

SEPTEMBER 1992

# AQUARIST & PONDKEEPER

Focus on HEALTH:  
Vaccines —  
Preventive medicine —  
Case history — Water quality

BREEDING WHIPTAIL  
CATFISH

Fish collecting  
in Ecuador

COURTING  
OSCARS

NEW  
SERIES:  
Latest aquatic  
patents

Pythons  
and Boas

British Shore  
Fishes

£1,000 'aquarian'® Competition  
Win an expert and his fish





SEPTEMBER, 1992  
VOL. 57 NO. 6

EDITOR  
John Dawes

ART EDITOR  
Ian Hunt

ADVERTISEMENT  
MANAGER  
John Young

ADVERTISEMENT  
PRODUCTION  
Gwen McNeil

PUBLISHED BY  
Dog World, 9 Tufton Street,  
Ashford, Kent TN23 1QN.

TELEPHONE:  
ADVERTISING AND  
PRODUCTION  
0233 621877

FAX NUMBER  
0233 645669

SUBSCRIPTIONS  
£21 per annum post paid.  
Overseas rates on application.  
All subscriptions payable in  
advance to:  
Aquarist & Pondkeeper,  
9 Tufton Street, Ashford,  
Kent TN23 1QN  
Origination by Wishpark Ltd.  
Printed by Headley Brothers Ltd.  
The Invicta Press,  
both of Ashford, Kent.  
Distributed to the Newtrade by:  
Seymour International  
Press Distributors Ltd,  
Windsor House,  
1270 London Road, Norbury,  
London SW16 4DH.  
Tel: 081 679 1899  
Fax: 081 679 8907



# Contents

## Features

In this month's Ponderings,  
Jason Endfield tries to  
unravel The Stickle-  
back Mystery 12

Accompany Norwegian  
aquarist Alf Stalsberg as he  
chases his South  
American Dream in  
Ecuador 24

## COMPETITION

Win an Expert and his  
Goldfish in Aquarian's  
£1,000 competition  
with a difference 35

Dr David Tipping and  
Angela Hollyfield describe a  
turbulent Oscar-winning  
Performance... there are  
some pretty special  
pictures too! 38



## Breeding

Harry Montagu advises on  
breeding the elegant,  
peaceful Whiptail  
Catfish 42

## Focus on: HEALTH

Vaccines for the Aquarist:  
the way ahead? Frank Cross  
and Peter Burgess  
discuss the pros and  
cons 44

Vet Lance Jepson is a firm  
believer in Disease  
Prevention. In Part 1, he  
looks at the Aims of  
preventive medicine, and at  
the Identification of  
health problems in fish 51



Nelson's Progress: a  
remarkable story of recovery  
from horrendous injuries.  
Steve Hickling of World of  
Koi has all the details  
and pictures 54

Molecular biologist Philip  
Hunt guides us expertly  
through the water  
chemistry jungle in  
Pure Thoughts 59

A super treat for snake fans:  
Small Boas and Pythons —  
a detailed guide to their  
care from Marc  
Staniszewski 99

Staying Alive: Part 1 of the  
'definitive' guide to Fishes  
of the British Shore by  
Bristol University's  
Dr Peter Miller 102



## Regulars

Cover Story	3
Editorial:	
Human Genes and Patented Guppies	6
News Desk	6
Tomorrow's Aquarist	8
Seaview	11
Books	15
Letters	18
Out & About	20 & 88
Koi Talk	28
Your Questions Answered	30
Herpetology Matters	36
Growing Tips	58
Diary Dates	64

## NEW SERIES:

Patently Speaking	67
Trade Talk	70
Koi Calendar	74
What's Your Opinion?	78
Product Round-up	78
Coldwater Jottings	86
Next Month	97

## COVER STORY — POWDER BROWN TANG

Photograph: Max Gibbs, Goldfish Bowl, Oxford

The Powder Brown Tang, also known as the Gold-rimmed Surgeon (where do Tangs end and Surgeons begin?) is a tropical Indo-Pacific fish that grows to around 20cm (8in) in the wild.

