

BRITAIN'S BEST-SELLING FISHKEEPING MAGAZINE

# practical fishkeeping

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**48-PAGE  
HEALTH  
SPECIAL**

HOW TO KEEP YOUR FRESHWATER,  
MARINE AND POND FISH IN  
TIP-TOP CONDITION

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The advantages of a  
hard water set-up



- THE DWARF GOURAMI
- ASIAN AROWANA

## TOP OF THE CLASS

Which are the best marine fish?

**ON TEST**

**INTERNAL  
POWER  
FILTERS**



On sale March 22 - April 18 2006

# practical fishkeeping

Incorporating Fishkeeping Answers

## Editorial

Practical Fishkeeping Editorial, EMAP Active Ltd., Bretton Court, Bretton, Peterborough PE3 8QZ

Telephone: 01733 264800 Fax: 01733 485246/485244

**Editor:** Karen Youngs: karen.youngs@emap.com

Contact Karen if you wish to contribute articles or pictures. Have an editorial problem or complaint about the magazine. Lengthy fishkeeping problems should only be sent to our Answers service.

**Technical writer:** Jeremy Gay 0870 002 2124 jeremy.gay@emap.com

Contact Jeremy if you have products for review.

**Webbs editor:** Matt Clarke 0870 002 2124 matt.clarke@emap.com

Contact Matt also at the website.

**Office manager:** Hannah Travers 0870 002 2125

hannah.travers@emap.com

Hannah handles the day-to-day running of the pets office. Contact her with queries about correspondences and subscriptions.

**Sub-editor:** Iain Hardy

## Design

**Group Art Editor, Pets:** Rachel Thickens 0870 002 2126

rachel.thickens@emap.com

**Senior Designer:** Louise McQuigg 0870 002 2127/163

louise.mcquigg@emap.com

## Publishing

**General Manager, Pets:** Steve Windsor 0870 002 2120

steve.windsor@emap.com

Steve is responsible for Practical Fishkeeping and sister title Pet Product Marketing.

**Distribution:** Frontline, Park House, 117 Park Road, Peterborough Tel: 01733 555 551

**Typesetting:** AT Graphics

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## Advertising

Bretton Court, Bretton, Peterborough PE3 8QZ. Tel: 01733 264866

**Ad Manager:** Sarah Wilson 0870 002 0055 sarah.wilson@emap.com

**Display Sales Executive:** Rebecca Mee 0870 002 3092

rebecca.mee@emap.com

### Classifieds and Your Local Guide:

Germa Wheatley 0870 002 0100 germa.wheatley@emap.com

Ian Morris 01733 485244 ian.morris@emap.com

Laura Wilcox 01733 485304 laura.wilcox@emap.com

**Ad Production:** Doreen Best Clarke on 01733 403472

Classified: Clare Gibb on 01733 485202

## Subscriptions and back issues

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**Email queries:** [emap@leisure.cheston.co.uk](mailto:emap@leisure.cheston.co.uk)

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2 APRIL 2006 PFK

# Conte

Issue 4 April 2006 On sale March 22 - April 18 2006



## A HELPING HAND

**ASK OUR EXPERTS 24**

Tips, advice and the answers to your questions. Plus tips on raising fry and information on how fish capture and digest their food.

## TROPICALS

**RAISING BABY FISH 30**

JOHN RUNDLE'S essential advice to help ensure your fry get the food they need... when they need it.

**HOW DO FISH CAPTURE AND DIGEST THEIR FOOD? 32**

RUPERT BRIDGES answers this question - and explains just how adaptable fish can be.

## WINNERS AND WINNERS 56

If you've ever been to one of the major fish shows, chances are you'll have heard of John Egan at trophy presentation time! JEREMY GAY visits this highly successful fishkeeper, drools over his stunning fish, and asks him a few questions.

**MY FAVOURITE FISH 64**

IAN FULLER shows his affection for a bug-eyed cat.

**THE JUNGLE APPROACH 66**

Perhaps the most common failure of a planted aquarium is just not enough plants. JEFF WALMSLEY looks at those all-important plants that will grow away like crazy!



YOU'LL FIND YOUR FREE PULL-OUT GUIDE IN THE CENTRE PAGES OF THIS MONTH'S MAGAZINE

## FIT TO SWIM IN? 4

Most fish health problems are caused by poor water quality, or the wrong water conditions. JEREMY GAY takes a look at the importance of getting the water right.

## FISHLESS CYCLING 86

Nothing to do with fish on bikes but a way of introducing bacteria via a filter to deal with harmful toxins, as THOMAS BERRMAN explains.

TO SUBSCRIBE TO PRACTICAL FISHKEEPING

# nts

## MEET THE OLD LADIES 71

MARY BAILEY introduces us to a group of large, but mostly rather peaceful fishes that make great pets.



## MARINE KEEP YOUR BALANCE! 60

For good growth, corals need calcium and carbonates to build a healthy skeleton. But you need to provide them in the right balance. TIM HAYES explains how to achieve this, using liquid supplements.

## NEW REEF OF LIFE 92

PHIL HUNT continues his series on setting up his new reef aquarium, and now breathes some life into his system.

## A TASTE OF HAWAII 110

Public aquariums have become leaders in reef aquarium keeping technology and practice over the past decade and LES HOLLIDAY recently made a return visit to London Aquarium to glean some tips and advice from their top aquarists.

## COLDWATER ALL THE WAY FROM JAPAN 30

What's involved in shipping Koi all the way from Japan to the UK? KEITH HOLMES of Koi Water Barn gives us an insight into the process.

## HEALTH STAGES OF LIFE 54

Dr Peter Burgess, of the AQUARIAN Advisory Service, continues his health series with a look at the problems that can affect your broodstock.

## EQUIPMENT FIRST SIGHT 100

The latest products available to the aquatic enthusiast.

## YOU ARE WHAT YOU EAT 15

...and so are your fish. Get their diet right and your fish will thrive, but get it wrong and their health may be at risk.

## HEALTH ANSWERS 22

Dr PETER BURGESS of the Aquarian Advisory Service answers your health queries.

## WHAT'S WRONG WITH MY FISH? 27

JEREMY GAY highlights some of the most

## COMPETITION SNAP UP A GREAT PRIZE 104

Enter our fabulous competition and you could win a great prize!

## NEWS AND OPINION NEWS 12

The latest fishkeeping news.

## PEOPLE'S POLL 17

Should we keep fish in bare tanks?

## LATERAL LINES 48

Your letters and views on the hobby

## SUBSCRIBE! 90

Our latest offer for new and renewing subscribers.

## WINNING TEAM 108

Hagen's club pages. Plus your chance to win a complete Hagen set-up.

## NEXT MONTH 137

Coming up in the May issue...

## TAILPIECE 138

What's happening in our own tanks this month?

## THE PFK RETAIL GUIDE

### RETAIL ROUND-UP 117

The latest news from the shops

### TOP OF THE SHOPS 118

The Top 20 shops, as voted for by PFK readers.

### INTERESTING IMPORTS 120

More rare and unusual fish found in the shops lately.

### SHOP TOUR 123

We visit four aquatic retailers in Cleveland.



## ON THE COVER

### THE PFK GOOD HEALTH GUIDE

Your FREE 48-page pull-out guide is located in the centre of this month's magazine.

### BEST IN CLASS 4

With so many different marine fish to choose from, where do you start? PHIL HUNT takes a look at some of the popular fish families and offers his opinion on the most suitable species from each one.

### FALLEN FROM GRACE? 18

A big percentage of ANDREW SMITH'S PFK postbag concerns the maintenance and breeding of the Dwarf gourami, so we thought it was time for an article on this popular but often frustrating fish.

### THE MAGIC DRAGON 44

Should you pay "silly money" for the Asian Arowana? RICHARD HARDWICK of Wharf Aquatics can help you make up your mind...

### BUYERS' GUIDE TO INTERNAL POWER FILTERS 80

JEREMY GAY powers up 13 internal filters and throws everything he can at them!

### SOFT WATER - WHO NEEDS IT? 96

NEALE MONKS explains why he thinks hard water can be a blessing in disguise.

Cover picture of Boesman's rainbow fish, *Melanotaenia boesmani* by The Goldfish Bowl/photomax.org.uk. See Neale Monks's article about hard water on pages 96-99.



What you have depends on the equipment you use.

### WHAT MAKES A HEALTHY REEF TANK? 23

MIKE PALETTA highlights the important factors that can determine whether your reef aquarium is a success - or a failure.

### THE PROBLEM-FREE POND 41

NICK FLETCHER has some seasonal advice on how to keep your pond and your fish healthy, happy, and trouble-free all year round.

common health problems that can affect your fish, and offers advice on how to treat them.

### HEALTHY GIVEAWAYS 30

Great giveaways to help you keep your fish happy and healthy.

### WIN A VECTON UV UNIT 31

There are three great UV sterilisers from Tropical Marine Centre to be won in this great competition.





# *Best* *in* *class*

With so many different marine fish to choose from, where do you start? **Phil Hunt** takes a look at some of the popular fish families and offers his opinion on the most suitable species from each one.

**T** There are a lot of different marine fish, some of which are excellent aquarium species and some of which are hopeless for one reason or another, with a lot more in between. But which are the best ones to keep? In this article we look at some popular marine fish families and give a personal view as to which are the most suitable species to keep in the aquarium – a combination of their appeal, in terms of appearance and behaviour, and their ease of keeping.

### The criteria

To qualify as best in class, a species needs to be a realistic proposition for most marine fishkeepers. This means that it must be straightforward to keep and feed (so the very difficult Regal angel, *Pygoplites diacanthus*, doesn't make it, despite being a good size, fabulous looking and fairly reef-safe), not so large that it requires a huge system (so the 45cm/18" Lipsick tang, *Maso ferox*, is out) and reasonably priced, or at least not wildly expensive (so no *Zebrafish* tangs or Resplendent angels, *C. resplendens*). Temperament is also important, so although individuals vary, you won't be seeing any psychotically aggressive species like the Clown tang, *Acanthurus lineatus*, or the Strawberry basslet *Pseudochromis porphyreus* here. Also, these fish need to be reasonably easily available, so at least for the moment there will be no Red Sea fish on the list.

### Tangs (previous page)

**Winner:** Yellow tang, *Zebrafish flavescens*

#### Why?

It's absolutely beautiful, a marine icon, reasonably peaceful (at least towards fish that aren't related to it), plus it's an excellent algae controller. Easily available, straightforward to keep, reasonably sized for a tang and can be kept in groups in large tanks.

#### Top tips

Should be bought at the right size (8-10cm/2½-4" is probably best) for ease of adaptation to aquarium life. Needs to be fed lots of algae, either neat algae growing in the tank or algae-based foods.

**Runners-up:** Kole tang, *Chromochloris strigosa*, for its attractive but almost-camouflaged appearance, sensible size and rock-scrubbing abilities; Mimic tang *Acanthurus gyoensis* for its easy-going nature (and ease of keeping), and different attractive colour schemes during its life (and the fascination of watching the changes).

### Dwarf angels

**Winner:** Coral beauty, *Centropyge bispinosa*

#### Why?

It's one of the prettiest angels as well as the easiest to keep, and perhaps the best species of all for the reef aquarium. Usually a very placid fish, it spends its time grazing rather than bothering its tankmates. It's nice and small, too.

#### Top tips

Like other *Centropyge* angels it likes to eat algae and detritus, so don't go overboard on tank hygiene. For the same reason, although it does well in traditional fish-only tanks, living rock-based systems suit it best. Some specimens are useful as algae control in reef systems.

**Runners-up:** Flame angel *C. Anniway* for its beauty; Cherub angel *C. orni* for being suitable for even the tiniest tanks, and still very pretty.



The Coral Beauty / Andrew Taylor





## Large angels

**Winner:** Majestic angel, *Pomacanthus navarchus*

### Why?

It's a manageable size and generally good tempered, as well as absolutely gorgeous. It is fairly hardy and not too difficult to feed, not particularly susceptible to disease, and at least some individuals are well behaved in the reef aquarium.

### Top tips

Buy at the right size, just as juveniles are turning into adults. Look for good, fat, well coloured specimens. Provide plenty of hiding places – can be shy at first. Companions should not be too aggressive. Feed plenty of vegetable-based foods, particularly dried algae such as nori.

**Runners-up:** *Geniocranthus bellus* for being completely reef-safe, straightforward to keep and beautiful. Map angel *Pomacanthus maculosus* for looking great, being very hardy and straightforward to keep – and not too big.



## Clowns and damsels

**Winner:** Common clown, *Amphiprion ocellatus*

### Why?

In captive-bred form it's so hardy it's virtually bomb-proof, it's colourful (and comes in different colour morphs), easy to keep, hard and even (by marine standards) breed. It has a great personality, relating really well to people – which is what you would expect in a captive-bred fish. It's also small enough to keep in even the smallest aquarium, and is very peaceful.

### Top tips

Always buy captive-bred ones, not wild-caught – leave the latter to the experts. Best kept in pairs – to form a pair, just buy two young fish. There's no need to keep them with an anemone.

**Runners-up:** Dark clown *Amphiprion clarkii* for being a big, bold clown, available in captive-bred form. Green chromis *Chromis viridis* for being a small, colourful, perky reef-friendly schooling fish.

## Gobies (not pictured)

**Winner:** Yellow watchman goby *Gypsobius caelestis*

### Why?

It is superbly coloured in bright yellow, with neon blue spots. It is easy to keep and feed, it can be kept with commercial goby shrimps, it can be kept in pairs, it isn't particularly territorial, it won't starve to death while apparently feeding well (unlike some other gobies), and it has a fabulous grumpy face!

### Top tips

Provide a bed of fine sand with some coarser material, so that the fish can dig burrows, feed sinking pellet foods to make sure enough gets down to the 'basement' for the goby. Fine in reef tanks (less likely to shower inverts in sand than many gobies) but don't keep with very small shrimps.

### Runners-up: Clown goby

*Siniperichthys* species for its outrageous colour pattern and flamboyant fins, Yellow coral goby *Gobiosoma olivaceum* for being big, cute and fascinating to watch.



## Lionfish

**Winner:** Antennata lionfish *Pterois antennata*

### Why?

It is a sensible size, has a very striking appearance, and like many other lionfishes is extremely hardy. It can be kept in groups (provided there are enough hiding places – should these be 'dens' when lionfish are involved?) It will live in the reef aquarium without harming corals – although it will eat shrimps and small fish. It's hard to single out lionfish – most are excellent aquarium fish, but this species has a good combination of size, hardness and appearance.

### Top tips

Don't touch.

**Runners-up:** Fuzzy dwarf lionfish *Dendrochirus brachypterus* for its unusual looks, Mombasa lionfish *Pterois mombasae* as a classic lionfish in a small package.



## Wrasse

**Winner:** White-belly wrasse *Helicolenus leucoganthus*

### Why?

Beautiful chrome yellow and silver colour scheme, extraordinary hardiness, easy-going nature, can be kept in groups. Fascinating social behaviour, accompanied by colour changes as individuals change sex. Safe with invertebrates (other than very small shrimp), stays small. Bold and outgoing – always on display.

### Top tips

Provide a bed of fine sand as a place to sleep/hide. Keep in small groups to see their social interactions. **Runners-up:** Candy hogfish *Bodianus bimaculatus* for its fantastic coloration, reef-safe nature and bold temperament. Pyjama wrasse *Pseudocheilodactylus neotoma* for its fascinating appearance and behaviour, and for dealing with a lot of reef tank pests.



## Blennies

**Winner:** Midas blenny *Ecsenius midas*

### Why?

It is probably the most brightly coloured blenny, but is also a real personality fish – a marine pit. It is also one of the safest blennies for the reef tank (a much better bet than other *Ecsenius* species). It adapts extremely well to aquarium life, being very hardy and easy to feed. It isn't particularly territorial and will get on well with most tankmates. Any fish that can swim backwards with the speed and

accuracy of this one just has to be top of its class.

### Top tips

Provide plenty of holes in the rockwork so the blenny can choose one as a home. Feed lots of algae-based foods. **Runners-up:** Black-lined tang blenny *Micropogonias undulatus* for its elegant swimming and striking appearance, and being one of the easiest of the lovely *Micropogonias* species to keep. Bicolor blenny *Ecsenius bicolor* for its hardiness and sheer goofiness.



## Butterflies

**Winner:** Double-saddle butterfly *Chaetodon lineatus*

### Why?

By butterfly standards, it is hardy, bold and easy to feed. It is also a desirable size, and beautifully coloured in a kind of classic butterfly design (wide front of body, dark band through the eye and brightly coloured tail and rear of the body) variations of which occur in several *Chaetodon* species. It can be happily kept in groups in large tanks, and is happy to share a tank with other butterflies – even those that look similar.

### Top tips

Buy when fairly small for ease of adaptation to aquarium life. Provide plenty of shelter as it can be shy when first added. Live rock-based tanks (without corals) are much appreciated by this and other butterflies.

**Runners-up:** Yellow longnose butterfly *Forcipiger flavescens* for its hardiness, lovely colour and unusual shape. Black-back butterfly *Chaetodon melanocephalus* for its combination of robustness and beauty.





## Grammas, basslets and dottybacks

**Winner:** Royal gramma, *Gramma lorea*

### Why?

Intense colours and relatively peaceful for this type of fish. Can be kept in groups in the right setting, and will sometimes spawn in captivity. Easy to feed and hardy. Excellent for reef tanks.

### Top tips

Provide plenty of hiding places, particularly large caves and overhangs (grammas like to rest under overhangs, sometimes upside down). Avoid tankmates that compete for such hama, or serious trouble can break out.

**Runners-up:** Yellow forktail *Acanthurus balearicum* for its lovely colour, tremendous hardiness and the possibility of keeping it in groups; Chalk bass, *Serranus tortugarum* for the same reasons, although the colour is subtler.



## Hawkfish

**Winner:** Flame hawkfish *Nesoclinemus ornatus*

### Why?

It has incredible colour and is extremely hardy and disease resistant. Much less aggressive than many hawkfishes – if anything, it tends to get bullied by other fish. Less of a threat to small fish and shrimps than other hawkfishes, because it is small itself, with a mouth to match. It is also a great pet, interacting well with people and always watching what is happening outside the aquarium as well as inside.

### Top tips

Tankmates should not be too aggressive or territorial. Likes to have places to perch from which it can watch the rest of the tank.

**Runners-up:** Longnose hawkfish *Ogcoeleles tylosus* for its bizarre appearance and easygoing nature; Redspotted hawkfish *Amblyrambassis pinnos* for its small size, attractive appearance and relative lack of territoriality.

## Triggers

**Winner:** Blue-shin trigger *Xanthichthys dunckeri*

### Why?

A very atypical trigger; it's a peaceful planktivorous species that can be kept in pairs or in a big enough tank a group. It is also a sensible size – unlike most triggers. Because it is planktivorous, it can even be kept in reef tanks without impairing corals or clams. It is also very attractive, with males and females being distinctly coloured (only males have the blue chin of the common name). Conveniently, it is just as hardy as other triggers.

### Top tips

To keep a pair or group, buy all individuals at once and keep one male and one or more females. If you keep it in a reef tank, make sure that any shrimps are already in residence before the trigger is added.

**Runners-up:** Pintail trigger *Melichthys woda* for looking great and being more peaceful than the average trigger; Picasso trigger *Acanthurus oculeus* for looking fabulous and, while being a classic trigger, at least it isn't enormous.

## Dartfish

**Winner:** Purple finfish *Nemateleotris decora*

### Why?

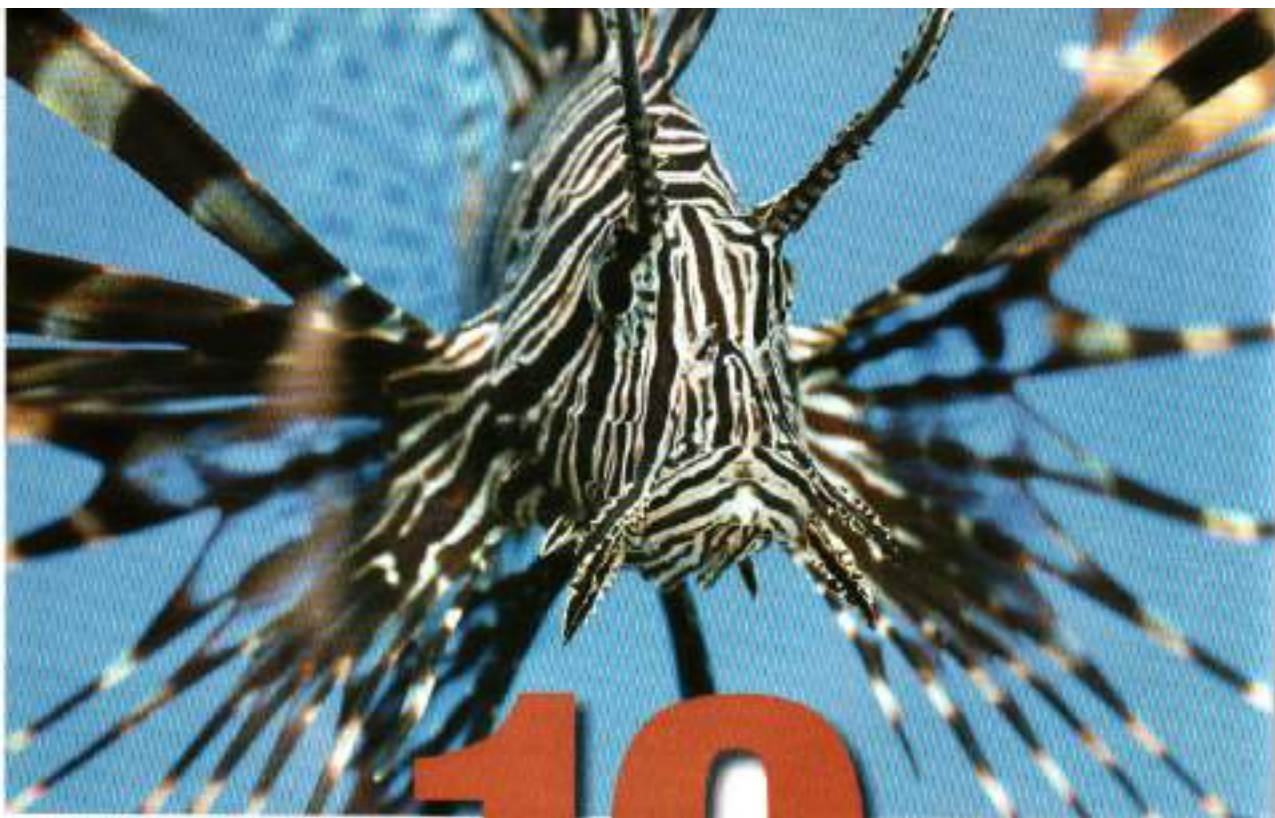
It is stunningly beautiful, small but longer and bolder than other firefish. It is very hardy, eats just about anything, and is perfect for reef systems, being completely safe with invertebrates. Hovers in mid-water catching plancton, so is always on display.

### Top tips

Best kept with relatively quiet companions, although species that are not competing with it for food, or are unlikely to try to eat it, generally won't bother it. Best kept singly or in mated pairs. Keep the tank well covered – like other firefish it will jump if frightened.

**Runners-up:** Zebra dartfish *Ptereleotris zebra* for its hardiness, subtle beautiful appearance and sociability; firefish *Nemateleotris magnifica* for its ease of keeping and fabulous coloration.





# 10 top fishkeeping tips

**Craig Baldwin** of Sparsholt College and Aqua One offers his top 10 tips for fishkeeping success.

## 1 Do your research

Obtain as much information and advice about fish, plants or invertebrates as you can before you even consider buying them. Match the environment from which that species originates with that of your aquarium and you are not only likely to minimise health problems for your fish, but may also reduce the expense and time required to keep them. Fish such as Discus, that originate from soft, acidic water are unlikely to thrive in an aquarium with an established population of hard water species like Malawi cichlids, for example.

Many species of fish are unsuitable for the community aquarium, and some should only be kept by experienced fishkeepers. Oscars, Red-tailed catfish, or some

species of Moray eel, may be appealing when small but they are also likely to consume most of the other fish as they begin outgrow their aquarium!

Butterfly fish are beautiful, but many species require specialist foods. Some species, such as Lionfish, may actually present a health and safety risk to the owners and should only be considered by experienced fishkeepers.

## 2 Find a good retailer

Choose a retailer who is prepared to take the time to discuss any problems and provide honest advice. Trained and experienced staff, clean and well-presented premises, healthy stock and a variety of equipment, feeds, treatments

and supplements may indicate a retailer with whom the aquarist may wish to develop a long-term and mutually beneficial relationship.

## 3 Choose equipment wisely

Even the most basic aquarium is likely to require a considerable amount of time and money on the part of the fishkeeper. Choosing equipment from manufacturers that have a record of reliability, are prepared to invest in the development or evolution of their equipment, and have an active customer support network may not always prove to be the cheapest option, but they are likely to produce reliable, effective and long serving equipment.

#### 4 Observe closely

The most subtle change in behaviour, such as a reluctance to feed or an increase in the speed of gill movement, may be a sign of environmental stress, such as a deterioration in water quality, a variation in water temperature, or the presence of a disease-causing organism. Take time to sit and watch your fish and investigate any behaviour changes.

Although reputable retailers will ensure that diseased or damaged fish are not offered for sale, the ability to observe your fish before you buy remains as the simplest and most effective means of disease prevention. Those that appear to be swimming slowly, gasping at the surface, or not swimming within a shoal, may have a health problem and should be avoided. Discolouration, an excessively thick mucus layer, or signs of 'flashing' or scratching may also indicate the presence of a disease-causing organism. Avoid buying fish that exhibit signs of physical damage or disease, or apparently healthy fish from the same aquarium.

#### 5 Check the water

The internal organs of a fish are separated from the water in which they swim by the thinnest and most delicate cell membranes. Consequently, any deterioration in the quality of water is likely to have a significant impact on their health. Regular monitoring alerts you to the slightest change in water quality before it is likely to affect your fish. Monitor water quality on a daily basis while the filter is maturing and continue monitoring once a week when the aquarium is mature. Check temperature, ammonia, nitrite, nitrate and pH.

#### 6 Feed correctly

Within their natural environment, most species of fish are opportunistic feeders and will consume as much food as possible. This so-called 'gorging' response will result in the fish metabolising only a small proportion of this food, with the remainder expelled as waste. Although these waste products may be toxic to fish, the large volume of water within natural pools, streams or oceans will dilute them down to a safe concentration before they are broken down by a population of naturally occurring waste-consuming organisms. Within an aquarium, feeding

more food than the fish can digest may result in such a sudden accumulation in waste products that they may overwhelm even the most sophisticated filtration system. Feeding a small, high-quality food on a regular basis may prove to be time-consuming but it will result in healthier fish and a more effective filtration system. Although every species of fish will have a unique feeding requirement, research indicates that adding enough food for fish to consume within 2-3 minutes at intervals of 2 or 3 times a day will minimise the amount of waste products produced by those fish and help prevent any deterioration in water quality.

#### 7 Carry out water changes

Even the most effective filtration system cannot prevent the slow accumulation of microscopic waste fragments, or compensate for the slow decline in a range of trace elements which influence the health of fish, plants and invertebrates. One of the key indicators of an accumulation in these microscopic waste products is the slight yellow or brown colour that may be associated with older, mature aquariums. Although every aquarium must be considered as unique, replacing 10 or 20% of the water on a weekly basis will help to reduce any accumulation in waste products and ensure that the fish have full access to any necessary trace elements.

Tapwater is the most common source of top-up water, but it does



contain a range of disinfectants and chemicals that are hazardous to fish health. Adding a suitable water conditioner from a reputable manufacturer will help reduce risks associated with the use of tapwater.

#### 8 Don't neglect other maintenance

Regular cleaning and maintenance will help ensure that each item of equipment functions effectively and will protect the health of the inhabitants of the aquarium. Feeding, observing fish behaviour and checking the equipment is working are probably the most important daily maintenance tasks. Algae removal, cleaning mechanical filters, water quality monitoring and water changes are the most important weekly tasks.

#### 9 Prepare for holidays

Adequate preparation will help to ensure that most fish can survive for the occasional week without you. Simple precautions such as regular maintenance of the filter may be all that is required for most aquariums to survive for a week without their owners. Longer periods may require the owner to install an automated feeder or rely on the good intentions of a trusted neighbour or friend to feed fish. Unfortunately, non-fishkeepers have a habit of grossly overfeeding the fish in their charge, so carefully measure the amount of food for each meal, and leave the instructions, together with an emergency phone number on which you can be contacted, just in case something goes wrong.

#### 10 Enjoy your fish!

Despite all the advice offered by so-called experts, the most important aspect of fishkeeping is to enjoy it!

**ABOVE:** The size of Paru moone they can easily overwhelm filtration systems.

**LEFT:** Lionfish are venomous and are best kept by experienced fishkeepers.

**BELOW:** Take time out to enjoy your fish. Pic. shows the Windsor aquarium from Aqua One.



# News

These news stories come from the Practical Fishkeeping website. To read them in full – and hundreds of others – visit: [www.practicalfishkeeping.co.uk](http://www.practicalfishkeeping.co.uk)

## NEWS IN BRIEF

### SWORDTAIL PREFERS SWORDLESS MALES

A study has been carried out on a swordtail to find out whether females actually prefer their males to have a swordtail or a normal tail. The species concerned, *Xiphophorus birchmanni*, has lost its sword naturally so scientists conducted an experiment to find out if given the opportunity, females would naturally have a preference for males with extended tails. Computer animations were used to create virtual swordtail males but the females preferred the short-tailed forms instead. The study helped to show how naturally occurring hybrids were prevented in the wild.

### SEAHORSES FOUND IN PARCEL

A parcel has been intercepted by customs and was found to contain 102 endangered seahorses. The parcel was sent illegally – it should have been sent by freight and with the right paperwork. Instead, it was sent by parcel post. Furthermore, the seahorses are CITES protected. A spokesperson from HM Customs said that the parcel was marked "Tropical Fish" so officers were immediately suspicious. "We think they must have been in transit for at least 24 hours in the cold and it is a pity so many survived. We immediately phoned Capastor Zoo who arrived within an hour of our discovery and we are delighted to say that 62 of them survived." Royal Mail does not allow live fish to be posted in any of its services, including special delivery.

## Malawi cichlid reshuffle

Malawi cichlid experts, Jay Stauffer and Ad Konings have published a review of the genus *Copadichromis*. The work re-examined the diagnostic traits of the group, which was last looked at by Eccles and Trewavas in 1989.

A new genus has been created called *Mtshenga*, and now contains *cylicus*, *thinos*, *concoloratus*, *lavinianus*, *inornatus* and *euchostomus*, which all previously belonged to the genus *Copadichromis*. The species have been placed into *Mtshenga* following differences in morphology, habitat and the way that they construct their nests when they breed.

Two more former *Copadichromis* have also been moved and now

belong to the genus *Nyasachromis*: *Nyasachromis protoforma* and *N. broadbenti*, as they are now called, join *N. breviceps*, *N. leuciscus* and *N. senensis* in the genus.

Stauffer and Konings' work also defines three groups within the *Copadichromis* genus that contains fish that are more closely related to each other, than to other members of the genus. They are the *Copadichromis quadrinaculatus* group, the *Copadichromis mbenye* group and the *Copadichromis virgatus* group. The *mbenye* group has been expanded to include an additional six species – *C. melas*, *C. parvus*, *C. diplostigma*, *C. insularis*, *C. cyanocephalus* and *C. thzumulensis*.

## WEB NEWS

After nearly a year in the making, Practical Fishkeeping has launched its unique fish mapping service on the PFK website. The service allows you to find out where in the world your fish originate from just by typing in its name. The fish mapper uses data taken with permission from Fishbase and allows you to view the longitude and latitude coordinates and museum accession numbers for each species.

We've used it and think that it is a work of genius. Designed and created entirely by our Website editor Matt Clarke, we recommend that you log onto the website and give it a try!



More fish news: Visit the Practical Fishkeeping

# Fish tattooing service

A Chinese fish supplier is offering a fish tattooing service that will display its customers' preferred words, patterns or logos on their sides. HK Aquaria Mall of Hong Kong tattoos Parrot cichlids with words including "I love you" and even seasonal greetings.

Alan Lee of HK Aquaria Mall, told a Chinese newspaper that his fish are tattooed using a laser. He said that it was a special low intensity laser that he claims leaves a permanent mark without causing any pain to the fish.

Mr Lee told the newspaper: "Firstly we need to select the appropriate fish and use only low intensity laser beams. We only engrave on the fish's scales, not through them. We also had concerns over the possibility of animal abuse, but to date the mortality rate has been zero. The fishes don't even bleed," before adding: "For the lunar new year I've arranged for popular New Year greetings to be engraved on them. If a customer wishes to personalise their fishes, they'll need to order two weeks in advance. Many people bought them as gifts for friends and relatives. I sold about 20 of them in just a week."

The fish cost around 100HKD (£7.40) and are said to be selling well.

Practical Fishkeeping has actively campaigned against the production and sale of dyed fish since the mid nineties. 75% of the UK's aquatic retailers have signed up to the campaign. Unfortunately, the process of tattooing fish with dye seems to be a progression from the original practice of injecting dyes or paint into the body cavities of fish.

Tattooing has been the suspected practice used for dyeing hybrid parrot cichlids and Giant gouramis, *Cyprinopterus*



We've recently seen fish with very intricate scale patterns.

## "Most aquarium experts believe that all forms of dyeing are unethical"

gourami that have turned up in some shops in this country. Such fish often have intricately coloured scale patterns. Though we have suspected that tattooing was being carried out, producers of such fish have remained silent about their practices until now.

We contacted Dr Alex Floeg, the Secretary General of Ornamental Fish International (OFI) and he told us: "The topic of dyed fish is one that is being discussed within OFI on an ongoing basis. However, it is proving exceptionally difficult to obtain direct information on the techniques used."

"Being ever-conscious that we cannot enforce any worldwide restrictions on the industry, we actively take steps to emphasise to our members that OFI is against any practices that are unethical or embody negative welfare aspects."

Most aquarium experts believe that all forms of dyeing are unethical and unnecessary. PFK contributor and fish health expert Dr Peter Burgess published articles on the original dyed fish in the 1990s. He offered his thoughts on the latest generation.

"The skin of a fish is living tissue throughout. Any colouring method that damages the skin's protective surface will render fish prone to potentially life threatening infections. The artificial colouring by laser presumably involves restraining the fish out of water for some time and this is likely to cause further unnecessary stress. And how do we know it isn't painful? This practice should be condemned as being cruel and totally unnecessary. It devalues living creatures and treats them as if they were some inanimate object that can be decorated purely for whim or commercial gain."

"Far too long, fish have been widely perceived as cold, unfeeling creatures that do not perceive pain, but we know this far from true. This despicable practise only serves to perpetuate the myth."

The use of lasers to tattoo fish is not entirely new. It was first used in 1975 on catfishes, and then later in 1993 by fish scientists to tag wild salmonids. Lee Blankenship and Don

Thompson of Washington department of Fisheries investigated the use of Coumarin Dye (CD) lasers on Salmon and found that the initial blasts tore away scales from the epidermis down to the stratum compactum, a layer of tissue.

