been caused by other water quality problems; more commonly caused by high ammonia/nitrite readings. Check that these are satisfactory (the only satisfactory levels are zero).
It is difficult to advise you about the algae problem, as there are different types of 'black algae', some of which are actually very dark green and thrive in 'good' water conditions. Having said that, most algae thrive in excessively intense or lengthy lighting, especially where there are no plants to compete for nutrients and light, so keep your illumination to a maximum 10 hours a day to see if that has an effect.
I would prioritise bringing your pH above neutral using the above method, and then, by keeping a check on the ammonia/nitrite hope to stabilise the fish mortality problem.
Ben Helm

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Tropical Q&A

What are these Cichlids?

Q I have been keeping fish for about 15 yrs now and have ended up being fairly well known in the area. My problems arose a couple of years ago when I rescued a Saiffin plec (*Glyptoerichthys gibbiceps*) which had out grown its previous owner's tank and was under threat of being thrown out and left to die an ungleasant death. Since then I've become an unofficial fish rescue centre with dozens of people turning up with unwanted fish. I was recently given 3 unidentified Cichlids (unwanted because they had bullied or eaten all their other tank mates) which despite all my efforts I cannot identify. Can you help? I've enclosed an attachment of the male, there are also 2 females who are both a very pale silver/blue with a few darker silver grey bars down their sides.The male is a deep iridescent green and purple with a red tint to his fins which doesn't show in the photo.

Vince via e-mail

A From what I can see in the attached picture the fish is an African mouth brooder. It's scientific name is *Oreochromis mossambique* and it grows up to 40 cm.

Alf Stalsberg

Suitable fish for a Fluval Duo 1000

Q I will soon be getting a Fluval Duo 1000, (100cm x 40cm x 40cm). I know that I want a pair of Kribensis, and some kind of catfish, however I am unsure as to what else to stock it with. I want to stock it quite lightly to give me room to raise some fry. Do you have any ideas?

Hannah Wudarski, Bristol.

A The size of your tank is very good and your idea of wanting to stock it quite lightly to raise some fry is also a very good decision. I would suggest 8 - 10 catfishes of the genus Corydoras since they are active during the day and will not try to occupy the cavern that the Kribensis like to hide and spawn in. Catfishes like Ancistrus will also like to hide in the cave and might also eat the eggs during the night. Other fish to put into a tank like this would be Tetras, such as a school of Congo tetras.

Alf Stalsberg

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Hair algae problems

I am new to tropical fish keeping (twelve months), but have had some successes, some failures, but have retained an enthusiastic interest. Although I gather a great deal of information from your magazine, enough to convince 'er indoors' to let me subscribe, I find myself in a situation where I need specific information.

My set-up - I have an off the shelf Tropicana 55 tank with its associated 3 stage filter system.

I run additional air into the tank via an external Rena 50 air pump running in to a 12.5 cm air stone under the gravel.The gravel base is approximately 5cm deep,there are several granite rocks, and plants (currently Vallis and Swords etc.) all from my local aquarium shop, the source of all my materials and fish. The light I use is a Sangle fluorescent tube (1) which is on from 8am until 10pm every day. I change 6 litres of water twice per week and add Aqua plus (1 capful per 3 litres) to de-chlorinate. Once a month I add a capful of Cycle nutrafin and a capful of Cycle waste control. I clean the sponge filter fortnightly, and the activated carbon monthly. In order to keep the tank clean and algae free (I wish) I also change every three months a pack of phosphate remover.

Water is hard but otherwise my local aquarium say there's never much wrong with my water quality. I have lost several fish to dropsy, but that seems to have stopped now (last one 4 months ago).

Fish stocked are:

- 2 Clown loaches approx 5 - 6 cm (the only two of my original stock)
- 4 full sized male Guppies
- 1 x 3cm Corydoras julii
- 2 x Honey gouramis (male 3cm & 4cm)
- 2 x 3cm Blue danios
- 1 x Suckermouth catfish 7.5 cm long

Ultimately I would like a similar sized marine set-up (Tropicana 6ft) or similar as it's got better lighting and a timer! However my problem at the moment is that I have hair algae and although I have tried to scrape off the worst and change water more frequently to reduce nitrates, I am slowly losing the battle. Can you suggest a fishy option as I would be happy to find a hair algae eater rather than go down the chemical route.

Steve Nelson via e-mail

I would use a two pronged attack on this. Add in a Bristlenose catfish and a couple of small short-finned Mollies to eat the algae. Test your tap water for nitrate as in some areas this can be quite high, so by doing water changes you are actually feeding your algae! Finally, be patient and let things settle down. Algae blooms come and go and often just fade away without you doing a great deal. In fact some aquarists actually culture a green hair algae on bogwood because it makes it look more aged and natural.

Derek Lambert

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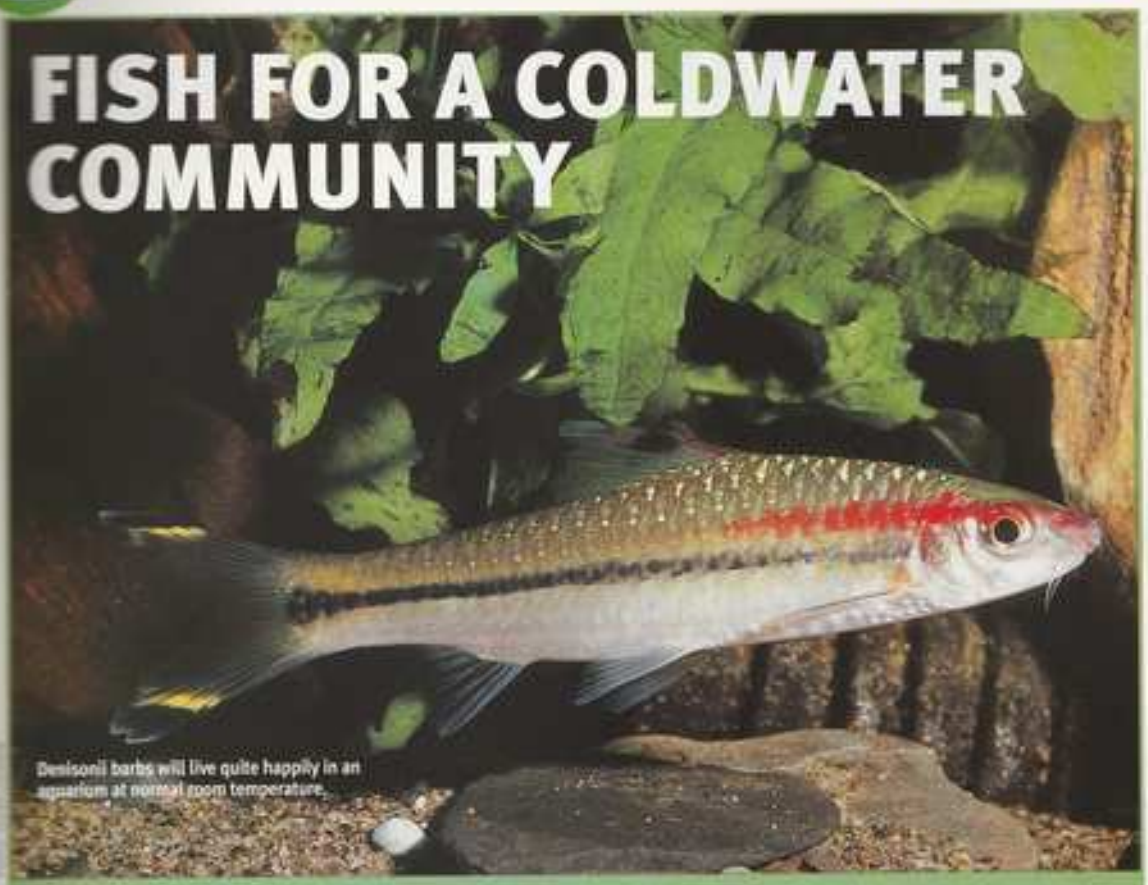

Denisonii barbs will live quite happily in an aquarium at normal room temperature.

I have been a Coldwater fishkeeper for a number of years, but for the last three years I have not been keeping up with the latest innovations and fish, because I have been gradually reducing my stock within my three fish tanks. I am now down to one standard Goldfish, approximately three inches in body housed in a fish tank 60 X 30 X 40cm deep. The filtration is a Hagen Trio 3000 Bio Filter system.

I would like a change from Goldfish and therefore am interested in a coldwater community set up with the idea of shoaling fish at all levels. I am finding it difficult to find information and stock. The set up must include the remaining Goldfish. Could you please answer the following questions:-

1) Can I mix tolerant tropical fish such as Danios and Barbs with coldwater fish such as American flag fish and Rainbow dace?

2) Where can I purchase Rainbow dace, Japanese bitterlings, European bitterlings, Pumpkinseed sunfish and American florida flags?

3) Will the mentioned fish be compatible with my Goldfish?

4) How many fish can I stock?

5) Can you inform me which level the fish will swim at?

6) What plants can I stock which will be unaffected by the ravages of the Goldfish ie Java Fern?

Gary Smith via e-mail

Taking your questions in order:

1 – In general yes, but both American flag fish and Rainbow dace can be a little hard on other fish, so I would steer clear of small Danios and White Clouds. Better choices would be Rosy, Golden, Odessa, Khavli, Denisoni, and Ticto Barbs. Goodeids are well worth searching for. These Mexican livebearers are almost all tolerant of cool temperatures and will even produce babies in your aquarium. Of these Butterfly and Red-tail Goodeids are the most common in the trade. If you go to a specialist livebearer auction good species to look out for are those in the following genera:- Ryodons, Allotocas, Skiffias, Xenoophorus and Xenotoca. Other fish worth looking out for in normal shops are any of the Barbus species, Danio davario, Bitterling, native Minnows, Fathead minnows, and any Zacco species. Many of these fish now require licences to keep and are very difficult to find. So you may find yourself limited to the temperature tolerant tropicals rather than the full range of fish you could keep.

2 – They are hard to find now. You will need to phone around all the shops in your area and ask them what they have in stock and what they would be willing to obtain for you. Be prepared to travel some distance and you may have to pay up front for a special order.

3 – Not the Sunfish. The rest should be fine.

4 – It depends on the adult size of the species you end up keeping. In an aquarium of your size you can keep up to 60cm of fish – but for safety I would limit yourself to only 50cm.

5 – Virtually all the species I have listed are lower to mid-water fish although they will all rise to the surface when food is added. Surface dwellers for this sort of aquarium are hard to come by.

6 – *Anubias* sp, *Vallisneria* sp., and *Acorus gramineus* are three which come to mind. There are others which will live happily provided they are not chewed up, but depending on the Goldfish and the other fish you choose you may be better off with plastic plants.

Derek Lambert

Follow the flag

Roy Osmint smiles on a happy cichlid.

Take a close look at the Flag acara cichlid (*Laetacara curviceps*) and you could be forgiven for believing that the fish was laughing at you. Well, at least smiling! As a matter of general interest, I once knew an aquarist who specialised in this species and always lovingly referred to them as "Mona Lisa" fish due to what he considered their apparently permanent enigmatic smile. In reality, of course, the smile owes less to the fish finding you a source of amusement and more to its mouth position and facial patterning. But still, it's a nice thought!

The Flag cichlid has been around the fishkeeping hobby for nigh on a century and for much of this time enjoyed considerable popularity. This is hardly surprising, for it is a most attractive fish with numerous endearing characteristics that appeal to both novice and experienced aquarists alike.

Although a dwarf in Cichlid terms, reaching some 6-8cm in length, in general shape and broad appearance this species has close similarities to many of its South American heavyweight cousins. Notable differences, apart from of course overall size, are a less protractile mouth and only three spines in the anterior section of the anal fin. The really "big boys" exhibiting between four and twelve.

Natural habitat and coloration.

The Flag cichlid is native to the lower reaches of the mighty Amazon, where it generally prefers to inhabit calmer back waters protected from the more vigorous currents. These areas are also normally rich in aquatic and overhanging vegetation from which the fish is able to seek sanctuary from any unwelcome disturbance or aggression.

As the fish covers a fairly large natural range, varieties tend to differ a little in general coloration and patterning depending on their particular geographical origin. In general terms, however, the back is of greenish/brown that subtly blends into a lovely silvery/blue on the flanks. This in turn gradually merges with the under-body hue which can vary between pale red through to golden.

Attractively peppered around the mouth area and gill covers are seemingly random dots and streaks in a similar blue to that of the flanks. Markings of this general colour are also present on most of the fins. These being especially evident on the tail and anal fins.

EVEN THE SCIENTIST THOUGHT IT WAS SMILING

It is certainly more than coincidental, however, that the modern scientific name of this species when translated from the Latin laetus, means "happy". Those responsible for its nomenclature must surely have based this on the fish's seemingly amused expression. Whilst on the subject of scientific names, it is worth mentioning that previously this fish was known as *Aequidens curviceps*, a title still quite often seen in aquarium literature and used by older aquarists. Its revised classification was awarded during the mid-1980s.

The prominent dorsal fin, that extends along the greater part of the back, is bluish grey bordered with a light red margin. Dark blotches appear towards the posterior section. The height of the fin rises towards the rear and terminates in a beautifully sharp point.

A beautiful male smiles to himself because his home has been arranged with his comfort in mind.

In the aquarium

The Flag is a species that can sometimes prove timid in the aquarium. Where this occurs the fish will retreat to some inconspicuous corner and be rarely, if ever, seen in its full glory. This is certainly likely to be the case if it finds itself in circumstances in which it does not feel comfortable and secure. Some thought and planning, therefore, needs to go into the establishing of its home if this unfortunate situation is to be avoided.

Efforts in this respect will be well rewarded. To see these lovely fishes swimming freely and untroubled in a well planted and furnished aquarium is a joy!

Clearly, as with any species, a water composition that simulates that of the natural environment is the ideal. In the case of the Flag this would be soft and slightly acid. That said, this is a tolerant and in many ways accommodating subject and the quality of water should be regarded as far more important than its chemical composition.

In this connection it should be noted that this species appears to become especially susceptible to disease if housed in unfiltered water that has languished in the aquarium too long, particularly Pop-eye disease (exophthalmia). This threat can normally be kept at bay by conducting partial water changes on a frequent and regular basis. Approximately 15-20% once a fortnight is usually about right in conjunction with efficient filtration.

The Flag is a generally peaceful fish, showing little sign of belligerence outside the breeding period. It is thus well suited to community aquaria with others of similarly peaceable temperament. At breeding time, like others of its clan, territorial instincts tend to come to the surface.

Even so, I have seen these fishes spawn in the corner of a large community tank with nothing more serious occurring than a few threatening gestures to ward off interlopers. The resultant progeny are, of course, unlikely to survive long in such circumstances. But more about this later!

In making this point, the reader should not interpret my observations in this respect as being necessarily representative of the norm. Clearly, many factors can and do contribute to a given situation and its outcome. In other circumstances greater levels of aggression might be demonstrated at breeding time. After all, we are dealing with Cichlids!

Reproduction

The Flag Cichlid is not a particularly difficult species to spawn, a fact indicated by my community tank example. Providing that everything is to the fish's liking in terms of environment and that a suitable sexual partner is available, they will often oblige in a prominent position within the aquarium, allowing the aquarist to carefully observe the procedure.

On the question of sexual partners, the Flag likes to choose its own and does not normally appreciate "arranged marriages". Specimens that have matured together from juveniles and allowed to pair through natural attraction offer the best prospect.

Many Cichlids make good parents, offering vigilant protection to both eggs and fry, at least in the early stages. This may well turn out to be the case with the Flag. But I have noticed that a certain amount of conflicting information appears to exist in this respect among various works of aquarium literature. Some confirming dedication of parental protection up to and including the free swimming stage, others suggesting the fish has earned a reputation for consuming its own eggs, especially the first few batches.

Conflicting reports of this type can clearly prove confusing. My own attitude to this sort of thing has always been to initially take "on board" all such viewpoints. After all, each has probably been formulated from the writer's own experiences and observations. In many instances there may not be an absolutely reliable pattern of behaviour, but ones occasionally stimulated or triggered by certain local environmental influences.

AQUARIUM DECOR

Aquarium decor is important. In addition to open water areas that will allow adequate space for free swimming, plenty of plants should be incorporated ideally grouped into individual thickets. A piece of decorative bogwood and suitable rocks are other desirable features, along with a fairly fine grained gravel substrate. Some aquarists prefer to use sand. I have found that where these fishes are provided with plenty and varied hiding places, they are actually less likely to use them. The fact that such areas of retreat exist and are available if and when required, seems to give the necessary feeling of confidence and security.

This pair have chosen a flat rock to spawn on. The female is the one of the left.

Predator Perfect

On the prowl, this Leaf fish has spotted some movement which may end up as lunch!

Last month Pat featured a leaf fish in her Starting point column which generated a great deal of interest in these strange oddballs. This month **Peter Capon** takes a close look at another species in this family.