Formerly known scientifically by the charming name *Acanthurus ali-ala*, *A. japonicus* is generally regarded as a peaceful community fish which swims at all levels of the tank. This ties in with observations made in the wild where this species has been recorded on reef tops, reef slopes and even in 'surge' channels.

Although it will take some commercial foods (preferably the frozen types), the diet of this beautiful fish should consist largely of invertebrates and plant matter (mostly algae). *A. japonicus* is therefore not one of the easiest species for beginners to maintain in peak condition on a long term basis. This should, of course, be borne very much in mind at the time of an intended purchase.



dangerous for humans, but can also kill the fish, so correct water maintenance is important for the fishkeeper and the aquarium."

And everyone agreed that, while you are in contact with your aquarium, under no circumstances should you put your fingers in your mouth. Be warned!

## Is It In The Book?

The Federation of British Aquatic Societies (FBAS) has released a new edition of the *Dictionary of Freshwater Fishes* (Booklet No 9). This is a complete revision of the updated edition produced in 1982, and runs to almost 150 pages.

Species are listed in two ways: scientific names to common names, arranged in popular fish groups; and common names to scientific names, on a strict alphabetical basis. The latter list also includes current FBAS showing class information alongside each name. A third section, based on the same principles as the main work, incorporates fish which have appeared in literature but which have not yet been allocated a particular fish class.

"This means that, although you may not yet be seeing some species on sale (perhaps due to export restrictions in their country of origin), you will still be able to identify the species and read up on them before the happy day when they do become available," explained FBAS chairman, Joe Netherell.

A further FBAS booklet has been issued to assist aquarists with varieties of longfinned fish. Booklet No 20 — *Longfinned Varieties*, incorporates a selection of longfinned fish, with, according to FBAS, "more existing than you realise".

The *Dictionary of Common Scientific Names of Freshwater Fishes* (Booklet No 9) is priced at £2.50; while *Longfinned Varieties* (Booklet No 20) is £1.50. These are available from FBAS Merchandising, 14 Upper Dane Road, Margate, Kent CT9 2LX.

## Grocklemania

A new name... and a variety of attractions, is planned for the Isle of Wight 'Aquatic Experi-

ence' which has become an established feature of the aquatic calendar.

Next year's event, to be held at Whitecliff Holiday Park, Bembridge IoW (23/25 April), is entitled 'Grocklemania' and is organised by Isle of Wight Aquarists' Society, supported by the Federation of British Aquatic Societies and 'Aquarian'.

"The success of 'The Aquatic Experience' over the past three years has been achieved by providing a leisurely relaxing atmosphere, mixed with the friendly competitive nature of an open show," explained show manager Paul Corbett.

The provisional programme for the event incorporates a cabaret/dance on the Friday evening, followed, on the Saturday, by skittles, hoop-la and other attractions, as well as a cabaret-buffet in the evening; while the IoW AS Open Show, lectures, stalls and the final of the 'Aquarian' Aquacub Quiz, will all take place on the Sunday.

A special weekend package has been arranged by the organisers, which includes return ferry crossing for car and foot passengers, two nights' accommodation in a self-cater chalet, grand buffet on Saturday evening, dance band and cabaret entertainment on the Friday and Saturday evenings, and full use of the holiday park facilities. Costs are £58 per head for adults, £30 per head for children aged between five and 13 years, and free for children under five.

Further information is available by contacting Paul Corbett, The Orchard, Gatcombe, Isle of Wight PO30 3EF. Tel: 0983 721246.

## Hampton Court Pond Win for Tetra

Tetra's impressive pond display at Hampton Court Palace International Flower Show



Tetra's award-winning pond design at the Aquatic Village at Hampton Court Palace International Flower Show, designed by Tony Howells.

(9-12 July) was voted the top exhibit in the show's Aquatic Village.

The prestigious Tudor Rose award was received on behalf of Tetra by designer Tony Howells, who explained that he used specially-imported Irish limestone for the design, which incorporated a twin waterfall cascading down either side of an island. Further colour and interest was provided by alpine and waterside plants around the pond, together with a variety of pond fish.

## Supreme Festival Response

Interest in this year's Supreme Festival of Fish-keeping has received immense advance interest in bookings, according to FBAS, who are organising the event, sponsored by Interpet and held at Pontin's Sand Bay Chalet Hotel (6-8 November).