Their research suggests that acoustic damage tears tissue from the margins of the hole instead of burning like other lasers do. Pigment cells from the stratum compactum are removed, bleaching the area, allowing it to be dyed using pigment in the laser.

Blankenship and Thompson said: "The epidermis recovers from the laser blast quickly. It closed within a week over all but the very largest injuries, which are completely re-epithelialised a few days later. The upper layers of the epidermis remain open-textured for some time as a function of the underlying connective tissue injury, but return to normal morphology after about five weeks." Fish with dark colouration need 4-5 blasts from the laser to bleach their pigment cells, causing massive blistering.

The proposed Animal Welfare Bill could have made it possible to prosecute British aquatic stores who imported dyed fish, but Defra and the RSPCA have confirmed that a ban will not be introduced. Defra said that there were no plans at present to introduce the bill either. The bill does allow the government to introduce new regulations, however, and these could include regulations that cover pet vending.

Defra said that if fish were injected or tattooed in this country, then it would constitute mutilation and would be illegal under the Protection of Animals Act 1911. But if done outside the UK, it is not covered by the act.

website on [www.practicalfishkeeping.co.uk](http://www.practicalfishkeeping.co.uk)

# News

## New Dwarf Synodontis found

### TAXONOMIC RESEARCH

#### *CHLAGLANIS PRODUCTUS*

A new species of sucker-mouth catfish has been described. *Chlagentis productus* belongs to the family Mochokidae, and was discovered in the Loutza river which flows into the southern tip of Lake Tanganyika. East Africa-Michigan Museum of Zoology.

#### *BARBOIDES BRITZI*

A new species of barb has been described from Benin in West Africa. *Barboides britzi* is found in the Oueme river basin in southern Benin and is named after Dr Ralf Britz of the Natural History Museum. It is the second fish to be added to the *Barboides* genus and reaches less than a couple of centimetres in length – Ichthyological Exploration of Freshwaters.

#### *POLYPTERUS MOKELEMBEMBE*

A new species of Polypterus has been described. *Polypterus mokelembembe* has already been circulated in the trade as *Polypterus* sp. 'Congo' and is similar to *Polypterus retropinnis*, *palmis palmis* and *reupoi*. It originates in several places throughout the Congo basin including the Tatuapa drainage in the Democratic Republic of Congo and the Aima drainage in the Republic of Congo – Zootaxa.

A new species of *Synodontis* has been described and is the smallest species in the genus so far. Adult at around 4.5cm/2". *Synodontis acanthoperca* was found in fast-flowing rapids at two sites in the Ogoué River system in Gabon. John Friel and Thomas Viglotta of the Cornell University of Vertebrates described the species and said that they initially thought that the specimens might be conspecific with *Synodontis marmoratus*. *S. marmoratus* is another species that has a pattern of dark patches on a light background. "However, *S. marmoratus* does not possess

a distinctive pair of spots on the caudal fin, lacks any evidence of opercular spines in similar sized specimens and also differs in head, barb and body proportions from *S. acanthoperca*," said Friel and Viglotta.

"*acanthoperca*" is in reference to the opercular spines that become highly developed in sexually mature males and is derived from the Greek word "acanth" meaning thorn and the latin word "opercul" meaning cover or lid. Friel and Viglotta say that the spines are one of the species most distinctive features and are unique among Mochokidae.

## BCA Spring Convention

The British Cichlid Association Spring Convention takes place on Sunday, April 9 at Amersham Common Village Halls, 24 White Lion Road, Amersham, Bucks. Guest speakers are Juan Miguel Artigas Azas on Central American cichlids and Mary Bailey on Malawi, Then

will be a 300-lot auction of cichlids, plants and dry goods. Admission: £6.50 members; £7.50 non-members. For information contact: BCA Publicity, 20 Ash Grove, Shotton, Connors Quay, Wales CH5 3AG (please enclose SAE) or email: KJHorrocks@aol.com

### DIARY DATES

#### April 2

Robin Hood Aquatics is meeting at Highbank community centre, Ramborough Road, Clifton, Nottingham. Contact Clive Hinton on 01150 521883

#### April 8

British Cichlid Association Spring Convention at Amersham Common Village Hall, 24 White Lion Road, Amersham, Bucks. Contact Karen Horrocks on 07785 730750

#### April 12

Dunstable and District Aquarist Society is meeting at Slip End Village Hall, Slip End Village, near Luton, Bedfordshire. Contact Bob Schofield on 01767 270840

#### April 14-15

Heritage Aquatics is having an Easter sale, with 32% off all livestock and live rock, and deals on dry goods. Heritage Aquatics is a marine-only shop based at Heritage Farm, Little Woodcote Estate, Wokington, Surrey SM6 0SN. Tel: 020 8847 5790.

#### April 16

Catfish Study Group UK is meeting at Highfields Working Mens Club, Radcliff Street, Barrow, Lancashire. Contact Adrian Taylor on 01528 718 708

#### April 23

Greater Manchester Cichlid Society is meeting at Littleborough Conservation Club, Peel Street, Littleborough, Greater Manchester. Contact Alan Waterfield on 01708 646535

## Reef fish follow their noses

Reef fishes from the genus *Apogon* use olfactory cues to allow them to remember where they live, and find their way home if they get lost.

Freshwater fish remember where they live and find their way home by sniffing out the smells left on the substrate by members of their species.

Scientists had believed that marine fishes probably used the same method of using their sense of smell to detect chemical cues in the water, and now new research has shown that this is right.

A team of scientists working at the Institute of Molecular Bioscience at University of Oslo in Norway, which is due to be published later this year in the journal *Chemical Senses*, says *Apogon* use their sense of smell to hold their station and find their way back to their reef if they get displaced.

The group studied three *apogonid* species, including

Five-lined cardinals, *Chelodipterus quinquelineatus*, Ghost cardinals, *Apogon leptacanthus* and Split-branded cardinals, *Apogon compressus*, on Lizard Island Research Station in Queensland, Australia during 2001 and 2002.

The study found that groups of *C. quinquelineatus* and *A. compressus* preferred artificial reefs that had previously been occupied by members of their own species.

The team wrote: "Individual *C. quinquelineatus* preferred scent of conspecifics from their own reef site to that from another site.

"They also preferred the scent released by artificial reefs previously occupied by conspecifics of their reef site to that of similar reefs previously occupied by conspecifics of another reef site.

"No discrimination between species from the same reef site was obtained in experiments with individual fish."

## Aquarium in the Desert

**GO THERE!**

Over four million Brits visited the USA last year. The Americans have allocated millions of dollars to promote tourism in 2006 and most of this will be aimed at the British tourist.

Almost every major city in the US has a public aquarium. However, Las Vegas, the gambling capital of the world, doesn't mention any public aquaria in its advertising – not surprising since the place is built in the middle of the Nevada Desert!

The aquarium in Las Vegas is actually based in the Mandalay Bay Hotel on 'The Strip'. The Shark Reef is North America's only predator-based aquarium. Housing 2000 animals there are 100 different species, most of which are predatory. They have 15 species of sharks.

The aquarium has 95,000 square feet, despite being buried in the middle of a hotel. A convoluted pathway takes you through a jungle theme which is air conditioned! The fish are housed in giant acrylic aquaria, including a tunnel with a transparent floor. Education and conservation are the claimed missions of the aquarium – it's a member

of AZA (American Zoo and Aquarium Association) and has its own Shark Reef Education Department offering educational tours to schools.

1.6 million gal. of seawater contains sharks, sawfish, stingrays and turtles. The sharks include Epauletta, Wobbegong, Zebra, Sandbar, Nurse, White tip reef and Sand tiger species. Also on display are freshwater species including Silver arowana and Pacu. The rare Golden crocodile can also be seen.

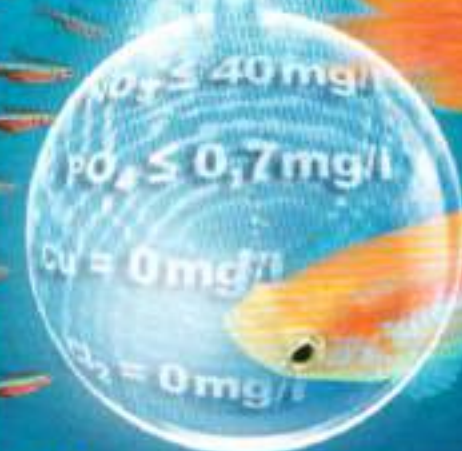
An 'ancient temple' is home to tangs, Lookdowns, snappers, parrotfish, grunts, wrasse, angels and puffers. But being mainly a predator-based public aquarium, most of the tanks are home to sharks, sawfish, torpons and barracuda. I found that the most amazing, indeed unnerving, display, was a tank full of giant Moray eels. > To find the aquarium you need to go the South end of the Strip – easy with the new Las Vegas Monorail at \$3 a trip. Get off at MGM Grand Hotel, cross over the Strip and walk or take the (free) monorail from Luxor to Mandalay Bay Resort Hotel and Casino. The interior of the hotel is vast and you need to walk a long way to get to the aquarium, through the casino.

Admission on my visit was \$15.95 for adults; \$9.95 for children aged 5-12 and free for children under that. It's open daily from 10am-11pm. **Dr David Ford**



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# The PEOPLE'S POLL

## Should fish be kept in bare tanks?

Many retailers, wholesalers and breeders keep fish in bare tanks. Does this clinical environment cause stress and impair natural behaviour, or is it doing them a favour by helping to prevent disease?

The overwhelming reaction was 'No', fish shouldn't be kept in bare tanks because of reasons like stress to the fish, loss of colour, and the fact that no natural environment is totally without decoration of some kind.

Many of you voted 'Sometimes', though, and most who did vote are amateur breeders who sometimes require clinical tanks for rearing eggs and fry, but who usually keep their fish in furnished conditions when they are not being bred. The 'Yes' vote was represented by less than 10% of the people who took part in the poll.

Dave Molnar, USA says: "I'm in favour of keeping fish in bare tanks in stores, especially the high turnover fish that are delivered once or twice a week and are sold in a short space of time. Bare tanks make maintenance a lot easier, have more water changes, cleaner water

and therefore help to cut down on disease. I understand that breeders use bare tanks for the same reasons."

Samuel Berridge from Leicestershire says that "keeping a fish in a bare tank makes it much easier for shop owners to catch fish, thus reducing stress. Turnover is often high so fish are rarely in a bare tank for long. Also bare tanks are easier to keep clean and make it easier to identify and quarantine sick fish. Obviously once purchased, a more stimulating environment benefits both the fish and owner."

Chris Osborn from Derbyshire has mixed views, saying: "It is important to house fish in bare tanks for a limited time, so that it is easier to clean the tanks, but if the fish are shy by nature then I believe that the dealer should go to the effort of providing shelter for them."

Toby Gibbens of West Sussex is categorical, saying: "It's cruel to keep fish in a bare tank with no stimulation. Fish have been proven to have a degree of intelligence and so a bare tank is unsuitable."

George Swift agrees, and offers the following: "Many fish enjoy the option of hiding places. Also planting up a tank

will show off the colours of the fish better. As fish shops are the first port of call for imported fish, the less stress they are put under the better. Seeing loach species huddling under a strainer in a bare tank is very distressing to me. Fish which buy are going to be 100% more stressed in a tank with no substrate."

Cluppy breeder Graham Seddon, from Devon has proven evidence when he breeds his fish and says: "I have experimented with tanks both empty and filled with Java moss for gravid females and fry up to searing age. As well as cover for the fry, I found that with Java moss to nibble on, fry grew faster as there was always food for them. With a bare tank the fish are dependent on us feeding them regularly."

Meanwhile, B Dunsmuir of Lanarkshire can see both sides of the argument, saying: "While I would always recommend that fish are likely to be healthier and happier in a tank with substrate and appropriate furnishings to match their original wild habitat, I believe that a bare tank is preferred as a hospital bay for fish requiring treatments for ailments as it can be sterilised between uses, thus preventing

contamination for future sick fish. Using a bare tank to quarantine new arrivals allows prevention of excess bacteria from entering the main tanks when introducing the new arrivals."

And Kevin Grant, also of Lanarkshire, actually prefers his retailers to have bare tanks so that "it gives a good idea of the upkeep of the tanks and the cleanliness. It is also harder to hide dead fish in bare tanks."

Discus keeper Mark Petchey from Cambridgeshire offers a final word on practicality versus aesthetics and says: "I keep a large number of Discus tanks without décor or substrate and my fish flourish. It's not very pleasing to the eye but easy to keep spotless and control water parameters. Most of the fish were bred and reared in bare tanks so it is not stressful to them."

### Next month's poll

The Animal Welfare Bill has not made it illegal to sell or import eyed fish. Many readers are up in arms about the decision but we want to know your views. Have your say by voting on the PFK website on [www.practicalfishkeeping.co.uk](http://www.practicalfishkeeping.co.uk) and adding your comments.

### HOW YOU VOTED

#### Should fish be kept in bare tanks?

YES

9%

NO

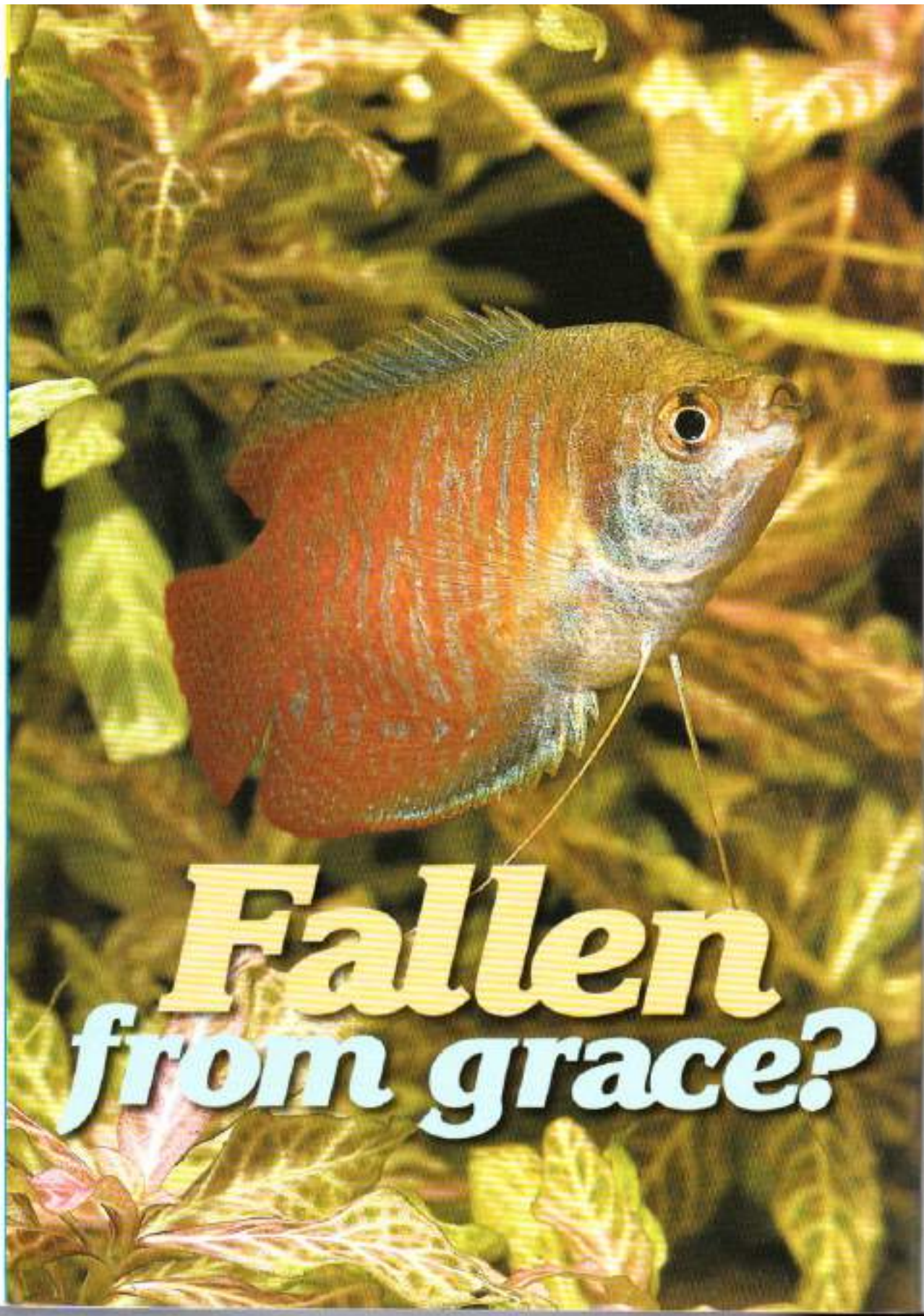
84%

SOMETIMES

37%

[www.practicalfishkeeping.co.uk](http://www.practicalfishkeeping.co.uk)





***Fallen  
from grace?***

A big percentage of **Andrew Smith's** PFK postbag concerns the maintenance and breeding of the Dwarf gourami, so we thought it was time for an article on this popular but often frustrating fish.

**F**or many fishkeepers, their first introduction to the world of anabantoids is with one of two species, the Siamese fighter, *Betta splendens*, or the Dwarf gourami, *Colsa lala*. This was the case for me, and indeed both species formed my early attempts at breeding anabantoids for the first time. But regular readers of my articles down the years will know that I'm not the greatest advocate of the Dwarf gourami as a first breeding project, and even its potential as a community fish. Hopefully this article will give you both sides of the argument.

#### Naturally beautiful

The Dwarf gourami was first described by Francis Hamilton-Buchanan in 1822 as *Trichopodus lalus* (*C. lala* was the name given by Myers in 1923) – *lala* pertains to the local region in the Coriah district where it was found. Its natural range extends from India, Assam and West Bengal, areas of the Brahmaputra, Ganges and Jamuna rivers. The ecology of these areas often involved dense vegetation, and sometimes paddyfields where drainage channels had bought them.

The wild form of the male Dwarf gourami has some of the finest natural colouration of all popular aquarium fishes. The basic body colour in the male is red brown, and there are iridescent blue/green bars on the body. The chest and throat area is also blue/green and the dorsal fin is red covered with many iridescent blue dots. The two sexes can be easily determined – the female is smaller than the male and is a basic silver/grey fish with faint yellow barring to her body and the smallest amount of blue on her chest and throat area.

With such spectacular natural colouration it's a wonder why anyone would want to alter it, but this species lends itself to colour enhancement which in turn has resulted in a number of different varieties becoming available. One of the most popular is the Red robin gourami in which the male has an all-over red colour with blue/green

on the chest and throat and a fringe of blue on the dorsal pennant. Another variety has enhanced the iridescence of the blue barring on the body giving rise to the Neon blue dwarf gourami, but I think this variety looks false, and the colouration lopsided.

Some years ago I saw a variety with long fins. Apart from looking ghastly, they gave the fish a lot more weight to carry which it struggled with, resulting in the caudal fin drooping lower than the fish's body. Mercifully I haven't seen this variety for some time.

#### Choosing gouramis

Availability has never been a problem but the standard of the fishes over the years has declined quite noticeably, so what should you look for when buying them?

First of all, do some research. Find and compare pictures of Dwarf gouramis and you will soon get a feel for what is a good fish and what is not. Are the lines and contours of the fish you are looking at in the shop, smooth? Many specimens now have a kind of bump on their heads. Look also at the fish head-on. Does the stomach have a full look? Avoid fish with a malnourished look, even if they seem to be feeding well. Are the gouramis active? When upset or distressed, *C. lala* will clamp its fins and hide, or hang listlessly at the water surface. The latter is often a sign of disease such as Velvet, which this fish seems particularly prone to – it appears as a glittery dusting all over the body. If treated early it can be cured, but in the terminal stages where the fish behaves like above, any treatment is likely to be ineffective.

So look for a well proportioned fish, active, brightly coloured and reacting to tankmates. Although generally subordinate, the females should equally be as active and well-rounded.

#### Care in the aquarium

A lot has been written about the Dwarf gourami, much of it re-hashed from existing literature

that suggests not only is it a good community fish, but an ideal first breeding project. This may be due to the fact that males take the matter into their own fins and regularly build bubble-nests in community tanks.

Given the vast difference in colouration and the attractiveness in the male versus the female, shops tend to sell *C. lala* to you in pairs. The classic 60cm/24" tank should house just one pair of Dwarf gouramis and should be well planted. All the common gouramis and other anabantoids love clutter – places to hide and set up territories.

Water values have become something of a grey area since a lot of shops rely on tapwater, which in many regions has the constitution of liquid concrete. My tapwater in Essex is pH 7.8 and has a hardness of 25-28GH. I have found that *Colsa* species tend to do best when the pH is on the acidic side of neutral, at 6.5 with a relevant hardness, but most shops will have stock that has been acclimatised to tapwater, so check first and if you are going to alter the composition of the water, do it gradually!

Feeding gouramis is problem-free once they become settled in their new surroundings. They will take 'fake' and in general do very well on it. Supplement their diet with as much variety as you can using live and frozen food, but avoid lopsided feeding with any one food.

Bubble-nesting anabantoids do not need aeration in the tank and certainly not the jacuzzis that some pumps produce, but your other fishes may need it, so a compromise is necessary. Tankmates should be of a peaceable disposition though it is often the attitude and demeanour of the gourami that causes problems. There are basically two extremes to its behaviour. It can be a very shy secretive fish that hides away, rarely seen and lives a fairly short and miserable life in the community. Or it becomes a dominant, quarrelsome thug and takes over the whole aquarium! Yes, many will integrate easily and lead straightforward lives, but you need to be aware of the potential for aggression.

### Breeding Dwarf gouramis

This is another area that I get asked most about, and again this is probably the result of past literature suggesting this species as a first time breeding project for the beginner. In actual fact, getting them to spawn is relatively easy, but rearing the fry to adulthood is fraught with problems. For some reason, fry mortality rate in this species is high, and seems, as the enhanced strains come in, to be getting worse.

Male *C. lala*, are one of two gourami species (the other being the Moonlight gourami, *Zichogaster microlepis*) that build a nest, actively incorporating vegetation within its construction. The fry are very tiny and it's possible the plant material in the nest contains many tiny infusorians as the fry's first food. Often a male will build a nest in a community tank, even if a female is not present, usually in one corner of the tank, and all the other fish are not allowed near it. All labyrinthfish are territorial to a greater or lesser degree, and whatever the usual demeanour of your male *C. lala*, when he is in breeding condition, he will become fearless and very aggressive.

Of course spawning in the community aquarium is all well and good but after a few days when the fry become free swimming the male is unable to look after them and they will be viewed by other fish as food, so survival rates within these confines is very slight. You will need to set up a tank specifically to breed them.

Using tank water from the maintenance tank, set the breeding tank up with plants, both floating and pot rooted, and no substrate. Floating plants should be the disposable type like Duckweed, Riccia or *Salvinia*, and try to include feathery leaved plants like Cabomba. Add some pots and pipes, both floating and sunken to allow the female to take refuge from the male if necessary – they can also aid you in removing the fish after spawning. You can filter this tank with an air-operated sponge filter, but have it running very slowly – too much surface movement makes bubble nesting difficult.

Place the female in the tank and leave her to become acclimatised and used to her new surroundings. Feed live foods such as brine shrimp, bloodworm and mosquito larvae.

The female should have a well rounded appearance in her belly and if you don't feed for a while, it should not lessen. It's at this time you can think about adding the male. He will have to court her in her territory – she knows the hiding places in case he becomes too aggressive.

If all the factors are in place, nest building may start within a few hours, or it may take some days before they get going. If they show little or no interest in each other try a cool water change, a few degrees less than the existing water which will gradually heat up, or fast the fish for a couple of days and combine a large feed of live food with the water change.

The male builds a nest by taking in air at the water surface and blowing clouds of tiny bubbles to bind together the plant pieces he has gathered throughout the tank. The nest will look like a little dome jutting out of the water and can take a while to complete. The female is not allowed near it until he's ready to spawn. She pacifies him by nudging him in the flank with her snout. Both fish circle until the male finally cuts his body around the female.

At this stage no eggs are produced and the fish part and the female swims away – it's a kind of dry run where the partners



Join the club interested in Anabantoids? Send an SAE to Mrs C. Clark, Secretary AKGB, 1940 13 Chiltern Crescent, Southborough, Doncaster, South Yorkshire DN7 8PE



are testing each others' breeding potential.

The actual spawning embrace occurs when the male's grip on the female is much tighter and he turns her upside down under the nest. Many glass clear eggs are produced by the female and fertilised by the male as they float up into the nest. The fish part while the male gathers any eggs that are not in the nest and places them there. The spawning continues in the same fashion for as long as it takes for the female to lay all her eggs after which she is driven away by the male. In the wild she would have somewhere to escape but within the confines of a tank it can be quite dangerous for her. Here is where the pipes come in handy – if she hides in one, just remove the whole pipe and place her in a different tank to recover.

The male guards the nest and the resultant fry which hatch out after about 24 hours. Any that fall from

the nest, the male will gather up in his mouth and spit back into it. He continues to maintain the nest until the fry start to free swim. Constant gathering of fry that swim further and further from the nest takes its toll on him and he soon loses interest. At this stage he can be removed.

The fry need copious amounts of infusorians or rotifers as their first food, and maintaining a balance between heavy feeding and not polluting the water is difficult. Similarly, when the fry graduate onto taking brine shrimp nauplii, care should be taken to syphon out any dead and uneaten food. Many fry are lost in these early stages of development, and after a few more days when the labyrinth organ forms. The ultimate goal is to rear fit and well-formed fish, though some deformed ones may survive the early stages. You need to be prepared for this and take whatever action you consider necessary.

#### ABOVE:

This variety of Dwarf gourami is known as 'Peacock'.

#### LEFT:

Dwarf gouramis are usually sold in pairs.

Ask the experts

# Ask the Experts

Got a query or a fishkeeping problem? PFK's expert team of fishkeepers is on hand to help.

You can email your questions to:  
[questions@practicalfishkeeping.co.uk](mailto:questions@practicalfishkeeping.co.uk)

## TROPICAL LETTER OF THE MONTH



THE WINNER OF THE TROPICAL LETTER OF THE MONTH was a TetraTec 1000 internal power filter. A key feature of the TetraTec filters are the discs with which they are maintained. There is no need to remove the entire filter, as all components can be quickly and easily removed in situ. In addition, the flow rate can easily be adjusted, and the direction of the flow can be altered. The 1000 is suitable for tanks up to 200 l.

## What use are these bristles?



The head "tentacles" of male bristlenoses may be used as fry mimics.

**Q** I have been keeping common Bristlenose catfish for about six months and have fallen in love with them. Recently they spawned – but why do only the males have spikes on their noses?

JONATHAN PURDIE, VIA EMAIL

**A** A recent scientific paper has put forward a very plausible explanation for the males' head tentacles. As you know, when these fish spawn, the male in his fantastic head-dress guards the eggs. What perhaps isn't obvious is that a single male will often 'chain reproduce'

with one female after another.

Bristlenoses spawn in caves, and to a female, the sign of a good father is a good-looking cave, filled with a strong-looking big male with a set of fry that look as though they are just about to strike off into the outside world.

However, to avoid exhaustion, males may stop breeding to go and eat for a while.

So, if you've not got fry kicking around in your cave, how do you entice a female? The scientific theory put forward is that the head tentacles not only identify mature males to females, but also mimic fry

in the cave.

As an interesting aside, although many similar types of plec have spines or bristles, those of the Bristlenose are actually floppy when the fish is removed from the water, although these fish do have barb-like spines around their gills, which have given rise to their scientific name, which is Greek for a barbed, hook-like weapon.

By the way, Bristlenose fry are a great way of getting rid of any leftover Brussels sprouts round the festive season!

JILLIAN DIGNALL



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Neil Horsford

## Beautiful – but why so costly?

**Q** I recently bought two flag-tailed prochilodus which are kept in a 180 x 60 x 60cm/6' x 2' x 2' tank with a pair of freshwater stingrays and some peaceful cichlids. Mine are beautiful and peaceful, and seem to eat just about anything, but at £25 a pair they were not exactly cheap. Why are they so rare in the trade?

BONNIE O'GRADY, VIA EMAIL

**A** Senzaprochilodus are beautiful fish that usually get along fine with other species, but they can be problematic if only kept in twos.

You have been lucky with yours. All too often, the slightly larger of the two will pester the life out of the weaker one, resulting in its death. I would recommend keeping three as an absolute minimum.

These fish are always wild-caught and seasonal, and the adults migrate up the mighty Amazon, fighting the rapids in much the same way as our own Atlantic salmon does. This explains why the price is much higher than for, say, Tinfoil barbs, which are mass-produced in fish-farms and much more readily available.

RICHARD HAWKICK

**ABOVE:** Flag-tailed prochilodus are best kept in groups of at least three.

**BELOW:** Angelfish make good community fish most of the time, but some can cause problems when they mature.

## Stick with the top ten

**Q** I have a 120 x 30 x 30cm/48" x 12" x 12" aquarium containing three Rainbowfish, four Congo tetras and two *Botia striata*. Could you suggest some more exotic fish that would mix well with these?

SCOTT SHARLEY, COVENTRY

**A** Any of the popular community species would suit a tank this size – the top 10 are as follows: Neon tetra, Cardinal tetra, Angelfish, Guppy, Molly (but not the Black molly, which is really a brackish-water fish), Platy, Swordtail, Zebra danio, Dwarf gourami and Corydoras (various species).

By definition, these are all compatible, although note that older Angels can sometimes turn nasty.

DAVID FORD



Neil Horsford

## YOUR TROPICAL EXPERTS

Write to us using the form at the end of the Ask the Experts section or email questions@practical-fishkeeping.co.uk and we'll forward your query. Please note we can't offer a quicker service for email queries as every question has to make its way to the 'top of the pile'. Please include a stamped addressed envelope for letters sent by post.

**PLANTS**  
PETER BRACKLEY is our plant expert

**REELS**  
Dr PETER BURGESS is an expert in fish health. He lectures at Plymouth University.

**ROBOTS**  
ROBERT HAWKICK is a smart Aquarist with a huge knowledge of robotic fish.

**LIVERCAVES & SWIMMING**  
JENNIFER BALE is a fish crafter and expert on livercave fish.

**CARPING**  
CHRIS BALDI is a catfish expert and part-time lecturer at Ipswich College.

**LARGE CATFISH**  
SARAH LAYTON is a large cichlid and large species star.

**ANGLERFISH**  
ANDREW SMITH of the Anglerfish Association of Great Britain, is an expert on Anglerfishes.

**WATER QUALITY/GENERAL**  
Dr SHARV MANI, of Water Aquatics, has a vast amount of freshwater knowledge.

**TECHNICAL**  
Dr DAVID FORD has many years of experience.

**SECRETWORLD CATFISH**  
(Secretworld)  
JULIAN DEWILL is the man behind Planet Catfish.com. It's your catfish at his fish.

**RAINBOWFISH**  
Dr NELLE MONKS runs a popular online fish shop HQ.

**RAINBOWFISH, CYPRESS & PANGLOSS**  
PETE COOTTE has 40 years' fishkeeping experience and 25 years on a Dose A show judge for the TDA.



# Ask the experts

## Interloper in a batch of catfish

**Q** A few months ago I bought some Upside-down catfish, and one now looks completely different to the others. It is black, covered in small dark spots, and with large barbels. It hides all day under a large piece of bogwood, and measures 12cm/5" – about twice the length of the others. Could this catfish be *Brachysynodontis batensoda*? If so, I am worried that it will outgrow its 75cm/30" tank.

ROBERT SMITH, SHEFFIELD

**A** From the picture you provided I would suggest that your catfish might be *Synodontis nigrita*, which, as you have found, is a much larger fish than your *S. ziguinensis*. It does not appear to be *B. batensoda*, a fish that I have not seen for a number of years now.

*S. nigrita* can attain a length of 22cm, and is quite often found in shipments of its smaller relative. As a juvenile it even adopts the upside-down habits of the true Upside-down catfish, but later reverts to the normal upright position. It is found in Cameroon, Chad, Egypt, Gambia, Ghana, Guinea, Mali, Niger, Nigeria, Senegal and Sudan, and belongs to the family Mochodidae – generally referred to as 'Squeakers' or 'Upside-down catfishes'.

I would recommend you up the size of your tank to 120 x 45 x 45cm/48" x 18" x 18" if you intend keeping this fish in the long term. Otherwise, ask your local retailer if they would consider taking it back and finding it an alternative home – they should oblige, as they did sell you this fish as *S. nigrita* in the first place.

CHRIS BAILEY

## Leave the salt on the shelf

**Q** Would it benefit my Neon tetras if I added aquarium salt to their water?

**And if so, would this harm my plants and filter, or have any adverse effect on my water chemistry?**

F. LEACH, WANDSWORTH

**A** Adding salt would be of no benefit to your Neons, since these fish originate from water that is soft and contains no salt. Although a low level of salt will not kill them, they may lose colour. Salt is generally used as a tonic for fish such as Guppies, Mollys and goldfish, which like harder water

and can benefit from short-term baths in high salt concentrations, or long-term exposure to low salt concentrations.

Salt will also be detrimental to plant growths, but low concentrations will not harm your filter bacteria. One benefit of salt is its ability to detoxify nitrite, so the only time I would ever use it is if I tested the water and found very high levels of this compound. Apart from that, leave the salt on the shelf, even if your Neons become ill, when you should use an antibacterial or anti-parasite remedy instead.

Normal aquarium salt like API tonic salt does not alter pH, but Aqualinium salt by Interpet will, as it contains a pH buffer.

JEREMY GAY



Forktails are easy to breed, but the fry are extremely tiny.

## Rearing and raising Forktails

**Q** Can you please give me some information on the Forktail rainbowfish? How can I breed them, and what set-up should I use?

NIGEL CHEROULT, MALTA

**A** The Forktail rainbowfish, *Pseudomugil furcata*, is one of the easier 'blue eye' rainbows to keep and breed. They prefer hard water on the alkaline side, and will eat almost anything, although they are especially keen on live foods such as Daphnia and mosquito larvae.

Obtaining eggs is fairly simple, but raising the fry is rather more difficult, due to their size. I keep mine in a bare tank – 30 x 30 x 20cm/12" x 12" x 8" is quite sufficient to hold a male and a couple of females. Add a woollen

mop, as used for spawning killifish, and the *furcata* will soon make themselves at home and start laying eggs. These are quite small, but can be handled with care. I prefer to remove them every day and hatch them in a separate container. They take around 12 days to hatch, and the fry are tiny.

Very fine food such as ZM000 from ZM foods is ideal for them, because it floats on the surface where they feed. After a couple of weeks, they are capable of accepting newly-hatched brine shrimp.

The July 2005 issue of PFK has an article by me on *P. furcata*, and back issues are available. A full account of breeding them can be seen on [www.stroodaquarist.co.uk/content/factsheets/factsheets19.asp](http://www.stroodaquarist.co.uk/content/factsheets/factsheets19.asp)

PETE COTTE



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## Holding on to Zebra plec fry

**Q** I am lucky enough to have had three successful spawnings of my L46 Zebra plecs. However, over the past four months I have lost a few fry and I am anxious to keep fatalities down to a minimum. I currently feed them crushed sinking tablet food before and after lights on/off. I have heard that they need regular meals of high-protein food, and that I should raise the pH to encourage strong bone growth. Yesterday I witnessed my fourth spawning, so have you any useful advice?