THE FIRST LEAF FISH THAT I EVER SAW were in the Aquarium at Gamages department store in London in the early 1950s. This once popular department store ceased to exist many years ago but the Leaf fish is still offered for sale occasionally by shops that pride themselves in carrying a little more than the run of the mill bread and butter fish. It is interesting to note that Jack Hems probably saw the same fish in the same shop and that he wrote of the fish in August 1954.

The reason for the common name of Leaf fish becomes apparent once the creature has settled down happily in a well-planted aquarium. They look for all the world like a dead leaf even to the extent of having spots on the body that look just like the beginning of decay. Indeed, some of the related species *(Monocirrhus polyacanthus)* carry the deception so far as to sport a barbel on the lower lip that gives the appearance of a leaf stalk. Couple their appearance with their habit of drifting lazily through the water with little or no fin movements and the effect is complete.

Natural habitat

Polycentrus schomburgi comes from Trinidad, Venezuela, Guyana and tributaries of the lower Amazon. It is a nocturnal creature that frequents sluggish backwaters feeding mainly on fish small enough to be swallowed at one gulp.

It is classified in the family Nandidae together with species of *Polycentropsis, Monocirrhus,* and *Nandus*. At one time *Badis* was also classified in Nandidae but is now placed in a separate family.

Polycentrus schomburgi grows to about 10 cm, the fish's body is deep and strongly compressed and usually of a dark colour, but is variable and can be pale grey, brownish grey, a rich leather brown or even black but almost always has an irregular pattern of spots and dots. The eye is camouflaged by the three brown to black bars radiating from it, one of which extends to the snout, one to the lower edge of the operculum, and one to the nape of the neck. There is no visible lateral line.

The hard rayed portions of the anal and dorsal fins are olive green to blue black but always in tune with the basic body colour. The soft rayed portions of the dorsal and anal together with the caudal and pectoral fins are colourless and perfectly clear. These latter fins and portions of fins only are used in locomotion and are next to invisible when in use. The first few rays of the ventrals are extended to form long points and are edged in a greenish yellow.

Most photographs are taken, and most aquarists view these fish broadside on. If it is looked at head on, a totally different effect is seen and the fish is virtually invisible. When approaching prey the normally dark head is transformed and a pale cream band extends from the upper jaw, between the eyes and ends at the first rays of the dorsal fin , the tips of the hard rays of that fin are also tipped with cream. At its narrowest, this band is about half the diameter of the eye. From the point of view of a prey fish, the leaf fish cannot be a danger as this light band makes it look like two much narrower fish. The pale band

breaks up the outline of the predator and lulls the prey into a false sense of security.

Two males will act aggressively towards one another and it is interesting to note that in this case no head stripe is shown. Presumably the need now is not to hide but to emphasise the size and shape to intimidate the rival. At breeding time the male does not show the head stripe and it is now the female's turn to show the stripe. It is thought that in Polycentrus society at breeding time the stripe indicates her willingness to mate, in a similar way to the light vertical bars seen on the flanks of a female Betta splendens.

Reproduction

At breeding time the male takes on a velvet black colour with silvery blue or even turquoise spots. In some specimens even the usually clear parts of the dorsal and caudal can take on a black colour. The female is generally paler and at breeding time becomes very pale with an almost flesh colour. Breeding is relatively easy to induce provided plenty of live fish are fed. In the wild these fish spawn in hollows under the banks or on submerged logs. The male selects the spawning site, but whether he cleans it or not cannot be agreed by the various observers. In the aquarium a clay flower pot laid on its side makes a suitable substitute. The male takes up station at his selected site and when the female approaches he makes quick rushes at her and prods her belly. If not ready to spawn, the female will flee. If she is ready, she will station herself at the site and become a very pale colour whilst the male will progressively become darker until he is a velvety black and seems to vibrate as though he is trembling. The female then swims upside down and deposits a few eggs on the roof of the flower pot. The male remains upright when he releases his sperm which being lighter than water floats upwards to fertilise the eggs. The spawning continues for up to two hours until some 400 to 450 eggs have been laid.

After spawning, the female is best removed and the male left to care for the spawn which he usually does by careful fanning and seeing off any fish that dares to come anywhere near his nest. At 28°C the eggs hatch in about 48 hours but take several more days to become free swimming. Once the fry are free swimming the male is best removed.

The feeding of the fry requires the usual Infusoria, Brine shrimp, Micro-worm regime but rarely can they be persuaded to take any food that is not obviously live. Small fish can be fed on Daphnia, Grindal and White worms but the adults do need live fish as food.

An interesting fish but not one for those who might object to supplying live fish as food. It is not suitable for the average community aquarium as it can devour fish that are almost its own size. With fish of its own size or larger it is not normally aggressive being a quiet retiring creature.

There is a lot of variation in colour between individual Leaf fish, this one is lighter than some.

This 4m long giant reef tank belongs to Garry Thomas and is probably the largest privately own reef tank in Wales. Despite the size and success of this tank Gary had only been keeping fish a couple of years before he upgraded to this sized aquarium.

It's all a matter of scale

The overall approach to plumbing and operating a large system is simply a matter of scale when compared to a smaller home aquarium. You will find, however, that many obligations to water quality are much more strict with a heavy bio-load. Testing for less common parameters like oxygen saturation and phosphate levels may be easily overlooked (and certainly more easily corrected) in a smaller system, but a large aquarium requires due diligence, patience and planning to control these and other parameters. They are subject to the virtues and limitations of their very size. Both good and bad things are likely to happen slower in a large volume of water. We gain greater stability with increasing tank size. Thus, climbing nitrate levels are easily observed in advance, but a dangerously low level of oxygen cannot be remedied quickly, for example. This reality demands that you pay strict attention to simple but thorough items of aquarium husbandry.

With careful feeding, light stocking, regular water changes, etc., you will be able to enjoy a remarkably easy system at any size. Set realistic goals for the bio-load and have a planned stock list in advance (including a proposed order of introduction). A super-sized aquarium does not mean "unlimited" potential stocking with fishes... it just means you may have to scrape algae with a mask and snorkel. There is a finite and practical stocking density to any aquarium. Rules of thumb such as X cm of fish per litre are really inappropriate without perspective. There is the very real matter of mass versus length. Ten dainty Cardinal fish at 3 cm each do not place the same demands on filtration as one 30 cm sloppy Grouper... yet they are the same cumulative length of fish! Thus, you can quickly see how flexible we must be on guidelines for stocking densities in a given aquarium.

Filtration

Trickle-filters are one of the very best types of filtration for heavy bio-loads. There are numerous interpretations of the concept for large and small aquaria, indoor and outdoor applications alike. They offer an ideal combination of significant surface area for nitrifying biological faculties while exploiting the unlimited availability of oxygen (in atmospheric air) in the moist environment of the media chamber. Since the media is not submerged in system water, it does not compete directly with livestock for oxygen in the event of a power or equipment failure (trickle filters can generally endure longer and stronger during such catastrophes). This style of filtration is recommended for moderate to heavy bio-loads.

Fluidised bed filters are also highly touted. They operate by churning a suspension of sand or plastic beads in a flow of raw water. The extraordinary surface of the fine media foster even greater surface biological activity than trickle filter media per kilo. As such, they can be made smaller to handle the same bio-load, and are indeed space saving. As submerged media, however, they are wholly dependant on the flow of water to bring food and oxygen to them. In some ways, they compete with livestock for oxygen and can contribute deleteriously to water quality if overfed. In the event of a power or system failure, this submerged media is vulnerable as it settles and suffocates its aerobic bacteria. Overall fluidised bed filters are superb for very heavy bio-loads and situations with limited space for life-support equipment. Any concerns about its limitations are easily remedied with back up generators, pumps and alarms that are well worth the investment for dream aquaria.

Protein skimmers

Protein skimmers are also highly recommended for big marine systems. In fact, they are so efficient at nutrient export that water quality will benefit immeasurably with two skimmers in operation. The →

Protein skimmers are at the heart of most big marine systems. This Turbofloter 5000 is being used on Gary's mega reef tank and Mark has two of these on his 7000 Lt tank.

WATER QUALITY

Keep a close eye on accumulating nitrate; it can be a scourge in support of nuisance algae and lead to health problems for many desirable creatures in the aquarium. Natural nitrate reduction (NNR) strategies like deep sand beds over 10 cm have been demonstrated to be very effective at denitrification.

suggestion is to keep two unique styles (venturi, airstone, injection, or aspirated) because different skimmer designs can extract different qualities of skimmate. Alternate or stagger cleaning and servicing events to ensure minimally interrupted skimmate production. While large water changes and chemical filtrant exchanges can be cumbersome, impractical or expensive on big systems, protein skimmers can temper the degradation of water quality inexpensively and effectively. Protein skimmers are also a crucial means of supporting oxygen saturation in a system with a heavy bio-load.

THE TANK AND STAND

For the safety of your person and property, be sure to have a professional evaluate and confirm the integrity of the aquarium and the solid foundation of the stand, as well as the floor upon which it sits. Most large aquariums over a hundred kilos will need to be set on solid ground (concrete flooring). When this is not possible, a strategy will be required with an orientation perpendicular to the run of the floor joists and possibly with the support of floor jacks underneath. The stand upon which the tank sits is to be as close to perfectly level as possible. Imbalanced tanks can place undue pressure on a side or seam and cause a leak. Irregular surfaces (knots, divots, fastener heads poking up, etc.) can cause pressure points and lead to a crack in the glass or acrylic. Likewise, the posts and pillars of the stand should make a large footprint to distribute the weight of the aquarium. Narrow legs or excessive shims can cause dangerous pressure points, which will lead to a twist or torque of the aquarium. Such flaws are often called to pay the price if the foundation settles even slightly in time. One way to compensate for small flaws is to bed the aquarium on a thick slab of non-absorptive Styrofoam. Without padding, it is crucial to ensure that the stand top is not porous at all but rather very dense. Particleboard and pressed wood are terrible materials for stand construction and will absorb water, swell and can cause a leak in the tank (the uneven stress pulls a seam). Very solid materials are necessary for aquarium stand construction overall.

QUARANTINE ESSENTIAL

Be sure to quarantine all new specimens separately in isolation for a full four weeks without exception. This includes all plants, algae, fishes, invertebrates... anything brought home wet! The ramifications of admitting a parasite, pest, or disease into any display, but especially a large marine aquarium, can be devastating. Four-week quarantines are standard protocol by professional animal handlers because anything undesirable that can be expressed usually will be expressed within that time.

LIGHTING

The luminary needs of the inhabitants will dictate the hardware necessary to meet the demand. For photosynthetic plants, algae and animals in water deeper than 60 cm, metal halides will be required. For large marine aquaria that are long but shallow, modern efficient fluorescent lighting (T 5's) will work fine. Whichever lighting you choose, be sure to employ efficient reflectors (like parabolics) to optimise the distribution of light into the aquarium. Most importantly, choose your livestock and identify their needs before buying a fixture. Too many aquarists buy lighting to fit a tank size without consideration of the living guests.

MYTHS ABOUT BIG FISH

Please also remember to resist buying species that you cannot presently house humanely on the mere hope or expectation of a larger aquarium in time. Too many large species stunt and die prematurely in captivity for having been kept in undersized tanks. Some dreadful myths to rationalise this ill-advised scenario abound. It is no more realistic, however, to expect a fish to just "grow to its tank's size" than it is to expect a colt to never grow into a horse because it lives in a small barn.

Décor

Options for décor in large aquaria are limited only by one's imagination. A wide variety of natural and synthetic materials can be used to construct attractive and effective habitats for the aquarium residents. Natural substrates like rock, gravel and sand are handsome but heavy. Artificial substrates like plastic, fibreglass and resins are lightweight but inefficient in many ways for a lack of porosity. Enlisting the minds and resources of a good aquarium society can be quite helpful for perspective from experienced and well travelled aquarists. Some public aquaria personnel are also kind enough and able to chat with private aquarists about large system features and artefacts. A behind the scenes tour of the exhibits is well worth a pint of beer or two for a friendly staff member!

If compatible with the species and habitat you seek to replicate, a healthy portion of live rock will serve incomparably as décor, food (generating plants, algae and plankton), and as bio-filtration. To facilitate a better price and perhaps product quality or shapes, it will be helpful to seek a local aquarium store that can piggyback your order with one of their normal shipments to optimise freight and the cost of importation. Many local merchants are quite accommodating in such matters and in doing so earn a fair commission, negotiate a better price from a distributor for you, and finesse good will for all in the process. Use live rock and live sand wherever possible in natural marine aquariums large and small.

Good planning is logical and necessary but not insurmountable for realising your dream aquarium. On the contrary, it is great fun and merely a refined expression of good husbandry and success on a larger scale of the hobby.

ADDITIONAL READING

Escobal, *Aquatic Systems Engineering*, is a technical but reliable reference that simply must be on the bookshelf of serious aquarists and operators of large marine aquaria.

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Spawning Surprise

Paul Skinner thinks more people should try keeping Killifish in their community tank. Here he explains why.

Male Rivulus magdalenae have a yellow band in their tail from which gave this fish its common name of Yellow tail panchax.

PHOTO: M.P.S.C. FRANCIS

KILLIFISH SHOULD BE KEPT MORE OFTEN as a member of community aquaria, especially as they occupy the upper reaches of the water – a part of the tank which is often ignored when purchasing fish. However, as a group they suffer from some seriously bad press. Firstly they are tarred by their group name of Killifish, which many people confuse with 'killer fish', and because of this will not buy them. Secondly, more often than not, the only fish that fishkeepers read about are the annual species which survive only during the rainy season in the wild (the eggs lying dormant until the return of the rains). Fishkeepers are reluctant to buy them as they believe that the stunningly attractive males will only live for a couple of months. There are, however, numerous species that will live for a number of years and are suitable for inclusion in a community tank.

If these fish are kept in a tank of their own, they prove to be even more interesting to the hobbyist who can then observe their fascinating spawning behaviour. When I kept this particular fish it proved to be even more surprising than I ever expected.

My first experiences

When I first came across this fish I was really into keeping Killifish in a big way. I definitely had the bug and was currently keeping and breeding 20 or so different species. As I went around various shops and fish shows I was always on the lookout for anything different, as well as obtaining fish and eggs through the BKA (British Killifish Association). One day I noticed a dealer's tank that contained a dozen or so pairs of chunky looking Killifish which I recognised as a species of Rivulus, although I was unsure which species they were. I had no Rivulus at home so decided to purchase a pair and I returned home very pleased with my purchase.

The fish were placed in one of my standard Killifish tanks which was a 30 x 20 x 30cm all glass tank filled with soft, slightly acid water and fitted with a good cover glass. The cover is essential as all Killifish

Factfile

Common name:	Yellow tail panchax
Scientific Name:	*Rivulus magdalenae*
Family:	Cyprinodontidae
Distribution:	Magdalena basin, Columbia
Size:	7.5cm

are good jumpers and will invariably find the smallest gap to jump through. The tank also contained a woollen spawning mop which I make myself. I prefer these mops to real plants as they do not introduce snails, and I can boil them to sterilise them before use. I also find it very easy to spot the eggs on the mops and easily remove them to a container.

My fish were just under 5cm. The male's body had a greenish-olive background colour highlighted with 8 horizontal rows of red spots. The gill cover had a green spot which was the same colour as the pelvic and anal fins. The dorsal was more of a yellowy green with red spots, as was the base of the tail. The grey coloured tail was black on the upper and lower edges. The rear edge had a pale yellow band - from which the fish gets its common name. The male, although not the most beautiful killifish, was nevertheless striking in appearance. The female was an olive colour with the occasional red spot.

Making a spawning mop

1. Cut undyed wool into strips about 20cm length
2. Gather 25 strips together before folding them in half
3. Fasten them together by wrapping a piece of plant weight around the middle (if used for bottom spawners) or tie them together round the middle and attach a cork as a float (if used for top spawners)

Where were the eggs?

The fish settled well and were given a diet of frozen Brine shrimp and Bloodworm, augmented by occasional feeds of Whiteworm. They soon put on body weight. A couple of weeks later I noticed that the male was displaying to the female. I thought 'this is it' and expected to find eggs on the mops but I found nothing. Over the next few days I kept looking and was completely at a loss as to why there were no eggs as the pair were continuing to display and looked in good condition. It was at this point I turned over the cover glass , and noticed that there were 9 eggs adhering to the underside of the glass. I decided to watch these fish closely and settled down in the fish room shortly after the lights came on. Half an hour later the pair leaped from the water and stuck to the cover glass, they stayed there together for about 10 seconds before they dropped back into the water again. This was repeated until they had laid 5 more eggs. Then they lost interest in each other and went their separate ways.

I wondered what to do about the eggs.