A & P stand, Weston-super-Mare 1991.

In addition to the highly-successful attractions of previous years, this year's event will incorporate a European Open Show for the first time in a UK aquarists' show; while top aquarists throughout the UK will be participating in the FBAS

## Supreme Championship.

Also part of the attractions will be the final of the Aquachamp Competition, to test the brain-power of the best of British aquarists and, according to Interpet special projects manager Mike Clarke, an "end of term" atmosphere will accompany the celebration of fishkeeping at its very best: "Everyone involved with the Supreme Festival will be trying their hardest to ensure you have a good time — whether it is finding out about fishkeeping, at whatever level, from the trade, from expert speakers, by mixing with other hobbyists, taking part with the residents' competitions, or simply enjoying a relaxing swim or exercise in the indoor health centre at the venue."

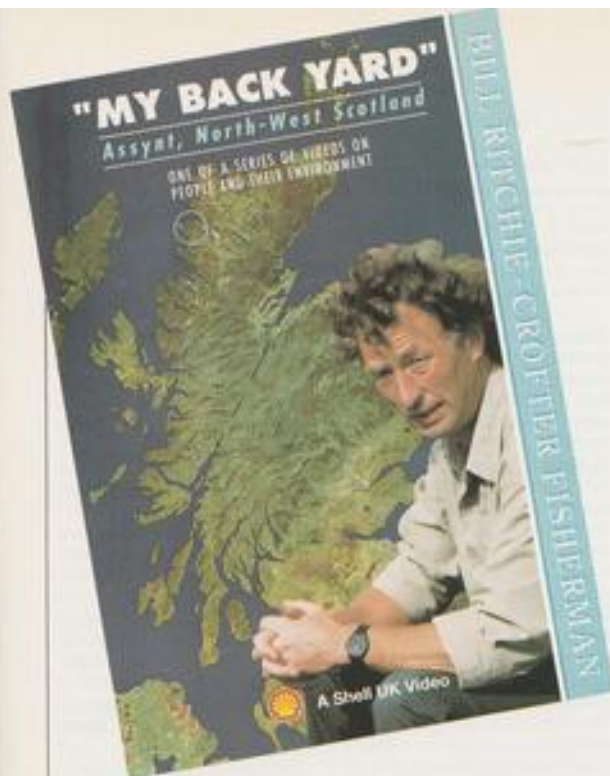
The weekend costs £57 per person (£35 for juniors under 16 and £20 for those aged 2-10) and booking details should be sent to Colin Richards, Beechwood Cottage, Long Grove Wood Farm, 234 Chartridge Lane,

Chesham, Bucks HP5 2SG. Tel: 0494 773094.

## My Back Yard — On Video

No, this is not a guide to laying your patio, or even transforming that patch outside the kitchen door into a resplendent Koi pond. For presenter Bill Ritchie, his 'Back Yard' combines the sea, lochs, and bays of the mountainous Parish of Assynt in the Highlands of Scotland, and is the subject of a 23-minute video, presented by Bill and recently released by the





Shell Film and Video Library as the first in a series of *My Back Yard* programmes about Europeans who believe that, by their actions, they can have a positive influence upon their environment.

The film is one of several programmes available on free loan or sale from the Shell Film and Video Library and follows Bill at sea to fish for lobsters and prawns, protecting the fragile landscape of Achmelvich Bay, working the croft, and stalking for red deer.

According to Shell, *My Back Yard* will appeal to educational establishments and audiences with an interest in conservation and the environment. The programme is available on free loan on VHS and U-Matic video cassette to group audiences, but not to individual borrowers. Background notes are provided by Shell and are sent with booking confirmations, to help plan the use of the programme in advance. The video is also available for purchase by groups and individuals at £12.34 for VHS, and £34.08 for U-Matic (inclusive of VAT).

Further information or bookings should be addressed to Shell Film and Video Library, Viscom Limited, Park Hill Road Trading Estate, London SE21 8EL. Tel: 081 761 3035.

## First North Eastern Fish Festival To Go Ahead

Northumberland's first fish festival is set to go ahead in October, despite a fire which destroyed half the sports centre where it is to be held.