RICHARD SHAWDON, VIA EMAIL

**A** First, I'd revise your expectations of growth rate. While Zebra plec fry develop very quickly, and are independent at the age of around 20 days, from then on it takes a long time for them to make progress. After a year they should be 4-5cm/2" long, and they are not sexually mature until the age of three. I have not heard any reports of pH affecting growth rate, despite the fact that Zebras have reproduced under a broad range of conditions from pH 6.2-7.8.



ROBERT HOPKIN

I would suggest you add more frozen food to their diet, and small amounts of quality high-protein food – I use and recommend Tetra Prima, but there are plenty of options out there. Frozen brine shrimp is a good starter, moving on to bloodworm and chopped mussel once the young fish pass the 15mm mark.

Breeders report most success when the young are suspended in a container within the parental tank that allows free throughflow of water. An airstone is added to the container. Transferring fry to

another aquarium in the early days is risky, because it is not easy to match water parameters, whereas restricting them to a small area ensures they find food easily and can eat pretty much all the time. If you use a separate, small aquarium, keeping water quality good is very difficult.

Once your young are up to around 2cm/1", they can be released into a larger tank. Don't even have peaceful tankmates, such as Corydoras, because these will compete with them for food.

JULIAN DIGNALL

**ADVICE:** Zebra plecs are worth breeding, as they are difficult to come by in the shops these days.

**REMARK:** Glass catfish are better kept in groups.

## Glass cats are clearly unhappy

**Q** My two Glass catfish don't seem happy – they hide in the bogwood or among background plants, and their colour changes from clear to a mottled dark brown. They are still eating well, however. I use RO water for weekly part

water changes, and the pH is a constant 7.0.

SIMON ARNOLD, GOCHING-BY-SEA

**A** Your water parameters seem fine, but I am concerned that there may be an underlying problem with other fish bullying

your Glass catfish.

As you are aware, these fish can be quite shy and retiring, and prefer to be kept in shoals, where there is safety in numbers. The dark markings they show in hiding could indicate stress, which is associated with bullying or an underlying water quality problem.

Do you add any buffers when you carry out changes with RO water? I know from personal experience that my aquarium suffers pH crashes unless I add buffers or some tapwater, although you state that your pH is stable. If I had to guess from the information you provide, it would be that your fish are incompatible with their tankmates.

CHRIS RALPH



FRANK CULPIN/ROB



# Ask the experts

The Goldfish Reef / photoscience.co.uk



**ABOVE:** Buenos Aires tetras may nip the fins of other fish.

## Tetras are the likely culprits

**Q** In my 150 L/33 gal. aquarium the main species are four Silver dollars, which share the tank with a Bristlenose cat, two Angels and a shoal of six Buenos Aires tetras.

The fins on the Silver dollars are tatty, although my water checks out OK and I have seen no signs of aggressive behaviour. Any ideas?

SMON FISHER, OKEHAMPTON

**A** I'm afraid the culprits are more than likely the Buenos Aires tetras, *Hyphessobrycon anostzi*. These fish are renowned fin-nippers, though in my experience I haven't found them too bad as long as they are kept in a large enough shoal. The only thing that doesn't make sense is that you say your Angel fish aren't damaged, so it is also possible that the Dollars are nipping each other. If I were you I'd stand a fair distance away from the tank, so as not to distract the fish, and simply wait for the offenders to reveal themselves.

RICHARD HARDWICK



Cardinals are too big to be eaten by young Discus.

The Goldfish Reef / photoscience.co.uk

## Mystery of vanishing fish

**Q** I set up a tank with two 7.5cm/3" Discus and 30 Cardinal tetras. Recently I have been losing Cardinals at an alarming rate. Occasionally I have found a body, but the

rest are unaccounted for – is it possible the Discus have been eating them?

MIKE FOSTER, NAZING

**A** Although it is possible for adult Discus to consume small tetras, I doubt whether yours are big enough to do this. Finding the odd dead Cardinal also suggests that

## Hair algae? Try scrubbing it off

**Q** Rocks and flowerpots in my tank are growing black hair algae. How can I get rid of it?

JAMES FAWCETT, VIA EMAIL

**A** There is no easy method of removing black hair algae. I suggest you take out the rocks and pots and try removing the algae with a Magic Eraser, a sponge-type block, available from Lakeland Plastics. Tesco do a similar one from Sportex. Alternatively, you could use a plastic scouring pad, which is also quite effective as a means of physical removal.

The cause of this algae is always an imbalance of nutrients, and is usually caused by overstocking, overfeeding or insufficient water changes. To improve water quality, change 20% weekly. This should see an end to the hair algae problem.

PETER BRACKLEY

predation isn't the cause of their demise.

So, what could be causing the tetra losses? First, bear in mind that small fish decompose rapidly after death, so often one never discovers the body.

If it were a water quality problem I'd have expected your Discus to be affected, given their sensitivity to adverse conditions. I still think it is worth checking your water parameters – pH, ammonia, nitrite and nitrate – just in case.

It could be that your Cardinals are simply weakened individuals, or are harbouring some disease that doesn't affect Discus. All you can do at this stage is carefully monitor the survivors for any signs of ill health, and let me know if you spot anything suspicious (looking at them through a magnifying glass may help). Don't add any medications or tonics, and don't introduce any new fish, at least for the time being.

PETER BURGESS



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## Techniques for trapping snails

**Q** My community tank is infested with snails, and my two Clown loaches don't seem to be able to keep on top of them. I stripped down the tank and left everything to dry, but within two days the snails were back. They are too small to trap, and I don't catch too many on the pieces of cucumber I put in for my plecs. I don't wish to use chemicals if I can help it – any other suggestions, please?

MARE HALL, VA EMAIL

**A** Snails can carry diseases and parasites, some of which are internal, so do not crush the shells to allow the fish to eat them. Instead, use a baiting technique after dark – for every snail you see, there are 100 more hiding in the gravel.

Place a very small piece of raw liver on a saucer or plate, and place



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another upturned saucer on top, which stops fish eating the bait. The snails smell the meat, crawl all over the saucers and can be collected and discarded the next morning before the lights go on. It will take about a week to trap them all.

Some snails are livebearers, others lay tiny eggs, so it is easy to bring them in via live plants. Some may hatch even after you have cleaned out the aquarium, making it necessary to repeat the baiting a week later. Hopefully, this will get rid of the young snails before they are able to breed.

DAVID FORD



© JEFFREY WATKINS

## This 'whale' is not an option

**Q** I own a 240 l/53 gal. tank which is stocked with Clown loach, a shoal of Congo tetras, Angels and various catfish and gouramis. I change 20-25% of the water every 3-4 weeks. I am interested in adding a Baby whale and an Elephant nose. Would this be a good idea?

PL CLIFLAND, ILL EMAIL

**A** First, I would suggest a water change of 25% weekly. Even the best filtration won't remove nitrates, which need to be kept as

low as possible by regular dilution.

I'm not too sure what you mean by a Baby whale, but if it's what I think it is, then definitely not. There's a species known as the Blue whale catfish, *Cetopsis coecutera*, from Peru which is a parasitic species that hunts in shoals, removing whole body parts from unsuspecting fishes.

Elephant nose species are rather shy fish that require plenty of fresh and frozen foods, and good shelter. Keep either one or three or more for best results.

RICHARD HARRINGTON

## Is this substrate diving normal?

**Q** One of my snakeheads, *Channa gachua*, keeps plunging into the sand substrate of its tank, leaving only its head showing. Is this normal behaviour?

Also, I recently bought a fish labelled 'Golden snakehead'. It looks very much like *C. orientalis*, but with more distinctive patterning along the sides.

Could you tell me what it is, and advise me on the best diet for snakeheads in general?

Mine are kept in a 150 x 38 x 45cm/60" x 15" x 18" tank along with a *Polypterus weeksii*, a Spiny eel, an *Ancistrus*, two adult Hoplo cats and a freshwater Lionfish.

CERIS BERRY, VA EMAIL

**A** Many of the smaller snakehead species bury themselves in the substrate with only their eyes showing. It is a great method of concealment, and allows them to ambush prey.

Your Golden snakehead could be *Channa aurantimaculata*, until recently known as *C. stewarti*.

Offer whole/chopped cockles and mussels, and if the fish need to be stimulated into feeding, try live foods such as earthworms, bloodworms, and mealworms (actually beetle larvae, used to feed reptiles).

Keep an eye on the freshwater Lionfish – these grow to 20cm/8-9", and although they are peaceful towards large tankmates they are fiercely predatory towards anything that will fit into their large mouths.

RICHARD HARRINGTON

**LEFT:** Clown loach aren't as good at eating snails as they are fipped up to be.

**BELOW LEFT:** Blue whale cats are not good community fish, due to their feeding method which involves removing the body parts of other fish!

### STUFF YOU NEED TO KNOW ABOUT...



# Raising your baby fish

**John Rundle** has some essential advice to help you ensure your fry get the food they need... when they need it.

**W**hen breeding fish, without a doubt the most crucial stage is when the larvae first become free-swimming and need to find an external food source. The size of the fry and the number in the brood can both affect the fishkeeper's chances of success.

In the wild this is governed by natural factors – there would be plenty of food around for the fry and there would be plenty of space for large broods of fish and natural reduction by predators.

In the aquarium, to be successful with rearing fry we need to:

- Supply food of the correct size
- Supply food in the correct quantity
- Supply quality food that will promote growth
- Supply enough space for the brood to grow
- Be prepared to cull any runts in the brood

Over the years, through work and the hobby, I have bred some strange marine and freshwater aquatic animals ranging from molluscs through to crustaceans and fish.

The resulting progeny when first born have varied in size from just a few micron to a few millimetres in length.

In terms of feeding, fish larvae could almost be described as separate species when compared to their adult counterparts – the larvae, after hatching from the egg, are so small and poorly developed that their feeding ecology is vastly different from what the species practices during the rest of its life. So, special attention must be given to the way that young fish search, find and ingest their food.



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### Growth stages of a fish

#### ● Larval period

There are two distinct periods in the larval period:

#### ● The yolk sac period

This is when the larvae first hatch and carry their own food supply in the form of energy rich yolk.

#### ● The larval stage

This is when the yolk sac has been absorbed and before metamorphosis into the juvenile stage. It is also the point when the fish we are looking at become 'free swimming'. Their food source now is exogenous.

#### ● End of the larval period

This can be best described in terms of a metamorphosis – the transition from the larval appearance to the time when the small fish takes on the characteristics of the juvenile. Some of the changes are:

- Yolk sac resorbs
- Paired fins develops
- Muscles are defined and active
- Juvenile period

The juvenile period begins when the organ systems are fully formed, or nearly so. Juveniles are recognisable by the presence of fully formed fins and have the appearance of miniature adults, although they may not have the distinctive adult colour patterns.

The juvenile period lasts until the gonads become mature and is usually the period of most rapid growth in the life of a fish.

#### ● Adult period

Once the gonads are mature a fish can be classed as an adult. The onset of this period is reflected in spawning behaviour and often in the development of reproductive structures and colour patterns.

### Getting it right

So how can we raise broods of barbs, danios, rasboras and tetras from the minute yolk sac larvae to the adult stage? This is the tried and tested method I have used to enable me to raise thousands of fish over the years.

#### Yolk sac larvae

I breed the vast majority of these in bare tanks (that is in a situation where there is no gravel substrate, making it quite a clinical set up). At this stage the larvae are not taking an external source of food – they are feeding on the rich yolk sac that can be clearly seen on the tiny larvae by using a magnifying glass.

You can actually lose the brood at this stage if you place any source of food into the tank – dry foods, and live foods such as brineshrimp that will die, will pollute the water. It is also not the time to feed an infusion type food.

#### Free-swimming larvae

This is the time when we see the still tiny larvae moving through the water of their own accord,

swimming in darting motions either near the surface or in midwater. It is also the time when they are able to take external sources of food.

This is a particularly critical period in the life of the young fish, a time when there must be an adequate amount of food of the correct size and quality.

It has been proven that the vision of this type of larvae is poor. Despite the general excellence of vision in mature fish, that of the offspring is distinctly inferior. This handicap is probably one of the reasons why fish breed in considerable numbers, given the probability that so few survive.

The often transparent bodies of the larvae cannot shield the nervous system from light, so that, while their powers of image formation are limited, they respond like plants to light that strikes their bodies and use other senses to find their food.

In fact, we have to make sure that there is enough food in the correct density and size for it to flow easily into the mouth of the free-swimming larvae.

We have a few options for the first feed:

- A cultured minute live infusion food that has always gone under the general name of 'infusoria'. I have cultured this source of food for years using fresh powdered milk. (see reference panel below)
- I have in the past few years been using a very fine powdered dry food supplied by ZM foods. This

has proved very successful for certain species of danios, barbs and a few tetras. If fed carefully the food floats on the surface of the water and the free-swimming larvae seem to sense the food and feed.

- Recently I have started culturing vinegar eels (*Turbatrix* spp.). They are about 2mm in length and swim in midwater – they will stay alive until eaten by the larvae.

When the larvae have been fed correctly on one or more of these foods for a few days the 'fry', as I will now call them, should be able to take larger foods such as live brineshrimp naupli or a large grade powdered dry food. Once at this stage the problems should be behind you and the fry will move on to the juvenile and adult stage.

**Spawning**  
Fish such as danios, barbs, rasboras and tetras can be prolific breeders and just one pair will produce hundreds of eggs. If you are successful in raising the brood, then a fair amount of tank space will be required and you must only keep and raise the fish that you have space for. All nuts and deformed fish should be culled and if you still have too many fish for your tank space, why not pass some on to friends?

#### LETT

Baby  
Euboscistis.

#### BALLOON

Portonville  
mean fry.



The GoodLife-Baby / Photomicro.org.uk

#### REFERENCES

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- **Biology of Fishes** by G. Barak, N. E. Marshall and J. R. S. Baxter
- **Breeding Egglayers** by John Rundle
- **Live Foods for Aquarium Fishes** by John Rundle

## CICHLID LETTER OF THE MONTH



THE BENDER OF THE MONTH LETTER OF THE MONTH wins a TetraTest Laboratory kit, containing tests for nitrite, pH, GH, KH and CO2.

### They don't get on...

**Q** I set up an 80 L/18 gal. hexagonal tank to try and breed a pair of Convicts, but the male has knocked ten bells out of the female and I am worried about her.

**I have another, 170 L/37 gal. tank containing a pair of Convicts, Rainbow cichlids, Firemouths and Blue acaras – should I move the female into that?**

KEVIN TELFORD, VIA EMAIL

**A** You have found out the hard way that a male and a female cichlid do not necessarily make up a pair. The two Convicts in your larger tank are a pair that have formed naturally in a situation where they had plenty of room to keep away from one another, so the female didn't suffer during the period when she wasn't yet ripe with eggs and hence not ready to pair.

In your other tank you have forced the issue by making the male-chose yourself, and the situation is made worse in that a hexagonal tank offers little length for the female to get away from the male. Odd-shaped tanks are not good for cichlids, the ideal home being a tank at least twice as long as it is wide/deep, with a gap in the middle where you can insert a divider.

Moving either Convict from the hexagon to the other tank is not an option, as the about-to-breed pair will not take kindly to the invasion of their privacy and will attack, and probably kill, the invader. Assuming the (hexagon) female is smaller than the male, the obvious solution is a selection of caves that she can get into but he can't – pieces of plastic pipe might do the trick, or flowerpots with a limited-size 'door' rapped out of the rim with pliers.

Under normal circumstances, it would be better to remove the male to a separate tank and allow the female to settle in peace before reuniting them. If you remove the victim, she will be attacked even more vigorously when returned to the original tank, as she will be regarded as an intruder.

On the same principle, if trying to make a pair out of two cichlids without the use of a divider, put the smaller/weaker one into the tank a day or two before the other, to compensate for the existing disadvantage.

For future reference, forget the hexagon for cichlids and use it instead for small, non-territorial fishes, or as a quarantine/hospital tank. A normal rectangular tank is a bit like a small room, a hexagon more like a phone booth in terms of opportunities to move and behave naturally.



### Vary the diet

**Q** What are the dietary needs of mbuna?

KEITH BURDETT, VIA EMAIL

**A** *Labretropheus*, *Misuloclinia* and most *Pseudotropheus* species are algae-feeders, which get a fair amount of 'meat' from

organisms in the biocover. Some *Labretropheus* ditto, but others are invertebrate pickers that don't eat many greens. *Cynochilaps* actually feed on zooplankton, and *Melanochromis* are also more carnivorous, sometimes taking fry.

The nominal herbivores will usually pick out 'meat' and leave 'greens', given the chance, so feed

them greens when they are hungry, then the meaty foods when they've had some greenery. And then the non-herbivores can eat, too.

For greens, you can use spirulina foods and/or blanched spinach or lettuce, cooked peas, slices of cucumber or courgette, and blanketweed if you know someone with a pond.

For meat feeds, you ideally need live bloodworm and *Daphnia*, or their frozen equivalent (never Tubifex), earthworms, whiteworms, chopped shrimp, prawns and mussels. Avoid animal/poultry meats, which can cause serious, sometimes fatal, problems. It is okay to feed some dried foods, but not too much – mbuna fed mainly dried foods are prone to Mlwiwi float.

Another useful food in moderation is cod roe. Whatever you give your mbuna, don't overfeed. The objective should be a fairly flat profile between ventral and anal fins, but not a hollow or a portly belly. If you find nitrate rises faster than regular partial water changes can reduce it, that is a sign of overfeeding.



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## They'll compete for limited space

**Q** I intend setting up a 120 x 50 x 60cm/48" x 20" x 24" tank for cichlids and catfish, and have the following possibilities in mind – two Firemouths, two Blue acaras, a Severum, a Convict and possibly an Uaru – although I suspect that fish would grow too large. I already have two *Pimelodus pictus* catfish and was thinking of including Tiger barbs to act as dither fish. What are your views on this proposed mix?

ALASTAIR GOODIN, VIA EMAIL

**A** Here we have a mix of hard water and soft water cichlids, though if you keep them all in hard water the soft water fish (the Severum) will survive. The real problem is one of compatibility. Even if you have only a single fish of a species, they are still likely to be



Uaru can reach 25cm/10" in size.

By M. Bailey

territorial (they don't know a mate won't come along at any minute). Two Firemouths, if both male, will require half the tank apiece, as will two male Blue acaras and the Convict so that's five cichlids all competing for two territories. Females may prove almost as bad. A fully-grown Severum can reach 30cm/12" and would want all the tank. Uaru are out for the same reason.

I suggest you go for two of

the three smaller species, either singly or in pairs. Or you could probably squeeze in one Acara, one Firemouth and one Convict.

*Pimelodus pictus* cats are not armoured, and so are defenceless against the biting of territorial cichlids, and please forget the Tiger barbs. They, too, would be harassed and stressed, and you do not need dither fish for large, outgoing cichlids – only for timid dwarfs that are on everyone else's menu.

## FACTFILE

### *Astronotus trifasciatus*

**Common name:** usually known by the specific name *trifasciatus* or "trifasc" for short.

**Size:** Males to 6cm (2 1/2"), females to 3cm (1 1/2"), maximum TL.

**Distribution:** Southern Brazil, eastern Bolivia, Paraguay, and the extreme north of Argentina.

**Habitat:** Small shallow pools/streams in woodland or savannah, with leaf litter, dead wood, and usually dense aquatic and marginal vegetation.

**Aquarium:** 80 x 30 x 30cm/24" x 12" x 12" for a mated pair, or can be kept as a harem (male + 2-5 females) in a 60cm/58" or larger. Requires lots of cover – plants and bogwood, plus oaks. Fine substrate. Moderate lighting. Include dither fish (eg. small tetras).

**Water parameters:** Soft with a pH of 6.5-7.5 in nature. This species can be kept/bred in hard alkaline water but males then tend to have less splendid dorsal fins.

**Temperature:** 24-26°C/76-80°F.

**Diet:** Carnivorous aquatic invertebrates. Usually offer live/brown foods (not live Tubifex), but will usually take flakes.

**Sexing:** Males are much larger, and have quite different coloration to females – metallic blue as opposed to pale silvery gold with black markings.

**Breeding:** Each female requires a territory 30-38cm/12-15" in diameter, centred on a low-lying log with a small entrance. Inverted clay plant pot (straw) trays with a V-trick in the rim are ideal. The fry can take Artemia nauplii as first food.

**Similar species:** Other species with similar coloration and finnage, but no other known species has the characteristic small, starting black stripe on the belly.

**Notes:** The aquarium population of the species is probably based entirely on imports from decades ago, which are now "aquarium hardy". Wild fish from southerly latitudes may require lower temperatures and an even cooler "winter" period.



By M. Bailey

## YOUR CICHLID EXPERT

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## MARY BAILEY

is the foremost cichlid writer in the UK and a long-term monthly contributor to PFK.



## COLDWATER LETTER OF THE MONTH



**THE CHOICE OF THE COLDWATER LETTER OF THE MONTH** wins a Tetra® W801 internal power filter for tanks up to 150L. Tetra® W801 filters work biologically and mechanically to remove dissolved ammonia and solid waste. They are easy to maintain, the flow rate can be adjusted and the direction of the flow altered.

## Two views on Koi pond pumps

**Q** I am building a 6800 l/1500 gal. Koi pond which will be gravity fed via a bottom drain to a Cloverleaf 2 filter. What is the most economical (but reliable) external pump to return the water from filter to pond? I have heard central heating pumps may be used. If so, what size/model do you recommend, and what do you estimate the annual running costs to be?

HUGH CASTLE, HAYWARDS HEATH

### Answer 1

**A** Most Koi keepers aim for a turnover of around half their pond volume per hour, which would indicate a pump that can circulate at least 750 gph in real life. As your pond is on the small size, you may wish to up this turnover rate, especially in summer, but not above 1,000 gph, otherwise you may jeopardise the efficient settlement of waste in the filter chamber.

Because the filter is gravity fed, and moving clean water, you could choose a pump with a high-efficiency 'closed' impeller. In most cases you would be best to note the pump's rated output at a 1m head or more to

get the most realistic idea of what flow you might obtain. If you are pumping to a high waterfall or through a venturi, you will require some extra pressure.

Pond pumps are generally a better choice than central heating pumps, as they are designed and guaranteed for this purpose, made from non-corrosive materials, and usually supplied with good strainers to prevent dirt being drawn into the impeller. Although you could mount your pump externally, my advice would be to use a submersible pump with a strainer cage, sunk underneath the media in the final chamber. This will provide cooling from the surrounding water and give the pump some protection from frost.

Models you may wish to consider include the Dase Neptune 5000, Aquamax 6000, Aquamax Eco 6000, Hazelock Cascade 5500 and Red Devil 6500.

Electricity prices are now typically around 9p per unit. As a guide, a 100W pump run continuously will cost £1.51 per week to run, or £78.84 per year. Bear that in mind when choosing a pump,



as a more expensive model may eventually recoup its purchase price due to lower running expenses.

JAMES ALLISON

### Answer 2

**A** I can see nothing wrong with using a central heating pump if your budget is tight. They may not be designed for ponds, but their reliability in the usual domestic situation is legendary.

They are not, however, good for pumping to a head, and the commonest Grundfos model has a cast iron impeller chamber which will eventually rust. This drawback can be overcome by fitting an Aquatum conversion kit costing around £20.

The pump will need to be mounted externally (nine feeds a PVC, and the pipework returns through the pond wall). You do need to keep an eye on the impeller, though, as it is very prone to blockage. My Grundfos has three flow settings, the highest 900 gph. This option is very useful, as the flow rate can be reduced in winter, just to keep the filter ticking over.

I actually run two pumps, the other one being a submersible placed in the final filter chamber as James Allison suggests. For the record, it's an Amphibious, and has given me 10 years of uninterrupted service.

NICK FLETCHER

## You must catch this Koi!

**Q** One of the Koi in my pond appears to be growing a beard. The growth is white, presumably some sort of fungus, but there is no sign of fungus anywhere else.

The fish seems fine in itself, but I can't catch it for closer examination.

FRANZETTA, LUDLOWVALE

**A** If you are only viewing the fish from above, it is quite possible the fungus has spread over the abdomen and you merely haven't noticed it yet.

Fungus is usually a secondary problem following an injury that breaks the mucus layer or the epidermis, and it requires urgent treatment, otherwise it will eventually spread into the body tissues and kill the Koi.

You must catch this fish in order to treat it. I recommend you buy

a shallow pan net with a handle as long or longer as the greatest dimension of the pond, and a floating basket, and keep trying. A friend with a second net to steer the fish into yours would probably help matters.

As only one fish is affected, it will require treatment away from the pond. A bath in a proprietary anti-fungal remedy is the usual course of action.

NICK FLETCHER



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## Saving those spring tadpoles

**Q** My 5450 L/1200 gal. pond has a box filter fed by a solids-handling pump. Last spring, for the first time, frogs arrived and spawned, but most of the spawn was sucked into the pump and destroyed.

I don't want to turn off the filter this spring, for the sake of my fish. Is there any way I can keep it running and still save the frogspawn and any tadpoles that may appear?

MRS T. WIGGINS, ROMSEY

**A** If you have one, you could substitute a pump with a cage strainer for the solids handler for the duration of spawning. The pond would need more regular maintenance to keep it clear of debris, however.

Another solution would be to obtain a white plastic bucket, drill a series of 1 cm holes around the base to allow water in, drop the pump inside and then screen off the top of the bucket with fine plastic mesh (an onion bag would do).

Again, you would need to

Try to make your garden pond as wildlife-friendly as possible.

remove rather more debris than usual manually, or with a vacuum.

Leave the bucket in place until the tadpoles have hatched and begun swimming strongly. Then revert to having the solids-handling pump running unobstructed. **NICK FLETCHER**

Photo: Steve

## What causes this high pH?

**Q** I recently built a concrete pond, sealed with Blagdon Poolglaze (I followed the instructions to the letter). A week after filling, the pH was 9.5. I assume this is due to lime leaching from the concrete – if so, will this situation continue? The water is obviously too alkaline for fish at the moment. Would a coating of bitumen stop the leaching? How

were concrete pools sealed against leaching when sealing compounds were not available?

BRIAN TAYLOR, OREHAMPTON

**A** First thing to do is double-check the pH, as it is possible your test kit is giving you a false reading. A digital pH meter, properly calibrated, is the most reliable indicator; some colour comparison chemical tests lose accuracy after their use-by date.

You don't say whether you've installed a filter and set it running with a bacterial starter. If so, it is quite natural for the pH to rise in

the first few weeks, and it should settle down eventually.

Did you fill and empty the pond after you built it? You should always drain and refill a new pond at least once, because however careful you are it is possible that some residue of mortar may have found its way in, if not from the pond itself, then from the mix used to bed in any paving surrounds, or coping slabs in the case of a part-raised pond.

I would not advise coating the pond with bitumen, not least because this would give the walls and floor a rough texture and give blanketweed a head start. If you do have to apply another coating, black G4 would be my choice (it has to be applied to a dry surface, ideally of Fibromax render).

Historically, I think builders of concrete ponds simply drained and refilled them several times until leaching ceased, although I seem to recall that singlass may have been used as a primitive form of sealant, and acid added to neutralise a high pH (not recommended!). Can older PFK readers confirm this?

**NICK FLETCHER**



Mortar residue can find its way into the pond from paving surrounds or coping slabs, making the water very alkaline.

## YOUR COLDWATER EXPERTS

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### PHONE

01223 326000

### ASK

**NICK FLETCHER**

answers your general pond queries and fish-keeping questions.

### PHONE

01223 326000

### ASK

**JAMES ALISON**

is our pond-building and aquatic plant expert.

### PHONE

01223 326000

### ASK

**Dr PETER WARDLASS**

is an expert on fish health and coldwater fishes.

### PHONE

01223 326000

### ASK

**Dr JOE SMART**

professor of genetics at Southampton University is a world authority on goldfish breeding and genetics.



# Ask the experts

## MARINE LETTER OF THE MONTH



**THE SERVICE OF THE MONTH LETTER OF THE MONTH** wins a Tetra Nitrate test kit. High nitrate levels in a marine aquarium can severely affect the health of both fish and invertebrates – levels below 10ppm/L are most recommended. Tetra's Nitrate test kit will do 45 tests and is suitable for freshwater and marine use.

### TIP

**Skimmers** – skimmers need regular maintenance. Areas where the foam rises up to the collection cup need regular cleaning, as the fatty organic material that builds up can inhibit proper foam formation. Getting a good supply of air into the skimmer is also vital. In ammonia skimmers the airstones or diffusers should be changed regularly. Wet-dry skimmers need their wet-dry cleaning. Air inlet pipes in need-to-whirl (aspirator) and vertical types should be checked for development of salt crystals at the point where air and water meet and cleaned if necessary.

## Setting up on a budget

**Q** I recently rescued an old Seabray aquarium (120 x 50 x 60cm/48" x 20" x 24") along with a Fluval 304, fluorescent lighting and airpump. As I am working on a budget, and can afford only token amounts of living rock initially, could I set this tank up for fish only with the existing equipment plus a skimmer, using RO water?

**Would reverse-flow undergravel filtration be practical while I slowly add living rock, and how deep should a live sand bed be?**

I am an electrician, so metal halide lighting would be available, but I am concerned that the requirement for an open-topped tank would lead to chilling in the winter, as the

tank will be sited in a shed.

DAVE BATES, UK EMAIL

**A** I wouldn't bother with reverse-flow filtration, especially if you are planning to use a live sand bed. What you can do if you need to add living rock gradually to the system is pack the Fluval with biological media, such as Biohome, and let this do the interim work.

You need to be sure that any living rock you add is completely 'cured' or 'seeded'. If there is any decaying matter on or in it, you risk an ammonia spike which will probably kill the fish. Once you have as much rock as you need, you can remove the bio-media from the filter canister and let the living rock take over.

The depth of sand you need

depends on its grain size: about 3cm of sugar-fine sand, but for anything with a grain size of 2-4mm a depth of 6-8cm would be better.

It's a myth you have to have an open-topped tank for metal halide lighting. Doing this is fine if you live in a climate with very dry air, or have air-conditioning, but otherwise you can end up with a very humid room and condensate running down the walls. There's no problem at all in using cover glasses with metal halides, and in most circumstances it's best to do so.

Fluorescent tubes do give you the option of putting a hood over the top, though, which may help a bit in a cold shed – but the extra heat from metal halides might even be an advantage in this situation.

PHILIP HUNT

## Stocking needs a total rethink

**Q** I am setting up a 100 x 50 x 50 cm/40" x 20" x 20" reef tank into which I would like to stock a pair of Common clowns (with anemone), a Regal tang, a Yellow tang, a Long-nosed hawkfish, a Copperband butterfly, a Wimplefish, a starfish, Cleaner and Blood shrimps, hermit crabs and snails.

**Are there any corals which don't need intense lighting and could you advise me if there are any T5 tubes**

available for the Akva-Stabil canopy?

N. STEVENS, BISHOP AUCKLAND

**A** You could try Mushroom anemones and Bubble corals – these all do well under less than intense lighting. But forget the anemone. You need far stronger lighting, and your clowns will be quite happy without one.

I think your fish list needs a rethink. Copperband butterflies are actually quite difficult to keep, and both of the tangs and the Wimplefish get too big for a 100cm/40" tank. You might get away with the Yellow tang, but personally I wouldn't be happy with a fish that grows to 15cm/6". Total stocking capacity is about

70cm/28", and your wish list considerably exceeds this.

The clowns and hawkfish would be fine, but the Long-nose hawkfish can be a threat to shrimps – though only if it is a particularly large specimen in with very small shrimps.

As for T5 lights, if you can find some with a remote ballast (starter unit), like ordinary T8 fluorescents, these should fit under your reflectors.

Unfortunately most of the T5 lighting around has these tubes fitting into the ballast unit, and the whole thing going into the aquarium hood.

PHILIP HUNT



Long-nosed hawkfish may eat small shrimps.



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Aiptasia can reach plague proportions if left unchecked.

## A solution to Aiptasia

**Q** I have found an Aiptasia anemone in my marine tank. How do I get rid of it without moving the rocks, as this one is attached to the bottom of the stack.

**Will any fish or crabs eat these pests?**

JOHN CAPLAN, EDINBURGH

**A** The animal you need is the Peppermint shrimp, *Stomatopoda*. This species eats Aiptasia without damaging other inverts and is straightforward to keep, but they do require very slow, careful introduction to the aquarium because they are very sensitive to changes in salinity. They feed on detritus, leftover fish food and so on, once they have disposed of the Aiptasia. You can keep two or more together, as they are quite peaceful animals. **PHILIP HUNT**

## Lower SG to cure whitespot

**Q** I have been treating my Copperband butterfly fish for low-level whitespot, using an invert-safe remedy. But the fish never quite seem to shake it off fully, and now I have noticed that my Star polyps are failing to open properly.

**Are the two problems connected, and what can I do about them?**

BLAIR FARBER, VEE

**A** It wouldn't surprise me if the treatment you have been using is damaging your Star polyps. I have yet to see a whitespot remedy that is both effective and completely harmless to all invertebrates, although in my experience most corals will be fine – it is only the odd one or two species that seem to suffer.

To tackle both your problems I'd recommend the low-salinity regime. You need to reduce salinity in the main tank, over two or three days, to 1.014-1.015 – your inverts should tolerate this. Do this by carrying out

partial water changes, but without adding any salt to the top-up water. As you do so, keep a check on the alkalinity of the water, and use a buffer additive to maintain it at around 2.8 mEq/L per litre. Once you're down to the required SG, check alkalinity weekly and add

buffer as necessary. Stay with this for at least six weeks after the last fish becomes clear of spots, then adjust salinity back to normal by reversing the process, using top-up water at an SG of around 1.030, over two days.

**PHILIP HUNT**



Copperband butterfly.

### YOUR MARINE EXPERTS

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#### GENERAL HELP

**PHILIP HUNT** is a UK marine biologist who has shared his experience with PFK readers for 10 years.

#### GENERAL ADVICE

**SPRING** is a UK marine expert. He's written several books on reefkeeping and marine invertebrates.

#### GENERAL BIRD

**DOUG GOSWOLD**, USA reef expert, is best known for his study of pleurox and living sand filters.

#### REEF AQUARIUM

**TIM RAYE** runs Midland Reefs. He has bred a number of marine fish and propagated many coral species.

#### GENERAL REEF

**KEVIN DAVIES** of Japan Media has been keeping marine for over 20 years. He has kept a wide range of fish and invertebrates and has been successful with some of the more difficult species.

## EQUIPMENT LETTER OF THE MONTH



THE EQUIPMENT LETTER OF THE MONTH goes to Tetra's pH test kit. The pH is a measure of how acidic aquarium water is. Fish do not like fluctuating pH levels, and some need to be kept at specific pH levels. Each kit contains 30 tests.

## Which is better, RO or deioniser?

**Q** What difference is there in water quality as a result of using an RO unit or a deioniser for a marine set-up? I have had conflicting advice which has left me baffled.

GARRY TAYLOR, WOODPORT

**A** Few aquarists now use deionisers, most opting for an RO unit. These offer low maintenance and good water quality with minimal running costs.

An RO unit with a good quality membrane will remove around 95% of nitrate, phosphate and other pollutants, as well as hardness-causing agents.