Aquarium set-up

Tank:	30 x 20 x 20 cm
Filtration:	Air powered sponge filter
Substrate:	None
Decor:	Spawning mop
Plants:	None
Diet:	Frozen Brine shrimp, Bloodworm and cultured live Whiteworms
Temperature:	26°C
pH:	6.8
GH:	20°

Should I leave them on the glass (the air trapped above the water line was quite humid and the eggs did not seem to be drying out). I was worried that the parents would eat the fry if the eggs hatched and the fry dropped into the water. I decided to remove the eggs by sliding my fingernail carefully under the eggs and placing them in a a separate plastic container with water from the parent's tank. I then placed an air stone in the container to supply a gentle air flow. At a temperature of 26 °C the eggs began hatching after 12 days and the fry were free swimming almost immediately. I transferred them into a larger container and began feeding newly hatched Brine shrimp. The youngsters grew quickly and Microworm was introduced into their diet. Three weeks later powdered dry food and diced frozen Bloodworm were also fed to the rapidly growing fry. On this diet and with regular, partial water changes (25% per week) they reached spawning size after 12 weeks.

The spawning of these fish was surprising as Splash tetras are the only fish that I have seen behaving in this way. Why were the Rivulus acting like this? It has been suggested that Splash tetra do this to avoid predators in the wild. Is this also true of this species?

In common with most killifish females of this species are much plainer in colour

Have you bred this fish?

Since Paul's experiences with this species are different from most other killifish breeders have any other readers noticed this behaviour in these or any other Killifish? If so, perhaps you will write in to the magazine and let us know.

Our readers Write

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

Feeding is a hot topic in *Points of view.*

Oh dear, I must be showing my age or something, as John Ainsworth of Birmingham has taken me to task over my comments in introducing a topic for consideration (TFK, July issue).

"Dear Dick, I disagree with your rather cavalier dismissal of fish tattoos (July issue). If you hadn't noticed this form of art is gaining in popularity all the time, even among the older generations. Personally I am passionate about my Koi and didn't like any of the really stylised creations on offer at my local tattoo studios, so I took a copy of Nick Fletcher's "The Ultimate Koi" book with me and showed them which fish I wanted. It is a Kohaku with coloration almost identical to my favourite Koi. I have had him for 5 years now and even enlarged my pond into a proper "state of the art" Koi pond so he would have enough room to reach his full potential. The tattoo artist carefully created a design to match my fish and I now proudly sport him on my upper arm. My parents love it (they are right into Koi as well) but said it wasn't for them. I know of another Koi keeper who had one done after seeing mine at a Koi show. Do any other readers have fish tattoos?"

Thanks John for your viewpoint, I hadn't intended my comments to be either cavalier or dismissive at all as I believe everyone should be able to have their own views and personal tastes in everything; what I thought might have brought a smile was my implied warning to stick to the bounds of good taste when describing tattoos (or even sending in any photographs!). I hope all readers will not be deterred from contributing their views for fear of my responses - in fact the shortness of time between receiving comments and creating a reply hardly gives me time to review all the possible implications! My first initial 'gut-reaction' is probably what you'll get every month, for better or worse.

VARIETY THE SPICE OF LIFE

With reference to an early topic, I'm grateful to Amy Eastwood of Fleetwood, Lancs for her point of view with regard to feeding regimes. She writes, *"Dear Dick, In the May Points of view you asked for readers thoughts on variety in the feeding of fish. I saw a TV interview with a man who lived solely on baked beans. He seemed healthy enough but I certainly wouldn't like baked beans morning, noon and night (think of the after effects!), or any other item of food all the time come to that, however nutritious it might be."*

I have to jump in here, Amy, on the grounds of topicality. Apparently, according to reports in the National Press, the days of the anti-social repercussive effects of ingested baked beans are now numbered. Researchers at the Food Analysis Laboratory in Caracas, Venezuela have now found a method which they say will get rid of the bacterially- produced methane and sulphurous substances responsible for the beans' traditional 'bad press.' The secret of suppression is to naturally ferment the beans before they are canned; this denies the bacteria of their basic culprit building-block chemicals, alpha galactosides and soluble dietary fibre. After 96 hours of fermentation, the concentration of alpha galactosides drops by 95% and all soluble fibre is long gone after only 48 hours. But, of course there is already a counter argument to this 'good news' – Dr Glenn Gibson, a food microbiologist at Reading University is not convinced that a 'wind-free' bean would be a good thing. *"Flatulence is an important indicator of a healthy gut system. You need to expel gas to ensure your gut is functioning properly."* A spokesman for Heinz, the food producer, says *"We are the biggest baked bean eaters in the world, so it seems people are quite happy with the product as it is. We sell about one and a half million tins a day and experts say flatulence is good for you."* At the risk of sounding dismissive, so it might be, but what about the rest of us?

However, back to Amy, who continues: *"Variety is the spice of life and I think this definitely applies to food and this includes fish food. My fish have their preferences but if fed on one kind of food continuously they could reject other foods when offered. This is particularly true of dried foods. I've seen it happen. Feed your fish continuously on one kind of dried food and when a new one comes along, yuk! It tastes peculiar as it's not what they thought it was. It's like drinking coffee when you think it's tea.*

My fish love Bloodworm, my Discus in particular they'd eat it all day. But a diet solely of Bloodworm would soon send them spiralling down. I alternate the dried foods I use and give my fish a great meal deal. Daphnia, all types of frozen foods, Brine Shrimp, Shrimps, Fish, Mosquito Larvae and delicious Earthworms - which are chopped up for the smaller fish. Gourmet meals for fish, that's what they need."

Aquatic companies

Now for something completely different. Having lived with the computer for several years and, in relatively recent times, used the Internet for e-mail and research purposes I never cease to wonder at the power (whether used for good or bad) of the database. Just type in any subject matter word or phrase into any of the search engines on the Internet and you'll be flooded with information. In the interests of marketing research, it follows that any Company worth its salt will also be gathering information either for its own use or to reissue as a service to its customers. With due regard to the regulations on data held about anyone by anyone else, it is probably true that aquatic Companies know a whole lot about consumer issues. It would be illuminating if they could let us in on a few topics of interest. For instance, what's the most common, recurring topic referred to by customers, beginners and experts alike? What's the most useful or popular piece of aquarium equipment in their ranges? How fast can a Company react to changes in hobbyists' tastes or demands? Has any reader ever seen a suggestion sent in to a Company eventually emerge as a 'new product?'

Have you had a first lately?

A female Water soldier plant in flower. Male plants have pinkish flowers which are produced in groups.

Now and again something occurs which makes you pleased with life. Apart from June's warm glorious weather (which brought out really vigorous growth in and around the pond), I had a 'first' - my Water Soldiers (*Stratiotes aloides*) produced white flowers. As there was only one per plant I assume that these were female flowers, as the male flowers apparently grow in groups and are pinkish. Reading up on the species, it seems that most Water Soldiers reproduce by vegetative runners as the likelihood of flowers of both sexes appearing in the same locality are quite rare.

Have you had a 'first' worthy of note, or of which you are justly personally proud?

See you next month.
Dick Mills

Contact *Points of view*

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

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Copy for Diary Dates

Copy for Diary Dates should be sent to Today's Fishkeeper, Winchester Court, 1 Forum Place, Hatfield, Hertfordshire, AL10 0RN Telephone 01673 885352, fax 01707 269333 or e.mail derek@tmg.co.uk copy deadline 8 weeks before publication date.

today's fishworld

August's show, auction and club meeting dates.

Fri 1st	**North West Cichlid Group meeting.** Contact 019422 707593
Sat 2nd	**British Aquarist Festival.** Contact 0161 652 6207 or 01254 776567
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Tues 5th	**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 01 4561836 **Halton A.S. meeting.** Contact 0151 2898190 **North Bucks A.S. meeting.** Contact 01908 377333 **Oldham A.S. meeting.** Contact 0161 281 3725 **Preston A.S. meeting.** Contact 01772 321145 **Lang Toun Aquarists and Pondkeepers Group meeting.** Contact 01592 595825 **Wyke A.S. meeting.** Contact 01482 445543
Wed 6th	**Corby & D.A.S. meeting.** Contact 01536 790932 **Oasis Fish Club (Sunderland) meeting.** Contact 0191 3841433 **Perth A.S. meeting.** Contact 01 738 621704 or 01506 510558 **Clacton Fish Keeping Club meeting.** Contact 01255 428065 **Portsmouth A.S. meeting.** Contact 01673 885352 **Bracknell A.S. meeting.** Contact 01189 732874 **Ryedale A.S. meeting.** Contact sdmarshall@lineone.net **Tameside A.S. meeting.** Contact 0161 339 6593
Thurs 7th	**Glenrothes meeting.** Contact D. Smart, 4 Lochty Ave., Kinglassie, Fife. **Faircity A.S. meeting.** Contact 01738 561291 or 07714 188507 **Sandgrounders A.S. meeting.** Contact 01704 541177
Friday 8th	**Basingstoke A.S. BBQ.** Contact 0118 970 1461 **West Cornwall Fishkeepers meeting.** Contact 07799401248 or 01209 614518
Sat 9th	
Sun 10th	**Glenrothes Open show and auction.** Contact D. Smart, 4 Lochty Ave., Kinglassie, Fife.
Mon 11th	**Kirkcaldy A.S. meeting.** Contact 01738 634689 or 01592 205565
Tues 12th	**Darwin A.S. meeting.** Contact 01254 701925 **Northwich A.S. meeting.** Contact 01606 882966 **Caer Urfa A.S. meeting.** Contact 0191 5237464 **Telford & D.A.S. meeting.** Contact 01952 409721 or 01952 616410 **Lang Toun Aquarists and Pondkeepers Group meeting.** Contact 01592 595825 **Northern Goldfish and Pondkeepers meeting.** Contact 0161 9697567 **Greenock D.A.S. Meeting.** Contact 01475 704219 **Bangor Aquarists & Breeders Society.** Contact 028 9187 3539 **Clyde Aquarist Society meeting.** Contact john@farnanf.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 **Oldham A.S. meeting.** Contact 0161 281 3725
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Sun 24th	
Mon 25th	**Kirkcaldy A.S.meeting.** Contact 01738 634689 or 01592 205565 **Thorpe & D.A.S. meeting.** Contact 01953 605394 **Solway A.S. meeting.** Contact 01387 750606 **Merseyside Aquarist Society meeting.** Contact 0151 260 3664 **Ayrshire Fishkeepers Association meeting.** Contact 01294 605272
Tues 26th	**Northwich A.S.** meeting Contact 01606 882966 **Lang Toun Aquarists and Pondkeepers Group meeting.** Contact 01592 595825 **Greenock D.A.S. meeting.** Contact 01475 704219 **Croydon Aquarist Society meeting.** Contact 020 8654 0984 **Strood & D.A.S. meeting.** Contact 01634 221291 **Oldham A.S. meeting.** Contact 0161 281 3725
Wed 27th	**Hounslow D.A.S. meeting.** Contact 020 8890 6933 **Halifax A.S. meeting.** Contact 01274 880471 **Workington A.S.** Contact 01900 67951
Thurs 28th	**Mid Sussex A.S. meeting.** Contact 01273 602407
Fri 29th	**Eastbourne & District Pondkeeping.** Contact 01323 7731369
Sat 30th	
Sun 31st	

British Aquarist Festival

As reported in the June edition of *Today's Fishkeeper* the British Aquarist Festival has moved its date from a dark and damp November weekend to what everyone hopes will be a bright 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.

As usual the festival will feature the Champion of Champions contest. This started in 1967 when the *Aquarist and Pondkeeper* magazine (Now called *Today's Fishkeeper* magazine) announced the launch of the Champion of Champions contest, as *"For the first time in the history of Fishkeeping in this country, a competition is to be held to decide the Champion fish of the shows. The entries will come from winners of the 'Best Fish in the Show' awards, which are included in the open shows now being held, and will be automatically eligible to enter for the 'Champion of Champions' contest which will be held in conjunction with the British Aquarist's Festival"*.

This contest still continues today and is now open to the first three best in shows at each show, and there are separate Tropical and Coldwater contests. The contests will now be held as one-day shows. The Tropical contest on Saturday 2nd August and the coldwater contest on the Sunday.

Further details of the Champion of Champions, and details of the British Aquarist's Festival can be obtained from A Chadwick, 9 Bromille Close, Chadderton, Oldham, OL1 2RH Tel. 0161 652 6207 or E-Mail arniechad@btinternet.com

FURTHER DETAILS

A Chadwick, 9 Bromille Close, Chadderton, Oldham, OL1 2RH Tel. 0161 652 6207 or E-Mail arniechad@btinternet.com

INTERESTED IN KILLIFISH?

The British Killifish Association is dedicated to the study of, propagation of, and publication of knowledge pertaining to Killifish. What are the benefits of membership? Firstly there is the Killi-News which is the monthly BKA journal published in full colour and typically 20-24 pages. Back issues are still available in the BKA online store. If you are looking for an article on a specific topic, you can also search the database of back issues. Apart from this there is a starter booklet 'A Guide to Killie Keeping' by Fred Wright; covering killie maintenance, feeding, breeding, diseases and posting fish. You also get the nominal role; a list of names and addresses of all BKA members, so that you can contact members nearby. You should also be supplied with names of members willing to answer your questions. Rules and Services guide, details of association rules, and the BKA merchandise listings. Access to the BKA web site members area which contains the online auction and a whole lot more pictures and articles. Membership costs UK £15, EUROPE £18 and OVERSEAS £28.

To join visit the web site at www.bka.org.uk or write to: Cliff Griffiths, 8 Cropthorne Close, Woodrow North, Redditch, Worcs, B98 7SJ.

SAD NEWS

Just as this issue of *Today's Fishkeeper* went to press we learned that Bob Davies (co-author of Frogs and Friends) has sadly passed away. Val will be continuing with the column and for some time to come Bob's name will still feature as co-author since they worked on many of the coming features together.

Shop Visit

Today's Fishkeeper visits ***Leytonstone Aquatics*** in Leytonstone, East London.

Parking at Leytonstone Aquatics is not usually too much of a problem since there are parking areas both in front of the shop and down the side streets as well.

Shop details: Leytonstone Aquatics. 625 High Road. Leytonstone. London. E11 4PA Tel/Fax 020 8539 1250
Shop opening hours: 10am - 6pm Monday - Saturday 11am - 3pm Sunday
Proprietors: Paul Verlander and Sally Baldwin
Staff: Alex Pastelas
Number of tanks Over 100
Display tanks and ponds: 1 Display Tank and 2 ponds
Specialities: Tropical, Coldwater.
Additional services: Pond set- ups and maintenance, pets and pet services.
Brands stocked: All major brands particularly Juwel.
Which groups of fish do you sell?: Tropical freshwater and Coldwater including Koi.

There is a good display of Juwel aquaria for customers to choose from.

Leytonstone aquatics is not just an aquatic outlet it is a full blown petshop as well, just the sort of place where many of us bought our first aquarium and started on the path to becoming an aquarist. The proprietor, Paul Verlander started in this business about 25 years ago when he left school and started working at Exotic trade wholesalers. Then 3 years ago he decided to start his own shop with Sally Baldwin.Today, Leytonstone Aquatics is becoming well known for good friendly service and reasonable prices. The fish on sale range between the usual "bread and butter" species right through to some 'L' number catfish and a few of the more unusual Corydoras which are Paul's personal favourites. Currently Paul says he has a good range of Discus in the shop and some attractive Koi as well.

The dry goods are stacked floor to ceiling in some parts of the shop.

Our verdict

Just the sort of place where most of us started our fishkeeping life with friendly advice and good service always on hand.

Paul's verdict on the manufacturers

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

Which company gives your customers the best service?
Eheim, Hagen and Interpet

Cutting edge

In this two part series on Synodontis from Lake Tanganyika, **Erwin Schraml** presents photographs of all seven species for the first time ever.

PHOTOS: ERWIN SCHRAML

At present seven valid species of *Synodontis* are known from Lake Tanganyika and form a small species flock of rather similar looking fishes. Because these catfishes are repeatedly confused with each other, it is my wish to present all the species occurring in the lake side by side with photographs. This way I can point out the differences so aquarists can recognise which fish is which.

Synodontis multipunctatus Boulenger, 1898

The Cuckoo catfish is the best known of all *Synodontis* because of its unusual behaviour. It is also the species which has been kept the longest of all *Synodontis* species from Lake Tanganyika in aquaria. Götzen (1977) reported about it first, believing it came from Lake Malawi and was called *Synodontis* njassae. Under this name, the species was kept for a while in Great Britain. In Germany I (Schraml 1980) misnamed the species, because at that time the trade names were used unconditionally. So this species was available as *S. petricola* because of the drawings in the "*Synodontis* – bible" (Poll 1971). There were several species in the lake which looked alike, so it was assumed that more than one species was being imported. Individuals with a lighter pattern were called *S. eurystomus* and darker ones *S. petricola*.

Blank (1981 a) published first in DATZ observations about the extraordinary reproductive behaviour, under the name *S. petricola* in Germany, and in England a few months later as *S. njassae* (Blank 1981 b). Colditz (1986) gave a comprehensive report about the reproductive behaviour using the right name as used in the USA (Koziol 1983; Ferguson 1983).