Over £750,000 worth of damage was caused by the fire, in the Newbiggin Sports and Community Centre, where the inaugural Great North Eastern Fish Festival is to be staged (3/4 October).

The centre's social and community facilities were com-

pletely destroyed, but the remainder of the premises will be in use again by October, and the festival's joint organisers, the North Eastern Federation of Aquarist Societies and Wansbeck District Council, are confident that the quality of the event is not going to be affected.

Main festival organiser George Liddle, a north-east aquarist and national show judge, is working on a theme for the festival which will tie in with the first Eurofest being staged in the Wansbeck district of Ashington, Bedlington, and Newbiggin. In addition, a number of special classes for young aquarists are planned; while enthusiasts from Wansbeck's German twin town of Renscheid have been invited.

The fish festival will open the Eurofest, which itself is expected to attract international artists and performers to Wansbeck throughout October. Among the attractions organised for the week are music, dancing and street theatre, themed food and drink weeks, a beer festival, cookery demonstrations and wine-tasting sessions.

Further information is available by contacting: Martin Boyle at the Publicity Office of Wansbeck Council, Town Hall, Ashington, Northumberland. Tel: 0670 814444; Fax: 0670 520136.

## Discus on Floppy?

A computer-based resource system which claims to assist ecological monitoring, as well as assisting aquatic hobbyists, societies, and researchers, has

been launched by biologist and conservationist Dr Cedric Woods (see also **Product Round-up** in the July issue of *A & P*).

According to Dr Woods, the 'Ski' System (SKI stands for Six Kingdom Inventory), incorporates a cross-reference of the scientific and common names of all types of fish, to which the user can add information as a personal database or diary.

As data are entered, these are automatically restructured into groups of references, under each fish name, so that future reference to that name will reveal the user's complete compilation of notes for that fish.

"This will be extremely useful to individual hobbyists, breeders and societies," remarked Dr Woods. For example, a society could catalogue the aquatic collections of all its members and collate information for the benefit of the society; or a breeder could assemble information about breeding programmes for future analysis."

For the computer-minded, the program is designed for use on IBM-compatible computers with 540k memory or above and running on DOS 3.0 or higher. No hard disk is required, as data can be stored on a series of 'floppy' disks, though a hard disk will improve the program's performance.

Dr Woods has reported significant interest from individuals and educational establishments, and is keen to sell the program as cheaply as possible, at around the £100 mark. A demonstration disk is available, price £5, by contacting Dr Cedric Woods, SKI-1, 31 Ivor Place, London NW1 6DA. Tel: 071 724 8827.





# Tomorrow's Aquarist

By Gina Sandford



## SEXES APART

Sometimes, when you are out buying fish, you have to take a chance — not with sick fish, but with whether or not you have purchased a pair. What is it that tells a male is a male and a female is a female?

With most of the common community fish, it is relatively straightforward: male Guppies *Poecilia reticulata*, the various mollies (eg *Poecilia velifera*), etc have a gonopodium (modified anal fin) and the females do not. In other fish, the male is highly coloured and the female is drab. Just look at Dwarf Gouramis *Colisa lalia* or Rosy Barb *Barbus conchonus*. Yet others show elongation of the fins in males.

Looking for these characteristics is fine, provided you have adult fish. However, if you like to buy young fish, how can you increase your chances of getting a pair? After all, most of the characteristics do not develop until the fish are semi-adults.

Let's start with the good old swordtail (*Xiphophorus helleri*). Young fish all look like females and, if you want to have large males, you want them to stay looking like females until they have grown to about 100mm (4in). The dominant fish in the shoal will begin to sex out — the anal fin will change into the gonopodium and a slight black line will appear at the base of the caudal fin. The fin will then extend the last few rays to form the well-known 'sword'. Remove his dominant male and one of the other 'females' will often develop into a male.

Fins are always a good place to start spotting differences in the sexes — elongation of the dorsal fin's rays is common in

males, whereas in females, the fin is rounded; likewise in the anal fin. But again, this takes time to develop. In some catfish, the first ray of the pectoral fins becomes thicker in males and may even turn up slightly at the ends, as with some of the Whiptails (Loricariidae).