However, it produces water relatively slowly and wastes around 80% of the tapwater going through it. In other words, for every five gallons put through, only one gallon of purified water will be produced. However, the membrane will only need replacing every few years, and the prefilter(s) every six months.

A deioniser should remove 100% of pollutants from tapwater with no waste. However, in hard water areas the resin will need frequent recharging. In true deionisers, this

is normally done with concentrated hydrochloric acid.

This cannot be obtained without some interrogation by the seller, and it requires extreme caution in handling. Disposal is also difficult: it must not be put into the sewerage system and should be neutralised with caustic soda, another nasty chemical.

Some types of deioniser use a disposable resin, but this will require frequent replacement, especially if the water is hard and contains high concentrations of undesirable substances.

If you are looking for the ultimate in pure water I would suggest you use a reverse osmosis unit to remove the majority of impurities. On the outlet where the purified water flows out you could install a deioniser pod – this will remove the remainder of contaminants,

**RO units offer low maintenance and good water quality.**



but because relatively clean water is being passed through it, the unit should last for ages. This set-up gives you the best of both worlds. Some RO units available have a deioniser pod built in.

JASON SCOTT

## Getting rid of fine particles

**Q** I have a 98 x 30 x 38cm/39" x 12" x 15" tank filtered by a Fluval 304. My problem is that particles are still floating around in the water – I would have expected to see a definite stream of fine solids being drawn into the filter, but this does not seem to happen.

MURRYN WICKEL, RENDING

**A** It is a common misconception to expect the intake of a filter to be visibly drawing particles towards it. The suction will only draw them in when they are within a few inches of the strainer.

The filter outflow has far more force.

This should keep particles in suspension, so that the intake will eventually pull them in.

I don't think you need another filter, as the 304 is more than adequate for your size of tank. It may be that you are cleaning yours too frequently! Up to a point, dirty filters work more efficiently than clean ones, the reason being that when particles are trapped they, in turn, trap more particles – the snowball effect results in clear water.

Clean only two sponges at a time, alternating them so that some are left 'dirty' until the next maintenance session. Clean biological media in waste aquarium water, not tapwater, to

preserve beneficial bacteria.

You could try removing media from one container and replacing it with flow.

This will catch smaller particles than the sponges in the vertical holders.

You could also try one of the available flocculants. These clog tiny particles together, so they are large enough to be trapped by your mechanical media.

There are two ways to clean out sediment that accumulates around plants – first, try wafting your hand in the vicinity to put it into suspension so your filter can deal with it, and second, use a syphon pipe to suck out the waste while doing a water change.

JASON SCOTT



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## Too warm for comfort

**Q** What's the best way to heat my fish-house? I have a 1500W oil radiator and a 17.5cm/7" fan to circulate air. The building is well insulated, but the top tanks are about 4°C warmer than the bottom ones. Do I need a more powerful fan?

PETER HOLT, VIA EMAIL

**A** In my fish-house, the top tanks were always a few degrees warmer than those near the floor, so I used the top ones for breeding and growing fry, or keeping fish that liked warmer temperatures, like Discus and Samese fighters.

Good air circulation will reduce the temperature difference, but I don't think your fan is big enough. Try a larger one, position it high up and point it down at a 45° angle. Fans sold primarily in summer for domestic use tend to be powerful and inexpensive. **JASON SCOTT**



Discus are happy at higher temperatures.

### YOUR EQUIPMENT EXPERT

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Aquarium technology expert

**JASON SCOTT** of The Water Zoo is on hand to answer your questions on equipment.



## Why did our tank explode?

**Q** On Christmas eve my wife and I were watching TV when our 290 L/64 gal. tank suddenly exploded, throwing out potentially lethal shards of glass. We are still in complete shock as to why this happened. Any thoughts? The tank was second-hand, but in pristine condition when we bought it.

D. COOMASER, STOTINGBOURNE

**A** An aquarium breaking with such ferocity is a very unusual occurrence, and should not put you off replacing it. Acrylic tanks are available, and although more expensive they are approximately six times stronger than glass.

I can make a few suggestions as to why your tank failed. The glass could have been struck at some stage in its life, weakening it. As the aquarium was bought second-hand, this scenario cannot be ruled out.

It is always advisable to ensure that the tank and its cabinet are

not twisting, and are sitting level. Polystyrene tiles can compensate only to a degree.

I'm sure you would have noticed this, but reinforcing straps may have become detached. These straps enable the aquarium to be made of thinner glass, and without them a tank can bow out alarmingly, or simply fail.

Finally (highly unlikely, and I have never heard of it happening in this country!) an earthquake can have catastrophic effects on glass aquariums. **JASON SCOTT**



It is highly unusual for an aquarium to 'explode'.

# The. **magic** **dragon**



## Should you pay "silly money" for the Asian arowana?

**Richard Hardwick** of Wharf Aquatics can help you make up your mind...

**T**he Chinese call the Asian arowana, *Scleropages formosus*, the Dragon fish and they're supposed to bring luck and prosperity to all that keep them. These days fishkeepers in the west have developed an eye for these majestic fish and are willing to pay what some would describe as silly money for a perfect specimen.

Over the years, I've kept all species of arowana but this is my favourite by far; it's beautifully proportioned, has huge individual scales, a deep strongly-built body and a steady disposition.

### Size and colour

Asian arowanas generally grow to around the 60-65cm/24-26" mark in captivity though this is exceeded easily in the wild. A 60cm/24" specimen will require at the very least an aquarium of

75cm/30" front to back, and a length of 210cm/84". A height of 60cm/24" or above will be fine.

After many years of captive breeding there are numerous colour strains available, all based on the basic three colour morphs – red, gold, and green – with combinations and variations giving different intensities of colour. These are not only the most variable of arowanas, they are also the most expensive to buy. The cheapest are the greens – widespread across much of Asia – followed by yellow tails from Kalimantan in Indonesia.

The red tail gold comes from Sumatra, Indonesia, and though not cheap is usually affordable. If you can't afford a good quality red, always pick a redtail gold.

Don't fall into the trap of paying the earth for a fish that's just labelled red; there's red and there's super red from Kalimantan, and the two are a world apart where quality is concerned. For instance, a red will never look like that blood red fish you saw in a book, whereas a super red, though a slow developer, will reach full colour in

insatiable appetite for something different. There are also genetic modifications such as the spoon headed, short-coupled bodied types that look disgusting. Why would anyone want to change something with such natural beauty?

### Aquarium care

Arowanas are generally hardy fish, which live long, healthy lives providing they get the proper care. Dragon fish jump far less than other species of arowana but it still pays to fit tight, strong aquarium covers. Otherwise, these fish are surprisingly easy to raise.

Good water quality is a must though the chemistry of the water is less important – pH and GH are not a problem, so long as it's not extreme. I keep mine at a pH of 7.2 to 7.5, GH 12.

Temperature is more important, and needs to be between 26-29C/79-84F. Sudden drops in temperature can cause gill curl.

You should also avoid undersized aquaria and high nitrate levels

which can have similar effects.

Even when healthy, these fish sometimes develop a strange droopy eye condition that doesn't bother them at all, but can worry the owner – particularly if they have paid a small fortune for it. It's been suggested that it's a fault brought on by the fish feeding off the bottom, which causes the eye to be trained to look down, rather than up or straight forward. Personally I don't believe this because it would be a slow, progressive tilt, and I've seen this condition occur with one of my own Asian arowanas in less than 24 hours.

The condition rarely affects both eyes, but I have never known any eye to correct itself.

Dragon fish can be kept with other species, providing they are purchased at a small size and introduced to similar sized tank mates from the start. Even then the occasional one will turn out to be a rogue and must be kept on its own as it matures. They can be kept together with their own species, but several individuals will need to be kept, as pairs seldom work.

To keep a quality group

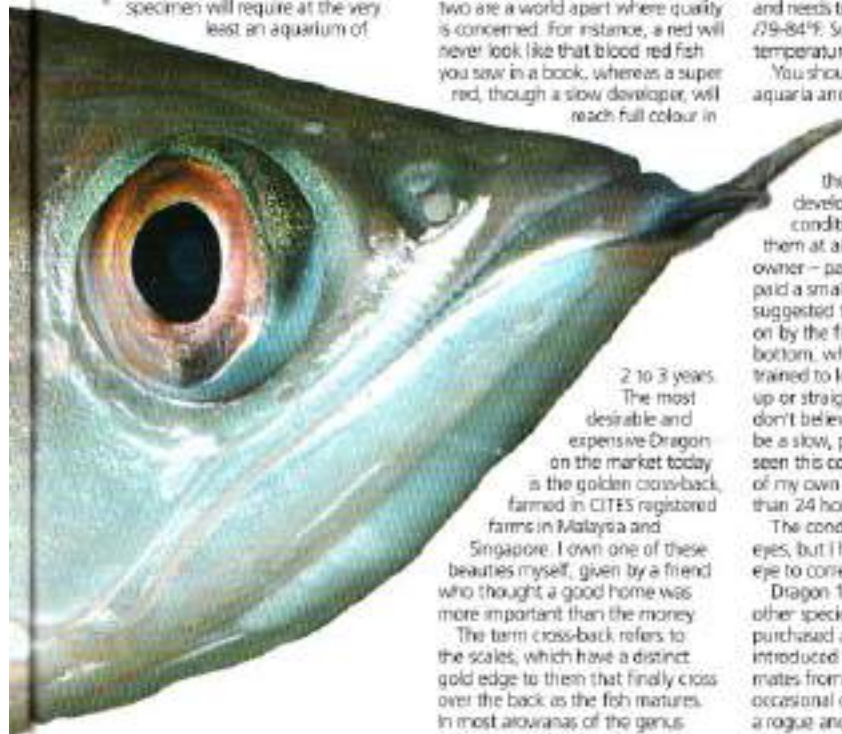
### LEFT

Dragon fish sell for large sums and are meant to bring luck to their owners.

### CITES restrictions

This species of arowana is protected by CITES due to over-collection from the wild in the 1970s. The problem has now been addressed by captive breeding projects. Once a CITES Appendix I species, it's now CITES Appendix II. All creatures that come under CITES Appendix I are given an identity tag to prove they are legal via an injection to the muscle that stays with the receiver for life. This is accompanied by a certificate that must pass to any new owner at the time of sale. Good Asian arowanas reach about 10cm/4" they are anaesthetised and a microchip is injected into the left-hand side of the dorsal muscle or around the operculum. Once the fish is placed in water it quickly resumes consciousness and is no worse for the experience.

Neil Reynolds



2 to 3 years.

The most desirable and expensive Dragon on the market today is the golden cross-back, farmed in CITES registered farms in Malaysia and

Singapore. I own one of these beauties myself, given by a friend who thought a good home was more important than the money.

The term cross-back refers to the scales, which have a distinct gold edge to them that finally cross over the back as the fish matures. In most arowanas of the genus *Scleropages*, the dorsal area is a uniform dark brown.

These are just the main colour varieties; there are many others to choose from today due to Man's

**RIGHT:**  
The Australian  
arowana,  
*Scleropages  
jardini*, is  
an aggressive  
species when  
adult.

**BELOW:**  
*Scleropages  
formosus*.

Above: The Quattrini; Below: *Scleropages formosus*



The same cannot be said of a similar fish of the same genus (*Scleropages*) known as the Pearl arowana *Scleropages jardini* from the Jardine River in Australia. This beautiful species is a very nasty piece of work when adult, so is best kept alone.

cichlid sticks and specially formulated Arowana sticks from Sera and Hikari.

together you need a vast aquarium, which is not cheap. I've kept dragons with Siamese tigers, *Datnoides* sp., Stingrays, *Potamorhynchus* sp.; Giraffe cats, *Auchenoglanis* sp.; various species of shovel-noses, large disc characins, *Mylius* sp. and many others.

#### Décor and maintenance

In the Far East these fish are often kept in small tanks with no décor at all to prevent damage to scales on rocks or wood. I think both fish and owner would appreciate a more furnished aquarium; a few pieces of smooth bogwood with java fern attached and rock across the bottom with a scattering of sand, makes for a nice picture that is easily maintainable.

Asian Arowanas quickly get used to you working in the tank and don't easily become spooked. Even then any movement around them should be done slowly with the utmost care. Keep a damp towel ready in case they jump and if they do, wrap them up immediately when they hit the floor and put them back in the tank. If there's any damage, treat the tank straight away using salt or pond salt at one tablespoon per five gallons.

Make weekly water changes of 25–30%. Check nitrate regularly; some areas have high levels of nitrate in tapwater so you may not have reduced these levels as much as you thought. It may be necessary to change the water every five days. Make sure it's a similar temperature to your tank to prevent curing of the floppy edge of the gill cover.

### Breeding Dragon fish

You can't breed this species without a successful pairing and you really need to keep several fish together to get one. This would require a 2270 l/500 gal. aquarium. In the Far East, Dragons are bred and cultivated in outdoor ponds of simple design with sloping banks above and below water just in case a fish decides to jump, and invariably ends up flipping back into the water to safety. During courtship the male follows the female in a circular pattern for a number of weeks before spawning takes place. When the fertilized eggs sink to the bottom of the pond the male scoops them into his lower jaw. The buccal cavity expands like the lower jaw of a pelican and the eggs stay there until they develop and become free swimming.

In a farming situation, eggs are physically removed a few weeks after the male first brooded them by opening the male's mouth so he spits them out. An average of 30 eggs is usually found, which are non-adhesive and sink to the bottom. Water must be of the highest quality and slightly aerated for them to develop.

#### Feeding

A healthy Dragon is usually a greedy fish, but it's vital that this species is offered a varied diet from young and is left wanting after a feed. Many people feed their Arowanas to bursting point and, worse still, with only one type of food. If the fish are allowed to gorge themselves, they will lose their appetite for long periods and it may be hard to get them feeding again. Other reasons for loss of appetite are low temperatures and poor water quality.

If they are constantly offered the same foods it is almost impossible to persuade them to take alternatives. This is especially true of mealworms that seem to be the favoured food of this species in captivity.

Small specimens up to 15cm/6" should be fed little and often (three times a day), larger ones three times a week, to maintain a healthy appetite. Food should consist of prawns, mealworms, earthworms, cockles, mussels, crickets, carnivore

# Lateral Lines

**Write to:** Lateral Lines, Practical Fishkeeping, Bretton Court, Bretton, Peterborough PE3 8DZ. **Email:** karen.youngs@emap.com

## Pigment loss in Clown loach

A doctor friend of mine happened to glance at this picture that reader Michael Congreve recently sent to me of his Clown loach and declared: "I didn't know that fish could suffer from vitiligo!" As you may know, vitiligo affects about one per cent of the population, and is an auto-immune disease that attacks the skin's melanin pigment, causing it to fade.

I know that pigment development in Zebra danios has been studied as a model for vitiligo and similar defects in humans, but I am unsure if fish actually develop "classic" auto-immune vitiligo. Either way, there would be no cure for this condition, but at least it wouldn't be harmful, just disfiguring.

Michael Congreve's fish are 10cm/4" and he says that they seemed as though they were going through a spawning ritual, and simultaneously lost most of their dark pigment. Two weeks later they returned to their normal colour, but now the pigment loss is evident again. Whatever is causing the skin pigment problem in Michael's fish, I somehow doubt that it is contagious, and judging by his picture, his fish seem otherwise fine. Although many Clown loaches

are still wild-caught, others are being bred commercially, and perhaps some of these have some genetic condition, due to inbreeding, that causes the black pigment to fade or vary. Some reader feedback would be useful here – has anyone else experienced the same problems with their fish?

**DR PETER BURGESS, PFK CONTRIBUTOR**

## Nearly 25 – and still going strong!

I purchased my first aquarium (John Allen 100cm/40" Jewel) early in 1983 and after maturing it with some Tiger barbs I added two Clown loaches and a selection of community fish. A few years later, when the loaches were bigger, I added a third one but after a number of years, I lost one of the trio due to a temporary depletion in oxygen levels (caused by a bacterial film after replacing an underground filter plate). I upgraded my display tank to around 250l, in the '80s. They stopped growing when they reached about 17.5cm/7" long but are now very deep bodied and are fairly active. I think the fish that died may have been the newer one of the three, but as I bought the original two at almost 5cm/2" long, some 23 years ago, I think at least one of them must be approaching 25 years old! How unusual is this? Does anyone have an older Clown loach?

**GERRY SCULLION, VIA EMAIL**

## Watch those tankmates!

Last year my husband and I bought some of the lovely peaceful *Puntius dersoni* barbs. After a couple

of days we noticed that they were being harassed by our Angel and a group of Australian rainbows. We removed the Angels and the rainbows and have since just kept Neons, Swordtails and Bristlenose catfish with the barbs. They all live in harmony now.

We had read articles that state some of the *Puntius* are a bit skittish. On a trip to our favourite aquatic shop, where there has been a lovely tank set-up featuring *dersoni* for ages, we saw one injured and the another which had died, the culprits being rainbows once again.

Maybe we have to be more selective about the fish we keep them with.

**PATRICIA PROSSER, VIA EMAIL**

## At home with the Red pencilfish

I'm writing in response to the fascinating article about the Red pencilfish, *Nannostomus montenthaleri*, by Dr Zahradka in March's PFK.

In 2003 I was lucky enough to be involved in a collecting trip in the Peruvian Amazon, where one of the fish we collected was *N. montenthaleri*. It is native to certain clearwater streams quite high up in the watershed of the Rio Nanay.

The Rio Nanay itself is a very torturous blackwater river, and we actually approached the collecting sites from the Rio Tigre which is a much more accessible river on the other side of the watershed. At some points the Rio Tigre and the Rio Nanay are only a few miles apart, separated by a high ridge covered in dense jungle. Our expedition leader decided to try crossing the ridge from the Rio Tigre side at one of these points near a village called Santa Maria.

The climb through the jungle was fairly arduous, but only a mile or two from the Tigre we crossed the

**BELOW:** Have other readers experienced pigment loss like this in their Clown loaches?





highest point of the ridge and discovered some beautiful clear water streams descending towards the Rio Nanay. Here we collected a number of different fish including a few *N. marmoratus* – nowhere was it very frequently encountered and the majority of the fish caught were juveniles resembling *N. marginatus*.

Here *N. marmoratus* lives in very soft (no detectable hardness), acidic water (around pH 4), with a lovely transparent amber hue from dissolved tannins. The stream beds were white sand, strewn with dead wood and fallen leaves from the completely intact forest cover, and the streams themselves were often little more than tiny rivulets a few feet across. There was no aquatic vegetation at all.

One of the biggest surprises for me was the coldness of the water which was only around 20-22°C/68-71.5°F, extremely refreshing after our sweaty climb through the humid jungle full of biting insects!

Conspecifics were mostly small non-descript silver tetras, although we also caught some little *Apostogramma*, *Pymhelia*, *Rivulus*, *Characidium*, and predatory juvenile *Hoplias*. The numerous burrows in the mud banks suggested it was also home to *Loricariidae*, and some unidentified "Plecs" were collected, clinging to sunken branches. One day I hope to be able to return to these sites and collect some more of these stunning little fish.

**DR MIKE STATHAM, AMAZON AQUATICS**

### Stuck in the roots

We recently purchased a Trigon 190 aquarium. We decided to set up the aquarium with real plants. The only piece of 'fake' ornament was a resin tree root as we thought this would look great. But when two 7.5cm/3" Clown loaches and a Zebra danio disappeared within the space of two hours with absolutely no sign of them in the tank, we became concerned. Then my wife suggested they might be inside the resin tree root as this had a hole to let water in and a small hiding place for shyer fish. I carefully looked inside the hole and couldn't see any fish – but was horrified to find all three actually stuck inside the root, wedged within the hollow sections. I carefully hit the root with a hammer to break it open; the fish were all stuck in the smallest part of the root, wedged fast. I prised the resin off, trying to save them which I did apart from the Zebra danio which eventually gave up as it wouldn't budge. Why do manufacturers make these items hollow? I could have had three dead fish and a polluted tank!

**DAVE CLARKE, VIA EMAIL**



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# All the way from Japan

What's involved in shipping Koi all the way from Japan to the UK?  
**Keith Holmes** of Koi Water Barn gives us an insight into the process.

**BELOW:**  
The breeders prepare selected fish for shipping by moving them to a separate pond without food.

**RIGHT:**  
Next time you buy a Koi, remember all the hard work that's gone into getting them from the breeder's to the dealer's.

**N**ext time you visit your local Koi outlet, spare a thought for what is involved in getting these Koi to the UK from Japan. During the busy summer months, or in October/November when the Autumn harvest stocks are arriving, there can be two or three shipments a week, with a typical shipment consisting of anything from 50 to over 100 hundred boxes of Koi.

## Making your selection

The whole process of shipping Koi starts as soon as either an individual on a buying trip, or a dealer, agrees to purchase a particular Koi – or even a pond of Koi!

On selection the fish will probably be moved to a separate pond. This is because the Koi need to be prepared for shipping which includes no food prior to the shipping date, and it is for this reason that many breeders insist on a minimum of ten days' notice before shipping any Koi. While the Koi is being prepared the farm will contact their shipping agent who

is responsible for booking the space on the airline and making sure any official paperwork is correct. For Koi being exported from Japan into the UK, a health certificate is required, and this has to be issued by a vet in Japan just before shipping to say the Koi are free from certain diseases and are fit to travel. This health certificate and other documents are then sent not only to shipping agents in Japan but also to the chosen clearing agent in the UK, as without a clearing agent the Koi would not make their way through the cargo handling system once the plane lands here.

## Shipping day

The large-sized Koi purchased throughout October and November will generally be packed at one or two per box. In these instances they are simply transported in bags with water and oxygen, which are then sealed in a purpose-made cardboard box ready for shipping. Smaller Koi can be packed 30-40 per box and some of the smallest are packed

## DID YOU KNOW?

The whole process of shipping is not cheap and this tends to be overlooked by the general public, when considering a new purchase. For example to ship a Koi of 50cm/24" back to the UK will require in excess of 20kg of water, plus any inland shipping to get the Koi to the airport. If shipping in the summer there will also be the cost of dry ice and then once the Koi reaches the UK there are additional charges which may total anything up to £100 or more. All these charges have to be considered when purchasing Koi.

over 100 to a box, although in the hottest months the number per box is decreased and ice packs or dry ice may be added to help keep the temperature low. To help maintain a low temperature the airline is always informed that Koi in transit need to be kept at below a specific temperature, in general this is how most Koi are shipped, however should you or your dealer decide to purchase something of a larger size, a purpose-built shipping container may well be used.

Once the Koi are packed they are transported to the airport where they will be checked in before being prepared and loaded for shipping. Stickers are placed on the box detailing that it is livestock, so that it can easily be identified.

The Koi will then be off to the UK, in most instances to London Heathrow, although shipments to Manchester and other airports do occur. Before the plane even took off from Japan your dealer in the UK was busy making phone calls to his clearing agents, ensuring all required paperwork had been sent





to provide a smooth and quick passage once the flight has landed. The transit time from packing at the farm to landing in the UK can be anything up to 20 hours or more, and if there are problems and delays this will only increase the total time that the Koi are in the boxes before being released to the dealer.

Once the plane lands the clearing agents will ensure that a number of things happen and keep the importer (the Koi dealer) informed as to their progress. They can also advise on the time when the Koi can be collected.

All live fish shipments arriving at London Heathrow have to be transferred to the Animal Reception Centre where they are inspected by DEFRA and customs before they can be released to the customer. A typical Japanese Airline flight may land at 16.00hrs, but it could take 4-6 hours for the shipment to be ready to collect. The whole process of clearing a shipment can be lengthy and requires experience of communicating with airline handling agents and official services, so a good clearing agent with knowledge of importing Koi is priceless.

Once they get the call that their fish are cleared, the Koi dealer can collect the fish. It is worth remembering that in many cases this will be in the early hours of the morning, and for the dealer the hard work has only just begun!

#### At the Koi outlet

Once the Koi are back at the dealer's premises they need to be unpacked. Depending upon the size of the shipment a number of extra staff may be enlisted to help as unloading 100 plus boxes each with an average weight of 20kg, is not only time consuming but also very tiring.

Many dealers enlist the help of customers, as they are eager to be involved in this whole experience, and get a glimpse of these Koi before anyone else. If it is a shipment with Koi on it, for numerous dealers these will also be at hand to help with the unloading – and in many instances they may also make one or two extra purchases as Koi which have not already been purchased by them are unloaded.

Once the boxes are in the shop they are opened, and the Koi allowed to adjust to the light inside the shop for a few minutes. Then



**FIGURE 10**  
1. The newly-imported Koi arrive at the dealer's; 2, 3 & 4. They are transferred to a bowl so the polluted water in the bags doesn't get into the dealer's vats; 5, 6 & 7. The Koi are moved to a vat using a sock net; 8 & 9. Netting or boards are placed around the vat to stop the new Koi jumping out.

they are ready to be introduced to their new temporary home. If there is to be a big difference in the temperature between the water in the bags and that of the ponds, the bags are floated to allow the temperatures to even out.

As the bag water is heavily polluted every step is taken to ensure the water does not enter the dealer's pond. The bags are gently opened and the contents emptied into a separate bowl. Some shippers use products to adsorb ammonia during transit to help keep stress to a minimum. Once the Koi are in the bowl a sock net, or plastic bag is used to remove the fish from the polluted water. It is then carried to its new home.

A 50-box shipment can take anywhere from 3-5 hours from unloading to finish. Once all of the Koi are unpacked (and have been admired!) the ponds need to be

secured, as newly transported Koi have a tendency to jump out of the pond. Netting or boards will be placed around the pond so if any Koi do jump they will be redirected back inside.

The shipping boxes may also be used to create a shield around the pond just in case anything does try to escape. These covering methods will remain in place for a number of days while the Koi become acclimatised to their new home, and during this time the dealer will check for any obvious signs of parasite infection and treat accordingly. The Koi will then be kept for further observation and treatment, should any be required. Only when the dealer is happy will the customers have the opportunity to make a purchase.

So next time you buy a Koi, please remember all the hard work that's gone into getting them here!

## Taking your new Koi home

In many cases, when you buy Koi from your dealer your selection will be placed into one or two plastic bags. Once bagged, oxygen will be added and the bag sealed with an elastic band. It will usually be placed into a cardboard or polystyrene box, and it is important that this be positioned correctly in your car for the journey home. Ideally this would be with the length of the box going across the car, is wheel to wheel. By doing this should you have to brake, the Koi will roll in the bag rather than hitting the front of the box as it would if it had been placed head on. It is also important in the summer months to ensure that the box is kept in the shade to avoid overheating.

Koi should be added to your pond with the minimum of stress – the bag should be floated on the pond for 30 minutes or so in a shaded area to allow any difference in water temperature to even out.

Open the bag and allow some of the pond water to mix with the water in the bag. The Koi can then be carefully released. Cover your pond for a few days until the fish are settled. After the covers come off, you can you can sit back and enjoy the latest addition to your pond.



# STAGES OF LIFE

**Dr Peter Burgess** of the AQUARIAN Advisory Service, continues his health series with a look at the problems that can affect your broodstock.

**A**s fish reach adult stage they become sexually mature. The behavioural and physical demands of reproduction can be a very stressful and exhausting time for fish, and presents its own particular health problems.

#### **Failure to breed**

**Symptoms:** Broodstock fail to

spawn (or fail to mate in the case of livebearers).

**Causes:** Various. In some cases, an environmental "trigger" to breeding is missing under conditions of captivity. In the wild, many fish breed in response to changes in temperature, day-length, and/or pH, with each species having its own specific trigger conditions. In general, temperate freshwater fish, such as goldfish, breed in response

to an increase in water temperature and day-length. Conversely, for some South American catfishes it is a reduction in water temperature, associated with the onset of the rainy season, which initiates spawning. Catfish breeders use this temperature reduction trick to encourage some *Corydoras* species to breed in captivity.

In other situations, failure to breed may simply be due to a lack

of both sexes! With many "oddball" fishes, such as pufferfishes and knife-fishes, it is impossible to tell apart the sexes, hence the need to buy several specimens to improve the chances of having both males and females present. Attempting to breed from fish that are sexually immature, or simply too old, will also meet with failure. Dietary inadequacies are sometimes to blame. For example, a lack of Vitamin E (alpha-Tocopherol) has been linked to reduced spawning efficiency in trout.

**Treatment:** Investigate possible underlying causes and attempt to rectify them. In some cases it may help to swap one or both spawning partners and try again.

### Dystocia (egg-binding or fry retention)

**Symptoms:** The affected female does not release her eggs or fry. In egg-layers, this condition is often due to a build-up of immature eggs within the female fish. Egg retention is not necessarily serious but in some cases may stress and weaken the female. Fry retention, however, often proves fatal to both mother and unborn young.

**Causes:** For pondfish such as Koi, dystocia may be the result of seasonally low water temperatures (notably, a cold spring) that inhibits

egg maturation and spawning.

**Treatment:** No attempt should be made to hand-squeeze the eggs or fry from the female, as this risks organ damage and death. With livebearers, an improvement in water quality and a slight increase in water temperature may encourage birth. With some egg-layers it is normal for the unshed eggs to slowly be reabsorbed by the female, hence intervention is unnecessary. In large pondfish, such as Koi, dystocia is occasionally treated using an injectable hormone (such as CPE - Carp Pituitary Extract) to stimulate egg release - this procedure should only be performed by a vet or other suitably qualified professional. In the case of livebearing stingrays, dystocia in captivity is not uncommon and may require veterinary intervention to assist the birth of the stingray pups.

### Disease transmission to offspring

Some infections are capable of being transmitted from the mother fish to her unborn young or eggs. This is known as "vertical disease transmission".

**Symptoms:** The offspring are already infected by the time they are released (as eggs or fry) by the female. The specific symptoms depend on the type of disease

## Spawning-related aggression

Some types of fish develop aggressive behaviour at breeding time, which can result in fighting injuries, sometimes leading to death. The territorial behaviour of cichlids is heightened as the adults select mates or defend nests and young. Even the relatively placid gouramis lose their timidity when guarding their nest, and chase away intruders, including much larger fish. Such fish should be spawned by themselves and never in a community tank. With some species, including Bettas, the male may chase and even kill an unwilling female. A female Betta should be removed after spawning as she is likely to be attacked by her nest-guarding partner. Closely monitor the behaviour between spawning partners, and be prepared to intervene by separating the individuals if one fish (usually the female) appears at risk of serious injury or stress.

that has been passed down by the mother fish (eg. fry suffering from an inherited mycobacterial infection may exhibit poor growth, spinal deformities and early death).

**Causes:** Several fish viruses as well as mycobacteria (bacteria that cause wasting disease) are capable of being transmitted vertically. Farmed livebearers seem particularly prone to mycobacterial infections.

**Treatment:** Viral and mycobacterial infections are notoriously difficult to treat, and it may be kinder to put down badly infected fry. Prevention lies in selecting only healthy broodstock for breeding.

**LEFT:** Many fishkeepers use a cool water change to get Corydoras in the mood.

**RIGHT:** Egg retention in Koi can be caused by cold spring temperatures.

## Nutrition and breeding

The nutritional requirements of fish increase during periods of sexual maturation and reproduction. In particular, extra protein is needed for proper development of the reproductive tissues - the ovaries and testes. A boost of dietary lipid provides energy for vigorous spawning and nest-defending activities. Lipid is also needed by the female for egg development. Supplementing the diet with protein- and lipid-rich foods (such as daphnia and various worms) will therefore help bring the adult fish into breeding condition.



### TIP

- Avoid breeding from fish that are closely related (eg. parent-offspring and brother-sister matings). It helps to introduce "new blood" every so often. By joining an aquarist society you will meet fish breeders who may be willing to exchange stock.
- At breeding time, mature male goldfish develop whitish pimples on their head, gill covers and pectoral fins. These pimples, known as "spawning tubercles", also develop on mature males of other cyprinid (carp-like) fishes, such as barbs. Not to be confused with whitespot disease (see) in which the spots are not limited to the head region but may occur anywhere on the body surface.
- If you can get hold of them, earthworms and fruit flies (Drosophila) are rich sources of protein for conditioning medium to large fish.
- Have a bottle of anti-bacterial remedy to hand, to prevent infection of any skin damage incurred during spawning activity.



**NEWS**  
The Supreme  
Champion,  
Bodie  
Nitratoris.

**JUDG**  
John's fish-  
house is home  
to an amazing  
collection.

#### Pollution-free zone

John has carried out some trials on products that will help to eradicate pollution in tanks containing show fish. It came about after a conversation with Dr Peter Burgess at a show.

Peter introduced him to a series of API products that he thought would be beneficial to fish, placed in show tanks for extended periods. John initially said "no" on the day, as there was no way he would risk anything going wrong with his best fish at a show.

He started off by testing the products at home in his fish house. He trialed fish in show tanks, one with no chemical filtration, and others with API Amaro chips and



Nitra zorb. "I tested the water and the results were very positive," John told us.

#### From goldfish to cichlids

Most of John's fish reside in a purpose-built fish house in his back garden, but he has some coldwater fish in his garage and in a series of small ponds.

He has nearly 40 tanks, all containing fish, with a selection that contains everything from Bristol and London shubunkins to characins, catfish, and Central American

cichlids. John's collection is mostly tailored towards fish that suit his local water. The water comes out of the tap at about pH7, but quickly drops to as low as pH4 within a week unless he changes it or buffers it by filtering through coral gravel. John says that with a pH and hardness like that, he doesn't keep rift valley cichlids or livebearers.

Most of the tanks are filtered by internal or external power filters. John is pretty good at building with glass, too, and has built some filters himself to his own particular specifications. This allows him to use a greater choice and volume of media, and some of the filters for the Central Americans contain coral gravel to buffer the pH and hardness.

Decor in most tanks consists of a 5cm<sup>2</sup> layer of coarse gravel on the bottom, with a glass partition leaving an area devoid of gravel where John places the food. The use of a partition allows much better cleaning and removal of uneaten foods as well as somewhere to put large vegetable foods like potato or cucumber.

Lighting is, in most cases, subdued, but is still bright enough to support a healthy growth of Java

### Join the club

If you are interested in finding out more about Port Talbot and District Aquarist Society, tel. 01639 7770795.

#### Get featured!

If you think your fish would be of interest to other readers, why not contact us and tell us a bit about them? We'd be particularly interested to hear from other fishkeeping club members. Email Jeremy at [jeremy.guy@expe.com](mailto:jeremy.guy@expe.com) or give him a call on 0870 062 2124. Everyone who features in this section of the magazine will win fishkeeping goodies from 'Aquarian'.