A whole series of articles followed, with the cuckoo behaviour as the theme. Büscher (1994) cites Brichard (1989) was the first to criticise this acceptance that the species reproduces exclusively

S.multipunctatus about 7cm long, with big eyes, high dorsal fin, short adipose fin, and well defined, narrow black bars in the caudal fin.

This *Synodontis multipunctatus* came from the same shipment as the other pictured and is about the same size. It has smaller eyes, lower dorsal fin, and broad but washed out bars in the caudal fin.

through brood parasitism. He suggests several things to cast doubt on this. The relatively high numbers of *S. multipunctatus* in the lake is contrasted with the comparatively rare discovery of mouthbrooder females in nature which have catfish babies in their mouth. It is also a fact that fishermen around the lake didn't know about this method of reproduction. Büscher (2000) assumes, they would know it, if it was normal and could be observed more frequently.

Other spawning methods?

There is at the present time a discrepancy between large individuals of *S. multipunctatus* which are known to carry up to 200 eggs in the body, but only relatively few can be placed at the spawning site of the mouthbrooder. In the aquarium, the catfish reaches lengths of 12 to 14 cm, but the holotype in the British Museum measures 27.5 cm. It could be conjectured that such large animals change to another reproductive strategy, or it could be that since misidentifications are common in scientific literature, animals with a high egg number belong to another species and large real *S. multipunctatus* are simply parasitic on large cichlids, for example *Cyphotilapia frontosa*.

More recent reports, however, show that everything could be completely different. Jerry Miranda reports on an Internet page about a completely different spawning scenario, which he has captured on video. He observed *S. multipunctatus* which contributed to a Malawi cichlids' spawning approximately 100 eggs in an explosion like spawning but the cichlids picked up none of the eggs. Generally speaking, however, his fish laid about 20 eggs per spawning and then turned away. They did this about 5 to 8 times, one after another. The maximum amount of baby catfishes found in a brood within a mouthbrooder mouth was 53!

Büscher (2000) mentions for the first time, that an aquarist has reported to him, that *S. multipunctatus* can also spawn without the cuckoo behaviour, however, the trigger was spawning mouthbrooders in the same aquarium. Dinyar Lalkaka (New York) informed me that his *S. multipunctatus* spawns in his aquarium without any mouthbreeders since he doesn't keep any cichlids.

Apart from Marc Danhieux (see dedication page 53) Frank Schäfer received fish from Zambia after a stay there, which he made available to me. Guy Teugels and Jos Snoeks kindly provided specimens from the collection of the Africa museum in Tervuren/Belgium for photography. Luc de Vos (National Museum of Kenya) has tried, despite technical problems, to send commentaries to the texts and pictures via e-mail. The remaining photos have emerged during the years at Gerald Kellner (Mering), Aquarium Glaser (Rodgau) and Verduijn Cichlids (Duivenhuizen/NL).

Luc de Vos has also informed me, that it is also known among scientists that there are in addition to the seven species already described, still further ones which nobody has yet worked on.

Identifying *S. multipunctatus*

S. multipunctatus can be recognised by its large eyes when compared to the head size. These are not as large in diameter in any other species of this group. But , even within a group of animals which originate from a single import, striking differences in the eye size. The upper jaw barbels are also longer and more slender than in all the other species with which *S. multipunctatus* could be confused.

The humeral process (the pointed extension of the shoulder) is, in smaller to medium-sized individuals, very pointed and relatively slender. In the lower part a bulge is found which looks like a slender dog tail. In very large animals this bulge is hardly visible and the whole plate is somewhat higher and proportionately shorter. There are, in particular, striking differences between the caudal coloration of individual animals which means, in my opinion, that references to individuals should be examined more closely, to ascertain whether they belong to different species.

We can find animals with relatively narrow and short, i.e. not reaching the tips, clearly separated black strokes in each half of the fin (Fig. 1), as well as animals with broader lines which almost reach to the tips of the caudal fin and can virtually join each other at the body (Fig. 2). Both individuals in the photos are approximately 7 cm and originate from the same shipment from Zambia. They also show characteristics which can vary greatly in individual animals, such as different eye and pupil diameter or the length of the adipose fin.

Synodontis petricola Matthes, 1959

This *Synodontis petricola* is very similar to the type specimen in coloration and body shape.

This is a female *Synodontis* sp. "Petricola Dwarf".

This fish is similar to *S. petricola* but grows larger (it is known as "Petricola Big") but is probably another new species.

The first photo of *S. petricola* appears in the Aquarium Atlas (Volume 3, page 407, an underwater photography made by Walter Dieckhoff). In Volume 2 (page 547) *S. polli* is incorrectly shown as *S. petricola*. In earlier aquarium literature *S. multipunctatus* was mainly named as *S. petricola*. A comparison of this species with *S. multipunctatus*, which Schneidewind (1993) planned, fails, because the caption in one picture maintains the contrary (the back fish is in fact *S. petricola*). In Evers (2000: 530) the photo of *S. multipunctatus* is labeled, inadvertently, with the caption of the prior picture. Also he calls *S.* "Petricola Dwarf" *S. petricola*.

Synodontis petricola is the most slender of all the described *Synodontis* from Lake Tanganyika, it reaches about 12 cm long, has a greatly underslung mouth, the smallest eyes of all and a shorter humeral - process than *S. multipunctatus*, though not as short as in *S. polli*. In juveniles, the spots on the caudal peduncle appear to run a bit, individual dots joining with the one beneath. The most striking feature of all petricola forms is that the first dorsal fin spine is always white.

It was assumed that this species propagated like a cuckoo. Abnormal behaviour during spawning was observed as the eggs were released into the water by the catfishes. Redecker (1994) was probably the first to report this. His article is, however, not illustrated with his own photographs, so that identification is difficult. In most of the different observations of the spawning act, the spawning medium was a sponge filter on which the eggs were laid.

Probably three species are at present lumped together under the name *S. petricola*. *Synodontis* sp. "Petricola Dwarf" only reaches about 10 cm. It was under this name that juveniles of *S. multipunctatus* were exhibited at the Cichlid show of the Belgian Cichlid Association in 1999. At the same show in 2001 the real Dwarf petricola was seen.

Evers (2000) reports about its breeding under the name *S. petricola*. He counted over 300 eggs, which were expelled in one clutch. Burnside (2000) found up to 800 eggs. This species has the darker, medium grey to slightly cuprous toned basic coloration. The points on the flanks in this species or variant are relatively irregular and big mature animals have broad spaces, while with increasing age the points on *S. petricola* become more numerous and therefore narrower, and they are smaller and more proportionate in size. Tank bred "Dwarf Petricola" are frequently offered in the trade.

Both *S. petricola* and *S.* sp. "Petricola Dwarf" have a solid black triangle in the dorsal fin. Thereby they differ from a species, which has, like *S. petricola* as adults, small points of proportionate size on the flanks. Like the *Petricola* form it has small eyes and a brightly coloured dorsal spine, but only a triangular border in the dorsal fin. Further differences of this species are the much longer snout and the larger adult length (at least 14 cm). In Kobayagawa (1991) and Schaefer (1996) this species is shown as *S. dhonti*.

Synodontis polli Gosse, 1982

later found out that the name used by Matthes (1959) for the description of *Synodontis eurystomus* was already used by Pfeffer in 1889 for another mochokid. Meanwhile the taxon is counted simply as a synonym of *Chiloglanis deckenii* Peters, 1868. A new name had to be found. Gosse chose *S. polli* in honour of Max Poll, who worked


Adult specimen (14cm) of *Synodontis polli*.

for a long time with the taxonomy of *Synodontis* species.

The first photo of the species is found in the Aquarium Atlas (volume 2, as *S. petricola*). In Kobayagawa (1991) and Schaefer (1996) another species (*S. cf. dhonti*) is called *S. polli*, while the right *S. polli* is referred to as *S. petricola*.

S. polli has a relatively broad snout, which ends in a long bow in an almost underslung mouth. The barbels are short, likewise the humeral process; the species has a slightly compact appearance. Juveniles are relatively brightly coloured, however their basic coloration is never silvery but a rather bright bronze. Dennis Rawlinson pointed out in a discussion , that *S. polli* is easily recognisable through a thin light bar, which is found at the front edge of the dorsal spine, seen only from a steep angled front view. With increasing age the species becomes darker. It reaches a length of at least 15 cm.

Nothing is known so far about the reproductive behaviour of *S. polli*, even housing reports are missing in the aquarium journals. *Synodontis polli* appears to be more widely spread in nature. In Poll (1971) habitat specifications are only found for the northern Lake Tanganyika. Meanwhile, however, animals were also discovered in Lake Mweru Wantipa (between the southern end of Lake Tanganyika and Lake Mweru), which cautiously should be referred to *S. cf. polli*, because of the somewhat divergent colouring.

For the first time, from his export station in Zambia ,Thorsten Reuter recently sent to Germany a shipment with relatively large mochokids. Among them were some catfishes , which appeared to be like *S. Polli*. The animals differ from representatives of this species from the northern lake, by having a more slender body shape and a divergent head shape, but other features, like the shape of the cleithrum as well as the light stripe on the dorsal spine, unmistakably bring them into the relative proximity of the nominal form of *S. polli*. At 16 cm standard length these fish might have been fully-grown as no larger specimens have yet been found . Whether this form will receive its own species status, remains to be seen. In my opinion, my first visual impression is that this form is sufficiently different, to become a geographical variant and therefore be described at least as a subspecies.


A semi-adult specimen (9cm long) of *Synodontis polli*.


This fish was one of the recent imports from Zambia. It is 16cm long and similar to *S. polli* but may be decribed as a new species or subspecies.

Dedication

This paper is dedicated to and in memory of Marc Danhleux, who died much too early on August 26, 2001. He ordered fish repeatedly for this article, via his wholesale ornamental fish business (Mal-Ta-Vi, Hohenahr/Germany). Using different exporters from around the lake, he managed to import all seven species so that I could take photographs of those species.Before this no photos were available.

Top of the Pops

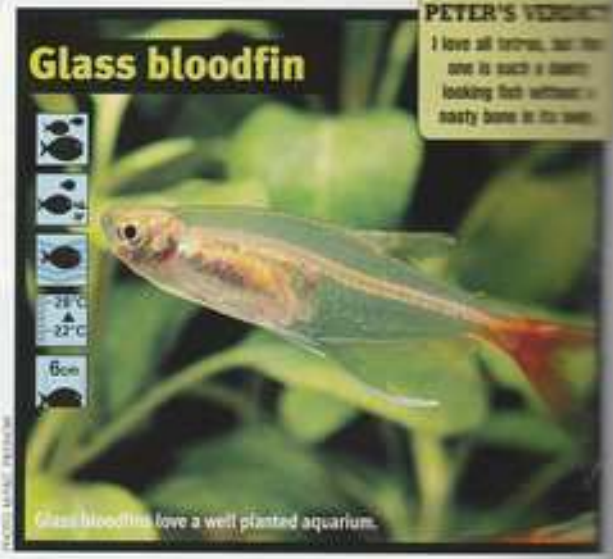
Everyone has their own "Top of the Pops" in the fish world. Peter Berry, from Hull gives his choice.

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:

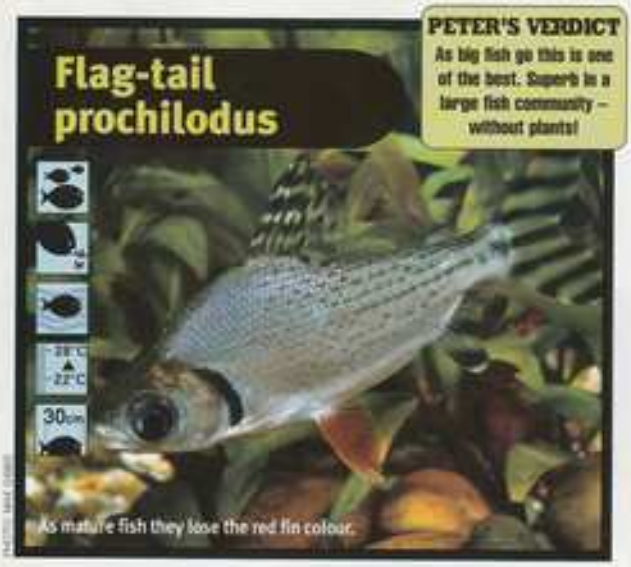
"Top of the Pops", Today's Fishkeeper magazine, TRMG magazines Ltd., Winchester Court, 1 Forum Place, Hatfield, Herts. AL10 0RN, or email derek@trmg.co.uk

Glass bloodfin



Scientific name:	*Prionobrama filigera*
Aquarium type:	60 x 30 x 30cm
Distribution:	Paraguay, Argentina and Southern Brazil
Diet:	All types of commercial foods but also likes some live food in its diet.
Companion species:	Other small peaceful community fish.

Flag-tail prochilodus



Scientific name:	*Semaprochilodus taeniurus*
Aquarium type:	180 x 60 x 60cm
Distribution:	Brazil & Columbia
Diet:	All commercial foods, plus any vegetable matter they can find.
Companion Species:	Other medium sized lively species.

Golden barb

Scientific name:	*Barbus semifasciolatus*
Aquarium type:	90 x 30 x 30cm
Distribution:	China
Diet:	All foods.
Companion species:	Other medium sized lively species.

SEE KEY TO SYMBOLS ON PAGE 8

Golden wonder

PETER'S VERDICT
I always liked the wild coloured fish of this species but this new introduction is truly gorgeous.

Golden wonder panchax are an easy killifish to keep.

Scientific name:	*Aplocheilus lineatus*
Aquarium type:	90 x 30 x 30cm
Distribution:	Asia.
Diet:	All foods, but likes some live or frozen food in its diet.
Companion species:	Other medium sized community fish.

Crescent zoe

PETER'S VERDICT
I wanted some from the very first time I saw them. I had to go to a specialist auction to get them but they were well worth the effort.

Male Crescent zoe.

Scientific name:	*Zoogoneticus tequila*
Aquarium type:	60 x 30 x 30cm
Distribution:	Mexico
Diet:	Not fussy. Flake, pellet, frozen and live foods.
Companion species:	Well suited to a medium sized community aquarium with other peaceful fish.

Thick-lipped gourami

PETER'S VERDICT
I really love this Gourami but you don't see it around much these days. My local shop had to order some in specially for me last year.

A pair of Thick-lipped gouramis (female below)

Scientific name:	*Colisa fasciata*
Aquarium type:	100 x 30 x 30cm
Distribution:	Burma and northern India
Diet:	Flake, small pellet, frozen and live foods.
Companion species:	Well suited to a medium sized aquarium with other peaceful fish. Males are territorial when breeding otherwise are not aggressive.

Firetail rasbora

PETER'S VERDICT
This was one of the first fish I ever kept. I still have a shoal of them in my tank 20 years later.

A group of Firetail rasboras

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

Sea view

Just like all other animals, corals can suffer from a range of diseases. **Andrew Caine** sums up what is known so far and has a fantastic looking fish and an easy coral for you to keep.

All corals can suffer from diseases but little is really know about what causes them and how to treat them. This is a healthy example of *Acropora millepora*.

Let's start to look at coral diseases, their causes and cure, or shall I say let's look at what we know about them as we are only at the beginning of our understanding in this subject. At the time of writing, only 15 different diseases have been identified and only 4 positive cures are known, not the best situation is it!

It is only when the cause is identified that a cure can be developed. The first area to look at is the obvious one, our little friends or foes the bacterial populations that exist everywhere.Here we have a problem when dealing with infection, as we have to identify the bad ones from the good. This is not so simple because of the rapid evolution of bacteria species. This results in many strains of a single species, some good and some bad and it spirals on and on.

Why not throw in a broad spectrum bactericide to do the job? Well there are a few factors to consider here, the first one being that the bactericide will kill the good bacteria as well as the bad. The good bacteria have a biological role to play, remove them and you remove the role they perform, which in turn will cause a problem. The second is that bacteria function best when attached to a surface, so you remove the good from a surface leaving areas for colonisation by the bad bacteria. This way is no good!

To prevent the disease why can't the system be protected with a UV ? The fact is that a UV will kill bacteria (both good and bad) only if they are in the water flowing through it. As most are active when attached to a surface, the majority of bacteria will never pass through a UV. They do help in the prevention of disease but their overall effectiveness has been, shall we tentatively suggest, over rated. With the upsurge in more natural ways of successfully keeping marines, UVs are slowly becoming redundant in home marine system planning.

Until recently it was thought that corals (being an ancient and simple life form) had no natural immune system, as this would require a very complex biochemical process. However this is now being challenged, if not completely dismissed by some very important work which is not only showing an immune process existing in corals but some biochemical process very similar to that of vertebrates.

So my aquatic friends next month we shall actually look at some diseases with such charming names as Black band disease, White pox, Yellow blotch and Rapid tissue necrosis. These and other fantastically named conditions will be examined and we will then realise the true extent of our almost total lack of knowledge in this area.