In males of other species, some have bristles around the snout (even in the females but to a much lesser degree): for example, *Ancistrus* and their common-name Bristlenoses reflect this. *Corydoras barbatus* and some of the loricariids develop cheek bristles, but only when they are in spawning condition, and even the common Goldfish develops tubercles on the head at this time. These are visible as tiny white 'pimples' or spots.

Perhaps the most extreme are the fish that change their body shape. Take as an example *Poecilia latipinna fischeri* — a Driftwood Catfish in which the male could be mistaken for a completely different species. He develops a different head profile, but his dorsal fin looks deformed and the maxilla (jaw) bone which supports his maxillary barbels extends almost the full length of the barbel. And what of the female? Well, she looks just like any other Driftwood Catfish!

When experienced aquarists look at fish in dealers' tanks they will study them for a while and, if unable to come to a decision about the sexes there and then, will probably buy six or so specimens (finances permitting!). At other times, they will pronounce with certainty, "Those two are a pair!"

I watched one such gentleman do this for me with young Pike Cichlids (*Crenicichla* sp). I hadn't been keeping fish that long and didn't really believe he could do it — I humoured him (so I thought). With instructions of "Watch that one while I catch this one", two fish were placed in a bag. He repeated this process to get two more pairs for other members of the club.

We looked at him with some degree of disbelief on our faces. "Take 'em home, grow 'em up and see!" He was right on all counts. How? "Subtle differences in the head shape," came the

reply. I couldn't see it at the time, and still doubt that this was the only thing, but it worked for him!

The ability to tell males and females with some degree of success in younger fish and those adult specimens where only the fish know the difference for certain, comes with experience. It is a combination of factors, subtle differences that you cannot quite put your finger on, plus the way the fish are behaving. This usually results in the profound, if inaccurate statement, "They're a pair — but I don't know why". What you really mean is that, "I can't quite put my finger on it, but they're different."

And, if all else fails, you take your fish home and wait until they have matured in the hope that they develop breeding tubercles or, at least, the females roe-up (fill up with eggs), while the males of similar size remain slim... and you live in hopes that the females are not just fat males!

## RESULTS TIME

Back in January, we announced a competition to be run at

the Isle of Wight A.S. Show this summer. Junior aquarists could enter their favourite fish, plus an essay about it. Well, Dick Mills (a regular contributor to *A & P*) was asked to judge it and here is his report.

## 1 Tomorrow's Aquarist Competition

Being a Judge at an Open Show brings enough problems dealing with the fish entries, you might think, but when you're not even a judge and you're asked to judge a special Class for juniors (inspired by *A & P's* Tomorrow's Aquarist) which contains both a fish and a written essay as an entry, then you'll appreciate the situation I found myself in at the recent Isle of Wight A.S. Open Show Weekend.

What came over very clearly was that all the young exhibitors cared very much for their fishes, no matter in what vein their essays were written. One young lady, for example, perceptively asked why her Comet was a Gold fish when it was no such colour!

Some essays were quite serious, from an illustrated work on



Lucky winners of the Isle of Wight TA Competition: Carl Bailey, flanked by Amy Jones and Susan Lumley, with judge Dick Mills behind.



a 'Baby-Eating' Mogurnda to a full dissertation on *Hypostomus nigricauda*. Despite the invitation to all aquarists under 16, the exhibitors were actually all under 12, each determined to argue why their particular fish was their favourite.

To Ken the Koi, Nipper the Piranha, Goldie the Goldfish, George the Comet, Gordon the Golden Gourami, 'Baby-Eater' Mogurnda, Tigger the Tiger Barb, and Frankie the Hypostomus, all I can say is thanks for bringing your owners along and showing us all that there's more to keeping fish than just looking at them!

Incidentally, the hardest part was deciding on the winning combinations but, eventually, it had to be Carl Bailey with his *Hypostomus*, followed by Amy Jones (*Mogurnda adspersa*) and Susan Lumley (Common Goldfish).

The Isle of Wight Society once again came up with something different, and with such keen youngsters showing off their paces, there should be no shortage of Tomorrow's Aquarists.