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**The fish list**

- |                                  |                                 |
|----------------------------------|---------------------------------|
| <i>Etheostoma gracile</i>        | <i>Melanotania aeneola</i>      |
| <i>Etheostoma plannicola</i>     | <i>Hemigrammus shawi</i>        |
| <i>Etheostoma caeruleum</i>      | <i>Hartigasterus ocellifer</i>  |
| <i>Poecilia erythrogaster</i>    | <i>Auratus albonotus</i>        |
| <i>Herichthys boocourti</i>      | <i>Neotilapia unicolorata</i>   |
| <i>Vieta regina</i>              | <i>Moenkhausia pittieri</i>     |
| <i>Parachanna aotracanthus</i>   | <i>Crenichthys spilargus</i>    |
| <i>Scaphiocratus omeletus</i>    | <i>Astatoteras rhytidus</i>     |
| <i>Stiphodon</i> spp.            | <i>Vieta zonata</i>             |
| <i>Danio pathirana</i>           | <i>Asotero britati</i>          |
| <i>Mystus leucophaeus</i>        | <i>Corydoras sterbai</i>        |
| <i>Aequidens rivulatus</i>       | <i>Corydoras melanostus</i>     |
| <i>Abramites hypolepis</i>       | <i>Synodontis shufeldtiani</i>  |
| <i>Asotomus fernaldi</i>         | <i>Syngnathus ornatipinnis</i>  |
| <i>Leucopygia flavulata</i>      | <i>Moenkhausia phaeota</i>      |
| <i>Bodo Aulofasi</i>             | <i>Licentias steinhausi</i>     |
| <i>Yasuhikotaka aotomanki</i>    | <i>Drama bleheri</i>            |
| <i>Cyathobates nigripinnis</i>   | <i>Microgobius nesiops</i>      |
| <i>Rastbora bairdiana</i>        | <i>Pterothrissus hypolepis</i>  |
| L47                              | <i>Poecilia erythrogaster</i>   |
| <i>Bodo Aethonice</i>            | <i>Hypessobrycon</i>            |
| <i>Microbates albonisi</i>       | <i>steppesoni</i>               |
| <i>Nannogrammus pulcher</i>      | <i>Rastbora steppesoni</i>      |
| L128                             | <i>Hypessobrycon zosterus</i>   |
| <i>Geophagus</i> sp. "Cabo frio" | <i>Danio aerni</i>              |
| <i>Leptocostichus petersi</i>    | <i>Corydoras poorei</i>         |
| <i>Vieta sympleura</i>           | <i>Nannostomus marginatus</i>   |
|                                  | <i>Nannostomus tritaeniatum</i> |



fern in each tank. Décor is minimal unless the tank contains fish that need a place to hide, like catfish and loaches.

I wanted to find out how John selected his fish for showing. He has quite a lot of rare fish in his collection and my question was do you buy a rare fish in order to show it, or for any other reasons? John's answer was that if he spots an unusual fish that he likes the look of, he will buy it out of curiosity first

and would only consider showing it if it turns out to be a good show fish in the future.

In fact, even if John wants to show an unusual fish there will more often than not be no show standard for it within the FBAS. This means that it cannot be judged on what it should look like because no one really knows.

Take the *Astatoteras rhytidus* for example. After purchasing the fish at 27/50p John first circulated a photo around the FBAS, then gave them all the information that he had, including any books that listed the species and its details.

A standard was created from that, along with an adult size collated from all the data sent in. The fish was added to the standards and circulated to all FBAS judges so that if one turned up in a show, they would be able to recognise and judge it.

This happens a lot and happened previously with John's *Geophagus* sp. "Cabo frio" and *Bodo aethonice* - two fish which contributed to his success in the Supreme at Hayling Island, and could not have even been shown without standards being created for them with John's expert help.

LEFT:  
A future  
champion?  
*Vieta regina*

BELOW LEFT:  
One of  
John's more  
unusual finds,  
*Hypessobrycon  
steppesoni*





# Keep your balance!

For good growth, corals need calcium and carbonates to build a healthy skeleton. But you need to provide them in the right balance.

**Tim Hayes** explains how to achieve this, using liquid supplements.

**C**orals need calcium and carbonates available in a particular ratio in order to build a healthy calcium carbonate skeleton.

One of the most important considerations when it comes to maintaining these levels is that whatever method is used, it must be a balanced one. Otherwise it can lead to difficulties in maintaining pH, calcium, and carbonate levels. For a supplement to be balanced it needs to provide something in the region of 20 ppm calcium along with 2.8 dKH (1meq/l) carbonates.

Many of you will be familiar with liquid supplements for calcium dosing but probably think of them as beginners' stuff. In fact liquid supplements for maintaining calcium and carbonates can be very sophisticated, superior

## TIP

If it starts "snowing" in the tank after adding liquids, then calcium carbonate is being precipitated out of solution. You need to either dose further apart or into a higher flow area of the tank. It may also be worth checking your calcium levels to ensure you're not in a state of calcium supersaturation.

in some ways to the more technical solution offered by calcium reactors.

Although there are plenty of different supplements for both calcium and carbonates on the market, many of these will replenish calcium or carbonates, but with long-term use result in ionically-unbalanced water. This can be particularly dangerous if water changes aren't carried out on a regular basis, as levels of sodium and chloride from these supplements can build up, producing water more like a solution of table salt than seawater!

There are three types of liquid calcium supplements of real interest to us: the ionically balanced two-part supplements; the Balling method, and what I'd describe as hybrid systems which seem to combine elements of the first two. All these methods aim to add calcium and carbonates in a balanced manner, the

differences tend to be in terms of how associated ions, minor and trace elements are included into the dosing regime.

One side effect of these methods can be an increase in salinity, so keep an eye on it. With use you'll soon see how much the salinity is shifting and can then work out a simple solution to correct it, eg. every so many days or weeks, remove a given volume of water from the aquarium and replace it with fresh RO water.

## Balling method

This system of calcium replenishment was originated by Hans-Werner Balling and first published in 1994. Essentially the system consists of dosing calcium chloride and sodium bicarbonate as separate solutions in a strict ratio,





but as the chloride and sodium ions are not used in the aquarium, a third additive is required to balance out what would otherwise produce an increase in salinity. This third solution added to the aquarium is, in effect, a sodium chloride free sea salt mix that brings with it many minor and trace elements. If you want to experiment with this method the only readily available source of sodium chloride (NaCl) free sea salt that we are aware of is Tropic Marin's Pro-Special Mineral.

#### Two-part balanced ionic supplements

These systems are designed to add calcium and carbonate, along with their associated ions in a manner mimicking the natural ionic ratios of seawater. Over time you'll register a slight increase in salinity as, in a

sense, it's almost like dosing with a concentrated sea salt mix.

Julian Springs Two Little Fishies produces a balanced two-part system called C-Balance.

Kent Marine has a two-part system, Tech-CB. This product recommends to dose in the morning to prevent an overshoot of pH.

#### Hybrid systems

Aqua Medic's Reef Life system consists of three parts – Calcium, KH Buffer (carbonates), and Trace (a trace element solution). All three components are made up into solutions, diluted with RO water, for dosing with Aqua Medic's range of ReefDoser programmable peristaltic pumps.

Aqua Medic also produce a Reef Life Calcium set, suitable for smaller or lower stocked reef aquariums, designed for manual dosing only.

The system from Gro Tech consists of five parts – KH1 and KH2 (a two part calcium/carbonate additive) along with Coral A, B, and C (three trace element mixtures which, like the calcium and carbonate additives, need to be dosed separately). Gro Tech has its own range of microprocessor controlled peristaltic dosing pumps, based around a three-pump controller (for Coral A, B, and C) and can be expanded up to an 11-pump system by the addition of two and four pump units, all controlled from the base unit and with just a single power lead. The Gro Tech dosing pump allows only one pump to work at a time, eliminating the danger of solutions like calcium and carbonate coming into direct contact, causing precipitation.

Tropic Marin have recently introduced Bio-Calcium Liquid, a three-part balanced system. This can be bought in liquid form but, usefully, there're also bulk refill packs available consisting of the three different salt mixtures (A, B, C) in dry form to be made up with RO water before dosing.

#### Liquid dosing vs. calcium reactors

■ Liquid dosing doesn't introduce any phosphate into your reef system, whereas a calcium reactor, depending on the quality of the media being used, can be the source of unwanted levels of phosphate.

■ Liquid dosing won't alter your pH, and it may help support it,

### The right level

Before using a balanced liquid supplement, ensure your calcium and carbonate levels are at, or near, the correct levels for a reef tank, around 380-440ppm calcium 7-11 dKH. If your levels are out of balance, here's what to do:

- Calcium and carbonates too high: discontinue all forms of supplementation and wait for the levels to naturally decrease. Monitor regularly.
- Calcium and carbonates too low: add balanced liquid supplements at a slightly higher dosage than recommended. Monitor until acceptable levels are reached, then cut back on dosage until maintenance of required levels is achieved.
- Calcium too high, carbonates too low: add carbonate component only. Monitor until back in target range.
- Calcium too low, carbonates too high: add calcium component only. Monitor until back in target range.
- Calcium at target level, carbonates too low: add calcium component at lower dosage, say 50% and add carbonate component at double dosage (don't exceed manufacturer's maximum dose). Monitor until back in target range.
- Calcium too low, carbonates at target level: add carbonate component at lower dosage, say 50% and add calcium component at double dosage (don't exceed manufacturer's maximum dose). Monitor until back in target range.



LEFT: Most calcium additives come as a two-part solution to add calcium and carbonate.

however a poorly set-up calcium reactor can lower the pH of your reef.

- Liquid dosing can often be an almost complete source of supply of minor elements and trace elements.
- Liquid dosing will contribute far more available calcium than calcium hydroxide (kalkwasser).
- Liquid dosing is ideal for covered aquariums where there's not enough evaporation to allow kalkwasser dosing or for reef tanks where there's no space for a CO<sub>2</sub> reactor.
- Knowing the calcium demand of your reef you can easily calculate

# My favourite fish

Ian Fuller shares his affection for a Bug-eyed cat



**M**y favourite fish is not a Cory, as many would think, with my lifelong interest in this fascinating group of fishes, but a small African catfish *Synodontis contractus*, which comes from the Congo region (Stanley Pool) near Kinshasa. It is a relatively small species growing no larger than 8cm/3" and is similar in both looks and character to the more commonly encountered *Synodontis nigriventris*. *S. contractus* has a larger head, broader mouth and far larger eyes. It is these large eyes which give it its common name of 'Bug-eyed catfish'. Its odd looks are more than compensated for by its unique character. I think they are absolutely wonderful little creatures.

## Temperament

*Synodontis contractus* has a very mild temperament, which means it is an ideal tank mate for almost any planted community aquarium. Having said that, they are a very shy and timid species, hiding themselves away in the shadier areas of the aquarium, under overhanging vegetation or other tank decorations and, because of their shyness, potential tankmates should be chosen carefully. I keep my little group of three in a 54 x 30 x 30cm/18" x 12" x 12" tank, and have provided them with a mound constructed with pieces of bogwood, creating lots of nooks and crannies for them to hide in. There is also a large dump of Java fern and an abundance of floating plants, creating a shaded low light environment. The fish takes

a little time acclimatising, but once settled is relatively easily maintained.

## Diet

Their natural diet consists mainly of insect larvae, small crustaceans, and microscopic organisms that they find grazing the undersides of overhanging leaves and in the bio-film that forms on rocks, fallen branches, tree roots and plant stems. They also spend a great deal of time upside down at the surface feeding on plankton. Their mouth is wide and underslung, and is ideally designed for grazing. In aquaria they relish live foods such as Daphnia, bloodworm and tubifex and readily accept the same in frozen form. Commercially prepared tablet, granular and flake foods are suitable, too.

Although a nocturnal species, given the right conditions this fascinating little fish can be observed quietly moving around in the shady areas of a well-decorated aquarium. It can be encouraged to venture out by offering its favourite food of live bloodworms, placing it in the same exposed place each time.

## Breeding

Once a group is established, it should be possible to breed this species. Unbeknown to me, in the early part of 2005 my own group of three, which consisted of a female and two males, produced a batch of 30 large (3mm diameter) bright orange eggs. These had been placed in one condensed



## Fact File

**Scientific name:** *Synodontis contractus*

**Common name:** Bug-eyed catfish  
Sex: Males form 2/3, females 8cm/3."

**Aquarium type:** Well planted, peaceful community

**Distribution:** Congo region of Africa, (Stanley Pool) near Kinshasa

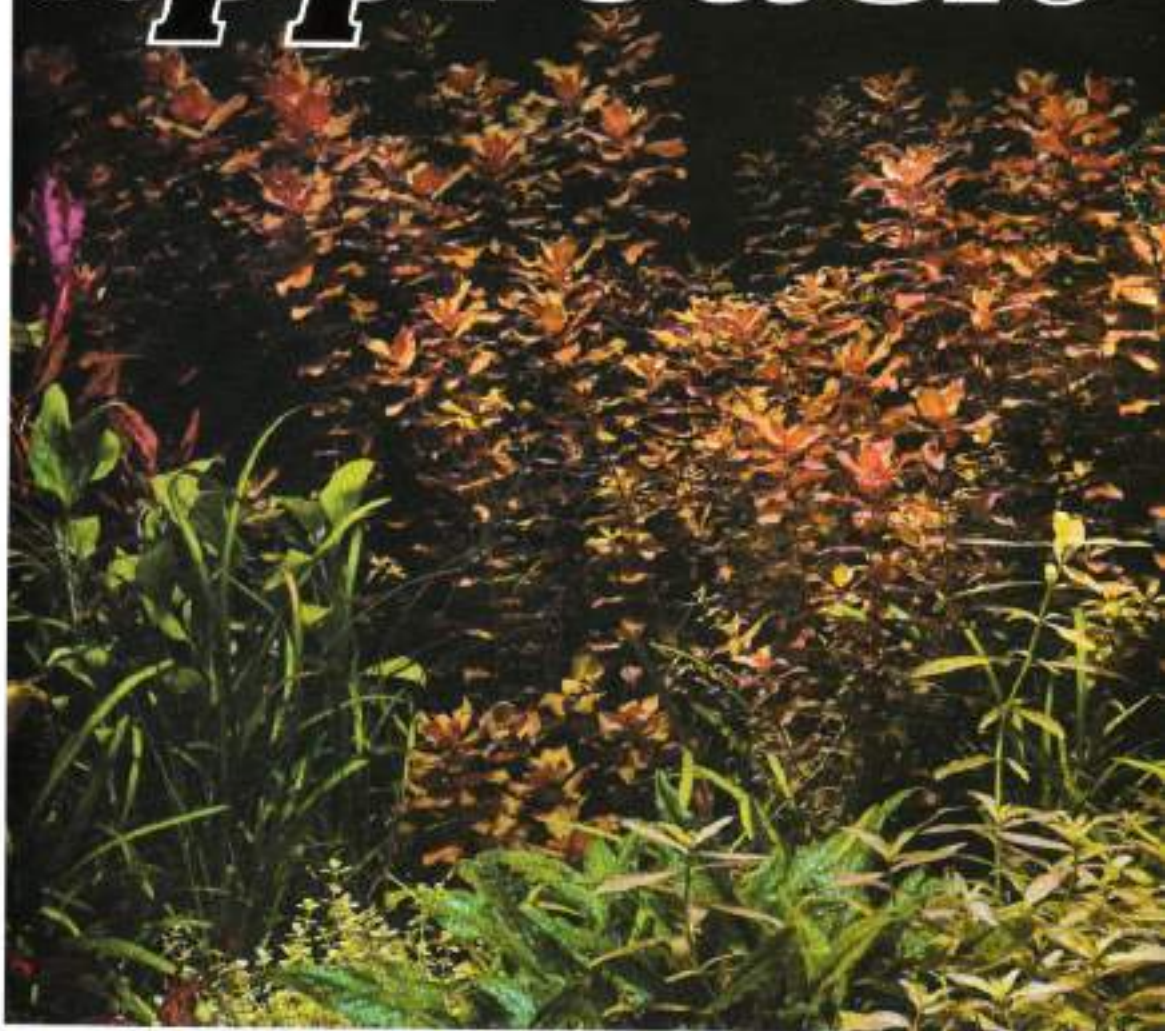
**Diet:** Live foods like Daphnia, Cyclops, bloodworm and Tubifex. Frozen foods, tablet, granulated and flake foods.

**Water conditions:**  
Temperature: 24-27°C/75-80°F, pH: 6.5-7.5, 5 (2009)

group and were well hidden, having been deposited high up on the side glass in the back right-hand corner of the aquarium. They were only discovered when I was doing a routine glass cleaning exercise to remove excess algae and bacteria film. I unknowingly removed the eggs from the glass with the cleaning sponge and, although they did not look damaged, they never developed.

I have recently moved them into a new larger, dimly planted tank, which probably means that if and when they do breed, I won't know anything about it until youngsters start appearing!

# The **jungle** approach



Perhaps the most common reasons for the failure of a planted aquarium is, quite simply, not enough plants. **Jeff Walmsley** takes a look at those all-important first plants that will gain a foothold and grow like crazy!

IT'S easy to be seduced when you start your first planted aquarium. Pictures in books feature elegant, unusual, brightly coloured plants, but to buy them individually is very costly, and is why so many beginners end up with too few plants. The best way to start off your first newly-planted aquarium is with the cheapest collections you can find, and you'll always need more than is usually recommended.

If I were on a limited budget, having acquired all the necessary basic kit, I would spend my remaining budget on plants and forget about fish and filters until I'd saved up more money. This would solve two problems at once because another common reason for the failure of a planted aquarium is putting in too many fish at the outset. Too few plants + too many fish = big algae problems.

When starting a new tank, aim for 600 stem plants per square metre (or 50 per square foot) of tank bottom. You can sometimes buy plants quite cheaply from retailers, particularly if they have been sitting in the display cascades for a while and it might be worth making them an offer. You can often buy miserable-looking plants cheaply – or even get them thrown in for nothing if you make a decent purchase – and, given the right conditions, many, if not most, will simply rocket away.

#### Call in the thugs

The most difficult time in any new aquarium's life is the initial period after setting up. Quite simply, if it doesn't work, any choice and expensive plants will disappear under a suffocating coat of algae, gradually losing their leaves – and

their lives. The best kind of start-up plants are common 'thug plants' – those that will take over your tank in no time at all, spreading vigorously, consuming excess nutrients and other nasties in the process, and purifying your water – and substrate – in a way that no filter can do.

If you've bought a surplus collection or two, most of them will be of this kind, but there may also be a few non-aquatics and a few prima donnas among them. Some will expire rapidly, others will thrive, and in this way you will also begin to learn which plants like the conditions you have provided. You can then throw out the failures and the langashers and propagate the ones that like you. Never mind if you don't like them – there will be time for those luxuries later!

#### Plants to avoid when starting up

Another reason for failure at the outset is too many of the wrong kind of plants – either the slow growers like *Cryptocoryne*, *Anubias*, most *Alternanthera*, *Rorippa*, and many *Echinodorus*, especially the smaller, fancy hybrids, or very small

**LEFT:** *Cryptocoryne* (front centre), giant *Hydrophilis* (extreme right) and *Alternanthera* (extreme left) are some of those best avoided at start-up.

**RIGHT:** *Rotala macrandra* (near) and *Echinodorus rotundifolius* "variegata" are both good starter plants.

#### Say NO to...

Avoid the following plants when starting up your aquaria: All *Cryptocoryne*, *Anubias*, ferns and mosses (this includes Java fern), aquatic 'grasses' and 'rushes', most large sword plants, all *Ceratophyllum*, *Microsorium* spp., *Myriophyllum* spp., *Mallophrasia*, *Echinodorus basilus*, *Rotala wallichii*, and anything you don't recognise instantly.



**ABOVE**  
Get the plants well established and the algae under control before adding any fish.

plants like hairgrass, *Echinodorus tenellus*, *Acorus*, and the various bulbous plants; those which are very slow to establish, like giant *Hygrophila* and other plants which have been cultivated emerse prior to sale and so have no underwater leaves – like *Cryptocoryne* yet again.

None of these will do anything to condition your new aquarium or combat the algae infestations that attack every new set-up. Additionally, some plants which are reasonably fast growers and quite well-behaved in an established set-up appear to attract algae like

a magnet, notably *Echinodorus tenellus* and *Rotala wallichii*. After six months or so, when your tank is finely-tuned, you can then start thinking about more difficult plants.

What about those giant sword plants which everyone seems to love? Frankly, the majority are too big for most tanks, but you could have one if you had an open-topped tank for the sole purpose of allowing it to grow out of the water. This is the quickest and surest way to a healthy substrate. Otherwise, they are usually too slow to get moving in a new set-up.

One that doesn't grow out of the water, and gets going quickly, is the useful and handsome *E. martii*.

### Say YES To...

- *Bacopa caroliniana*
- *Cabomba caroliniana*
- *Echinodorus latifolius*\*
- *E. Bolivianus*\*
- *E. (Quadrangulatus)*\*
- *Goniatophyllum* species
- *Gonolobus agrestis*
- *Heteranthera zosterifolia*
- *Hydrocotyle fluviatilis*
- *Hydrilla verticillata*
- *Hygrophila polysperma* (not other varieties)
- *Ludwigia repens* (smaller)
- *Magasa fluviatilis*
- *Najas japonica* (big tanks only)
- *Rotala Nanjenshan* (syn. *Magasa setowakusana*)
- *Rotala mucronata*\*\*
- *Rotala rotundifolia*

\* If these plants are supplied in their emerse form they will instantly lose all their leaves, but once the underwater leaves appear they will spread like wildfire into every corner.

\*\* Given the right conditions, this will grow very rapidly and very healthily and, once it reaches the surface, it will branch prodigiously, providing plenty of propagation material.

### Decisions, decisions

If you have followed my advice and left the fish for now, you will eventually have a nice, clean, well-established, algae-free tank. You can then start thinking about more choice plants and a few fish and need to decide whether you are going to match your conditions to particular fish, or particular plants. Decide where your priorities lie but, once having made the choice, for example soft, acid water to grow the maximum range of plants, then you can disregard those delectable Rainbowfish which like hard, alkaline water.

If you've decided on South American dwarf cichlids which like soft acid water, then you won't buy *Valisneria*, certain *Limnophila*s or *Bacopa monnina*, which flourish in hard, alkaline water.

With lighting, if you don't think it's as strong as it might be, then there's no point buying light-hungry plants like *Rotala* or *Aternanthera*.

### Email me!

For a trial period, you can email me at [gw@kplabs@yahoo.co.uk](mailto:gw@kplabs@yahoo.co.uk) with your comments, questions or criticisms on any aspect of this series. Please keep messages to a maximum of 10kb, with no pictures or attachments, as I don't have broadband – sorry, but any contravening the guidelines won't get through!

But if you've got the best lighting and soft, acid water at 24°C/75°F, then the plant world is your oyster.

### Book worms

In the world of books, you get what you pay for, and what is possibly the most expensive aquarium plant book in the world is also the best, "Aquarium Plants" by Christel Kasselmann, although not perfect and some of the advice on aquarium set-up and management is a little questionable in my opinion, is a good bet.

Books in the lower price levels are not quite so reliable. What's possibly the second most expensive plant book in the world, "Aquarium Plants – the practical guide" by Pablo Tepeot, has 160 pages of full-sized A4 colour plates, all beautifully rendered, but 120 plants – including most of the *Cryptocoryne* and *Echinodorus* – are shown in their emerse form.

The Baensch aquarium encyclopaedias are the most comprehensive plant books, but collectively are quite expensive, although you do get the best possible general fish guide with them and this can be valuable when setting up a planted aquarium.

"System for fascinating aquariums – the big Dennerle guide" is, without doubt, the best value for money. The many beautifully photographed set-ups show you how plants look when they are actually growing in an aquarium, and there is a useful illustrated compendium of mainly accurately named plants. The book is dedicated to Dennerle's own system, but this doesn't detract from its value.

### Next issue

Choosing plants without the good advice from books, plus layout and design.

practical  
**fishkeeping**  
MAGAZINE

# THE PFK GOOD HEALTH GUIDE

Essential information  
to help you keep your  
freshwater, marine and  
pond fish in the very  
best of health.

# Contents



## **Fit to swim in? 4**

Most fish health problems are caused by poor water quality, or the wrong water conditions. JEREMY GAY takes a look at the importance of getting the water right.

## **Fishless cycling 10**

Nothing to do with fish on bikes but a way of introducing bacteria via a filter to deal with harmful toxins, as THOM BERRMAN explains.

## **You are what you eat! 15**

...and so are your fish. JEREMY GAY says get their diet right and they'll thrive, get it wrong and their health may be at risk.

## **Health answers 22**

Dr PETER BURNESS of the Aquanote Advisory Service answers your health queries.

## **What's wrong with my fish? 27**

JEREMY GAY highlights some of the most common health problems that can affect your fish, and offers advice on how to treat them.

## **Healthy giveaways 30**

Great giveaways to help keep your fish happy and healthy.

## **Win a new V2ecton UV steriliser 31**

There are three great V2ecton V200 UV sterilisers from Tropical Marine Centre to be won in this great competition, each worth £26.99.

## **What makes a healthy reef tank? 33**

MIKE PALETTA highlights the important factors that can determine whether your reef aquarium is a success – or a failure.

## **The problem-free pond 41**

NICK FLETCHER has some seasonal advice on how to keep your pond and your fish healthy, happy, and trouble-free all year round.



**Practical Fishkeeping**  
EMAP Active Ltd.  
Bretton Court,  
Bretton,  
Peterborough  
PE3 8DZ.  
Tel. 01733 264666.

**EDITOR:** Karen Youngs  
**TECHNICAL WRITER:**  
Jeremy Gay  
**OFFICE MANAGER:**  
Hannah Travers  
**SUB-EDITOR/ WRITER:**

Kate Hardy  
**GROUP ART EDITOR,**  
**PETS:**  
Rachel Thickpenny  
**SENIOR DESIGNER:**  
Louis McGuffog  
**AD MANAGER:**  
Sarah Wilson  
**DISPLAY SALES**  
**EXECUTIVE:**  
Rebecca Mee  
**CLASSIFIEDS:**  
Gemina Wheatley,  
Ian Morris, Laura Wilcox

**GENERAL MANAGER,**  
**PETS:**  
Steve Windsor

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# Fit to swim in?

Most fish health problems are caused by poor water quality, or the wrong water conditions. **Jeremy Gay** takes a look at the importance of getting the water right.

**W**ater quality is the most critical aspect of fishkeeping to get right. Get it wrong and the chances are that your fish will not survive for more than a few days.

Why won't fish live in poor water quality? Well, at the end of the day they are just not adapted to live in it. Nature provides bacteria,

rainwater for dilution, and plants for the removal of ammonia, nitrite and nitrate in natural waters, and therefore fish and other aquatic life do not have to deal with them. If we then try to keep them in water where ammonia or nitrite are present, they will soon become ill and die because they are unable to cope with the situation. So how do we get round keeping fish in small, closed bodies of water, when their

metabolisms produce ammonia but they cannot live in water that contains it?

#### The nitrogen cycle

Luckily for us, Nature offers us a helping hand. Fish produce ammonia as they breathe but there are oxidising or nitrifying bacteria that convert ammonia into nitrite and nitrite into nitrate. Plants can



**Fans will do much better in aquaria with soft, acidic water.**

bacteria). In those aquariums where sufficient nitrification is taking place, ammonia and nitrite will be converted as quickly as it is being produced and the result will be rising levels of nitrate which is then available to plants as a fertiliser.

So in an ideal world, we would be able to keep fish in a tank with plants and a filter and it would have everything it needed. Food from the plants, water purification by the filter bacteria and nitrate intake by the plants, providing more food for the fish.

But it's not simple as that, unfortunately – not all tanks contain plants and not all fish eat plants. For plants to function properly they also need the right environmental conditions like light before they can deal with other things. However, those tanks that do contain healthy growing plants will benefit from reduced nitrate levels and increased oxygen levels in the daytime. We mainly use only a part of the nitrogen cycle to our benefit, and that is the part where bacteria oxidise ammonia and nitrite. We generally deal with the resulting nitrate through water changes.

The species of bacteria that do the oxidising is up for some debate too. Traditionally, all literature states that ammonia is oxidised by *Nitrosomonas* bacteria into nitrite. Typically, *Nitrosomonas europaea*. Nitrite is then oxidised by *Nitrobacter winogradskyi* bacteria into nitrate. However, a paper published by Dr Timothy Howanac of the University of California said that the main genus of bacteria converting nitrite into nitrate in freshwater tanks, are *Nitrospira*.

Whichever genus is doing the actual conversion into nitrate, we should be eternally grateful and without it our hobby would be quite different – we'd no doubt be using far more chemicals than we do now, for example.

### Nitrate

So if nitrate is useful to plants why is it a problem for fish? Well, it is a lot less toxic to fish than ammonia or nitrite. If we compare the results of a typical water test, nitrate levels can be 50 to 100 times higher than nitrite or ammonia and still not cause too much trouble for the fish that are living in it. But nitrate builds up over weeks or months and a fish taken from a nitrate level of

5ppm and placed into a nitrate level of 100ppm will certainly become stressed, with sensitive species succumbing to disease and even death. Nitrate is also often linked with phosphate when investigating the causes of nuisance algae.

Apart from plants there are other ways of getting rid of nitrate in aquarium water.

Firstly we can change a proportion of the tank water with a source of water that contains less nitrate. Usually, and depending where you live and what sort of fish you keep, tapwater is the cheapest and most convenient source of fresher water for your tank, but as many of us are aware some tapwater is pretty dire from a fishkeeping aspect, and an initial nitrate test should be carried out to ascertain whether it is suitable. If levels are 20ppm or more then I wouldn't use it and would consider purifying it by using a Nitragen, deioniser or an RO unit. You could even store it and place nitrate removers in it.

Once you have established a source of low nitrate water change water you can use the PFK website water change calculator to ascertain how much you should be changing ([www.practicalfishkeeping.co.uk](http://www.practicalfishkeeping.co.uk)). To remove water from the aquarium I always use a siphon tube with a simple gravel vacuum. The advantage with gravel vacuuming is that it removes detritus from the gravel – this is a source of nitrate. If you want to reduce nitrate drastically, then thinning out the depth of the gravel may also help.

If you are still struggling to control nitrate despite an excellent maintenance regime you may be overstocked or overfeeding, but there is a help in the form of chemicals and media to control it.

Firstly there are nitrate removal resins like Nitrazorb from API. This comes in a big 'tea bag' and can be placed in the aquarium or inside an external filter. It sucks up nitrate to the point of saturation and can then be thrown away or recharged with aquarium salt. Green-X from Rolf C. Hagen also reduces nitrate levels along with Juwel's Nitrate Removal Sponge and Underworld's Polyfilter. Tetra's Nitrate minus works by utilising denitrifying bacteria to break down granules placed in the gravel. Oxygen flow is less in the gravel bed and denitrifying bacteria use nitrate instead of oxygen to

utilise nitrate as a fertiliser, and fish can use plants as a food source. This link between fish, bacteria and plants is known as the nitrogen cycle.

Understanding the nitrogen cycle is part of successful fishkeeping, and you can find out whether the cycle is present and functioning in your tank by testing the water. Aquarists with levels of ammonia or nitrite in the water don't have enough nitrifying bacteria to convert all the ammonia being produced. This could be due to a new filter or new media being installed, too many fish, or filter media being washed under the tap (the chlorine in tapwater kills the beneficial filter



### "Algae Problem?"

Why not try feeding a low phosphorus food such as Nitratin Max, with low phosphorus for less algae."

# Fishless cycling

Nothing to do with fish on bikes but a way of introducing bacteria via a filter to deal with harmful toxins, as **Thom Berriman** explains.

## Filter maturing agents

There are also some special filter maturing agents on the aquatic market, such as Waterlife's BioMature. It's ideal for maturing new filters and maintaining empty hospital tanks and can be used in freshwater and marine setups. You use it daily in conjunction with a nitrite test kit, until the nitrite reading has peaked at 10ppm and then once the nitrite reading has fallen to zero, you can start stocking the aquarium.



**C**ycling of an aquarium is basically just the maturing of the filters – the establishing of a colony of bacteria within the filter that will deal with fish waste. Without these bacteria, chemicals that are toxic to fish, such as ammonia and nitrite, will not be broken down and so could threaten the health of our fish. Fish produce ammonia as a waste product, both through respiration and excretion. Among other things, ammonia can burn fish gills, making it difficult for them to breathe. This is what is known as ammonia poisoning, and is a killer.

In order to remove ammonia, we need to build up a colony of bacteria in the filters called *Nitrosomonas*, which will convert the ammonia into nitrite through oxidation. Nitrite is again very toxic to fish and, among other things, will bind with haemoglobin in the fish's blood. Haemoglobin is the part of the red blood cells that enable them to transport oxygen around the body so again, nitrite can result in breathing difficulties as the fish try harder and harder to get oxygen around their body to the organs and tissues that need it.

The removal of nitrite from the water is again done through the building up of a colony of bacteria in the filter, this time the bacteria *Nitrobacter* and *Nitrospira*. These bacteria will convert the nitrite into nitrate – again through oxidation. Nitrate is far less toxic than either ammonia or nitrite, and is perfectly acceptable in tanks at levels up to

around 25ppm (parts per million) long-term. Fish can tolerate higher levels of nitrate short-term, but over a longer period, higher levels can, and will, have a detrimental effect, causing fish stress, lowering their immune system, and so increasing their susceptibility to disease. Nitrates can be removed from the water through regular water changes.

The 'cycling' of a tank is the building up of these bacteria colonies before the fish are added (known as fishless cycling), so that when they are introduced into the aquarium, the waste they produce

can be dealt with without the fish being exposed to toxic ammonia or nitrite.

## On your bike

In order to cycle a tank, a source of ammonia has to be provided to feed these bacteria so that the colony can get started and multiply. There are several ways of getting this ammonia, including pure ammonia (which you may be able to get hold of at a supermarket, but check it is just pure ammonia and does not contain any other chemicals), fish food (this can be messy and isn't



**ARE THESE BACTERIA ONLY FOUND IN FILTERS?**

No, they are present on practically every surface within the aquarium. When tank maintenance is carried out, it is very often recommended that you only vacuum a small section of the substrate within the tank at a time to preserve as many of the bacteria found there as possible. However, in order to work most effectively the bacteria need a good supply of oxygen, by flowing water over them, and research has shown they work more effectively in darker conditions. These conditions are best replicated in the filters, and so it is within the filters that the bacteria are most effective. Filter media also have a very large surface area because they are porous, allowing for a greater number of bacteria to colonise what is a relatively small section.

the best source of ammonia) or raw cocktail shrimp.

The raw cocktail shrimp is one of the latest ideas in fishless cycling, and, although I haven't personally tried this method, I have heard a lot of positive feedback from those who have.

First, decaying cocktail shrimp produce the ammonia needed to supply the bacteria, and they save the need for regular dosing. With fish food and pure ammonia,

**Pencilfish need the stable water conditions that cycling can provide.**



regular doses have to be added to the tank in order to keep the supply of ammonia going for the bacteria, but with cocktail shrimp there is a gradual decaying, so re-dosing is not so regular, only once the original shrimp is no longer producing ammonia. Two downsides to the shrimp are that it does make a bit of a mess in the tank when decaying (but this can be suctioned out after the cycle), and it can let off a bit of a smell in an uncovered tank!

It is very important to ensure you get the right dose of ammonia into the tank; too little and you are not going to get enough bacteria built up to be able to deal with the waste produced by the fish once you start to stock the tank. Too much, and it's going to take a longer period for the cycle to complete because more bacteria would have to be produced as a consequence. Aim to dose in the region of 2-3ppm of ammonia, and no more than 5ppm

of ammonia in the tank; otherwise you will risk prolonging the cycle period.

Another factor that can affect the speed of cycling is tank temperature. The bacteria you are building up in your filter have been found to multiply, and so colonise, much quicker at higher temperatures. Therefore, if you are cycling a tropical tank, it would be worth having the heater on – even though there are no fish in it, and set it to the temperature that you intend to run it at once your fish are added.