AQUA MEDIC AQUARIUM FILTRATION – Bio-engineered

A fish for you

The Undulate trigger is a beautiful fish which is very hardy, but it has to be kept on its own.

UNDULATE TRIGGER *(BALISTAPUS UNDULATUS)*

If you ever get the chance to look at early marine books published around 1965 to 1975 or even later, the one picture you will find is an aquarium containing a solitary clown trigger *B. conspicillum*. In those days it was considered that if you introduced any fish with the Trigger it would kill and eat them, we now know this is quite false. The improvements in animal husbandry and water quality has allowed this species to calm down in the confines of a closed system. Now our beast, and what a beast it is, lays claim to the title of "Fish Only Aquarium" Currently, to play safe, you only have one of these and add no other animals to an aquarium. Yes it has been done, but the photos you don't see are the hundreds that failed.

You really do require a whole set- up for just one fish. "What!" I hear you scream, "£800 or more for a set-up for just one fish!" Slam on the breaks, we are talking about a pet here, how much do pedigree dogs or cats cost? Quite a bit more I think, and it's got nothing on a medium grade Koi. That's the thing about marines, everyone harps on about the cost, yet compare them to other pets and Koi and you will get a real perspective on what you are planning.

I have seen many books quoting a minimum size aquarium of 200litres. What rubbish! Our beast will live for many years and quickly grow to 30cm, so it needs a minimum sized aquarium of 120cm x 60cm x 60cm. With very good filtration, oversized skimmer with ozone injection, and good phosphate control, you will be able to keep the dreaded algal menace away. This fish is a very messy eater, tearing to bits large meaty foods and crushing closed shellfish releasing a whole load of bits to rot down.

It is a very hardy fish and can be tamed to take food from your hand but be careful or you will lose a finger. Feed at least 3 times per day. Coloration and size make it one of the most visually exciting fish you can acquire and at the cost of less than £100 makes this a total bargain, and one that should outlive a pedigree dog or cat!

PROFILE

Family:
Balistidae

Name:
Balistapus undulatus

Location:
Indo Pacific

Feeding:
Vitamin enriched meaty foods

Reef Compatibility:
No chance, will rip everything to bits!

Tank mates:
To be kept as a single specimen.

Size:
Up to 30 cm

Difficulty:
Very hardy fish, follow the rules

AQUA MEDIC
AQUARIUM LIGHTING
– Consciously better

An invertebrate for you

The Elephant skin coral can be very difficult to obtain.

ELEPHANT SKIN CORAL *(Pachyseris rugosa)*

We have seen a massive increase in marine keeping over the last 10 years and now we are on the crest of a wave that is surging towards a massive shift from soft coral to hard coral reef aquaria. Here we have one problem and that is the diversity of corals that are available to the hobbyist. There are many species that come through, but many jewels are overlooked by the importers and there is no reason why! Last month we looked at one such coral and this month here is another beautiful one that is easy to look after.

The Elephant skin coral is unusual to look at and you can see where the common name comes from. The texture of the surface makes it an incredible addition to any marine aquarium, giving the aquarium a totally different contrast to coral growth forms. If you are lucky enough to find one such beauty it will often be a pale fawn colour so, apart from the texture, it does not have much going for it and this may be a reason for the low numbers imported. However, there is a twist in this tale. This beast originates from quite deep waters for hard corals, so the symbiotic algal population is quite low. In the aquarium where it receives more light, this algal population increases and within one month you have a vivid green coral coupled with the texture of the colony.It really should be one of the most sought after corals today.

If this coral grows better in high light conditions then why is it found in a low light environment? It is possibly due to the fact that it has no visible polyps, therefore no defence against the stings of other corals. Hence this species is out competed and banished to the lower regions where the more aggressive species cannot live. Mangroves are the same, they grow stronger and larger on land, but other species of trees out compete them and so mangroves are forced live in inter-tidal regions where other trees cannot. Funny thing this nature stuff isn't it?

With no visible polyps what does it feed upon apart from the symbiotic algal bi-products? Dissolved organics through the skin and minute particles have been observed caught in cilia (small stiff hairs) over the surface of the coral providing nutrients. This is what we assume but we don't really know. What we do know, however, is that this is a very easy hard coral to keep, if you ever find one!

PROFILE

Phylum :
Cnidaria

Name :
Pachyseris rugosa

Location :
Indo-Pacific.

Feeding :
Liquid coral foods.

Size : 2 cm

Water flow :
Medium to high.

Lighting :
Will perform better under intense lighting.

Difficulty :
Easy, but high water quality as always.

AQUA MEDIC AQUARIUM FILTRATION – Bio-engineered

Letters in association with Tetra

Today's Postbag

Pro-Flowerhorns

I have to write and say thank you for the article you have just published on Flowerhorn cichlids. I saw some in my local shop and wanted to know more about them, but the shopkeeper could tell me little above the basics and nothing about their origin. Then I read that they were worthless hybrids and no shop should sell or promote them.-At the time I thought that was a negative attitude to have towards hybrids when so many of the most beautiful garden plants I have are hybrids. I really couldn't understand what the problem was. Then along came Max Gibbs article, full of real information about these "Beautiful Beasts" and backed up with a no-nonsense article about hybridisation. It put everything in perspective and gave me the information I needed to keep a Flowerhorn cichlid if I wanted to. As it happens I don't have the room for the large tank needed to keep a Flowerhorn in, so I will not be buying one. Even so, being a keen cichlid enthusiast I always like to read about any new cichlid I come across.

Pam Higgins, Birmingham.

Anti-Flowerhorns

First of all can I say how much I enjoy *Today's Fishkeeper* magazine. It is a real breath of fresh air. I love reading about all the new fish, but was amazed that you published Max Gibbs's article on Flowerhorn cichlids. These worthless hybrids should not be sold by shops in my opinion, they are almost as bad as GM fish which you did such a good job of campaigning against.

Being very concerned about conservation I wonder what effect these fish could have on our captive stocks. I did read the article on hybridisation and the editor's comments on this subject, but as a responsible aquarist who makes sure the cichlids I keep and breed are true species, I am still concerned that too many fish are becoming a hodgepodge of species rather than true to the wild fish. Another cichlid I really hate is the Red parrot – such a deformity should have been culled at birth!

Anyway, thanks for a great magazine otherwise.

Dean Marsh, Brighton.

Flowerhorn cichlids certainly stirred up some reviews.

The editor replies

These are just two letters we received about this article. At *Today's Fishkeeper* we have always believed it is important to inform our readers about everything that is going on in the hobby and industry. Flowerhorn cichlids are a hot topic at the moment which is why we published this article on them and no doubt we will publish other information on these "Beautiful Beasts" in the future. The article on hybridisation in the same issue was included so you had all the information at your fingertips to make an informed decision about these fish. Our GM fish campaign is still ongoing and we shall be bringing you an update on that in the near future.

Star Letter

Would it be possible to include more details about specialist societies in your club news page please? Some societies seem to get a good mention but others are hardly ever included. I know there is a Killifish group but how do I contact them?

James Peters, Dunstable.

The editor's reply

A point well taken. The problem is few societies send in much information about their events so I have to play "Sherlock Holmes". This month I did track down the BKA details and you can find those in the club news (page 48).

www.tetra-fish.co.uk

IN ASSOCIATION WITH Laguna

PHOTOS: DAVE BEVAN

Ponderings

Dave Bevan says *"If you want wildlife in your garden, then make sure you select the right plants to encourage it".*

THE GARDEN WILDLIFE POND IS A TINY habitat in its own right and whilst any plants will provide shelter for wildlife and maybe even food, our native wildlife is happier with and in some cases dependent upon native plants in order to complete their life cycle. So if you want to develop a self perpetuating and balanced system it makes sense to use native plants.

Whilst any combination of brightly coloured nectar rich flowers will attract the Orange tip butterfly, it is dependent upon the lovely Ladies smock or Cuckoo flower (*Cardamine pratensis*) to complete its life cycle. This plant together with Garlic mustard is the food plant of their caterpillars.

Many of the creatures we regard as pests in the garden pond are only pests because they are so plant specific and capable of decimating a small stand of plants. The Iris sawfly larva on Flag iris, and the Water lily beetle on Water lilies are two examples.

By sticking with native plants, particularly if you allow them to do their own thing, you should still retain a reasonable range of plant life, although in the struggle to survive the strongest plants will ultimately dominate the pond. This will usually take several years as they respond to natural changes in the system. The use of alien plants, particularly some of the species sold as oxygenators, can be disastrous as they literally take over the whole pond and its margins within a couple of years.

Ladies smock plant in full bloom.

Laguna
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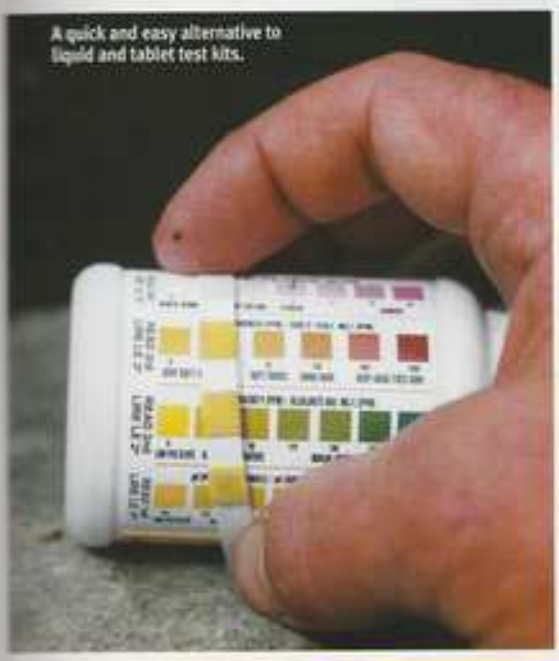
PUMPKINSEED BASS FACTFILE

SPECIES :	Pumpkinseed bass (Lepomis gibbosus)
OTHER NAMES :	Sunperch, Pond perch, Sunbass
OTHER FORMS :	Can hybridise with Bluegill sunfish making identification difficult.
SIZE :	20 to 25 cms
WEIGHT :	Up to 1 kg
AVAILABILITY :	Occasionally found in specialist fish keeping outlets but requires a DEFRA licence to keep them as they are regarded as alien species capable of establishing in the wild.
HABITAT :	Native of the Northern United States and prefers shallow water with sandy bottom.
IDENTIFICATION :	It is a deep bodied, slab sided fish with a small mouth. The dorsal fin has 10 or 11 spines. It is a pale olive colour with purplish horizontal bars on the sides. It can usually be identified by the bright orange spot on the tip of the ear flap.
HABITS :	The male excavates a small depression on the river bed where several females will deposit their eggs. The eggs hatch after a few days and the young fry feed on zoo plankton before turning to a diet of insect larvae, snails and molluscs. They are colonial nesters preferring shady nest sites over thin silt or sand substrates.
POND FISH VALUE :	An interesting fish whose value as a pondfish is reduced due to the need for a licence.

Pumpkinseed bass have become rare in the trade because you need a license to keep them



A quick and easy alternative to liquid and tablet test kits.

Today's top tip

Beware of Parrot's feather and Swamp stonecrop. They will take over a pond to the exclusion of all else.

Equipment Corner

Water testing is a vital part of pond management, particularly if you tend towards overstocking. Waste products can build up rapidly and the very dangerous products like ammonia and nitrite you cannot see.

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

Laguna have recently launched a quick test which consisted of five impregnated patches on a paper strip. All you have to do is take a strip from the container, dip it into the pond for 2 seconds, shake it once and wait for the colour to develop and check against the colour chart on the side of the container. After 25 seconds you read off the levels for pH, Total alkalinity and Total hardness and then after 60 seconds check the levels for nitrite and nitrate.

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POND PROBLEM

Often the first you know about this troublesome pest is when your water lillies are smothered with tiny black specs, which on closer inspection move slowly over the surfaces of the leaves and flowers. These are Water lily aphids. Whilst washing them off may give some immediate relief, it is necessary to understand a little more about the aphids' life cycle in order to implement control. What you see in summer are wingless females which can reproduce asexually continuing the process every few days, hence the alarming build up under ideal conditions. During the autumn winged adults are produced and the females deposit their eggs in the bark of the host trees (plum and cherry). This is your chance to break the cycle by spraying with a tar oil winter wash which will kill the over wintering eggs.

Water lily aphids can do great damage in a short space of time when they attack a lily leaf.

Fishy tails

If you can control the acidity and alkalinity of your pond then you can go a long way towards keeping your fish healthy. Most pond fish like the pH to be between 7 and 8 although anywhere between 6.0 and 8.5 is acceptable. Any change in pH outside this range warrants investigation.

When the pH is consistently high (alkaline) the most usual cause is untreated concrete on the pond surround but it could also be caused by a new statue or even the water itself if it runs through a bed of limestone or chalk.

Low pH (acid) can be caused by a build-up of organic debris in the pond as well as by the incoming water being naturally acid.

The pH of your pond can change by up to 3 units over a 24-hour period if there is a large algae population. If your pond contains a green pea soup rather than water, then the pH will rise during the day as the algae remove carbonic acid from the water, but after dark the process is reversed and the algae produce carbonic acid and the pH is lowered again. Rapid changes in pH will stress your fish leading to increased incidence of disease.

Dipping deeper

The Water scorpion belongs to the family of water bugs, which live below the surface, characterised by their sucking rather than biting mouth parts. Brown or olive green in colour their body is flattened and leaf like providing excellent camouflage as it moves slowly through the plants. The body is about 25 mm long with a 10 mm tail, which is actually a breathing tube through which it takes in air. Its forelegs have developed into grasping arms with which it can catch and hold its prey. Water scorpions will eat anything small enough for them to catch and hold, including small fish up to about 12 mm in length. They are widely distributed, often becoming established in garden ponds, but they can easily be overlooked due to their slow movement and excellent camouflage.

Water scorpions are successful predators down amongst the water plants.

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FASCINATING Fact

The degree of acidity or alkalinity of the pond is measured by its pH which ranges from 0 (most acid) through 7 (neutral) to 14 (most alkaline). The pH scale is logarithmic which means that pH 6 is 10 times more acid than pH 7 whilst pH 5 is 100 times more acid than pH 7.

If your pond looks like this then the pH could be fluctuating wildly between night and day.

Below the surface

The nitrogen cycle is a biological, self perpetuating process where by the potentially dangerous products produced during the breakdown of animal waste and decaying plant material are converted into less toxic products. Without this naturally occurring process the toxic wastes would rapidly build up within the enclosed pond system, killing all living creatures dependant upon the water. How does it work? Fish and other creatures eat food, excreting waste into the water. To this is added uneaten food and the products of plant and animal decay. This material is broken down (eaten) by fungi and bacteria producing ammonia, an extremely toxic gas to living creatures. However, provided the conditions in the pond remain aerobic (there is oxygen in the system), this ammonia is rapidly converted to nitrites (which are less poisonous) and then into nitrates. Nitrates are readily absorbed by plants enabling them to grow and then the cycle is repeated.

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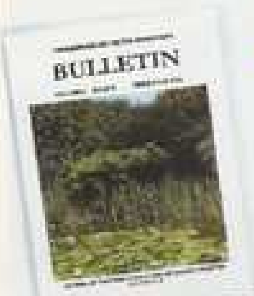

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DISCUS PROBLEM SOLVER

Our resident Discus expert helps solve another batch of Discus problems.

What should I do when I go on holiday?

Q I will be taking a holiday in August and it will be the first time that I have left my Discus tank since it was set up last year. Can you tell me if it is best to let someone come in and look after the fish?

A Stretton, **Ambleside, Cumbria**

A You do not say how long you will be away for, but I would like to reassure you that well grown Discus that have been previously well fed will go 3 - 4 weeks without any food whatsoever, so if you take the following preparatory steps your fish will be fine. Fit a plug in timer to your lighting to simulate day/night. Feed a few extra feeds for 1 - 2 weeks before you leave. 2 days before you go do any maintenance and extra water changes just to sweeten things up, then leave them to it. If you still want someone to call in to make sure that everything is OK then that is fine.

Why do my Discus keep eating their eggs?

Q I have just got my first pair of Discus out of a small shoal that I purchased just over a year ago, but all they do is spawn and eat the eggs, then spawn again. Should I set up another tank for them and how can I stop them eating the eggs?

Alan Sykes, **Nottingham.**

A Eating the eggs is very often a trait of young Discus and as yours are 12-15 months old they fall into this category. Very often they will grow out of it but Discus often eat their eggs as a protective measure when in a tank with other fish. To be fair to the pair they really do need a tank on their own if they are to succeed. This only needs to be a bare tank with filter, heater and water of the same quality and parameters as your main tank. Be patient with them and allow them time to settle in. If they persist in eating the eggs, you can fashion an egg protector from plastic coated chicken wire which you should be able to obtain from any hardware store. This should be made large enough to just slot over the spawning media and allow the fish to see the eggs and fan them but not eat them.