Carl's prize was a free 12-month's subscription to *Aquarist & Pondkeeper*. Congratulations to Carl, whose first issue will be arriving shortly, and to all the entrants who presented me with such a difficult challenge. Dick Mills

## 2 Word Search

Entries for this competition closed on 30 June. I would like to thank all those who entered. All the names were placed in a bag and I got my daughter to pull out the winners.

The lucky people are Susan Hobbs (8) from Woodfield Northampton and Andrew Pinel (14) from St Mary, Jersey. Congratulations to you both.

A copy of the *Interpet Guide to Community Fishes* will be on its way to you soon.

ALL LETTERS FOR T.A. SHOULD BE ADDRESSED TO: GINA SANDFORD, TOMORROW'S AQUARIST, AQUARIST & PONDKEEPER, 9 TUFTON STREET, ASHFORD, KENT TN23 1QN

## INTERPET LIMERICK COMPETITION

And now for this month's super TA competition! Are you ready for this?

This time the competition is aimed at the poets(?) among you. I would like you to write a limerick about your favourite aquatic subject. It could be fish, plants, reptiles, amphibians, water fleas or whatever — the choice is yours. Bet you can do better than I can.

*There once was a fish from Peru,  
Who ended up kept in the zoo,  
As he peered from the tank  
He thought of a prank  
And splashed water all over you!*

The prizes on offer are 2 Interpet Water Test Kits (Easy Test No 5 pH Broad Range), so get writing.

Don't forget to include your name and address in BLOCK CAPITALS. Closing date: 31 October, 1992. Send your limerick to TA/INTERPET LIMERICK, Gina Sandford, Tomorrow's Aquarist, Aquarist & Pondkeeper, 9 Tufton Street, Ashford, Kent TN23 1QN.

Good luck! See you next month.



Interpet range of EasyTest Kits. The 'Limerick' prize is No 5 (second from the left on the front row).



# KOI



**AVENUE FISHERIES** the Country's longest established full time Koi only Retailer invite you to visit their new purpose-built premises at  
**46 ROOKERY ROAD, WYBOSTON, BEDS.**

THE NEW AVENUE FISHERIES HAS:

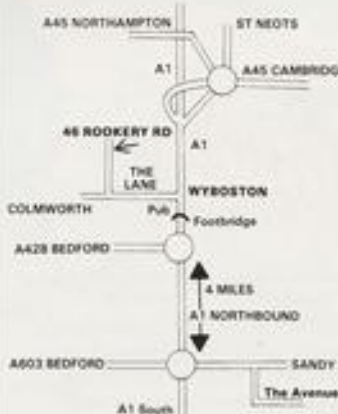
- (a) 16 ponds containing a total of over 40,000 gallons of filtered water.
- (b) Each pond individually landscaped and filtered to provide ideas both for the beginner and experienced Koi Keeper alike.
- (c) Possibly the Country's largest selection of quality Koi from 12" to 30" priced from £40 to £2600.
- (d) Comprehensive selection of smaller Koi from 3" to 10" priced from £3 to £40.
- (e) No other fish stocked — ONLY JAPANESE KOI.
- (f) Full range of pond/filter construction items including: Butyl, Ecanoliner, G4, Matting, Foam, Brushes, Lytag, Canterbury Spa, Siporax, Zeolite, Perforated Sheet, Bottom Drains, Polybac, etc.
- (g) **PUMPS** — vacuum, submersible and air from ITT, BWG, DAB, HIBLOW and WHISPER ranges.
- (h) **ULTRA VIOLETS** — 15 and 30 Watt UVAQ Pondmasters.
- (i) **MEDICATIONS** — Formaldehyde, Malachite Green, Acriflavine, Polybase, Salt, Chloramine T, Waterlife and Interpet ranges, etc.
- (j) **KOI FOODS** — Hikari, Tetra, Plankton and Silkworm Pupae.
- (k) **KOI NETS** — From 18" diameter to 30" diameter prices from £16 to £70.
- (l) **TEST KITS** — Full Tetra range.
- (m) **LANDSCAPING ACCESSORIES** — Japanese style lanterns, Bamboo poles, Rocks and Conifers.
- (n) **BOOKS** — Extensive range of Koi related books.
- (o) Large car park.
- (p) Full price list detailing all the above available upon request.