When you have a supply of ammonia being added to the tank, you should test the water regularly (daily or every other day) to keep an eye on the progress of the cycle:

- First observe a spike in ammonia levels as the bacteria that break it down multiply to levels high enough to be able to deal with the supply.
- You should then start to see nitrite building up as the ammonia is broken down by these bacteria.
- Next should come a spike in the nitrite as the ammonia is completely broken down by the bacteria. Keep supplying ammonia to feed the bacteria during the cycle otherwise they will die off.
- This spike will then start to drop off as the bacteria that deal with the nitrite multiply to levels high enough to deal with it. As the nitrite drops down, you should get a nitrate reading.

Once you have experienced both the ammonia and nitrite spikes, have a nitrate reading, and readings of 0 for both ammonia and nitrite, the cycle is complete. This process usually takes around 4-6 weeks.

After this, carry out a water change to reduce the nitrates to an acceptable level (2.5ppm or below), and get ready for your fish. Make sure you keep feeding the bacteria with ammonia while you have no fish in the tank.



**Fishless cycling would benefit the high initial stocking necessary with mbuna.**

# You are what you eat!

...and so are your fish. Get their diet right and your fish will thrive, but get it wrong and their health may be at risk.

**T**he importance of proper feeding should not be underestimated as it directly affects the health of your fish. Dry food packaging details lots of analysis data but do you ever look at it? If you know what each constituent does, selection of the best foods will really help your fish.

## "Typical analysis"

Typical analysis is the term stated on the side of the pot that details what the food is made up of and in what proportions. Most manufacturers list it in the same way and those are listed below.

### ● Protein

Proteins are made up of essential and non-essential amino acids.

Non-essential amino acids can be produced by the fish themselves from other amino acids, but essential amino acids must be provided for the fish in their diets.

Protein only provides some energy to fish and is mainly used for muscle building. Fish derive more energy from fats and oils provided in foods than protein, and when fish do use protein for energy, ammonia is produced from the break down of amino acids.

If fish are fed foods that are too high in protein for their make up, then the extra protein will not be used and will just result in increased ammonia production.

### ● Oil

The amount of oil that is added

### ▲▲▲

Flake foods are ideal for midwater-feeding fish.

to foods is usually quite small, as it provides more than twice the amount of energy that protein does, and too much of it will result in fat fish. The best source of oil for a fish is actually from fresh fish and fish meal. So if you do see "fish and fish derivatives," on your pot of food but have vegetarian fish, don't worry as it is doing them good.

### ● Fibre

The fibre content in food contributes little to the overall health of most fish. Fibre is largely indigestible and just results in more fish poo. Plant leaves contain lots of fibre so if your Plec decides to eat



AP © C. Nicholson / Alamy.com

## TIP

● Fish produce more ammonia while digesting their last meal, so do a water change after feeding, not before it.

them the problem will be twofold because he will ruin your plants, and poop much more.

### ● Ash

The ash content listed in food is the resultant ash when the food is burnt at high temperatures. Good foods will have a low ash content.

### ● Moisture

The moisture content in foods refers to how dry the food is when it is packed. Too wet and it will go off, but too dry and fish cannot digest it as quickly. Although dry in the packaging, manufacturers must produce a food that takes on water rapidly once it hits the surface to aid digestion by the fish when they consume it.

### ● Vitamins

Vitamins and minerals are essential to fish in order for their bodies to function. The vitamin requirements of fish differ with regard to whether they are growing or breeding, and deficiencies in any mineral can result in poor growth, loss of vitality and even death in some cases.

Vitamins can be fat-soluble or water-soluble. Fat-soluble vitamins can be stored by fish and administered when necessary but water-soluble vitamins like vitamin C for example must be continually replenished by foods.

## Frozen and live foods

Although they seem like the most

natural choice for a fish to eat, no frozen or live food can sustain a fish permanently on its own. Take a look at the nutritional content of frozen foods like bloodworm and brineshrimp and you may be surprised. A brand of frozen Daphnia reveals only 2.4% crude protein, 0.7% crude fat and all the rest is water with a tiny fraction of fibre. That is exactly why tropical fish fed exclusively on bloodworm will become thinner and thinner despite appearing to be quite fat after meals. Also, if you have a marine fish that will only eat brine shrimp then you will be in trouble there as well.

Fortifying these foods before you feed them using some of the special aquarium products on the market, like Kent's Zoecon can certainly help. Frozen foods can also lose their nutritional content whilst thawing, so try using Zoofish's Fishvits to revitalise it before feeding – tel 020 7730 9595; [www.zoofish.com](http://www.zoofish.com)

Frozen foods should be kept frozen at all times. In the same way that bacteria affect our frozen foods, thawing and refreezing will spoil any frozen foods and affect the health of your fish. In the past I have attributed fish deaths and disease to batches of thawed out and refrozen bloodworm.

Live foods must be kept



### TOP RIGHT:

Micro granules sink slowly through the water.

### NOTE:

Tablets are the best way of getting food to bottom feeding fish.

Big catfish often regurgitate food when being moved.



PH: S. C. HINDS / BUNNINGS



**Small fish like these Serpae tetras should be fed little and often.**

AP & C. Photo: iStockphoto.com

Live foods must be kept refrigerated and better still fed on the day of purchase. If you buy live bloodworm, daphnia or brine shrimp in the little sealed packets you get from retail shops, feed soon after purchase as they will perish within a few days, even when kept cool. If the food starts to die then you should throw it away along with the water that it was kept in as it could be full of ammonia.

### Storage

Dry foods usually have a foil seal for freshness. Always keep the lid on

the food after breaking the seal to make sure that it stays dry and away from atmospheric air. Nutritional content of dry foods will diminish if exposed to the air – a good reason not to buy bags of loose dry foods. It may be a cheap way of buying it but the food could contain half or even none of the nutritional content that they once came with!

Try not to get dry foods wet in storage as they will rot and should be thrown away. Also, don't keep the pot of food on top of your hood as the heat will spoil it and don't store it anywhere that it will receive direct sunlight.

**NOTE:**  
Fishes will quickly go off if exposed to the air.



### HOW OFTEN SHOULD YOU FEED YOUR FISH?

The frequency with which each fish needs to be fed differs from species to species, but generally, smaller fish should be fed more often than larger ones. It is good for small fish to be fed three times per day on small amounts of mouth sized foods. If feeding that many times per day, don't feed large amounts as if you do a lot of the food will not be digested and will pass as faeces. This will then manifest itself as ammonia and will cause strain on the filtration system. Little and often is not a cliché. Larger fish fall into two categories, depending on whether they are predatory or not. Large non-predatory fish like Tinili bards or Silver shanks can still be fed several times per day on a diet consisting of dry and frozen foods. Predatory fish are adapted to eat in a different routine, and should be fed less often with larger foods.

Like any predator, meals may be low and far between in the wild so a fish like a Pike cichlid is adapted to take large food items up to half its own size, and then take days to digest it. Fish that are evolved to eat fish should eat fish (frozen food fish of course, not live) otherwise they may not get all the micronutrients that they need.

We know of one Pike cichlid that would only eat cookies. It ate lots of them several times a day and grew to over 50cm/12" long in only a year. By 12 months it had become very fat and then it died. This could have been the combination of feeding far too often and on a food that didn't contain the essential micronutrients that the fish needed to survive.

Temperature affects the metabolic rate of fish. The warmer it is, the more the fish will want to feed but the flipside to that is that their oxygen requirements will also go up, in water that becomes increasingly devoid of oxygen as it warms. An accelerated metabolism also means greater

ammonia production so if you feed Pondfish on really warm, muggy days you could be heading for a disaster.

### WHEN NOT TO FEED

Never feed your fish when either ammonia or nitrite is present in the water. Fish in new aquariums where there are traces of "New Tank Syndrome" should be fed much less until the problem has gone away. Although this may result in thin fish for a few weeks, to feed them normal amounts may push ammonia levels higher, resulting in the death of the fish.

If transporting fish over long distances or showing fish, it is a good idea to reduce food for several days prior to transporting or put it out altogether. Fish will then produce less waste on the day. This is particularly relevant to large catfish as they can regurgitate a meal consumed days earlier through stress of being caught and transported.

# Health answers

Dr Peter Burgess of the Aquarian Advisory Service is here to help.

**BELOW:** *Gyrinocheilus agmaneri* can become intolerant of other fish when adult.

**RIGHT:** *Comatocaris* seems to be most common in livebearers and cichlids.

**BELOW RIGHT:** Harmless planarian flatworms can be introduced on plants.

## Getting rid of harmful copper

**Q** For many years I have been inadvertently poisoning my fish by carrying out water changes of 50:50 coldwater and hot water from my boiler. This led to a high copper reading and many fish deaths.

Now I am warming any change water by boiling a kettle, and using Polyfilter pads. Matters have greatly improved, but the pads still turn blue, indicating there is still some copper present. How long will this take to clear completely?  
Richard Hurst, Hove

**A** I presume you have double-checked the copper readings to convince yourself that the hot-water supply really was to blame? One simple test would be to take copper readings from both the hot and coldwater taps – if your assumption is correct, the former reading will be the higher.

High levels of copper are indeed toxic to fish, and especially so to aquatic invertebrates. Toxicity is at its greatest under acid water conditions.

One way to neutralise any copper is to use a dechlorinating product that additionally detoxifies heavy metals – Stress Coat by API is a good one.

Copper may also arise from within the aquarium, for example, from bars, copper-based metalwork or from rocks that contain seams of copper ore. The greatest risk comes not from shop-bought items of

décor – these should be safe – but from anything collected from the seashore or countryside.

## Substrate could be the problem

**Q** My 85 L/19 gal. tank tests out perfectly for water quality and has been set up for some time. The lights are on for nine hours daily and the tank is well planted over a sand substrate. It contains a mixture of fish including algae-eaters, tetras, rainbows and

Corydoras. Recently I have lost a female Congo tetra, a Neon, three Dwarf Neon rainbowfish and a Corydoras to finrot and mouth/body fungus. A female Swordtail is slowly recovering. According to my diary, I experienced a very similar problem a year ago – I hope you can help.

Keith Wooden, Burgess Hill

**A** I assume that several of the affected fish had been resident in your tank for several months prior to falling sick, so we can probably







MP & C. Pichon / iStockphoto.com

rule out any disease brought in at the time of purchase.

Even though your water test results appear fine, I should point out that finrot and fungus can be linked to deteriorating water conditions. Equally, aggression (such as fin nipping) by other fish could injure and stress the victims, laying them open to attack by these diseases. Potential aggressors could be your *Cyrtocochelus* algae-eaters – I have found the adults to be very intolerant of other fish.

I also note that you have a sand substrate. Because this is a very compact material, the water between the particles can easily become stagnant and deficient in oxygen. Any anaerobic pockets within the sand will lead to the production of noxious chemicals such as hydrogen sulphide. These pockets typically cause the surrounding sand (and any touching rock surfaces) to turn black, which is a bad sign. So I would think about using a coarser substrate – and that, unfortunately, means stripping down the tank.

**Will fish meet a sticky end?**

**Q** While I was feeding my Angels I noticed that one had what looked like a growth coming from its anus. Closer inspection suggested that part of its gut was protruding. I have never seen such a thing before – do you think I need to take the fish to a vet?

Kari Bullock, via email

**A** If the 'growth' looks like part of a thin, reddish worm that's protruding from the Angel's vent, then your fish probably has a *Cannibalus* infection.

*Cannibalus* is a gut-dwelling nematode that affects a wide range of species, but seems most common in certain livebearers and cichlids. It doesn't necessarily kill its host, but it can debilitate it.

To treat it, you will need the services of a vet, because there are no over-the-counter remedies that I know of that will eradicate these parasitic worms.

The commonly-used prescription-only treatments are Fenbendazole (2mg/litre, as a long-term bath) and Levamisole (1-2mg/litre as a 24-hour bath). Repeat treatments may be needed.

If the 'growth' doesn't look like a worm, then it could be a tumour or perhaps a prolapse of the anus, possibly operable. Either way, it looks like you'll need to see a vet.

**Unwanted worms come in on plants**

**Q** In my recently set-up planted tropical tank, still to be stocked with fish, I have noticed small slug-like creatures 1-3mm long gliding over the glass and similar-looking creatures free-swimming rather like leeches. Are these the same animals, and what should I do about them?

Patrick Kerrigan, via email

**A** The worm-like creatures gliding over the glass are probably a type of flatworm known as a planarian. They are harmless, and were possibly introduced via the plants. The swimming worms might well be leeches, but of the many species around, most are harmless to fish.

There are no safe chemical treatments for either of these pests, and to keep them in control I normally suck them



Joe Heston / iStockphoto.com



**ABOVE:** Although easy to diagnose, Dropsy is often difficult to treat and affected fish may not recover.

**RIGHT:** Angels are happiest in the company of their own kind.

out with a syphon tube. Were your plants sold for tropical aquarium use? It's a little unusual for tropical plants to harbour both these types of worm, although we might expect to find them occasionally on pond plants.

You are doing the right thing to mature the tank slowly. When you add fish, build up their numbers slowly, just a couple at a time.

### Dropsy – is it contagious?

**Q** Every so often one or two of my fish get dropsy. This puzzles me, because the disease is supposedly not contagious. The species affected are Siamese fighters, Guppies and Honey gouramis, and the 190 L/42 gal. community tank has been running for 10 months.

Ben Cousins, via email

**A** Dropsy can have many causes, although often an internal bacterial infection is to blame. In my experience, most forms of this disease that we see in aquarium

fish are not highly contagious, although some are. Whatever the cause, dropsy is generally hard to treat, even if over-the-counter remedies and antibiotics are used. Unhygienic water conditions will make fish prone to infection with *Mycobacteria*, which are responsible for some forms of dropsy.

I suggest you thoroughly strip down the tank and clean the gravel – at least you will then be starting afresh with a clean substrate. I see no need to sterilise or disinfect the tank or any of the equipment.

When you come to replace the lost fish, do so slowly, a couple at a time. But be very selective about what you buy. I'd steer clear of Dwarf gouramis, Betta and Guppies, as some farmed stocks of these seem prone to dropsy. I would stick with small tetras, barbs, rasboras and *Corydoras*.

### Benefits of a UV

**Q** I know several marine fishkeepers who have a UV steriliser on their system, but are there any benefits to adding

a UV unit to my freshwater community aquarium? Can they prevent disease?

J. Short, via email

**A** Ultra violet (UV) sterilisation can be equally beneficial in controlling certain diseases in freshwater fish. Indeed, many aquatics stores install UV sterilisers on their freshwater systems. It will, for example, help control outbreaks of freshwater whitespot (ich) but this added safeguard comes at a price: a good UV steriliser is reasonably costly and there is the ongoing expense of replacing the UV lamp every few months. This partly explains why this piece of equipment is more commonly used on the more expensive marine systems. Also, many marine fish, and especially corals and other invertebrates, are sensitive to some chemical disease remedies, hence the extra reliance on UV in marine aquaria. However, the best disease prevention strategy, whether for marine or freshwater systems, is to buy only quality stock from reliable sources and always to quarantine

MP/B.C. (Illustration: © iStockphoto.com)

new purchases for a week or so. Also, be aware that UV won't destroy all disease organisms, particularly those that are large (eg many fish parasites) or produce spores (eg fungi and some bacteria and protozoa), so never rely exclusively on UV to prevent or cure diseases. But despite its cost and limitations, UV can make a difference in terms of maintaining healthy freshwater systems.

### What's up with my angelfish?

**Q** One of my three Veiltail angelfish began picking on a tankmate and head-butting it, so I removed the victim to another tank. Two months on, this fish spends most of its time lying on the bottom, though it does occasionally swim up for food. Now its attacker is exhibiting the same behaviour. Do you think this is a water quality issue, or could some damage have been done to their swimbladders? My pH is 6.2, ammonia 0-0.5mg/l.  
Sun Maddison, via email

**A** If the problem were swimbladder damage, the affected fish wouldn't be able to swim normally at all, so I think we can discount that.

Lying on the bottom is a known angelfish reaction to stress. It is possible that the solitary confinement has caused this – angels are shoaling fishes, and for one to be alone after being part of a social group is potentially very stressful. But that doesn't explain why the aggressor is now lying on the bottom. Where is the third angel – are you sure that it isn't bullying the original aggressor in its turn?

Water issues could be a factor. Any ammonia reading indicates that all isn't as biologically balanced as it might be. There is nothing wrong with a pH of 6.2 for angels, but it is not unknown for chemical pH adjusters to have side-effects. If you are using one of these and the pH is yo-yo-ing, that could be at the root of your fishes' behaviour.

Are your water changes up to scratch? Not only do these remove nitrate, they also replenish minerals and generally freshen things up. Without them, your fish may be experiencing some sort of deficiency, or just the malaise of living in the same old water – a bit like living in a stuffy room.



### Whitespot has side effects

**Q** I recently introduced a fish with whitespot to my tank. I treated the aquarium, but I still lost some of my fish and a few haven't really recovered. Some of the fish that died developed what seemed to be a bacterial infection. Some of my other fish are still flicking. I completed the course of treatment, so I'm now unsure what I should do.  
Anna Wright, via email

**A** A severe whitespot infection can cause irreversible damage to a fish's gills and skin which can lead to breathing problems and also puts the fish at risk of secondary infections. So, although you may have eradicated the whitespot itself, some fish may be too ill to recover, or end up dying from other

problems.

The continuing rubbing could be due to residual skin irritation, but it could also mean that the whitespot parasites are still in the system. So I would monitor the survivors carefully for signs of a fresh outbreak of spots. Even if you see just a few, start a new course of treatment without delay.

To help overcome any secondary bacterial infections of the damaged skin, and to assist with wound-healing, I would treat the tank with a herbal based anti-bacterial remedy such as Melafix.

In future, quarantine all new stock before it goes into the main tank, and be sure to follow the instructions on the bottle if ever you have another case of whitespot – a two-stage treatment may not eliminate all the stages of the parasite.

# What's **Wrong** with my fish?

**Jeremy Gay** highlights some of the most common health problems that can affect your fish, and offers advice on how to treat them.

**W**hen you first spot disease in your home aquarium, shock is the initial reaction followed by a raised eyebrow as to where the disease has come from because "all your fish were fine before you bought the new ones." Well, you may be surprised to know that all fish carry disease of some kind, and unfortunately dealing with diseases is part and parcel of keeping fish.

## **What is disease?**

Fish disease comes in the form of organisms called pathogens, and they can be either parasites, bacteria, fungi or viruses. They may

or may not be infectious and if the cause of the disease is not removed then a treated fish could easily become ill again.

The number one cause of disease in fish is stress. Stress can be put on fish by a whole number of factors including capture, starvation, noise, light and environmental conditions. Environmental conditions include water quality, and fish kept in unsuitable conditions like the wrong pH or water containing ammonia and nitrite are the often the most susceptible to disease.

Unsuitable conditions can not only make a previously healthy fish ill but may prevent it from responding to treatments, leading to its eventual death.

## **The usual suspects**

Here's a shortlist of the most common diseases along with how to recognise them and advice on treatment. Always test the water before commencing with any treatment as any problems need rectifying before you start.

## **Whitespot**

This is probably the top disease affecting coldwater, tropical and marine fish, (or at least the top identifiable disease!) It is easily identified as its name describes what it looks like. Its proper name is *Ichthyophthirius multifiliis*, (*Cypridin* in marine,) and is sometimes referred to as

an abbreviation called "ich." A common cause of whitespot is rapid temperature change. This tends to happen if you change the water with water that is too cold, and happens more frequently in the winter months when tapwater is considerably colder.

Affected fish show signs of tiny white spots appearing on the fins and all over the body. The spots are about the size of grains of salt and each one represents one parasite beneath, called a trophont, embedded in the skin of the fish.

The parasite feeds on tissue, fluid and dead cells before bursting through the skin and forming a cyst elsewhere in the aquarium. The cyst then bursts releasing 1000 infective "tomites" that can free swim to find a new host and so the cycle begins.

It is because of the changing life stages of the parasite that makes it difficult to treat at times. To combat this, whitespot treatments are administered over the course of a week or more so that they are effective on the changing stages of the infection.

Treatment should be used as soon as the first spots are noticed and an increase of water temperature is recommended as this speeds up the lifecycle of the parasite. For tropical fish, increase the water temperature to around 30°C/86°F.

### Fungus

Fungus is again easy to diagnose because it forms a white, cotton wool-like growth on fish or fish eggs. Fungus does occur on submerged organic matter like wood, leaves and even uneaten fish food, but fish with wounds and broken skin are susceptible to infectious *Saprolegnia* fungi, which can kill them if left untreated.

The most common fungal occurrence is with goldfish in ponds. At spawning time, the females get a rough time from males as they are relentlessly driven around the pond. This rough treatment usually results in loss of scales on the flanks and broken skin on some occasions. The skin is naturally weakened at spawning time by hormones and fungi take hold on the damaged areas that were previously protected by skin and mucus.

Treatment should be with an anti-fungal treatment and prevention of further infection can be achieved by increasing hygiene in the aquarium or pond so that there are less fungal spores in the water. Fungus can attack fish that have previously been

weakened by parasitic or bacterial infection.

### Ulcers

Ulcers are a type of bacterial infection that commonly affect indoor coldwater fish and pondfish. Tropical fish can get ulcers too. Diagnosis is quite simple as ulcers are areas of broken skin that erode into deep, red sores. They usually have a white edge and become quite circular as they grow.

Ulcers are caused by *Aeromonas* bacteria, but can become infected with fungus, parasites and other bacteria as it is an easy way into the fish's body. The fish's osmoregulation is severely effected as they cannot control the flow of fluids so the addition of salt may help.

Ulcers are infectious and aquariums or ponds containing one infected fish can quickly turn into an outbreak. Isolate infected fish and treat with an anti-ulcer treatment. Even if the ulceration is stopped, tissue regrowth is often slow and may take months.

### Mouth rot and finrot

Also known as mouth fungus, mouth rot is actually caused by a type of bacteria called *Flexibacter*. It affects the mouth but also the fins of fish and is common in poor water conditions. Affected fish will not be able to feed and severe cases reveal loss of lips and deep erosion of the mouth and other areas. Treatment should be carried out with an off the shelf treatment for mouth rot.

Finrot is most commonly seen in fancy goldfish and goldfish kept



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in bowls and new aquariums. It is often related to fish kept in poor water conditions for extended periods and can be caused by several types of bacteria including *Aeromonas*, *Pseudomonas* and *Flexibacter*.

It only attacks the fins but can erode them right to the base, further infecting the fish's flesh. Symptoms include shortening of the fins and redness and or white marks on the fins.

Treatment with an anti-finrot treatment is advised along with a water test, because as mentioned earlier, it is nearly always related to water quality but can sometimes also be the result of fin ripping.

### TIPS

- To lower numbers of pathogens in your aquarium, fit a UV steriliser.

- Disease is often more prevalent in tanks that are poorly filtered and overcrowded. A spacious aquarium below the maximum stocking levels is recommended in all cases.

### PREVIOUS

**PAGE:** Ulcers commonly affect coldwater fish.

**ABOVE:** A Harlequin with whitespot.

**ABOVE RIGHT:** Dropsy affecting a goldfish.

**LEFT:** Fungus is easy to diagnose with its cotton wool-like growths.



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### Flukes

If someone mentions flukes they are often making a reference to the monogenetic flukes, *Gyrodactylus* and *Dactylogyrus*. These are large (up to 2mm long,) external parasites that are commonly found on pondfish. They are called monogenetic because they use one host to complete their lifecycle. Those that need two hosts to reproduce are called digenetic.

Initial symptoms may be heavy mucus production and fish scratching on surfaces but becoming otherwise listless. To make an accurate identification you really need a microscope. It doesn't have to be powerful because the parasites are already quite large and look quite distinctive. *Gyrodactylus* has visible hooks that it uses to attach itself to its host. Sometimes you can even see the young developing inside the adult parasite, also complete with hooks, and they can reproduce at an alarming rate.

Treatments containing formaldehyde are the most effective. Flukes proliferate in springtime when outdoor temperatures start to rise.

### Fish lice

Common on shipments of Chinese fancy goldfish, fish lice or *Argulus* are large dish-shaped external parasites that attach themselves to the bodies and fins of fish where

they suck their blood. Their large size (up to 10mm in adults,) makes them visible to the naked eye and they can be removed by sliding them off the fish with your finger nail.

They are pretty horrible-looking things and once you have accurately identified and removed one from your fish, you will become a veritable eagle-eye and will be expert at spotting them forevermore. Adults leave the fish to lay eggs and these can normally be spotted on the glass where they can be mistaken for snail eggs. They should be scraped off and syphoned out as soon as possible. Remove all substrate once you have diagnosed a case of *Argulus* to ensure that there aren't any more juveniles lurking there.

The worst case that I have ever seen was when a customer informed me that his Borneo suckers had bred. I visited the tank and found to my horror that the tank was actually infested with about two hundred *Argulus* in all stages of their life cycle. Two large Orandas were the hosts and warm summer temperatures had caused a population explosion. Fancy goldfish are very suitable hosts as they have lots of fins and so lots of points for the parasite to attach to, though I have seen *Argulus* attached to small tropical fish like Glowlight tetras too. I have found that Waterlife's Parazin P works best.

### Velvet

Velvet looks a little bit like whitespot and is sometimes wrongly diagnosed. The spots are smaller and usually more numerous, covering the fish's body in no time. They can look quite yellow sometimes and may look like the fish has been sprinkled with pepper. If you want a second opinion, show the affected fish to your local retailer as it usually needs a different treatment to whitespot.

It can be difficult to treat because of the initial diagnosis and if it gets into the fishes' gills they will be in trouble. Salt is useful for freshwater velvet, *Piscinodinium* but the real is a saltwater type of velvet called *Amyloodinium*, which is most effectively treated with a fish-only copper based solution. An increase in temperature is recommended in both cases to speed up the life cycle of the parasite.

### Dropsy

Dropsy is easy to recognise because part, or all of the fish's body swells up causing the scales to become raised. Severe cases will make the eyes protrude and it doesn't always respond to treatment.

It has been linked to fish kept in unsuitable conditions or fed the wrong diet, but it can just appear for seemingly no reason and all your other fish may go on to be fine. Use a treatment specially for Dropsy.



# What makes a healthy reef tank?

**Mike Paletta** highlights the important factors that can determine whether your reef aquarium is a success – or a failure.

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**RIGHT:**  
Even with  
a big tank,  
every death  
needs to be  
investigated.

**BELOW:**  
Stability is the  
key to success  
with marines.  
Also, crabs  
and shrimps  
in particular  
need to be  
acclimatised  
to your set-up  
slowly after  
purchase.

**F**ish and corals do not die without cause. This may sound obvious, but to many hobbyists if a fish or coral dies the general impression can be that it passed away for no apparent reason. In the past I have been guilty of thinking this way too, and unless there was a major die-off I didn't look for possible causes in my tank. However, after recently setting up a 4542 l/1000 gal. tank dominated by many rare small-polyped stony (SPS) corals as well as fairy wrasses, angelfish and Anthias, I have developed a much more critical eye for ascertaining problems in the tank. Now when something dies or even starts to look less than perfect, I begin to look at a number of different things including water quality, nutrition, pests and parasites.

One of the problems that can occur when a hobbyist has been keeping a reef tank successfully for a number of years is that they begin to think their tank husbandry is so good that they are above such



problems. Losing fish and corals "for no reason" has taught me that even after 20+ years of keeping reefs, neglecting little things like water changes or feeding properly for even a short period of time can lead to big problems.

One of the first things that tends to get overlooked in a long-established tank is proper water quality. In the context of marine aquariums and especially reef aquariums, proper water quality refers to maintaining the tank's parameters close to those of natural seawater. However it is not just important to match the levels of natural seawater but it is also just as essential that these conditions are stable. Even though it has been shown that many animals we keep can adapt to less than perfect water conditions, our chances of success are markedly improved when the quality of the water is good.

#### **Tackle it at source**

In trying to maintain high water quality the best place to start





is at the beginning: the water coming from the tap. Tapwater is an often-overlooked source of problems in the marine aquarium – the assumption is that if it is good enough to drink it is good enough for fish and corals. Unfortunately in most instances it will contain some extra chlorine as well as trace amounts of nitrate and phosphate or ammonia. In worst-case scenarios, these compounds as well as trace amounts of heavy metals, pesticides, herbicides or silicates or chloramines can also find their way into tapwater. For these reasons it is necessary for most marine hobbyists to purify their tapwater before using it in their systems. The most commonly used systems for this are carbon filtration, reverse osmosis (RO), or deionisation (DI).

Carbon filtration extracts chemicals as water passes across its surface. The nature of processed carbon allows for a vast amount of tiny pores to be present on every grain of the carbon. These pores act to trap small molecules as they pass across the surface. For this reason

carbon is very effective at removing dissolved organic molecules from water including making yellow water crystal clear.

In a similar fashion, DI purification uses the anionic (- charge) and cation (+ charge) to extract charged elements and compounds from tapwater. In this method cartridges containing either resins of the separate anions or cations or mixed beds have tap water flow across them. These charged materials in the water are attracted to the oppositely charged material in the resins and thus get trapped in the cartridges rather than getting passed through into the tank. These units are good for extracting small charged elements or compounds that are not removed by other means.

Reverse osmosis employs a semi-permeable membrane that allows compounds or elements equal or smaller than water to pass through. Thus any large molecules such as proteins, nitrate, phosphate, silicates, copper, lead, etc. are removed. Unlike the other

methods this system requires pressure in order to force the clean water through the membrane and the other water containing the unwanted material gets flushed out as wastewater. As a result, there is a significant amount of waste water produced when this method is employed.

The best of these systems employs all of these methodologies as well as a sediment filter. In this type of arrangement, tapwater first passes through the sediment filter, which removes any detritus or large particles that have passed through the municipal water treatment process. This water then flows through the carbon filter that extracts many of the dissolved organics as well as metals and chlorine, which acts to shorten the life of RO membranes. The water then goes through the RO membrane and then it finally passes through the DI cartridges. When functioning properly this unit can purify water to where it is 99.7% pure – a great place to start in terms of keeping water quality high, not

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**RIGHT:**  
Seahorses  
should be fed  
several times  
a day.

**BELOW:**  
Feeding your  
corals directly  
with a bulb  
baster will  
increase the  
likelihood of  
them getting  
their share  
before the fish  
eat it all.

**FAR RIGHT:**  
Dissolved  
organic levels  
can inhibit  
the growth  
of corals and  
other inverts.

just for newly prepared synthetic  
seawater but also for top-up water.

#### Salty solution?

Another aspect that is often  
overlooked is the choice of  
synthetic salt. Few of us have access  
to clean, pure natural seawater.  
Fortunately, the synthetic seawater  
mixes that are now available are  
usually more than adequate.

Good quality salts generally  
use higher grades of salts that  
contain fewer impurities. As a  
result when they are used there  
is lower likelihood that unwanted  
contaminants would find their way  
into the tank. The manufacturers  
of these salts also spend significant  
time and effort to blend their  
salt mixes thoroughly to get as  
homogenous a mix as possible. The  
goal is that the salt contained in  
Bag 1 is precisely the same as Bag  
X and that when any of this salt is  
mixed with pure water it will have  
a chemical composition to closely

### POOR MAN'S QUARANTINE TANK

Any time a new fish or coral is introduced we run the  
risk of adding something that can wreak havoc on a  
closed system. Many of the pests that come in on the  
fish or corals in limited numbers or at a small size can  
over time become major impediments to the health of  
our tanks. Parasites such as ich or crypto for fish or  
rod bugs and parasitic flatworms can all decimate a  
previously healthy population of animals. Because of this  
it is more important than ever to quarantine any and all  
new animals that we introduce into a tank. Unfortunately,  
despite the knowledge of what can happen, very few  
hobbyists use a quarantine tank.

Since I no longer add many fish or animals to my tank  
I also no longer have a quarantine tank. But I now do a  
'poor man's quarantine' for any animals or fish that I  
introduce.

Before anything is introduced it is placed in a large  
plastic tank that rests within my display tank. This tank  
has no holes in it, so none of the water and possible  
contaminants come into contact with the water in my  
tank. The water is removed every 8-10 hours for a day and  
discarded and water from the tank is used to replace it.  
During this time the corals and fish are observed from  
above and in front of the tank, both during the day and at  
night with a powerful light to watch for parasites or pests.

After two days, if the animal appears to be parasite/  
pest free, it gets placed in a mesh basket where it is  
allowed to acclimate to the tank's conditions. During this  
time all fish are fed to make sure they are eating and all  
corals are observed to see if they have polyp extension.  
They are also observed regularly for pests and parasites  
and treated to remove them if necessary. After 3-4  
days in this chamber they are released or placed in the  
display tank. This semi-quarantine has gone a long way to  
ensuring the health of the tank as well as increasing the  
success in adding new fish and corals.



mimic that of natural seawater.

Some lower quality salts aren't mixed as well and as a result there may be inconsistencies from bag to bag. This usually manifests itself by the animals reacting extremely adversely after a water change or by some animals like echinoderms dying off. Starting out with the best quality tapwater and salt increases the likelihood of maintaining high water quality over time.

### Keeping it stable

Thorough water testing should be done on a regular basis to assess the quality of the crucial water parameters. When test levels come back with undesirable results, a search for the cause should immediately be undertaken. Small incremental adjustments should be done to bring levels back to the desired range rather than massive adjustments. Remember that stability is crucial too.

There are generally four measures that indicate water quality is deteriorating: rising nitrate and/or phosphate levels, rising dissolved organics and lower oxygen levels. Since the corals and fish in our tanks generally come from water that is low in nutrients, having any of these conditions present is cause for concern. All these levels should be as low as possible with nitrate not exceeding 10 mg/l and phosphate .015 mg/l. Dissolved organic levels are not measured easily, but they are easily seen by either a yellowing of the water or by the formation of red slime algae. All these compounds can slow or inhibit the growth of corals, so levels need to be kept as low as possible. Remember that nitrate and phosphate are critical compounds in many biochemical processes, so the goal is not to completely eliminate them, but rather to keep them at low levels.

You also need to ensure you provide adequate calcium and alkalinity levels, so that your corals thrive and grow. In my experience when an SPS coral bleaches for no apparent reason it is usually the result of the calcium or alkalinity levels being less than optimal. So as with nitrate and phosphate, test these levels weekly and ensure you keep them at the proper levels.

### Nutrition

As we have become increasingly more successful at keeping corals and other invertebrates, we have



developed a better understanding of what's required for their long-term health. Considering that 60-80% of their structures are designed for food capture or intake, it now seems naive to think all their needs can be met simply by providing strong light and feeding the fish. As a result of these observations, manufacturers are now providing foods especially designed for corals and other invertebrates.

These invertebrate foodstuffs fall into two categories: phytoplankton (plant material) and zooplankton (animal material). Several studies have been done that show that most invertebrates predominantly consume zooplankton over phytoplankton, so why add phytoplankton as food? The reason is that many of the naturally occurring zooplankton within the tank such as Mysis shrimp and copepods consume phytoplankton, so by adding it to the tank it helps to feed these animals which are then consumed by the fish, corals and other invertebrates. There are several types of supplemental phytoplankton available including frozen pastes and cultured strains of desirable phytoplankton. In my experience all these additives have shown to be of equal value so ease of use and cost should be the deciding factor.