A lovely pair of Blue diamond discus

Q I have decided to try and make my own Discus food and have downloaded some diets off the Internet, the majority of which use added vitamins as a supplement in the food. As these are pretty expensive can you tell me if they are really necessary or not?

Mark Thompson, **London S.W.19**

A Many years ago I also devised my own diet and used to add extra vitamins to the diet mix, but I found that the fish still thrived when the vitamins were discontinued and replaced with a good quality flake food in the mix. The answer to your question is no, I do not think the addition of vitamins is essential they're already in the flake food.

Is a reverse osmosis unit essential for Discus?

Q I have wanted to keep Discus for a long time but have a limited budget and I am afraid I will not be able to give them the water quality they require as my water is very hard. I have been told that I must have a reverse osmosis unit but is there any other way in which I can soften the water to make it more acceptable for the Discus?

Keith Sanderson, **Grimsby**

A Let me reassure you that it is a fallacy that Discus need soft water and that you must have a reverse osmosis unit to keep them. My water is hard (600 micro-siemens, 13GH, 5KH) and my fish thrive. I pass my water through a triple cartridge water purifier that removes the chemicals and metals but leaves in the hardness. As a breeder with hard water,however, I am obliged to have reverse osmosis units as the eggs will not hatch in such hard water. If you do not intend to breed Discus I can assure you that if you remove the nasties from your water your fish will be fine.

Flowering Seagrasses

The Green jaw fish (*Paramonacanthus japonicus*) is a rarely seen species whose colours are a perfect match for a life in the Seagrass beds.

When we think of flowering plants, we usually associate them with green fields, a tender breeze and summertime. But there is one group of flowering plants that live quite differently from such associations - the Seagrasses. In this new series **Alf Nilsen** has the full story of these most unusual plants.

Seagrasses are flowering plants (angiosperms) that have evolved to live in sea water. To do this they must have been able to successfully perform at least five properties:

- the ability to live in a salty environment;
- the ability to function normally when fully submerged;
- a well developed anchoring system;
- the ability to complete their reproductive cycle while fully submerged;
- the ability to compete with other organisms under the more or less stable conditions of the marine environment.

Why 'Seagrasses'?

These flowering plants are called 'seagrasses' because most have ribbon-like, grassy leaves, but none of them are a true grass. There are many different kinds of seagrasses and some do not look like grass at all. For example, they may have oval leaves, elongated leaves or very thin, almost cylindrical leaves. Seagrasses have (like other flowering plants) roots, stems and leaves. They also form tiny flowers, fruits and seeds. Although the plants may occasionally be exposed to the air, they are predominantly submerged, and their flowers are usually pollinated underwater, when pollen is transported to other plants by movements in the surrounding water.

The roots and horizontal stems (known as rhizomes), often buried in sand or mud,

Looking at the seagrass bed of Cabilao you can see how these plants got their common name. The bed consists of two different species of Seagrass, probably *Thalassia* sp. and *Syringodium* sp.

anchor the grasses and absorb nutrients. Leaves, usually green, are produced on vertical branches and also absorb nutrients. The stems and leaves of seagrasses contain veins and air channels so they can carry fluid and absorb gases. Seagrasses, like other plants, rely on light to convert carbon dioxide into oxygen in the vital biochemical reaction known as "photosynthesis".

Where are seagrasses found?

Worldwide, there are about 12 major divisions, consisting of approximately 57 species of Seagrass. The most common genera are: *Zostera*, *Posidonia*, *Thalassodendron*, *Syringodium*, *Halodule*, *Cymodocea*, *Amphibolis*, *Thalassia*, *Halophila* and *Enhalus*. They are mainly found in bays, estuaries and coastal waters from the shallow region down to depths of 30 or 60 metres. Most species are found in shallow inshore areas.

Seagrasses inhabit all types of substrates, from mud to rock and coral reefs. The most extensive seagrass beds occur on soft substrates like sand and mud. Seagrasses cover areas in coastal waters from tropical to temperate and cold regions. The number of species is greater in the tropics than in the temperate zones. Only two species (*Halophila ovalis* and *Syringodium boeinfolium*) occur in both regions. The number of species decreases further when one moves to cold water regions.

In Norway, for instant, only two species of seagrasses are found, both belonging to the genus *Zostera*. The most common of them, *Zostera marina* (eelgrass) is found all along the coast, but becomes rare in the very north of Norway. In contrast over 30 species can be found within tropical Australian waters, where the most diverse seagrass communities are in the waters of north eastern Queensland and are an important part of the flora in the Great Barrier Reef region. There are over 27,000 km2 of seagrass beds in Western Australia, where 27 species have been recognised. If we move to the other side of the tropical planet, 15,000 km2 of seagrass beds are found in Florida where 15 species flourish. In conclusion: "Seagrasses are a common part of the shallow marine fauna of many coastal countries"

EVOLUTION OF SEAGRASSES

The origins of the seagrasses appear to have been around the ancient Tethys Sea, bounded by Africa, Gondwana and Asia, around 100 million years ago. By the Eocene, 50 million years ago, the seagrasses appear to have dispersed widely in the Asian-Pacific and the nearby regions. The climatic changes accompanying the tectonic plate movements of the Cretaceous (144-60 million years ago) appear to have resulted in significant distributional changes, as temperatures have dropped. There is considerable evidence that major extinction events have occurred in the past, suggesting that seagrasses as a group may be declining at present.

A large school of very young Striped catfish (*Plotosus lineatus*) hides among the Seagrass and find protection in this habitat.

PHOTOSQUARE PHOTO - A.F. ALFEN

How are seagrasses important to the marine ecosystem?

Seagrass communities are one of the most productive and dynamic ecosystems. They provide habitats and nursery grounds for many marine animals, and act as substrate stabilisers.

Seagrass meadows are also very important as they provide sheltered refuges and feeding areas for prawns and juvenile fish. In some coastal areas, entire fisheries may depend on the productivity of these seagrass beds. I was amazed at how many different species of juvenile fishes could be found in the shallow seagrass beds close to the island of Bunaken in North Sulawesi. Besides juvenile fishes, there were also many invertebrate species living permanently among the seagrass.

The rhizomes and roots of the grasses bind sediments on the bottom, where nutrients are recycled by micro-organisms back into the marine ecosystem. The leaves of the grasses slow water flow, allowing suspended material to settle on the bottom. This increases the amount of light reaching the seagrass bed and creates a calm habitat for many species.

Seagrass meadows are a major food source for a number of grazing animals. In the Great Barrier Reef region, the Dugong (*Dugong dugon*) and the Green turtle (*Chelonia mydas*) mainly feed on seagrass. An adult Green turtle eats about two kilograms of seagrass a day while an adult Dugong eats about 28 kilograms a day. →

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What threatens seagrass?

A number of problems face the long-term survival and health of seagrass populations in most coastal zones.

Human pollution has contributed most to Seagrass declines around the world. The greatest pollution threat to Seagrass populations is from high levels of plant nutrients. High nutrient levels, often due to agricultural and urban run off, cause algae blooms that shade the Seagrass. Reduction in light decreases Seagrass growth and can kill whole populations.

Suspended sediments also reduce light. This sediment can come from land development run off and through drains. Boating activity may also stir up sediment, reducing light levels. Other threats to Seagrass include damage to the leaves, stems and roots by boat propellers, trawlers' nets, and dredging. Loss of seagrass habitats will mean losses in marine ecosystem productivity as well as extinction of species that depend on Seagrass for survival.

Here in southern Norway, where I live, there used to be huge Seagrass beds on several locations close to our harbour 30 years ago. Today they are nearly all gone, pollution might be the most likely cause.

A large crab (*Calappa* sp. ?) in the Seagrass bed of Cabralo during a night dive.

Seagrass as a part of the Coral Reef ecosystems

Although seagrasses are commonly seen on soft bottoms a distance away from where the coral start to grow prolifically, such as in closer association with mangrove areas, they also grow on typical coral reefs areas. Seagrasses are often found inside the reef flat on muddy or sandy bottoms where they are almost dried out during low tide. They can also be found on shallow plain bottom areas of lagoons, covered with fine coral sands or with silty sand, with the depth of water during low tide being a few meters. Here they form dense meadows often referred to as "seagrass beds". Usually one or two species of seagrass grow together with the one dominating the other. In deeper waters of the lagoon seagrass often grow together with other macrophytes. In between the seagrass beds are patches of bare sandy bottoms (called "halos") usually close to large coral heads or patch reefs. They are formed as a result of grazing from herbivorous fish and invertebrates. The grazers hide during the day, but come out at night to feed as close as possible to their hiding place in the coral head.

The seagrasses show up usually at a late stage in the succession of benthic plant communities on soft bottom reef sediments. The Seagrass beds associated with coral reefs house a number of interesting organisms that find refuge and food in this biotope. Decaying Seagrass is an important food source for these organisms. On reefs of the Indo-Pacific the genera *Thalassiodendron* (in particular *T. ciliatum* and *T. hemprichii*) as well as *Halophila stipulacea* are the most common species, while in the Atlantic the "Turtle grass" (*Thalassia testudinum*) is by far the most common species. However, many other species can be found in both regions.

HUMAN USE OF SEAGRASS

Humans have utilised Seagrass in a number of ways. "The Western Australian Seagrass Web Page from Murdoc University, Western Australia (http://possum.murdoch.edu.au/~seagrass/) lists a number of rather extraordinary ways that this plant was used by humans. Here is a summary:

Dried Seagrass material was commonly used as housing insulation, until well into this century. As insulation it was non-flammable, because of its high silicon content, which was a major positive effect. Dried Seagrass material was also used to sound-proof radio studios in the USA and the UK. Seagrass material was popularly used to thatch roofs in rural coastal areas in Europe and the UK. Its use dates from the seventeenth century (and possibly before), and was used as a substitute for straw. The major advantages of Seagrass were that it was slow to rot, and was flea-proof.

Seagrass material was extensively used to bind clay and soil in embankments, such as in the dikes of the Netherlands. This use has found a translation into modern times, with Seagrass drift being used to produce mulch applied to sand dunes to help with stabilization. *Zostera marina* has found use as a substitute for horse hair in Europe and the USA, as a material for stuffing pillows, mattresses and upholstery. The crab industry in Chesapeake Bay used Seagrass as a packing material for exporting crabs from the region. Seagrass fibres were used to fill leaks in ships hulls in the seventeenth century.

Posidonia oceanica, when mixed with lime and phosphates, was used in Mediterranean countries as a meal for feeding poultry. Washed up Seagrass wrack is commercially used to make garden mulch. Various workers over the past few decades have studied the mineral composition of Seagrasses, and concluded that, while considerable quantities of minerals such as Boron occur in Seagrass material, it is not commercially viable to extract. There are suggestions that in Denmark Seagrass material may have been burned as a source of salt, soda minerals or simply for warmth. Old reports also exist about Seagrass as a relief for rheumatism.

Japanese fishers used Seagrass as a material for making wet weather gear up to the 1930s, when rubber became popular. Seagrass fibre is used to make mats and rugs sold in Australia. During the Second World War Seagrass fibre was used as a substitute for cotton in the manufacture of nitrocellulose in Germany. Experiments were carried out in England, on the use of Seagrass fibre for paper making."

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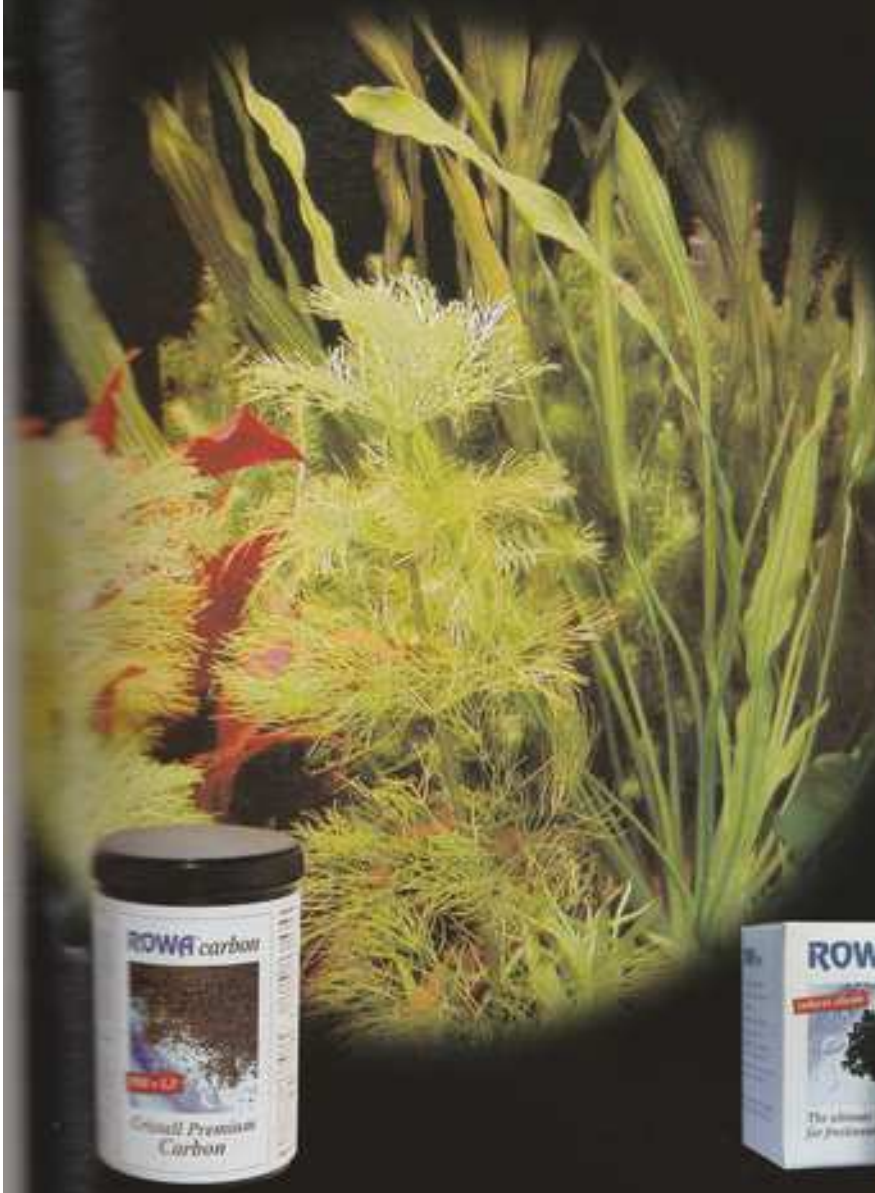

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Today's Surgery

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Lance Jepson, our resident vet, concludes his series on diseases associated with cichlids with a look at Protozoal diseases and a few of the more dubious conditions.

This Discus has a bad case of Hole-in-the-Head disease.

External Protozoa

White Spot is a very common disease. Characterized by the typical white "pin-head" spots on the skin, *Ichthophthirius multifilis*, needs little introduction. It can be a particular problem amongst dwarf cichlids (Apistogramma species) and the Acaras (Aequidens spp.). Treatment is with proprietary White Spot medications.

Other ectoparasites such as Ichthyobodo (Costia), Trichodina and Chilonodella can all cause serious skin disease. Initial appearance may be one of dullness of the skin as the fish increases its mucus covering in response to the parasite. This can progress on to reddening and ulceration of the skin due in part to the activities of the

Tumours

Many cichlids are long-lived (eight to ten years or more) and as family pets live long past the age that they would achieve in the wild. In these older fish tumours can be a problem and can develop from any tissue or organ, inside or out. Surgery may be a practical option in some cases but not all. Chemotherapy in fish is very much in its infancy but may provide a way forward depending upon the type of tumour involved.

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Miscellaneous (or Dubious Diseases)

"Malawi Bloat" is a poorly defined condition said to afflict Rift Lake cichlids. In truth the disease described is probably caused by a number of different and unrelated conditions. Obvious "bloating" can be due to a build up of fluid in the abdomen (ascites) as a result of liver, heart or kidney disease. Often this can be due to bacterial infections, but there are other causes. Toxins released from one bacterium – *Clostridium difficile* – have been linked to Malawi Bloat. Hexamita can also cause this bloating. In herbivorous fish any disruption of the normal gut environment (often due to improper diet) can potentially lead to fluid or gas build up in the intestinal tract. *Cryptobia iubilans* can also cause Malawi Bloat if it spreads to the main organs.

So called "Discus Plague" may or may not exist. Affected Discus are lethargic and show a darkened coloration with an excessive production of mucus. The breathing rate is rapid. Angelfish (*P. scalare*) can also be affected. From a diagnostic point of view, the problem is that these signs may also occur with other known Discus diseases such as Hexamita/Spironucleus infestations. Sometimes fish can succumb to several diseases at the same time and will show a confusing array of signs that do not appear to fit a "recognised" pattern. But does this mean it's something different? Look hard enough and Spironucleus will often be found. So is there no Discus plague? Spironucleus, after all, can be considered a normal inhabitant of the gut of Angelfish (and Discus) and so you'd probably find it in any case. Infected fish may well show the same disease signs that are seen with other conditions, but this may be just because fish can only react to many different diseases in a limited number of ways. After being initially skeptical I have a hunch that there may be something else going on with Discus plague – possibly a viral infection. I would argue that more work, including electron-microscopy, needs to be done on suspected cases before a conclusion can be arrived at.

Hybrid Parrot cichlids are said to occasionally succumb to "Black Spot" disease. I doubt very much that this exists. The colour patterns can be variable in these fish and so black markings can come and go over time. Deaths suffered whilst fish are showing these "black spots" are likely to be due to other diseases such as Spironucleus, with the altered coloration being incidental. Having said that, *Oreochromis mossambassicus* infected with one type of Fish-TB (*Mycobacterium marinum*) did develop areas of melanin concentration around inflamed areas of the skin (and in some internal organs) as part of their response to this infection. This produced small black-pigmented areas in the skin. However, this effect appears to be an uncommon one.

parasites, but also frequently the result of self-damage as the fish scratch and flick against hard surfaces because of irritation. Remember that protozoan parasites such as White Spot and Chilonodella will sometimes infest the gills without necessarily causing problems on the skin. Treat with proprietary ectoparasitic remedies.

Internal Protozoa

Cryptobia iubilans is thought to be the main culprit behind "Malawi Bloat", a poorly understood condition not only of Rift Lake cichlids (Malawi, Tanganyika and Victoria) but also transmissible to Central and South American cichlids. This parasite has been found to be present in the stomach and gut of freshly wild caught *Metriaclima zebra*. In some collections virtually all cichlids can be infected and the disease will show itself as a low grade loss of fish over a period of time. The main sign of infection with Cryptobia is a progressive loss of appetite, with the fish separating themselves from the main group. Eventually these fish become so anaemic that they can be found hanging at the surface and showing a very high respiratory rate. Death usually occurs within 24 hours of this stage.

The main damage caused by this parasite is that it triggers inflammatory reactions (granulomas) in the lining of the stomach; in some cases it can spread to involve the liver, kidneys, brain and other organs. It is believed that several factors can initiate disease and these would include poor water quality, stress and handling. Diet almost certainly plays a role in herbivorous cichlids as discussed in a previous article. There is no effective treatment, although some antibiotics appear to be useful in controlling the problem. The post-mortem picture of multiple granulomas is impossible to distinguish from Fish-TB without specialist laboratory techniques.

Hole in the head

A close relative of Cryptobia is *Spironucleus vortens*. This causes a range of diseases but it does include Hole-in-the-Head (HITH) or Head-and-Lateral-Line (HLL) disease of Discus. This pathogen, like Cryptobia, lives in the gut and once again if something affects the fish's immune system such as a significant stress then its numbers build up and it appears able to cross the gut wall and spread via the blood stream to anywhere in the body. The liver is frequently seriously damaged in these cases and this, combined to damage to the gut wall, affects the ability of the fish to digest and absorb its food. Infected fish lose weight and pass white, jelly-like faeces. HITH and HLL are possibly caused by the parasites inadvertently blocking the blood vessels to the lateral line causing tissue death and ulceration of those areas supplied by the affected blood vessels. Treatment is with metronidazole.

Hexamita is a protozoan often confused with Spironucleus, and indeed it is very difficult to tell the difference between the two on microscopy. As a result there is much confusion between the two in the literature. There is, however, I think, enough information to distinguish the two disease entities. Hexamita is known to cause problems in Discus, Angelfish, Oscars (*Astronotus ocellatus*) and other cichlids. It is an inhabitant of the gut and numbers can increase if the fish are immuno-compromised in some way. Infected fish become anorexic, lethargic and lose weight. Severely affected angelfish will show a distended abdomen and may lie flat at the water surface. It too can spread via the blood stream causing a disseminated hexamitiasis. Less severely affected adult breeding stock may have reduced fertility, egg hatchability and increased loss of fry. Treatment of choice is with metronidazole.

Protopalina is a large ciliated protozoan present in the gut of Discus. It is occasionally linked to disease in these but as far as I am aware a definitive link has never been proven. *Piscicryptosporidium cichlidoris* is a protozoan of uncertain pathogenicity although the fact that it encysts deep in the lining of the stomach does give it the potential to cause much damage.

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Characodon lateralis from Los Berros. The original Goodeid is thought have had a similar body shape.

Mexican Marvels

Derek Lambert has been a fan of Goodeids since the first species was imported to the UK during the late 1970s. Since then he has discovered three new species and caught, kept and bred virtually every member of this fascinating family.

ALL FISHKEEPERS ARE FAMILIAR WITH THE common livebearers we find in every aquarium shop around the world. Guppies, Platies, Mollies and Swordtails are everywhere and they are livebearers. But the world of livebearers is much larger than just the family of Poeciliidae to which these fish belong. Livebearing has actually independently evolved in a huge range of fish from halfbeaks to sharks.

There is however a unique family of fishes, the Goodeids, some members of which may already be known to you, others are much less common and are not so widely known. The ancestors of the Goodeid family originally lived in central Mexico and ranged north up into southern USA. How do we know? We know because there are fossil records and their descendants are still living today. These fish were egglayers and we would have called them Killifish. Indeed, some of these fish still survive in desert springs scattered throughout northern Mexico and into the USA.

Moving southwards

Further south, however, evolution was hard at work and over thousands of years the first Goodeid evolved. It is thought it looked a lot like members of the genus *Characodon*. These fish have a cylindrical body with the dorsal and anal fins set well back. Looking at their egglaying cousins (members of the genus *Crenichthys*) from the USA you can see the common ancestry

To the North

In the northern part of Mexico life was fairly stable for the Goodeids. Most lived in springs, lakes and rivers in a fertile land. Then the climate started to change and life became a whole lot harder. Springs stopped flowing, the land became desert and icy cold winds blew during the winter. Most of these northern Goodeids died out as their habitats disappeared. The process is still going on today, although now it is accelerated by man's over use of what little water there is, combined with a dramatic drop in the water table.

The heart of Goodeid country

Further south life was always more changeable. The real centre of Goodeid evolution is the Rio Lerma basin which lies between Mexico City and Guadalajara. Apart from this river system, the two places are connected by something else, a fault line. In fact you can follow it out into the ocean just off Mexico's Pacific coast and northwards through Los Angeles and all the way to San Francisco. This fault line has led to all sorts of changes in the aquatic habitats of Mexico's highlands. The land here is very unstable and earthquakes frequently occur, some are minor tremors but other have had a dramatic effect on the topography of the region. Indeed the highlands themselves have been pushed up as part of the general volcanic activity in this area. It continues to this day and has had some fundamental effects on the fish.

Chapala is a case in point. Just behind the town is a huge cliff full of fish fossils. Search through here and you are unlikely to find any of these species among those that live in Lake Chapala today. This is because all the fish in Lake Chapala were killed when the cliff was thrown up by volcanic activity deep in the lake. Once the water became habitable again, new fish were washed into the lake from the feeder rivers, evolution kicked in again and every part of this new habitat could be taken advantage of. Goodeids proved so adept at changing to take advantage of a habitat that they eventually became the dominant fish fauna in this part of Mexico.

Types of habitat

Today it is the springs and rivers flowing from them that are in the heart of Goodeid country. Northern Mexico still has a few *Chorcodon* and *Xenoophorus* populations left in these types of habitats, but the bulk of them have died out and the rest are in danger of going the same way.

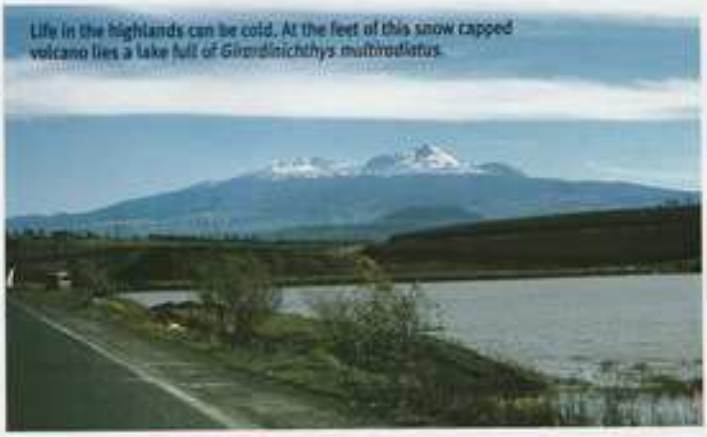
Further south is a unique group of springs containing a unique Goodeid. Media Luna is a thermal spring which generates huge amounts of warm water which flows into a large complex of lakes and canals. Here you will find *Ataeniobius toweri*, so called because it was thought the babies of this fish didn't develop the trophoetenia that all other Goodeids use to nourish their young whilst in the mother (more about this next month). Since then they have been found in very young embryos so the genus →

Riffle habitats in full flood have very fast flowing water and lots of boulders. To live there the fish have to be able to survive in a very strong current or tuck themselves away under the rocks. To the north, Darters have evolved a reduced swim bladder so they hug the river bottom and can avoid the worst of the current. In Goodeid territory the genus *Allodontichthys* has done exactly the same.

GEOGRAPHY AND CLIMATE

Today, Goodeids are confined to the Mesa Central of Mexico and nowhere else in the world. They are most abundant in the Rio Lerma basin. Almost every pond, ditch, stream and fast flowing river will contain a number of species, each specifically adapted to conditions in that habitat.

The climate in this part of Mexico can become quite cold during the winter months. Not far from Mexico City I found ice on the ponds in December. There was frost on the ground in Patzcuaro, where early mornings and evenings were quite cold so houses in this area have fireplaces. Daytime temperatures in winter, however, reach 26°C and above. We have often caught fish in water that is much cooler than that you would associate with tropical fish.



Life in the highlands can be cold. At the feet of this snow capped volcano lies a lake full of *Girardinichthys multiradiatus*.

name is not really valid any more but it is nonetheless a beautiful fish.

Moving south and west of here you arrive in the Rio Lerma basin itself. Here you will find every spring, river and stream full of Goodeids. Up to 8 species may live in one habitat. Each will feed on its own particular foods, indeed some Goodeids have a long gut to cope with lots of vegetable matter while others have a short gut for dealing with fish and other animal life. Sadly, many of these habitats have been polluted beyond redemption now but there are still areas where lots of fish can be found.

Derek and Mike Schadle fishing in the canals at Media Luna in search of *Ataeniobius toweri*.

The Rio Lerma today is very polluted and few fish survive in it.

Xenotoca variata from Lake Zacapu grow larger than many other populations of this species and also have far fewer reflective scales on their flanks. Research is underway to determine if there is only one species or two being lumped together under this species name. If these do turn out to be two species then this fish will probably be given a new name which would be the third new species to come out of Lake Zacapu in the last few years.

One of the most unique habitats of any Goodeid is plumb in the centre of Mexico City. It is all that is left of a massive lake and canal system which once stood where Mexico City stands today. Here the water is pea green with a unique species of algae which can only be found in this habitat and the water teems with *Girardinichthys viviparous*.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Magical mists

Our plant expert **Peter Hiscock**, shows you how to add an extra dimension to your aquarium with a mist maker.

PHOTO: PETER HISCOCK

Using a mist generator you can create a humid evironment above the water but also add a touch of magic to any aquarium.

A good way to add an extra dimension to a planted tank is to grow some plants above the water's surface. Many aquarium plants grow above the water's surface in nature and most are in fact not "true" aquatic plants anyway. The problem with growing plants above the surface in aquaria is that the heat produced by the lights creates a hot, dry area where most plants simply wither and die. Although some plants do produce leaves suited to life above water, these leaves are still not as effective at holding water to prevent drying as those of terrestrial plants. In some aquaria it may be possible to have an open hood, allowing good ventilation and removing the hot, dry air. Light units can then be suspended at least 40cm above the water's surface, allowing plenty of room to grow plants above the water. In aquaria where this is not possible, the ideal solution is to create an artificially humid environment and one of the best ways to do this is to purchase a mist generator. These devices are gaining popularity and are now easily available and often sold for water features or reptile aquaria. The visual effect of a mist

Plant Profiles

There are a number of varieties of *Anubias* on the most popular are combinations of *nana* and *barteri*. These plants are tough leaved, adaptable and have a striking dark green colour. The plants can be grown on rocks or wood or placed in the substrate, although it is important to make sure the main root (rhizome) is not buried as it may rot. Anubias are slow growing plants and algae often affect old leaves, so a good algae eating team of fish and/or shrimps are useful. Anubias can be grown in low light conditions, shaded areas and even above the water's surface in humid conditions.

Anubias sp. barteri

generator is also quite magical and creates an eerie swamp feel to the aquarium. Plants such as Anubias, Java Moss, Hydrocotyle sp., Ophiopogon sp., and also many pond marginals make ideal above water plants for the aquarium.

The importance of Carbon dioxide

Light, nutrients, substrate type, carbon dioxide and temperature are all limiting factors of plant growth and health. By this I mean that if one of these factors is inadequate or in short supply, the plant(s) will not be able to achieve their best appearance in the aquarium. Carbon dioxide (CO_2) is vital for plant growth and photosynthesis (the process by which plants gain energy) and is often the dominant limiting factor in home aquaria. Plants obtain their CO_2 through the roots and leaves from the surrounding water; some are able to obtain CO_2 directly from atmospheric air above the water's surface. In most planted aquaria, there is a larger plant population than in a similar volume of water found in nature, so carbon dioxide is used up far quicker. Powerful filters also increase the surface gas exchange, allowing carbon dioxide to escape into the atmosphere. In many cases, carbon dioxide in the aquarium is used up shortly after the plants start photosynthesising, the plants then have to "make do" with the slow influx of carbon dioxide from the fish and bacteria respiring. Without sufficient carbon dioxide levels, an increase in light and nutrients will be of no benefit to the plants and will simply help to encourage algae. For a successful planted aquarium, artificial introduction of carbon dioxide is vital.

Thankfully, there are a number of methods to introduce carbon dioxide and many are inexpensive. In recent years a number of carbon dioxide units have become available which retail at around £30, these are based on fermentation, chemical reaction or slow release tablets and produce a steady stream of carbon dioxide bubbles into the aquarium. The bubbles are released into a diffuser unit which keeps the gas in contact with the aquarium water for a period long enough to allow the carbon dioxide to become dissolved in the aquarium water. These types of unit are ideal for small aquaria and will provide a noticeable boost to plant health. For larger aquaria it may be wise to invest in a pressurised cylinder system that can be tailored to produce exactly the right amount of carbon dioxide for the aquarium. More complex cylinder systems even allow you to combine your lighting with a valve which turns off the CO_2 when the lights are switched off. The reason behind this is that in dark periods, plants stop using carbon dioxide for photosynthesis but continue to produce carbon dioxide through respiration. A low CO_2 level during the day and a high CO_2 level at night can cause large fluctuations in pH, switching the CO_2 off at night will minimise this fluctuation. In aquaria where it may not be easy to switch off CO_2 at night, it may be worth investing in an air pump that can be switched on at night. The additional aeration will increase the surface gas exchange and release the extra CO_2. I tend to put air pumps on my planted aquariums at night anyway, simply because such a large volume of respiring organisms can quite quickly reduce the aquarium's oxygen levels.

Once plants have a continual source of carbon dioxide during the day, they are better equipped to utilise light and take up nutrients and fertilisers. If your plants are not blessed with CO_2 fertilisation and are a little slow growing or worse for wear then no amount of care will produce an effect as good as the addition of carbon dioxide.

Water hedge (*Didiplis diandra*)

The key to keeping a fine leaved plant like Water hedge is to provide a debris-free environment, gentle water movement and plenty of light. The stems of this plant should be planted a couple of centimetres or so apart to allow for branching and to ensure light reaches the lower leaves. In bright light, the tips of the leaves will become an attractive reddish colour. This plant will only reach about 20-30cm in height and can be used in groups as a mid-ground contrasting plant.

Water hedge is a great plant which will thrive in an aquarium given the correct conditions.

Pets from the 'Med'

PHOTOS: BOB AND VAL DAVIES

Many reptile outlets are reporting the ever increasing popularity of Mediterranean tortoises, so we asked **Bob and Val Davies** to feature these most charming of pets.

Adult male Horsfield in indoor section where substrate includes chopped hay.

Spur-thighed tortoise

THE TWO SPECIES OF MEDITERRANEAN tortoise most commonly available are Herman's and Spur-thighed, however, we have included here the Horsfield tortoise as well since this is also frequently available.

Spur-thighed tortoise (*Testudo graeca*)

Sometimes referred to as the North African or common tortoise. There are 4 sub species:- ***T. graeca graeca*** from North Africa and Spain; *T.g. ibera* from Greece and Turkey; *T.g. zarudnyi* from central Iran and *T.g. terrestris* from Lybia, Israel and Syria. Although adult size and shell coloration varies between the subspecies they all possess the small tubercles or spurs on the upper thighs of the hind legs from which the common name is derived.