Zooplankton supplements come in a variety of forms and include everything from frozen grouper and lobster eggs to baby brine shrimp and frozen or cultured copepods. All these supplements are extremely high in nutrients so care should be taken when using them that not too much is added to the tank at any one time. Not all corals can or will consume all the possible zooplankton additives that are available. So as with all foodstuffs

use as wide a variety as possible. Don't just disperse them throughout the tank, but direct them onto the animals to be fed using a bulb baster or similar means. This directed feeding will increase the likelihood of the corals getting their fair share before the fish consume all the food. With this in mind, feeding those items after lights-out or just before, further increase the chances of the food finding its way to the corals. It is also a good idea to reduce the current in the tank to keep the food from being blown away from the corals. Corals don't need to be fed nightly - two or three supplemental feedings per week is usually enough to meet their nutritional needs.

In order to maintain the health of our fish over the long term, high quality food of all types should be fed. Just as we would get bored eating steak every day, so too will our fish if they are only fed one type of food. In addition to feeding a wide variety of different foods, feeding should also be varied in terms of the size of the food as well as when foods are given. Different fish have different-sized mouths. Providing a variety of sizes of food during feeding ensures all the fish are likely to get some. In the ocean most non-predatory fish graze all day. To try and replicate this in a closed system small amounts of food should be given as often as possible. Five or six small feedings per day are significantly better than one large meal. These small frequent feedings increase the chances of all the food being digested, which improves the health of the fish. Also since most fish have only small stomachs, not having the fish gorge themselves at one big meal also aids in their long term health.

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# A pond without problems

**Nick Fletcher** has some seasonal advice on how to keep your pond and your fish healthy, happy, and trouble-free all year round.

**A** successful garden pond contains all the elements essential to fish health, such as consistently high water quality, a diet that fulfils all seasonal nutritional needs, and sensible stocking levels in relation to space available, in perfect balance.

When pondfish fall sick, the natural reaction is to treat the obvious symptoms, when what we should really be doing is looking for the root cause. For example, if a fish develops fungus, why has this happened? *Saprolegnia* is an opportunistic pathogen that cannot take hold unless the mucus coat, and usually the skin itself, is breached. Perhaps the fish injured itself on something sharp in the pond? Or perhaps something less obvious caused the initial lesion, such as an ulcerative bacterial infection. If this were the case, how did the problem arise? Poor water quality? Or was the infection spread by new, unquarantined fish?

In all instances of disease we need to play detective and the first task in all but acute cases (such as wilful poisoning) is to test for ammonia, nitrite, pH and nitrate, in that order. This is because the elements required for a healthy pond do not exist in isolation, but impact upon one another. In the example of our fungused fish, a

water test reveals a high ammonia reading, yet the pond has long since gone through the maturation process. Clearly, something has upset the balance to generate this ammonia spike. It could be one of several things: a dead fish going unnoticed, a poorly maintained filter, or gross overfeeding. Remedy the problem before more fish succumb, and only then treat the affected individual.

## What's your problem?

Arguably, health problems in pondfish are more common than ever before, simply because expectations are higher. The old-fashioned goldfish pond, lightly stocked and heavily planted, got by without sophisticated filtration technology, and even if the fish were not fed a quality diet they could supplement their needs with the insect and crustacean live foods that quickly colonised their home. The result was a largely self-regulating mini version of a natural pond, and the only problem likely to arise was when, through regular spawnings, the population rose to a point where the pond could no longer support it.

All that changed when Koi became popular. These fish, with the potential to grow large, cannot possibly live without supplemental



feeds – not least because they tend to be kept in ponds devoid of the plant life that harbours natural foods. Koi are unable to survive without filtration, while biological filters cannot function without a constant supply of nutrients to feed them. Biofilter bacteria mineralise soluble and solid fish waste into ammonia and ammonium, which is then oxidised into nitrite. This compound is broken down further into nitrate, which can be diluted by partial water changes. However, we expect great things of our filters that they cannot always deliver.

Koi and other pondfish are not very efficient at assimilating their food – the more they eat, the more is passed partially undigested through the gut. With such emphasis placed nowadays on growing fish on, as opposed to merely offering a subsistence diet, it is easy to overfeed. Feeding time is, after all, when you interact most with your pondfish, and the temptation to give them 'one more handful' is strong.

Overfeeding not only produces obese fish, it has knock-on effects on water quality, which in turn can lead to a host of health problems.

### Food for thought

You can spend very little, or a small fortune, on pondfish foods, but all should contain four essential nutrients: protein (for growth and tissue repair), carbohydrates (for energy and efficient digestion), oils (which fulfil both functions) and vitamins and minerals. Foods differ in quality and relative percentages of ingredients, as well as any

additives like appetite stimulants and colour-enhancers. These additives are most prevalent in specialist Koi foods, and are costly.

Virtually all branded pondfish foods will meet basic nutritional needs, but avoid commercial trout pellets (too high in oils and cheap sources of protein) or any foods sold loose as their origin is unknown and there is no 'use-by' date to tell you whether the product is fresh.

The protein content of pondfish food should be geared to water temperature, and for normal summer feeding that will be around 30%. For growing on Koi, it can be as high as 40%, whereas low-temperature wheatgerm-based foods typically contain around 20%. The ability of fish to assimilate protein falls with water temperature. In winter, occupants of unheated ponds are not making growth and won't need it anyway. Provided you monitor the protein content, there is no reason why you can't feed general pondfish food to Koi or Koi food to goldfish.

### Pellets or pondsticks

Products come in several distinct forms, the commonest of which are floating pellets, floating pondsticks, and sinking pellets. The air that makes foods float is taken on during manufacture as the heated mix is forced under pressure through a set of holes in a process known as extrusion. Pondsticks contain more air than floating pellets and so weigh much less, volume for volume. Sinking pellets contain no air because they are not allowed to expand in the



Don't feed your pondfish while temperatures are below 10°C/50°F.



Koi need good filtration – and a decent sized pond as they have the potential to get very large.



50% of all pondfish ailments are caused by poor water quality, so ensure your filter is up to the job.

making, and are therefore denser than water.

Floating pellets are the most popular option and come in a wide range of diameters, from 2mm up to a jumbo 14mm, so they can be geared to the size of fish in your pond. They bring fish up to the surface (the best place for a visual health check), and any that remain uneaten can easily be netted out, to ease the workload of the filter.

Pondsticks are a good option if

you are prone to overfeeding your fish and as they soften in the water faster than pellets, fish are able to nibble pieces off sticks that would be too large to take in whole.

For fish just coming out of winter dormancy and still hugging the bottom of the pond, sinking pellets are the answer – although they must be fed very sparingly, because netting out uneaten food will be next to impossible.

Coldwater flake is another option, but best reserved for small ponds with few fish otherwise it can work out very expensive.

#### **What a treat**

As well as proprietary foods, pondfish are partial to 'treats' – these can be earthworms (good for conditioning them prior to spawning), prawns, fresh cockles, lettuce, orange segments, moderate amounts of wholemeal bread (never white), and any of the little creatures such as water hoglice, that live in filters. Avoid all meat and dairy products, or anything with a high sugar content, such as biscuits.

Proper storage of commercial pondfish foods is essential,

otherwise the vitamin content will quickly degrade, the pellets will oxidise, and there is a chance of harmful moulds developing. Airtight plastic buckets kept in a cool, rodent-free spot are the answer, and you should never buy more food than can be used inside a month. Any left at the end of the pond season should be discarded.

#### **Feast or famine**

How much a fish can safely eat relates both to its size and the temperature of its pond. Young Koi and goldfish can consume up to 10% of their body weight daily, juveniles around 5%, and mature specimens just 2% – this at 20°C/68°F. As the water cools, appetites fall away until at 10°C/50°F feeding can cease altogether.

In order to be able to give your fish all they require in the height of the summer, your bio-filtration must be capable of dealing with the extra waste generated, so many manufacturers now prefer to rate the filters according to the total weight of fish it has to support.

It can be difficult to calculate the combined weight of fish (they

continue to grow, and new stocks are added) so most pondkeepers are far less scientific about how often and how much they feed. Starvation is rare, but insufficient or poor-quality food over a long period will stunt fish, lower their fertility (egg and sperm production utilises a lot of energy reserves) and reduce their resistance to infection.

Chronic overfeeding is also quite rare – what usually happens is that if meals are spaced well apart, extra is fed at each sitting to compensate for the intervals between. This means much of the nutritional value is lost, resulting in partially digested food passing into the pond. This impacts on water quality and can lead to ammonia spikes.

The daily food ration should be divided into many small meals – up to six in the height of summer. If this is not possible, use an automatic feeder fitted with a timing device. It will dispense food as and when you want it to, and as you fill it you will gain a better idea of how much your fish are really eating. Unless you are away for more than 14 days, don't arrange for anyone else to feed your fish; they will happily browse on blanketweed.

## FEEDING & HEALTHCARE CALENDAR

### SPRING (MARCH, APRIL, MAY)

Spring is the most dangerous time for pondfish, with fluctuating air and water temperatures, a resurgence of pathogens (parasites and bacterial problems), and fish whose immune systems have yet to fully kick in. Water quality is potentially unstable, as filter bacteria populations need to re-establish to cope with the loading that accompanies the resumption of feeding. Under such conditions it is positively dangerous to medicate the pond unless you can positively identify a fish health problem that demands it (for example, an outbreak of whitepox). Poor water

quality is at the root of 90% of spring pondfish ailments, yet the symptoms are easily confused with parasitic infestations – 'flicking', for example, is associated with high levels of nitrite but is also indicative of gill or skin flukes. For a reliable diagnosis, use a microscope to examine mucus scrapes, or a water test kit to eliminate red herrings.

One exception to the 'no medication' rule is to add an anti-aeromonas bacterial preparation to the pond. This is a solution of bugs that out-compete the pathogens for nourishment and

starve them out of existence. This should help prevent outbreaks of bacterial ulcer disease. Feeding should resume only when water temperature is consistently above 10°C/50°F. Give very small meals of sinking wheatgerm pellets, mixing in some wheatgerm flakes as the weather warms, and gradually move to a staple medium protein level food.

#### Common spring ailments and treatments

##### ● SAPROLEGNIA (FUNGUS)

### SUMMER (JUNE, JULY, AUGUST)

Pondfish will now be at their most active, and feeding vigorously. They may spawn, in which case special care should be taken to maintain water quality – the spawning process releases a lot of protein into the water.

If no new fish have been introduced recently, serious health problems are unlikely to occur. The main dangers are environmental, notably lack of oxygen in warm weather. Visible ectoparasites normally come in with unquarantined stocks, although some (fish leeches, fish lice) may hitch a ride on amphibians that find their way into the pond. Poor water quality or overcrowding may allow normal background levels of some protozoan parasites to rise to the point where fish show symptoms of distress.

Feed regular meals of medium- to high-protein foods, as much as is consumed enthusiastically, and net out any surplus after 10 minutes.

#### Common summer ailments and treatments

##### ● OXYGEN STARVATION

**Symptoms:** Fish gasp at the surface and congregate under waterfalls, fountains, etc. Overnight losses may occur of especially sensitive fish, such as Orfe or Rudd. Most likely to occur on warm, thundery nights.

**Treatment:** Stop up aeration/surface agitation with anything available, such as aerators, and run fountains/waterfalls if not already in operation.

In an emergency, play a hose on to the pond surface. Acute oxygen starvation is most common in heavily planted ponds or those with blanketweed and green water, because at night these absorb oxygen and give off carbon dioxide. Overdosing with potassium permanganate can also deplete oxygen levels.

##### ● DROPSY

**Symptoms:** Bloating, scale protrusion, 'pop-eye'. A secondary ailment with many possible underlying causes, including organ damage. The bloated appearance is caused by a failure of the osmoregulation system, resulting in a build-up of body fluids. Is not usually infectious.

### AUTUMN (SEPTEMBER, OCTOBER, NOVEMBER)

Ease off feeding of high-protein foods as temperatures start to fall. Do not leave any ongoing fish health problems unresolved. Treat while immune systems are still strong and water temperature remains high enough for all chemical remedies to work.

Reduce build-up of organic material in the pond by regular use of filtration and pond vac. Trim back marginal plants, and remove dead or dying

leaves from aquatic plants, especially waterlilies.

Towards the end of autumn, begin to introduce floating wheatgerm pellets into the diet.

The balance is tipped in favour of fish and against pathogens at this time of year so there are no specific health problems to worry about.

### WINTER (DECEMBER, JANUARY, FEBRUARY)

Cease feeding when water temperature falls below 10°C/50°F. The feeding period can be prolonged into early winter by covering the pond at night and taking the cover off on mild, sunny days. Keep filters running, but turn off fountains and waterfalls to reduce surface agitation.

Do not be tempted to feed fish on the odd mild day in winter – even if they come up and 'ask' for it. Parasites and bacterial problems are rife at this time of year. If individual fish require treatment (for example, for physical injury caused by a heron) this must be done in an indoor hospital tank/net, not in situ.

**NOTE:** A Nod with carp pox. This viral disease is usually seasonal and should pass without needing treatment.



**Symptoms:** Cotton wool like tufts on skin or gills.

**Treatment:** Long-term bath with added proprietary anti-fungal remedy. Investigate underlying cause.

● **NITRITE POISONING**

**Symptoms:** Lethargy, excess mucus production, reddening of the skin, flicking.

**Treatment:** Large partial water changes to improve water quality.

● **CARP POX**

**Symptoms:** Waxy growths on body/fins.

**Treatment:** None – this viral disease is unsightly but usually harmless, and tends to disappear as the water warms. Most common in younger fish.

● **WHITESPOT**

**Symptoms:** Loss of appetite, hanging near the surface, sometimes patch-sized white spots visible on body and fins. A lethal protozoan parasite if not treated immediately.

**Treatment:** Add proprietary whitespot remedy to the whole pond and finish the course – even if symptoms disappear halfway through.

**Treatment:** Isolate affected fish in a solution of bactericide, with added salt to draw out excess fluid. Severe cases have a poor recovery rate.

● **GILL/SKIN FLUKES**

**Symptoms:** Loss of appetite, flicking, lethargy.

**Treatment:** Ascertain that flukes are really responsible by examining a mucus scrape under a microscope. Treat whole pond with Tetra-Meyer mixture (malachite and formalin), or a branded proprietary remedy. Gill flukes are most likely to be a problem in water above 18°C (65°F).

● **CYCLONELLA**

**Symptoms:** Clamped fins, difficulty in

breathing, lethargy, excess mucus. Early treatment essential.

**Treatment:** Firm diagnosis of the heart-shaped protozoan parasite under the microscope, followed by prompt treatment as above.

● **TRICHODINA**

**Symptoms:** Severe irritations of the normally background-level ciliate parasite are associated with overfeeding and poor pond husbandry. Affected fish often have a bluish tinge showing over dark skin, due to excess mucus built up as a defence.

**Treatment:** In severe cases, as above, but improving water quality is usually sufficient.

**QUICK TIPS**

● Always quarantine new fish at a temperature of 20°C/68°F or above where any latent diseases will manifest themselves in a couple of weeks. The quarantine tank/wat can double as a hospital facility, but the filtration must be kept active at all times so fish can be placed in it at short notice.

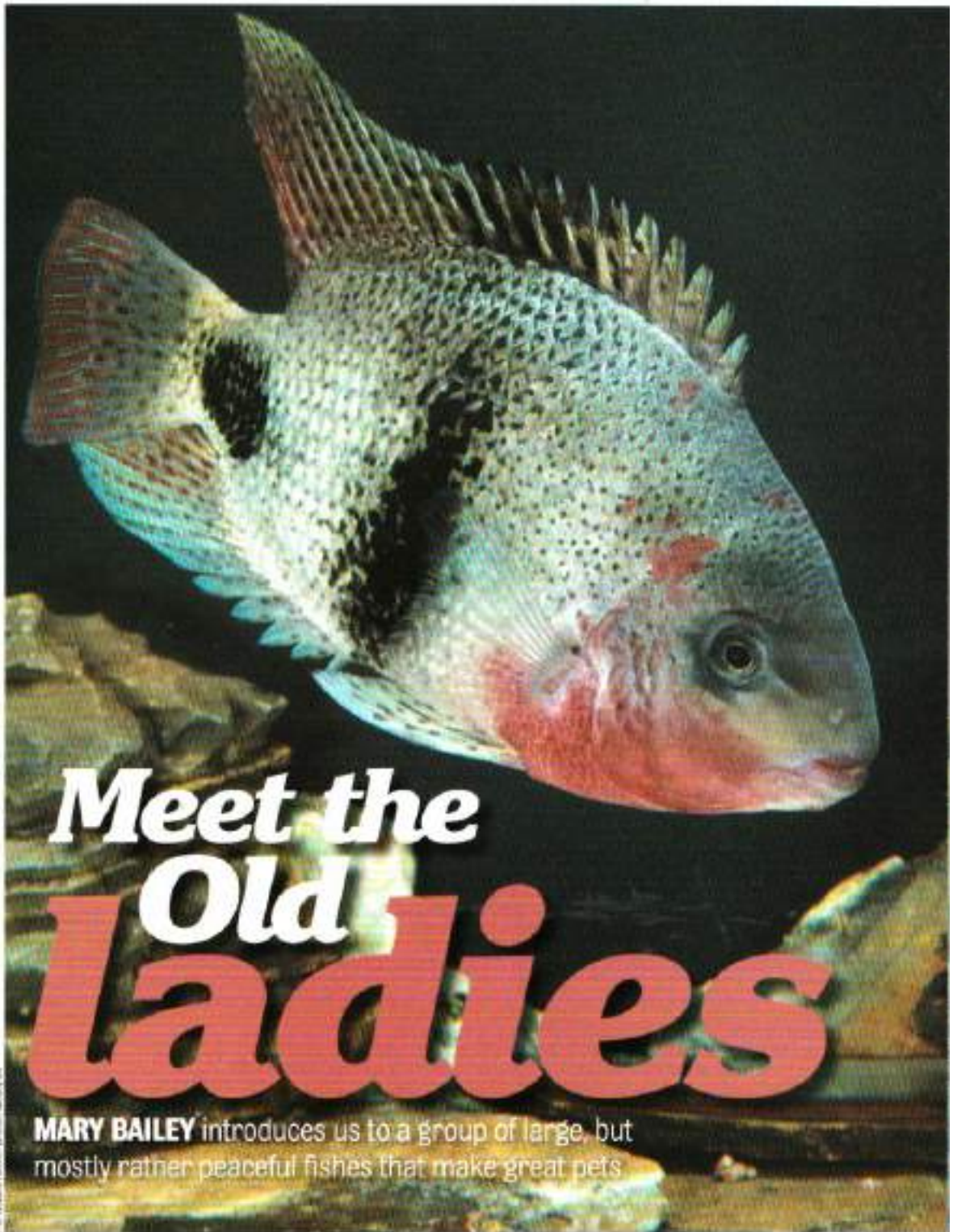
● A basic medicine chest for pondfish will save panic-stricken trips to the aquatic shop when emergencies occur. Stock up not only on remedies (salt, anti-bacterial/anti-parasite preparations), but ensure you have the means to administer them and treat sick fish for common ailments. That means having bowls, towels, cotton buds, latex gloves, fish anaesthetic, nets (Kai socks) etc. to hand. Keep an eye on use-by dates and store in a cool, dark place out of reach of children.

● Certain pondfish ailments, such as severe bacterial infections, will respond only to antibiotics. These can only legally be administered by a vet (PFK has a list of fish-friendly veterinarians available on request). Viral diseases are untreatable. In the rare likelihood that your fish contract SVC (Spring viraemia of carp, a codfish disease) or KHV (Koi herpes virus, specific to *Cyprinus carpio* and notifiable), then take specialist advice.



Lab. Fischer





# Meet the Old Ladies

**MARY BAILEY** introduces us to a group of large, but mostly rather peaceful fishes that make great pets

The Fishery, South of London, UK

**V**ieja is one of the largest genera of the Central American cichlids, and it offers plenty of variety to choose from. A few are staples of the hobby, some are rarely seen in the shops, one or two have probably yet to make an appearance in this country, and one, *V. zonata*, is a mystery fish of unconfirmed validity. And finally, *V. maculicauda* (the Black belt cichlid), is one best left to those used to dealing with large, murderous cichlids. Truly something for everyone!

#### Why Vieja?

All these species have a chequered taxonomic history, and many of you will know them better as *Cichlasoma*. But it is over 20 years since they were removed from that genus, now restricted to South American cichlids of the 'Port Acara', *C. portalegrense*, group. For a while we knew them as *Theraps*, but then they were moved to *Parachanna* and ultimately to *Vieja*.

The name is Spanish in origin and means 'old lady'. It actually derives from the local (in Panama) name for *Vieja panamensis*, the type species of the genus, which is now regarded as a synonym of *V. maculicauda*. Budding taxonomists among you may wonder how the type species of a genus can be a synonym – well, the species *panamensis* is a synonym of *maculicauda*, which was described much earlier, but the genus based on that population of *maculicauda* was revalidated as the earliest generic name available for these cichlids. If, heaven forbid, someone finds an earlier available genus name than *Vieja* would become a synonym of that genus.

Why the local name for our Black belt should be 'old lady' is something I have been unable to find out, though some suggest it refers to the motherliness of brood care. It is the most widespread member of the genus and has a different name in every country of origin. We are perhaps fortunate that Fernandez-Yepiz, who described *Vieja*, didn't use material from Costa Rica, where the Black belt is known as 'Pis pis'!

#### Distribution

Most of the old ladies are found on the eastern side of the central upland spine of Central America, in what are termed Atlantic slope

drainages, i.e. river systems on the Atlantic side and ultimately emptying into that ocean (or the Caribbean). Only the Black belt has a distribution, in places fragmented, extending from Panama to Mexico; most of the others are restricted to Mexico and Guatemala, often to small areas, with a remarkable number in the Usumacinta basin.

This distribution apparently reflects an interesting evolutionary pattern, and suggests that the Black belt (or rather, its distant ancestors) may have been the original species, and that some populations became isolated and evolved into new taxa. The Usumacinta species may well represent a species flock. All the species are clearly closely related and sometimes very similar to one another.

When it comes to biotope, the Black belt, as one might expect from its long distribution, has a lot

of variation within its range – it is primarily a lacustrine fish, but is also found in the lower courses and estuaries of rivers, including in brackish water. Even freshwater conditions vary considerably from locality to locality. The result is a species which is very tolerant in captivity. Some of the others are hardy generalists, too, but those with limited distributions may prove less tolerant, and should be treated with more discretion.

#### Buyer beware!

Juvenile *Vieja* are all very similar to the extent that there is no way to tell them apart. If mixed up at this stage there will be no sorting them until they start to show their adult coloration. Breeders keeping more than one species please note!

Unfortunately, they do sometimes get mixed up in shops, where often

© J. C. Fernandez-Yepiz



#### RECOMMEND

**PAGE:**  
Black belt cichlid, *Vieja maculicauda*.

#### NOTE:

The most well known member of the *Vieja* genus is the *Gynopoma*. It's a very hardy fish, but it does grow to somewhere in the region of 35cm/14".

## Factfiles

There are too many species to cover in detail here, other species (some of which are sometimes available in the UK) are: *V. argentea*, *V. brevipinna*, *V. amabilis*, *V. godmani*, *V. guttata*, *V. heteropleura*, *V. intermedia*, *V. macrophthalmus*, *V. nigra*, *V. tyrrhenica*, *V. zonata*. If you require specific information on any of these, please write to me at Ask the Experts.

*Viola bifasciata* (Steindachner, 1864)

**Common name:** Bifasciata, Bifasc.

**Meaning of scientific name:** Latin = "Two-banded", referring to the two distinctive longitudinal bands.

**Size:** To 30cm/12".

**Distribution:** Atlantic slope drainages (Grijalva & Usamacinta basins) in Guatemala and Mexico.

**Habitat data:** Mainly rivers, sometimes lakes, pH 7.0-8.5; general hardness 8-35 (1°dGH); carbonate hardness 7-24°dGH; temperature 27-29°C/80-85°F.

**Remarks:** *Dicolasoma parma*, *C. bifasciata*, *C. godmani* are synonyms. Probably the most popular and commonplace species after *V. zoster*.

*Viola hartwegi* (Taylor & Miller, 1960)

**Common name:** Hartwegi

**Meaning of scientific name:** After Hartweg, formerly curator of the Natural History Museum at the University of Michigan, USA.

**Size:** To 14cm/5 1/2".

**Distribution:** A very limited range in the upper Rio Grande de Chiapas system, Grijalva basin (Atlantic slope) in Mexico.

**Habitat data:** Fast-flowing clear rivers (with rock and sand substrates, lots of dead wood, and little vegetation), as well as slower, turbid water, but with population levels higher in the first habitat. pH 7.5; 10-33°dGH; carbonate hardness 12-18°dGH; temperature 20-29°C/68-85°F (dry season data).

**Remarks:** The smallest member of the genus.

*Viola maculicauda* (Regan, 1906)

**Common name:** Maculicauda, black belt.

**Meaning of scientific name:** Latin = "spotted tail" or "with a spot on the tail".

**Size:** To 25cm/10".

**Distribution:** Atlantic slope drainages from the Usamacinta basin (Mexico) to the Rio Chagres in Panama.

**Habitat data:** Mainly lakes, but also rivers with clear or sediment-laden water, with seasonal variation. Substrates range from mud, through sand and gravel, to pebbles, or even rock. Fluxatile populations are found in both fast-flowing rivers (where, however, they tend to be found in deeper, calmer, "holes") and slow-moving ones, and even in near-stagnant residual pools during the dry season. pH always alkaline, usually 7.5-8; 1-10°dGH; carbonate hardness 2-10°dGH; temperature 25-30°C/77-86°F.

**Remarks:** *Dicolasoma globovirens*, *C. nigritus*, *C. monzoi* and *V. parsonsii* are synonyms. Type species of the genus and its most widespread species. This species is the villain of the piece among the otherwise usually peaceful (for their size) members of the genus; a divider may be needed to protect the female from the male.

the dealer is taking them off the breeder's hands as a favour, and doesn't really want them. Over the years I have heard several horror stories from aquarists who have seen one tank containing juveniles of two different *Viola* species (from the label); or breeders who had unloaded young *Viola* and went back a few weeks later to find their fish had been mixed with another because of lack of tank space. And all too often these unholy mixtures are labelled *Synspilum* – and unfortunately some aquarists seem to think this is a community fish that gets to around 10cm/4" – it actually reaches 35cm/14"!

Now, as often happens with closely-related cichlids, if you mix them up they will sometimes hybridise. So what happens next is that some unwitting aquarist buys some *Synspilum* (actually mixed *Viola*). He grows them on and

breeds them, producing hybrids. In blissful ignorance he takes the youngsters to a shop and sells them as *Synspilum*.

The shop then labels them as such, so the next customer ends up with hybrids, or maybe a mix of hybrids and real *Synspilum*. And so it goes on.

There is now a big question mark over the genetic purity of the entire UK *Synspilum* population because of this, and also the *V. bifasciata* population. These two seem to be particularly often crossed. It has not been unknown for unscrupulous persons to pass these hybrids off as different species, i.e. those not normally available in the hobby, at a price to match.

So, what to do? Well, if I was buying young *Viola* I would try to find an experienced hobbyist breeder and even then I would visit personally and see the parents.



MAJ. C. PERRY / IAN SPURLOCK

**Wetja can produce thousands of fry so don't try to raise them all! Pic. shows 1 zovata.**

#### Meet the expert!

If you are interested in Central American cichlids you will enjoy the Green Cichlid Association convention in April, where the guest speaker will be Juan Miguel Arizaga Ariza, an acknowledged expert on the group. See next pages for further details.

I certainly wouldn't buy young, unidentifiable youngsters in a store. If buying older youngsters showing adult markings, or purportedly wild fish, I would arrive at the store with several books and take a long hard look at what I was considering buying. Or go to a specialist dealer who, hopefully, would be able to show me paperwork confirming where the wild fish had come from.

However, if you just want one or more big colourful cichlids as pets, there is nothing wrong with going out and buying some of these suspect youngsters. But please cull any fry they produce unless you are absolutely sure your adults are pure-blooded and of the same species!

#### In the aquarium

The species that are regulars in the hobby are big cichlids, 25-30cm/10-12" long, though some of the more

unusual ones are smaller. But they are all relatively large, characterised by a deep body and steep upper head profile, and need a large aquarium – 120cm/48" is the absolute minimum for a full-grown pair.

The tank should be at least 45cm/18" deep and wide for the larger species; 40cm/15" may suffice for the smaller ones. Of course, they can be kept – and sometimes bred – in smaller tanks when they are only part-grown.

Even the more unusual *Wetja* are reported to be hardy fishes, but it's always better to provide optimal conditions. Hence the correct conditions for each species should be ascertained if possible – but if not, as a general rule of thumb moderate hardness (7-10 °dGH), a pH in the range 7.3-8 (never acid), and a temperature of 25-27°C/77-80°F, should suit. These are big

cichlids and an efficient biological filtration system is necessary. Regular partial water changes will keep nitrate levels tolerable (below 50ppm for the aquarium-hardened species, below 30ppm for the more unusual and any wild-caught fish).

Members of the genus are normally classed as either detritivores or herbivores – in practice both designations are correct, as the detritus on which they feed is largely vegetable in origin. In captivity they will also eat algae and higher (ie. aquarium!) plants, as well as animal foods such as shrimp, prawn, and earthworms, plus suitably-sized dried foods. Nevertheless it is important to provide adequate vegetable content in the diet.

Avoid mammalian protein (eg. beefheart) because of the danger of obesity and a build-up of fats in the tissues.

Although these are largely cichlids of relatively open habitats, they do appreciate shelter. Rooted plants are unlikely to survive their feeding and excavating attentions, so provide suitably-sized caves (rocks, large clay flowerpots and/or drain pipes; and/or bogwood). Floating plants like Duckweed can be grown to provide shade, extra shelter, and between-meals snacks.

### Breeding

There is no clear sexual dichromatism or dimorphism in young Vieja, and both sexes may develop a nuchal hump with age, though that of the male may be much larger, so the best course is to buy half a dozen youngsters, or an adult pair that has been sexed by 'venting' (newly imported wild fish) or proven themselves by breeding.

While a young adult pair can sometimes be kept – for a time – in an aquarium smaller than the suggested minimum, it is wise to use a large aquarium for growing on youngsters except when they are very small; otherwise the potential for mayhem is too great with a group of unruly adolescents, testing each other's strength and suitability as breeding partners, in a confined space. Even in a large aquarium it will be wise to watch out for two individuals first displaying, then occupying, a territory together, so the remainder can be removed and rehomed before too much trouble ensues. Most Vieja are remarkably peaceful for their size, but they have their limits – i.e. sharing a tank representing perhaps 10% of natural territory

size with other cichlids, especially conspecifics.

As far as is known, all Vieja are open-brooding substrate spawners. One (the female) or both adults clean a suitable spawning site, generally a flatish rock in the open, or sometimes the bottom of the tank after a large pit has been excavated. The digging of nursery pits for the fry is also to be expected.

The female lays a row of eggs on the cleaned spawning surface, and the male then passes over them, emitting milt to fertilise them. The process is repeated until all the eggs are laid – a large pair may produce more than 2,000.

Direct care of the eggs, larvae, and fry is by the female; the eggs hatch after about 72 hours at 26°C/79°F and the larvae become free-swimming after a further 5-6 days. The male patrols the aquarium to ensure no predators come near.

As soon as they are free-swimming the fry can be offered microworms and/or *Artemia nauplii* as first foods. They can soon progress to larger foods. Realistically, however, you won't be able to raise, let alone sell, 1000 or more young Vieja, not even a rare and unusual one; so, as is usual with large cichlids, most of the brood should be culled at an early stage.

## Factfiles

*Vieja melanura* (Günther, 1862)

**Common name:** Melanurum.

**Meaning of scientific name:** Latinised Greek, = "with a black tail".

**Size:** To 18cm/7 1/8" TL.

**Distribution:** Guatemala, in the Lake Peten and Rio de la Pasion basins.

**Habitat data:** Lake Peten is relatively shallow with dense surface vegetation; no details of other habitats available; pH 8; 12-19°GH; carbonate hardness 4-6°KH; temperature 20-34°C/68-92°F.

**Remarks:** *Vieja synspila* was once thought to be a form of this species (they are rather similar in shape and colour) and it is uncertain whether the true *V. melanura* has been in the UK hobby, or simply *Synspilus* assigned to this species. There is a big size difference!

*Vieja synspila* Hubbs, 1935

**Common name:** *Synspilus* (Quez).

**Meaning of scientific name:** Greek, = "without a spot".

**Size:** To 53cm/14", usually (a bit) smaller.

**Distribution:** Atlantic slope drainages (including the Usumacinta basin) in Belize, Guatemala, and Mexico.

**Habitat data:** Prefers slow-moving, murky water (not advisable in captivity), but also found in crystal-clear canals (Sinkholes); pH 7.5-8; 5-69 (0°-90°) carbonate hardness 0-10°KH; temperature 23-29°C/77-85°F.

**Remarks:** The best-known, most colourful, and most popular member of the genus. The broad range of conditions tolerated in nature (where it has even been found in the sea!) and subtly accounts for its aquarium hardness. *Dichlozoma bakkeji* is a synonym. This species was once thought to be synonymous with the smaller *V. melanura*.

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The Goodfish Book / PhotoDisc Online



*Synspilus* - or maybe not! Many so-called *Synspilus* in this country are actually hybrids.

# A new reef of life

**Phil Hunt** continues his series on setting up his new reef aquarium. This month he breathes some life into his system.

**T**he biological filtration in my new aquarium was to be provided only by living rock and sand plus skimming and some carbon as chemical filtration. I therefore needed to think carefully about how much rock to use, and what types, and to ask the same questions about the sand.

I already had quite a lot of living rock from various sources, mostly Fiji rock, but there was also some from East Africa, and ocean rock that after about 10 years had been colonised by coralline algae and a variety of sessile invertebrates. There were also odds and ends like some rock from Vanuatu. I really had no idea how much rock I had. All I could do was estimate the space it filled in the old tank, and work out approximately what that corresponded to in the new one.

#### Interior design

I don't really like the traditional 'reef slope' approach to aquascaping, where quite a lot of the tank volume is taken up by rockwork that slopes from high up on the rear wall down almost to the front glass, with invertebrates arranged on top of it. While this provides a reasonable environment for some fish, like guppies, snail



clowns, dwarf angels and some small wrasses, it doesn't offer enough swimming space for the fish that I wanted, namely tangs and planktivorous species such as darterfishes, fairy wrasses and *Gerrhanthus* angels. Also, I intended to keep some sand-dwelling gobies and wanted a reasonable area of open substrate for them.

A couple of years ago in PFK I ran a series on a 150 l/33 gal. fish-only tank where the living rock was set up in vertical structures. This design looked great, providing cover for fish while still maximising open water and sand area. When I dismantled the aquarium before moving house, I kept some of the rock structures intact. I realised that this approach would be good for creating deep gullies to provide calmer areas in a turbulent tank.