LEGALITY

Both Herman's and Spur-thighed tortoises are classed as Annex A in Europe and cannot generally be imported or sold without Article 10 paperwork. Basically this means that breeders have to licence the adults so that progeny can also be granted a licence. Each baby tortoise, when registered, has its own licence, a copy of which goes to the purchaser. Without this paper work Herman's and Spur-thighes are illegal. Horsfield's tortoises are Annex B, which means they can be imported with the necessary export and import licences. These are obtained by the importer, one licence may cover several hundred specimens. Annex B reptiles do not need individual licences. Also any captive bred Horsfields do not need a licence.

Sport-thighed female depositing eggs. This particular specimen usually lays three clutches of three eggs per year.

Herman's tortoise (*Testudo hermanni*)

These are quite widely distributed from Western Europe through the Balkans, Greece and Turkey including islands such as the Balearics, Corfu, Sicily and Sardinia. The main distinguishing feature is the horny tip of the tail. Herman's lack thigh tubercles.

Horsfield's tortoise (*Testudo horsfieldi*)

Sometimes called the Russian or Afghan tortoise. Distribution includes Pakistan, Afghanistan, Iran, China, Kazakhstan and Turkmenistan. Can be distinguished from former species by a round rather than elongated shape and lack of thigh tubercles. Also the feet all have four claws.

FOUR GOLDEN RULES

1. An improper diet can cause shell deformity
2. Too damp/cold conditions can produce respiratory problems
3. Shells should not be oiled or painted.
4. All outdoor accommodation needs to be properly constructed to avoid escapes.

Captive care

Tortoises are relatively easy to keep providing basic points are taken on board. An indoor vivarium should be as spacious as possible e.g. 180 x 180 x 75 cm. with dust free sand and small pebbles for substrate. An outdoor enclosure should be larger, hard surfaces such as patios and waterlogged areas should be avoided. For both types of accommodation several hides will be needed. Those outside should be lined with hay for cooler nights. Temperatures indoors should reach 35°C at the hot spot falling to 10-15°C at night. High percentage full spectrum fluorescent light is essential for indoor vivaria. A 14 hour photoperiod is required.

Mediterranean tortoises should not be fed animal protein, instead a varied herbivorous diet including as high a percentage as possible of wild plants should be supplied. Suitable plants include Red clover, Plantain, Sow thistle, Dandelion and Welsh poppies. Nasturtium leaves and flowers and Rose petals are also accepted. Obviously these should be from unpolluted sources. Calcium should be given daily. Multivitamin and mineral supplements sprinkled on food twice a week if indoors, more sparingly when outdoors.

Mediterranean tortoises do not like high humidity. They prefer dry, sunny conditions. Where heat provision is made it should be a spot bulb rather than ceramic heater since tortoises will be attracted to the visible beams of the former. To prevent escapes by tortoises digging down in an outdoor enclosure, when constructing, dig down 45cm and line the enclosure including sides with flags. Earth can then be replaced and at the same time planted with wild plants. Mesh fitted to a frame can be used to prevent them 'going over the top'. It also protects them from predators.

HIBERNATION

During autumn the keeper will notice a decrease in appetite and the tortoises becoming sluggish, even trying to bury themselves. The keeper can place them in a small, ventilated hibernation box of dried moss which is then placed in the middle of a larger box lined all round with a thick layer of wood shavings. The outer box should sit on a slab of Styrofoam. The sensor of an electronic thermometer is taped to the tortoise's shell. Ideally the temperature should be a constant 5-7°C. At the end of the hibernation period some 12-14 weeks later the tortoises can be brought out and given a shallow, tepid bath.

Breeding tortoises

When sexing tortoises males have a longer thicker tail and usually a concave plastron - the latter is more noticeable in some species than others. Mating can be a noisy, brutal affair. When ours are mating indoors it sounds like we have builders in! Shells are rammed, head and legs bitten.

Tortoises will mate for most of the months they are active but females can store sperm from one year to another. When a female reduces food intake and begins to dig, males should be removed to separate quarters. Their continued presence and attentions may inhibit egg laying with the result she becomes egg bound. At least 30cm depth of soil is needed for a deposition site. Up to three clutches may be laid in a year, clutch size varying from 2 to 9 eggs depending upon species and female. Incubation takes from 90-160 days at 28-32°C.

Care of young

Once completely hatched with no remaining egg sac the young can be reared in an open, indoor pen with newspaper substrate, basking lamp and full spectrum light. During warmer weather they can be placed in suitable accommodation outdoors. Food items offered should be small and mixed together. Calcium is important. Tepid baths 3-4 times a week will help to keep the shell clean, give them a drink which often stimulates feeding and prevents dehydration.

Koi world

Bernice Brewster reflects on the future of the koi hobby.

IT WAS A GREAT PLEASURE FOR ME TO attend the Worthing Section of the British Koi Keepers Society Show at the beginning of June, we were fortunate enough to have a dry weekend even though the wind was rather strong on the Sunday. I had the honour of presenting the prizes on the Sunday and to my great delight amongst the winners were children, who were showing a number of their koi.

Why should I be so concerned that children were interested in the koi hobby? I think it is very important to be encouraging the youngsters to participate as they will be the future of the hobby especially as it seems to me that in recent years the number of people interested in just keeping koi is declining. In the mid to late 80's and early 90's of the last century, the British Koi Keepers Society (BKKS) boasted an annual membership of around 8,000 people but this has declined to just a few thousand over recent years. I realise that the BKKS has not been without its difficulties over recent years and a number of the sections have split from the parent organisation to form independent clubs. I occasionally visit various of the BKKS sections and Koi clubs and I have noticed over the years the numbers of people attending these meetings in many areas seems to be fewer - perhaps I'm just not the speaker I used to be, or everyone has seen my slide presentation too many times! So the fault there could lie with me.

I have noticed when visiting some of the aquatic retail outlets that many people who have a garden pond with a general mix of goldfish, orfe and other popular fish like to have one or two Japanese koi in the pond but the variety and quality are unimportant. Possibly in the future these people might be encouraged to extend their ponds or even become a dedicated Koi keeper.

The benefits of the local BKKS sections or koi clubs is there is a wealth of information available amongst the membership. Most of the people who have joined these hobbyist groups have all been through the problems of new pond syndrome, outbreaks of ulcer disease, parasite problems, even improvements to the pond system such as installation of new filters and even blanket weed. It is helpful for any new hobbyist to be able to talk through these problems with more experienced Koi keepers who are usually more than willing to help.

Children are the future of the fishkeeping hobby.

A PRODUCT FOR CONTROLLING BLANKET WEED

Whilst bringing up the topic of blanket weed, I had the opportunity earlier this year of testing a product for controlling this nuisance algae. The product is a powder, which uses enzymes and bacteria to remove the nitrogen and phosphate sources of nutrients from the pond water, whilst stimulating the blanket weed to grow but in the absence of any nutrients it simply dies instead. The product is extremely effective, what is more, it is entirely natural, no unpleasant or harmful chemicals, it has no adverse effects on lilies or other plants in the pond and is safe for all animals and wildlife. I am delighted to say the product has gone on sale as *No More Blanket Weed*, it does what it says on the label and details of your nearest stockist is available from Aquatic Industries Ltd on 01234 352710.

JOIN THE CLUB

To find your local BKKS section contact Brenda Blows on 01234 356675 or visit their website at www.bkks.co.uk

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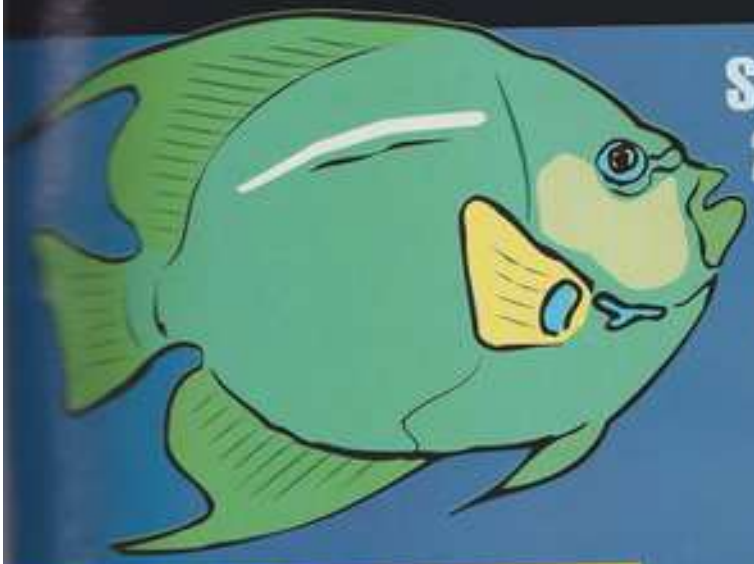

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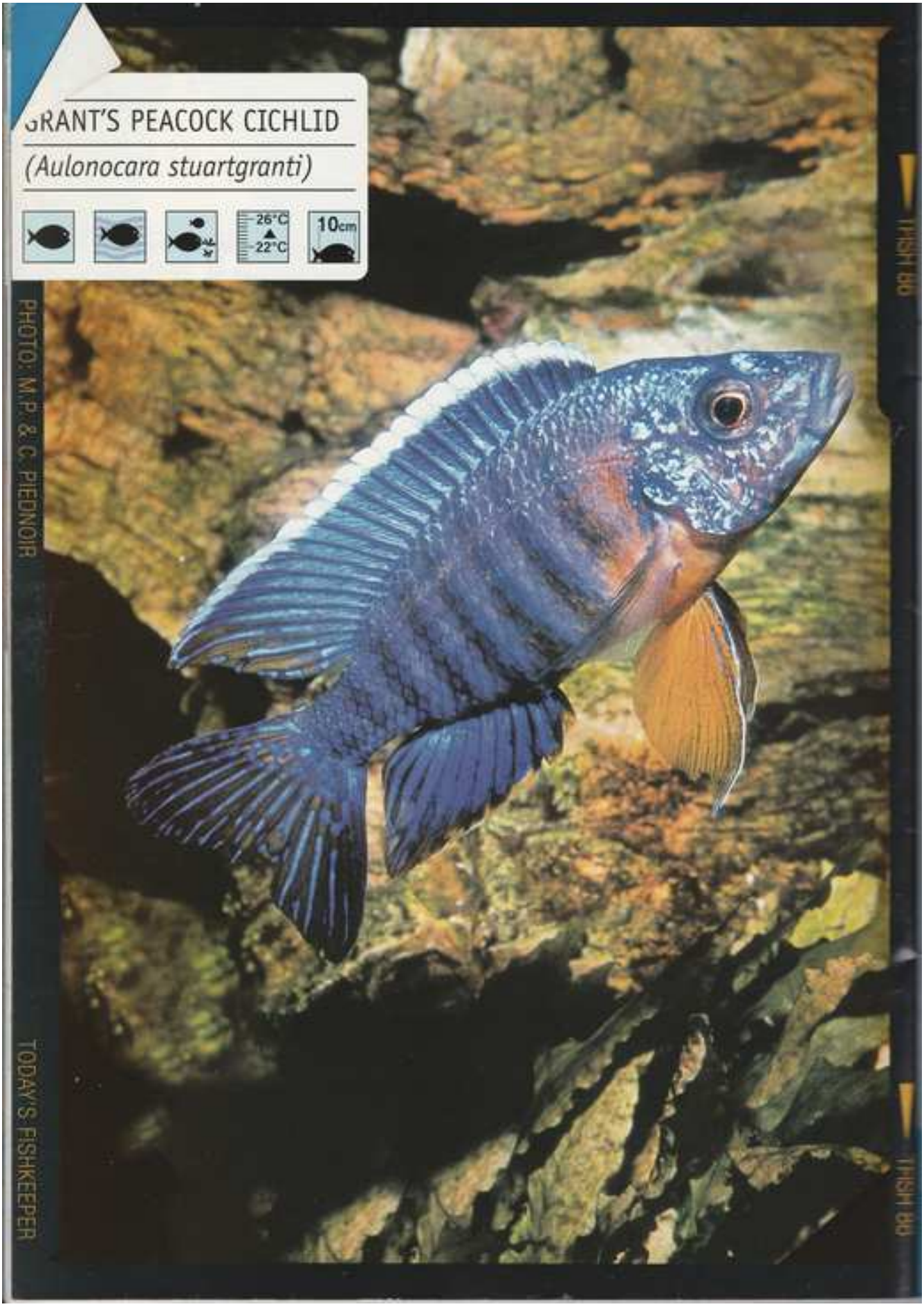
GRANT'S PEACOCK CICHLID
(Aulonocara stuartgranti)
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22°C
10cm
PHOTO: M.P. & C. PIEDNOIR
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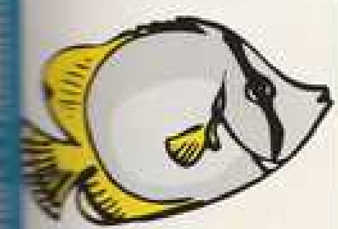

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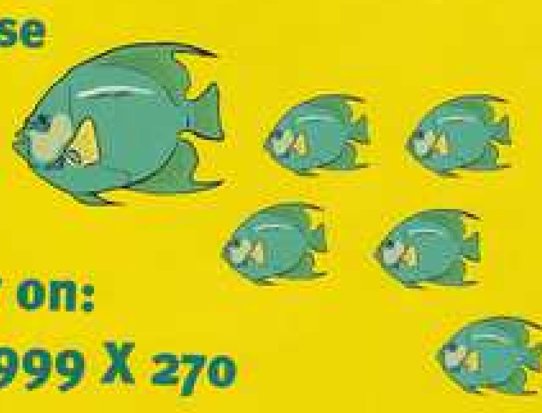

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...End Point

While most cichlids are not really suitable for a community aquarium, **Kathy Jinkings** has found one that will live happily with its tank mates and is a good introduction to this fascinating group of fish.

Although they are not great beauties, African blockheads are certainly not ugly either.

THE BUFFALOHEAD CICHLID IS AN endearing and fascinating little fish; for a cichlid it is very tolerant of tank mates, and is not fussy about water chemistry. Both males and females are dark brown, sometimes relieved with pale brown vertical bars (depending on mood). They do, however, have beautiful blue eyes, which show up well in contrast to the brown. Their common names relate to the fleshy protruding forehead which grows as the males mature - an asset which makes choosing a pair easy.

Fascinating breeding behaviour

Like most cichlids, it is their spawning behaviour that makes them particularly fascinating. Many of them pair for life, and can refuse to take another partner if separated - a fact to bear in mind when choosing two out of a large group. They are diligent and caring parents,carefully guarding both eggs and later the fry - However, in spite of the fact they are fearless in defence of their family, and have been described as particularly pugnacious,I have found these to be one of the milder cichlids in terms of temperament, and have kept (and spawned) pairs in community aquaria without bloodshed ensuing. Particularly nervous or long-finned tank mates are probably not a good idea but in a tank with plenty of plants, rocks, roots and décor to break up the line of sight, the other fish soon learn to stay away when there is the flutter of new little fins. A 1 metre community will provide ample room for a pair to have a spawning area without too much conflict.

Water conditions

In the wild they have been found in waters with a pH vale of between 6 and 8, and a dH of between 5 and 19. Most aquaria will have water chemistry somewhere in this range, making them a good choice for nearly everyone. Upturned plant pots of half pots on their sides make good caves (if you use an upturned one, do make sure the hole is big enough for the fish to be able to get in and out easily). When they have chosen a cave to their liking, it will not be long before between 20 and 150 eggs are deposited inside. They will be carefully guarded, and the aquarist is only likely to know about it when the new fry make their first trip outside. Commercially available fry food or baby brine shrimp make good foods - the fry are,like their parents, not fussy when it comes to diet. If the family is in a community tank, the food can be mixed with a little water in a turkey baster and squirted into the correct area to make sure the fry get it. These fish are always popular with aquarium shops, so when the time comes for the fry to leave home you should have no difficulty finding a purchaser.

In the wild the fish inhabit rapids, and therefore do not get much practice in swimming about, although they can swim perfectly well. In an aquarium they spend a lot of time 'perching' on the décor, and tend to move in short jerks. Many people are deterred from keeping cichlids, as the smaller ones are often fussy about water parameters, and the large ones aggressive. These fish are charming and easy to keep, and an excellent choice for those who would like to try their first cichlid and confirmed cichlidophiles.

PROFILE

Name:
Buffalohead cichlid, African blockhead, Lionhead cichlid, Humphead cichlid, Lumphead

Scientific name:
Steatocranus casuarius

Size:
12.5cm (male), 7.5cm (female)

Aquarium type:
Community or species tank.

Distribution:
Congo

Diet:
Live foods, frozen food, flakes

Temperature:
24 - 28°C

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