One downside of this approach is that you need to do lots of engineering to make the structures safe. Another downside is that it is less easy to place invertebrates on vertical walls, and so you can keep fewer of them. I didn't think this was too much of a problem; a lot of the tank would be occupied by branching SPS corals that would mainly be on the tops of rock structures. In any case, these corals can be grown on vertical walls by attaching small fragments using epoxy or superglue. For the more massive corals, such as brain corals, *Favia* and *Favites* pineapple corals, and boulder-like *Porites*, I was going to devote one end of the tank (about 25% of the width) to a more traditional stepped slope.

My next move was to draw a scale plan. I had to be flexible, as living rock comes in strange shapes and unpredictable sizes, but wanted to stay within the general bounds of the design. I used masking tape to mark out particular distances across the tank, and was then ready to add some rock.

#### Old rock and new

On a visit to STM I saw some 'plating rock'. Soon afterwards, I collected about 24kg of the plating rock (5 large pieces) plus 10kg of Fiji rock. This was the first living rock in the tank. Apart from about 3kg of 'base rock' and 3.5kg of Fiji rock, both from World of Fishes in East Grinstead, that were added later, this was the only new living rock I bought.

Moving the living rock I already had from the old tank took about five months. This was because at



least some of the rock was needed to maintain biological filtration in the old tank until the fish had been transferred.

Although some of the rock from the old tank was used in the construction of new structures in the new one, some existing structures were used as they were; others made taller to fit the greater height of the new tank.

Moving the rock from the old tank gave me the chance to determine just how much of it there was: 42kg in all, about 16kg of it was Fiji rock.

I used two methods to move the rock from one tank to the other. Because of the size of some of the rocks and their sharp edges, not everything could be transferred in water and given 'proper' acclimatisation. I knew from experience that the tougher types of invertebrate growing on the rock, such as fanworms, zoanthids and mushroom anemones, would not suffer any problems if I whipped them out of one tank and into another, provided that temperature and salinity were not too different. The same appears to be true for coralline algae. To minimise problems, I adjusted the temperature and salinity in the old tank to be as close as possible to the new one.

However, quite a few nice sponges had grown on some rocks, and these needed more careful handling. These rocks were transferred in water in large, thick plastic fish bags and given a thorough acclimatisation.

#### The clean-up

Much of the living rock in my old tank was afflicted by hair algae and

a lot of *Aiptasia*. My purple tang, *Zobosoma xanthurum*, kept the former under some control, but the *Aiptasia* had no predators.

I planned to have a collection of tangs in the new tank, and expected that these, especially as they grew larger, would bring the algae under control. For control of *Aiptasia*, I usually use Peppermint shrimps, *Gammarus wurdemannii*. I didn't have these in my old reef tank because during my house move I'd lost my original, quite large, shrimps, and when I tried to add some new, smaller specimens they were eaten by my *Pseudochromis fridmani*. To avoid this, I decided to add the shrimps before any fish, so that they could get to a decent size before the *fridmani* arrived.

Eight shrimps were added in the first few months, starting shortly after the addition of the first rock. Peppermint shrimps are very secretive, so all I see of them are antennae sticking out from rock crevices, or moulted exoskeletons. The *Aiptasia* keep disappearing, however.

#### Building the reef

When you build big rock structures in an aquarium you need to be sure they aren't going to collapse, killing livestock or even breaking the tank as a result. You need to ensure they fit together and stay together and you need solid foundations. In a tank with a sand bed, you need to ensure that the rocks are sitting on the base of the tank, not on the sand. There are two reasons; first, you might get an anoxic zone in the sand under the rock (although it isn't very likely in a tank with good water flow), but more importantly,

**ABOVE:** Phil borrowed the design theme from a previous fish-only tank to build vertical structures.

**LEFT:** The epoxy joints that both bind the rocks together and space them apart can be easily seen here.

# *Soft water*

*- who needs it?*

**Neale Monks** explains why he thinks hard water can be a blessing in disguise.





**F**or many fishkeepers, hard, alkaline water can seem like a curse. The water supply to homes in London, for example, can contain over 200 mg of calcium carbonate per litre, a hardness level comparable to that of Lake Malawi!

Hardness also affects pH. The hard water supplied in London has a pH of well over 7.5, but aquarium fish like Angels, Corydoras, and Neons do much better with a pH below 6.5.

Many aquarists use reverse osmosis (RO) filters and other devices for softening water but they are very wasteful, typically using 5-10 l (1-2 gal.) of mains water for every litre of soft water produced. If you can't find a use for the waste water, this can obviously be bad for the environment, but couple that with the rising cost of water and the widespread use of water meters, and running an RO filter can be expensive.

water butt, but while some fish and plants don't like hard water, many do, and it has some unique advantages, too.

#### What makes hard water?

Hard water contains relatively high concentrations of mineral salts, in particular carbonate salts such as calcium carbonate. When water passes over or through calcareous rocks such as limestone or chalk, it dissolves some of the minerals in those rocks and so becomes increasingly hard. Waters flowing over or through insoluble rocks, such as granite, don't pick up any hardness at all, resulting in very soft water. Most of England gets its water supply either from rivers flowing across calcareous rocks or from underground aquifers. Aquifers can be thought of as subterranean 'sponges', porous rocks that store vast amounts of water. They sometimes

come close enough to the surface for some of the water to leak out — these are freshwater springs. Water suppliers can also drill into these aquifers and release this trapped water. About a third of all water used in England and Wales comes from aquifers, and since it has been sitting in calcareous rocks of hundreds, even thousands of years, it's no surprise it can be very hard and alkaline.

#### Hard water in the aquarium

Besides raising the pH, hardness salts affect the animals and plants in a number of other ways, too. For some small fish adapted to soft water conditions, the minerals in hard water are thought to cause blockages in some of the organs. That said, the majority of soft water fish generally do well in hard water aquaria. The problem isn't that fish die prematurely, but rather that it becomes impossible to get the fish to spawn or to raise the fry.

In soft water aquaria, the small amount of CO<sub>2</sub> released by the fish is often enough to keep the plants happy, but in a hard water aquarium, CO<sub>2</sub> is quickly neutralised



#### Brackish fish

Brackish water fishes thrive in hard water. Their exact needs in other regards vary considerably and fall outside the scope of this article, but for the experienced fishkeeper, puffers, moray eels, soles, and pipefish can all make excellent subjects for a single species tank. Seals, Monos, and Archerfish are more amenable to community life, but being rather large, you will need a big tank to keep even these fish on their own, let alone with tankmates.

**RIGHT**  
Orange chromides will thrive in hard water with just a pinch of salt.

**LEFT**  
A shoal of rainbows, like the *Aleostomus xanthurus* specimen shown here, would make a beautiful addition to a hard water set-up.

by carbonate salts, making it unavailable to the plants. CO<sub>2</sub> fertilisation therefore becomes much more important if you want your plants to do well.

But perhaps the biggest advantage of soft water is that it makes for a very stable aquatic environment. Soft water lacks buffering salts, so a pH decline is often very rapid. Many fish that will tolerate a wide range of pH values if acclimated to them gradually can be killed by even quite small pH changes if they happen too quickly. Tetras, Discus, Halfbeaks, and rift valley cichlids are all known to respond poorly to rapid changes in pH. Because hard water contains plenty of calcium carbonate and other hardness salts, these mop-up the acidic chemicals and slow down the pH change. The average fishkeeper with a hard water aquarium will probably never even notice a change in pH because the water itself will effectively buffer any potential changes.

Another big plus is that some aquarium plants can use carbonate salts as a fertiliser — they absorb carbonate salts and strip away the carbon, and use that as a carbon supply. These include *Ceratophyllum demersum*, *Cryptocoryne beckettii*, *Echinodorus bleheri*, *Egeria densa*,

Collecting rainwater is a popular alternative that is ecologically sound and inexpensive to set up. Most garden centres sell cheap plastic butts, and attaching one to the gutters on your house is easy enough. However, using rainwater is not without problems; any dirt or leaves in the gutter tend to wind up in the water butt, so filtering it before use is recommended. There's also a small chance that any ambient pollution in the air (such as from a nearby factory) will be dissolved in the rain as it falls, but filtering the water through activated carbon should fix this. Collecting rainwater is only practical if you have access to the gutters and a place to keep the



**BETTER**  
The Blind cave tetra,  
*Aplocheilichthys*  
*maculatus*.

*Bloodea canadensis*, and *Valencius* spp. – all popular and easy to obtain. Admittedly, *Echinodorus bleheri* needs a rich substrate and good, strong lighting, but *Ceratophyllum demersum* and most of the *Valencius* are easy to keep. *C. demersum* is difficult to beat as a floating plant that provides a refuge for newly-born livebearer fry.

### Fish for the hard water aquarium

There are plenty of colourful and entertaining species that positively thrive in hard, alkaline water.

#### Livebearers

Among the livebearers, the Poeciliidae are the most popular. These include the Guppies, Platies, Swordtails, and Mollies, all of which make excellent choices for the hard water aquarium.

In recent years, the Ender's livebearer has become especially popular, and while aquarists debate whether the commercial stock is truly 100% Ender or some mix of Ender and regular Guppy, there's no question these brightly coloured, active fish make an excellent

contribution to the community aquarium. Guppies shouldn't be kept with more aggressive species, fin-nippers or substantially larger fish that might view them as food.

Mollies are peaceful, brilliantly coloured, and generally easy to keep. They are available in almost every colour imaginable. Swordtails are only a little less varied, but tend to be much more outgoing and fun to watch. Male Swordtails can be a bit aggressive though, and it's a good idea to keep twice as many females as males. Mollies round off the "big four" livebearers, and at lengths of up to 15cm/6", adult female mollies are easily the largest of the livebearers.

Whereas poeciliids like Platies and Guppies are ovoviparous, goodieids are truly viviparous. Ovoviparous fish retain their eggs inside the body, whereas viviparous fish supply the eggs with food via an umbilical cord. Though certainly not as frequently seen as Guppies or Mollies, at least two goodieid species, *Ameiobela splendens* and *Xenotoca essoni*, can be obtained easily enough from larger outlets. *Ameiobela splendens* is a peaceful fish that slots into a community tank very well. It's a pretty fish, with a speckled, silvery body and, on the male, a black tail edged with yellow. *Xenotoca essoni* also does well in hard water, but wild specimens can be persistent fin-nippers, so keep it without long-finned tankmates.

Another oddball livebearer worth considering is the Whistling halfbeak, *Dermogenys pusilla*. These smaller relatives of the popular Celebes halfbeak thrive in hard water and make wonderful surface dwellers for a community of small fishes. Like goodieids, these are viviparous fish.

#### Egg-layers

While many cichlids are adapted to soft, acidic water conditions (eg. Angels, Rams, and Discus), by far the majority prefer hard, alkaline water. All the cichlids from Lakes Malawi, Tanganyika, and Victoria fall into this category, as do many of the species from Central America and from Asia. But not all of these make good community fish, so while keeping a rift valley cichlid aquarium is certainly one option in a hard water area the focus here is on those species that will do well in a community setting.

African riverine cichlids are usually much easier

to keep in community tanks. One popular choice is the Kribia, *Pelvicachromis pulcher*. Kribis are very attractive fish, and, while they are just as diligent about broodcare as other cichlids, they tend to hold quite small territories and often the only sign that they have spawned at all is when you find the parents leading their offspring out on a hunt for food. Hard water isn't ideal for breeding them, however, as a pH above neutral tends to result in a preponderance of male fry.

One Asian cichlid that will do well in hard, alkaline water is the Orange chromide, *Forcipis maculatus*. The amount of salt they need is so low that they can easily be mixed with many species of fish as well as hard water tolerant aquarium plants. A specific gravity of 1.002 is all that is required, equivalent to a concentration of about 4g/l of salt. Guppies, Mollies, Halfbeaks, Bumblebee gobies, and Glassfish will all thrive in such conditions. Like all cichlids, chromides can be territorial and a bit disruptive if they choose to breed, but otherwise are peaceful. Central American cichlids tend to be a little on the aggressive side to make good community fish, though many aquarists have kept Convicts, *Archocentrus nigrofasciatus*, and Firemouths, *Thorichthys meeki*, in mixed species tanks. They are relatively large fish, the Convict being about 10cm/4" long when mature and the Firemouth over 15cm/6", so you'll need a community tank of at least 120cm/48" long.

In some ways, rainbowfishes are the hard water equivalent of the tetras and barbs; though many species normally inhabit neutral, even soft, water in the wild, they do uncommonly well in hard, alkaline water. Several species are simply stunning: *Melanotaenia boesemani* and *Glossogobius aureus* are some of the loveliest freshwater fish available to aquarists. They are also rather long-lived and hardy. About their only downside is that they tend to be a bit more expensive than the average barb or tetra and you really want to keep at least half a dozen if you want them to look their best.

Glassfish, *Avambassis nanga*, also make good schooling fish for hard water aquaria. These fish naturally inhabit a range of waters from soft and acidic through to slightly brackish, and adapt well to most water conditions. They are hardy, lively and entertaining, but tend to be fuzzy about food. Live or frozen foods are popular, particularly frozen

### Tetras for hard water

As a rule, the popular South American tetras tend to tolerate rather than thrive in hard water. Nonetheless, a few tetras do inhabit hard water streams and rivers. One of the best is the Kribia tetra, *Prototetra maxillaris*, a pretty, peaceful tetra that adds colour and movement to any community of small fishes. It isn't a fin-nipper, and so can be trusted with Guppies. Another fine choice for the community tank is the Blind cave tetra, *Aplocheilichthys maculatus*. Because this fish inhabits streams in limestone caves, it is perfectly adapted to hard, alkaline water. It's also a wonderful oddball fish, and despite having no eyes it navigates and finds food very easily.

Photo: Neve Photography





Bob Regener



Bob Regener

lobster eggs and bloodworms.

A significant number of killifish inhabit hard water, but only a few are routinely traded as aquarium fish. The Florida flagfish, *Jordanella floridae*, is easy to look after, though males can be aggressive. Treat them like dwarf cichlids, and don't overcrowd them.

Another hard water killifish is the Lamp-eye, *Aplocheilichthys macrophthalmus*. This African fish is very small and should be kept with other, similarly-sized species like Ender's livebearers and Bumblebee gobies. Lamp-eyes are not the easiest fish to keep and breed, but they make an excellent choice for a small aquarium.

Gobies and sleepers are full of personality, and often brightly coloured. The Bumblebee goby is lovely, inexpensive, hardy, and long-lived. Bumblebees are fussy about their food, and will not accept flake, but frozen foods like bloodworms and lobster eggs, plus live Daphnia, are greedily accepted. The Candy stripe goby, *Awaous flavus*, reaches up to 10cm/4", so needs a bit more space, but is a pretty fish with bags of personality and quickly becomes tame enough to feed by hand. New kinds of goby and sleeper turn up every year, so look out for these, as most do very well in hard water.

#### ABOVE

A good hard water fish for tanks with no long finned fish, *Jordanella floridae*.

#### LEFT

Ender's are hardy, cute and colourful.

#### BELOW LEFT

Putters are universally kept and prefer hard water.

# A taste of Hawaii

Public aquariums have become leaders in reef aquarium keeping technology and practices over the past decade and **Les Holliday** recently made a return visit to London Aquarium to glean some tips and advice from their top aquarists.



**ABOVE:** The Hawaiian exhibit is run on a Berlin system with an EcoSystem refugium added.

**T**he Hawaiian exhibit at the London Aquarium features an excellent display of hard corals and a collection of Hawaiian fish species. I was welcomed on my visit by London Aquarium's Chief Aquarist, Jamie Craggs and by Gareth Calvert, who is responsible for maintaining the aquarium's reef exhibits.

#### Filtration

Jamie explained that the filtration for the tank had evolved into a hybrid form after starting out fully equipped on Berlin system lines. Next a Leng Sy EcoSystem style,

Caulerpa and mud filter was added. As using an EcoSystem refugium in tandem with a protein skimmer seemed to negate some of the major benefits of the refugium in that any live plankton and populations of other microorganisms would be lost to skimming action, I questioned the effectiveness of such an arrangement. Jamie, however, is happy with the other gains he is making and told me: "The reef tank is far more stable since the refugium was fitted. The 24-hour lighting over the refugium allows the Caulerpa to stabilise pH day and night and eliminate any CO<sub>2</sub> build up in the system. Nitrates

and phosphates are also better managed".

He would recommend any hobbyist with a Berlin method filtered reef system to upgrade it by adding an EcoSystem style refugium. All of the reef systems at the London Aquarium have been modified in this fashion.

Jamie continued his description of how the tank functioned, and it soon became clear that apart from the filtration, the tank is fitted with a pretty standard range of equipment, mainly of Deftec manufacture. This includes the skimming, the lighting and calcium and carbonate hardness

management.

Because Jamie puts a lot of emphasis on good carbonate hardness levels, the tank is equipped with both a Calcium reactor and Kalkwasser delivery system and a simple drip feed that doses the tank with Sodium bicarbonate.

This allows him to maintain levels of around 16dKH (carbonate hardness) which is in the range recommended by experts like Thiel and Wilkins.

Sodium carbonate is a good buffering agent and will also increase pH levels but it can be tricky to use so it's perhaps better to employ one of the several commercial buffering products, some of which also adjust sodium, magnesium, borate and potassium levels as well as adding calcium.

### Huge refuge

Taking a closer look at this reef tank's equipment raised more questions. The refugium was enormous by comparison to other Leng Sy set-ups I have examined. At 500 l/111 gal. the refugium tank was easily large enough to act as a reef tank in its own right and accounted for more than 10% of the whole system's water holding capacity. According to Jamie, the bigger the sump the more stable the reef system will be and greater the beneficial effect on the aquarium environment.

"There has been lots of research that suggests that the conditions promoted by EcoSystem filtration can help reverse head and lateral line erosion (HILE) in fishes and I feel sure this is due to the probiotics. No single form of bacteria is allowed to take over – instead a more natural compilation of different bacteria flourishes. This results in a much more natural environment down at bacterial level for the benefit of both the fish and the corals."

### Phosphate removal

Attached to the refugium was a phosphate reactor. Jamie mentioned that he was about to test a phosphate reducing agent that he expects will become a prominent means of phosphate reduction in the future.

"This new product takes out phosphates on a ratio of one to one so if you have a gram of phosphates in your reef system it would only take a gram of this chemical to precipitate the phosphate as a non-

soluble compound.

"It is supposed to be very efficient and the unit costs are far less than current materials employed".

### Reservoirs

Alongside the refugium there were also two 750 l/165 gal. reservoirs for water changes. The content of one of these reservoirs is sufficient to undertake almost a 20% partial water change of both the reef display tank and its refugium. Compared with the average 5% water change most hobbyists usually schedule this seemed a lot. Jamie explained the thinking behind such large volume changes. "Partial water changes are the best way to manage water quality and as we have the facility to execute quite large water changes at one go, this has become the method for all of the reef tanks in the aquarium.

"We use a high quality salt mix (Reef Crystals) rich in calcium and other elements that require renewal so the chemical balance is more easily restored and the dilution factor related to large volume water changes makes any build up of pollutants such as nitrates easier to manage. Smaller volume changes wouldn't achieve the same result".

### Front of house fish

Time to join the aquarium visitors and examine the tank from the display side. Visually this reef is a real delight with its resident shoal of Yellow tangs straight from a Hawaiian biosphere.

All of the other fishes had similar origins in the Western Pacific. The islands of the Western Pacific are often isolated by vast distances – so many have their own endemic fish species. There was a small shoal of the Bicolor chromis *Chromis marginata* (a species that does not quite make it to the Hawaiian islands but can be found close by in the Marshalls, Marianas and Gilberts).

A number of fish species are found only around Hawaii including Potter's angel *Centropyge potteri*, the Masked angel *Gemicorhinus personatus* and some of the butterflyfishes like the Blue stripe butterfly, *Chaetodon fremblii* and the Millerseed butterflyfish, *C. milneri*.

Hawaii lacks many of the more common Pacific species except the surgeonfishes and triggerfish. These two fish families reproduce by spawning into the water column.

## Factfile

### Essential statistics

The coborets and glass display area is wedge shaped. The front glass plate measures 150 x 100cm/60" x 40" and the back wall 215 x 100cm/85" x 40".

The side walls each extend 170 x 100cm/70" x 40" and the volume is 3700 l/982 gal. The refugium measuring 150 x 60 x 60cm/60" x 24" x 24" has a capacity of approx. 500 l/111 gal. The volume of the whole system is therefore 4200 l/933 gal before displacement.

### Biological filtration

Based on a Delfco Berlin method with an additional Leng Sy Ecosystem refugium added. Some 0.85 cu m of living rock forms an integral part of the filtration system.

### Chemical filtration

A phosphate reactor that is replenished when phosphate readings rise over 0.5ppm.

### Water changes

A reservoir of 750 l/167 gal. is plumbed into the system and 18%–20% partial water changes are made using Reef Crystals.

### Skimming

A Delfco AP703 is fitted with a capacity of 2800 lph.

### Calcium and carbonate hardness management

High calcium salt mix is used for water changes plus the following additive systems.

A Delfco PF1000 Calcium Reactor

Delfco KAC001 Kalkwasser stirrer providing continuous drip feeding averaging 60 l/11 gal. (diluting 1-4 tablespoons to 50 l/10.5 gal.) weekly. A simple drip-feed for dosing the tank with sodium bicarbonate (100g per month).

### Water circulation

ArgonAUT AG series pumps are used both for sump/tank circulation and in-tank circulation as follows:

An ArgonAUT AG series 7 cu m/h for sump/tank circulation.

An ArgonAUT AG series 5 cu m/h for in-tank circulation.

Equivalent in terms of maximum pump turnover of 12000 lph.

### Cooling

Space cooling coupled with a ventilation fan.

### Lighting

The high intensity lighting includes:

Display area: three Double reflectors, two 20,000K 400W Delfco/BLV metal halide unit, one 10,000K 400W Delfco/BLV metal halide unit. In the sump there's a single Arcadia reflector with a 6500K 150W metal halide unit.

### Photoperiod of main display tank

From 0730 – 1930.

The lights in both the display area and in the sump are 50cm/20" above the water surface.

**Feeding**

There's no specialised meat food fed. Various frozen foods intended for the fish such as Red plankton, Cyclopoid and Artemia are small enough for soft corals and LPS hard corals. Other food includes frozen Mysid, Krill and fish eggs all soaked in vitamins before feeding. Reef Gel is also fed sparingly three times per week for the benefit of the Yellow tangs

**ABOVE**

Jamie Graham and Gareth Culvert.

**BELOW**

Finfish, *Nemateleostis magnifica*.

and the eggs and larvae become well distributed.

Also stocked were the Fire goby *Nemateleostis magnifica*, and the Arc eye hawkfish, *Paracirrhites arcatus* which do reach Hawaii – and fish like the Copperband butterflyfish, *Chelmon rostratus* and the Lemonpeel angelfish *Centropyge flavescens* with a distribution in the Pacific which doesn't quite reach Hawaii.

**Invertebrates**

There has been no attempt to stock corals specific to Hawaii in this display. There are relatively few coral species around these islands but the high diversity (some 25 species) in the tank makes for an impressive display.

The *Acropora* dominate and are thriving. These started off as small frags and quickly grew into huge colonies. The healthy state of these

corals is down to the lighting – a mix of 10,000K and 20,000K metal halides.

"The *Acropora* in the Red Sea tank alongside didn't succeed half as well with 6500K metal halides and it was only after the tank was upgraded to 14,000K that they began to look healthier and grow more strongly," Jamie explained.

The 6500K metal halides are ideal for the refugium as they simulate the optimum wavelengths required by the *Caulerpa* for efficient photosynthesis".

**The future**

Titanium heat exchangers will soon improve cooling and a series of coral frag propagation tanks are being installed behind the exhibits to allow the considerable surpluses of hard corals in the tanks to be grown on. These will then stock the tanks of a public aquarium in Paris.

**What's in the Hawaiian tank?**

In terms of dominance hard corals comprise about 80% of live bottom cover to 20% soft corals and colonial forms of anemones.

**Hard corals:** *Acropora* featured strongly with *Acropora formosa*. A stubber and a further seven or so other unidentified *Acropora* species. Easy LPS species like *Caulobrodia* *farcta*, *Physogygia* *lichtensteinii* and what looked to me like a large *Trachyphylla* species were also represented accompanied by SPS corals including *Mentopora*, *Pocillopora damicornis*, *Pavona* *caesia*, *Hydnophora* *granata*, *Stylophora* *pastelsi*, *Seriatopora* *speciosa* and *Mycedium* *elephantotus*.

**Soft corals:** Mainly *Solenastrea* including *S. dura* and *S. brassica* plus various *Sarcophyton* species.

**Other invertebrates:** Colonial anemones *Dalmanella*, *Aequorea* and *Zoanthus* species; a group of about 15 Cleaner shrimp (*Lamprolaima* *amblyops*) plus a large clam, *Tridacna* *dentata*.

**Fish:** The tank is dominated by a shoal of a dozen or more Yellow tangs and a shoal of nine Hawaiian monk seals, *Demissa margaritifer*. Other high profile fishes included four Fire gobies, a large Copperband butterflyfish, a Lemonpeel angelfish and an Arc eye hawkfish.

**WATER PARAMETERS**

Temperature	24.27/27.5-30°F peaking at 30°C/86°F on hot summer days
pH	8.1-8.2
Salinity	1.020/34gpm
Nitrite	Not detectable
Nitrate	0-20ppm
Phosphate	Less than 0.5, usually 0.1-0.5
Calcium	400 ppm
Alkalinity	15 dkh
DSP	Not measured

**QUICK REFERENCE CHART**

Filtration	Berlin/Ecosystem
Extensive constant skimming?	Yes (not high intensity)
OD reactor/specialised kalkwasser delivery	Yes
Light intensity (µmol/m <sup>2</sup> /s)	360µ
% water change	15-20%
Phosphate remover	Yes
Regular feeding?	Yes
Regular use of additives?	Yes (iodine)
Regular maintenance?	Yes





# Interesting **IMPORTS**

**Matt Clarke** and **Stefan van der Voort** look at some of the new and interesting fish currently on sale in the UK.



## Factfile

**Scientific name:** *Puntopites falcifer* Smith, 1929

**Origin:** Found in the Mekong Basin, in Thailand and surrounding countries.

**Size:** About 40cm/15", so a few inches bigger than a fully-grown Tinfoil barb.

**Diet:** According to Raintooth's *Fishes of the Cambodian Mekong*, *P. falcifer* feeds on plants and insects.

**Water:** Not known. Neutral or slightly acidic water should be fine.

**Aquarium:** This is a large, active species that occurs in large slow-moving rivers and dams and needs to be kept in very spacious quarters. A small group of four really deserve a

minimum of at least 180 x 60 x 60cm/6' x 2' x 2' when they're fully grown. Like most large barbs, these are likely to eat plants, so furnish the tank with river-worn cobbles and boulders instead. Should mix well with most other chunky cyprinids.

**Notes:** The *Puntopites* genus contains three other species which range in size from 30-50cm/12-20". Only one of them, *P. waandersi*, has been seen on sale before in the UK.

**Identification:** These fish were imported as *P. falcifer*, but while these specimens share some characteristics, such as the serrated anal and dorsal spines, closer inspection suggested to me that they were actually

*proctoyarsae*. In *P. falcifer* the last spine of the dorsal fin is so long that it can reach the caudal fin, the anal, pelvic and dorsal fin are also normally orange. *P. proctoyarsae* has darker greyish fins, 17-22 serrae on the dorsal spine (this one has 20), while *falcifer* usually has 28-35) and a lateral line that is decurved and extends to the middle of the caudal peduncle, as it does on these fish. However, I am reliably informed by those who live in the area and collect these fish that these are actually juvenile *falcifer*. Juveniles have a smaller dorsal than adults, which has fewer serrae and their fins are relatively colourless. Other

species of *Puntopites* include *bulu* and *waandersi*, but both of these lack serrae on the spinous anal fin rays, so they're relatively easy to tell apart when you know what to look for. *P. waandersi* is one of several cyprinids incorrectly sold under the common name of 'Tinfail barb'.

**Availability:** These fish were imported by Wildwoods in Middlesex (02088 380243) during January 2005 and are believed to be one of the UK's first imports of this species. They're not especially pretty, but they do look rather unusual in a graceful sort of way.

**Price:** Expect to pay about £20 for one of these.

**Matt Clarke**

## Factfile

**Scientific name:** *Bujurquina moronum* Kullander, 1986

**Origin:** Peru, Ecuador

**Size:** Around 10cm/4" when adult

**Diet:** Sven Kullander says that the fish feeds on insects, insect larvae, fish and plants, so it's quite a generalist feeder. It should therefore take pretty much any foods you offer it.

**Water:** Soft, acidic and fairly warm, but should be OK when carefully acclimatised to harder water.

**Aquarium:** I've only kept *B. vittata*, but I would imagine that *moronum* does well under similar conditions. I found vittata pretty placid for its size – mine were kept alongside some smaller *Ochlasomias* in a 120cm/48" tank containing loads of bogwood. It's worth getting a small group of these and allowing them to pair off naturally.

**Breeding:** This species has been bred in captivity. It's an egg-layer with biparental care.



**Notes:** The *Bujurquina* genus is poorly known in the aquarium hobby, and hardly any of the 18 or so species described ever got imported into the UK. A dozen of these species (*capaporazana condemodi*, *zurhivus*, *Agathya*, *huallagae*, *fabiosa*, *megalopsilus*, *moronum*,

*irregui*, *pergrinobanda*, *rebufo* and *lambopatao*) were described by Kullander when he created the genus in 1986. He described *B. burjurquina* the following year, but the remainder of the members (*imania*, *vittata*, *zypulus* and *zamorensis*) were

described by other scientists between 1940 and 1955 as members of the genus *Asoto*.

**Availability:** These fish were imported from Peru by Wildwoods in Middlesex (0208 360245).

**Price:** £14.95

**Matt Clarke**



## Factfile

**Scientific name:** *Bodio bloayrus*

**Origin:** This species originates with certainty from Raimona and the Buxa Tiger Reserve in Western Assam, India.

**Size:** A large species reaching up to 16cm/4" in males and up to 8cm/3 1/4" in females.

**Water:** These large bodids do best in soft water dH 5.0-4.0, pH 6.5-7.5 with a cool temperature of around

22°C/72°F. Slightly colder and warmer temperatures are tolerated, however.

**Aquarium:** Due to their size a large tank is required, at least 80cm/32" for one pair or one male to three females. The tank should preferably be a species tank to provide optimal care, though the larger schooling fish such as *Puntius* will be tolerated (smaller fish the size of Neon tetras have been

reported as being the subject of attacks when these bodids are kept hungry). The tank should be heavily planted thus providing the fish with plenty hiding places. Easy fish to keep.

**Diet:** Frozen and live foods only. Favourites are *Artemia*, glassworm and bloodworm.

**Breeding:** A cave spawner. Coconut shells make good spawning sites. The male guards the eggs and fry until they leave the nest, as if then they are on their own. Number of eggs can be anything from 20 to more, depending on the condition and size of the fishes. Not a difficult *Bodio* to breed.

**Notes:** *Bodio bloayrus* is one of the rarer bodids, only occasionally seen for sale and seldom reported being in possession of hobbyists. There isn't much interest in these fishes and therefore large quantities will not be offered in stores.

**Adult colouration:** The base colour is an orange-raddish with irregular scattered bluish-black blotches on the lateral side which may form ten to

eleven vertical bars from time to time. The fins are hyaline with the dorsal, anal and caudal fin origins having the orange-raddish colour and blotches as described above with also a white outer margin being present. The dorsal fin has a large black blotch located at the first few rays, and another large black blotch at the centre of the caudal peduncle. Females are coloured fairly similar though less intense and with a more grey to brown base colour on their body.

**Similar species:** *Bodio orsonensis* is the closest related fish though the two species are not that difficult to tell apart. *B. bloayrus* has an elongated jaw giving it a unique appearance, and also a much longer head compared to the former. Colouration and size are similar.

**Availability:** Rare in the hobby, mainly because of the low interest in bodids. These were on sale at Wildwoods in Middlesex (0208 360245).

**Price:** £5.95

**Stefan van der Voort**



# Tailpiece

News and views from the PFK office.



**"...when there are so many beautifully-coloured fish to choose from already, why do we need to dye them?"**

**W**hat would be your reaction if someone presented you with a fish that had "Happy Easter" or "Merry Christmas" tattooed on its side? A company in Hong Kong is offering parrotfish tattooed with the message of your choice – or even your company logo. The fish are tattooed with dye using a special "low intensity laser" which are claimed to leave a permanent mark but do not cause the fish any pain.

Dyed fish, like the unfortunate Glassfish, have been on sale for many years, and PFK is totally against them. Our PFK Dyed Fish Campaign has been very successful with 75% of retailers in the UK signing up to a pledge not to stock them. But recently we've started to see artificially-coloured fish in the shops with much more intricate patterns of spots and stripes. We don't know whether these fish have been tattooed or not, but whichever method is used to produce them, we think it's totally unethical. And it's unnecessary – when there are so many beautifully-coloured fish to choose from already, why do we need to dye them? We also don't know for sure whether the fish feel any pain – and I'm sure even if that were the case, they would certainly be pretty stressed by the experience!

It also raises questions, depending on the species concerned and how heavily they were dyed or tattooed, about their ability to communicate with other fishes via their natural colours and patterns. How do these fish indicate their readiness to breed, submission to a more dominant individual and so on? If the fish were coloured in the wrong way, it could also send out totally the wrong message to conspecifics. I also think it's degrading and a real form of abuse to the fish concerned.

And unfortunately not everyone realises such fish have been artificially coloured,

particularly non-fishkeepers. We had some help from a freelance sub-editor recently, a very intelligent lady, who happened to see the picture of the Giant gourami on page 13 and commented on how beautiful it was. She didn't for one minute think it wasn't natural – after all there are some stunning and very intricately-coloured marine fish in the sea! Admittedly few people will think that a fish with "I love you" or "Happy New Year", emblazoned across its side is natural, but it just goes to show how easily people can be taken in by artificial colour and pattern.

Unfortunately, there are no plans at present to ban the sale of dyed fish in the UK under the Animal Welfare Bill. Defra recently told PFK's website editor, Matt Clarke, that injecting or tattooing a fish with dye would be illegal if done in the UK, under the Protection of Animals Act 1911. But a loophole in the proposed Animal Welfare Bill means that if the fish are dyed in another country, they can be imported and sold in the UK. See the full story on page 13 of this month's magazine.

■ We're always keen to hear your views about the magazine, whether it's praise, criticism or features you'd like to see. We want to produce a magazine that's right for you. With that in mind, we have included a special reader questionnaire with this issue of PFK, which we'd love you to fill in and return to us. Postage is free – all you need to provide is the ink and an envelope. Your views on the magazine are very important, so please take the time to fill in the form. The first 1000 readers who send us their completed questionnaire will each receive a great free gift and all completed forms will also be entered in a special draw with some great cash prizes up for grabs. Please remember to return it to us by April 18, 2005.

*Karen Young*



Beauty without dye! (from top): Pyjama cardinal; *Tropheus* sp. "Rufino"; Glowfish; *Acanocara abarrigranti* "Buzza"; Roma angol; Ram; Purilae dmianii; *Nethobronchius guentheri*.