## AVENUE FISHERIES

**46 ROOKERY ROAD, WYBOSTON, BEDS. MK44 3AX.**  
**TEL: (0480) 215408**

**OPENING HOURS: MARCH to OCTOBER 6 DAYS. 9 AM to 5.30 PM.**  
**CLOSED ALL DAY WEDNESDAY**

**NOV 1st TO FEB 28th. 9AM - 4PM.**  
**4 DAYS. CLOSED MON., TUES., WED.**



**Approach Wyboston along the North Bound carriageway of the A1, exit at slip road to Colmworth directly after footbridge and "Wait For The Wagon" pub.**



## NEAR-DEATH OF THE MORATORIUM

On 29 and 30 June what was, in my opinion, the most crucial meeting yet of The International Whaling Commission, took place in Glasgow. Incredibly, Iceland, along with other Nordic countries — were holding a gun to the Commission's head by saying that they would start to hunt Fin and Minke Whales if the meeting did not agree to lift the moratorium on whaling which has been in force since 1988.

Of course, the whaling countries were being openly encouraged by Japan — whale meat is still Japan's favourite food and is deeply rooted in their culture. However, the Japanese had started to drag Third World countries into the arena by offering them financial incentives in return for lobbying for an end to the ban. Oh, I doubt that there were written agreements which were worded quite like that, but that, in effect, is what was happening.

So now, countries like the Dominican Republic — who have no interest in whales whatever — are joining the queue to protest at the moratorium. In fact, Britain and America seemed increasingly isolated in their stance to obtain an extension to it. Going even further, John Gummer wanted the IWC to widen the scope of the ban to include dolphins, of which some 1.5 million are killed every year.

While some observers seemed to think that the whaling nations were playing the bluffing game, I was not so sure. According to the press just before the meeting, there were four Icelandic whaling boats on stand-by in Reykjavic and Alan Thornton, of the Environmental Investigation Agency, reckoned that the Japanese had set up pirate whaling stations which were just waiting for the green light. It seemed to me that some kind of whaling would start again this year, no matter what. In fact, Japanese newspapers were predicting in early June that they would be allowed to kill one hundred thousand Minke Whales in the Antarctic in 1992 alone.

Andy Ottaway of Greenpeace said (and I quote):

*"The idea of entrusting the world's remaining whales to the industry that depleted and destroyed them is sheer lunacy. What is needed now is to accept public opinion and have a permanent ban on whaling."*

I couldn't agree more with this sentiment but, sadly, believe that this will never happen.

Anyway, the meeting in Glasgow decided to keep the moratorium for another year. That's the good news. The bad news is that Iceland and Norway both decided to turn their backs on the IWC and resume commercial whaling. Predictably, Japan didn't say anything!

## SINGAPORE REEF RESCUE

The summer issue of *Marine Conservation* — the magazine of the Marine Conservation Society — contained lots of interesting stuff. This magazine goes from strength to strength and membership to the society is worthwhile for it alone.

There was a superb article by Dr Susan Gubbay, the Senior Conservation Officer, called *Fisheries and the Environment*, which highlighted the damage the fishing industry is inflicting upon our waters. There was a piece about the society's involvement with the *British Steel Challenge Yacht Race* and there was also a piece on the *Coastal Zone Management Select Committee's* report.

All very interesting stuff, but what captured my imagination was an article by Helen Newman called *Singapore Reef Rescue*. Helen is chair of the Marine Conservation group of the Malayan Nature Society, Singapore Branch. Apparently, a project had been launched to save some of the marine life threatened with destruction due to a reclamation project in which the island of Buram Durat will be joined to Sentosa, creating a marina and other developments.

Visibility there had degenerated to less than 50cm (c 20in)

following reclamation work and heavy siltation was apparent. Suitable sites for relocating corals and other organisms were found on Sentosa, in places where development had already taken place and none likely to re-occur. Site conditions were better on Sentosa, with visibility ranging from one to two metres (c 3-6ft).

The sites are on submerged rock-retaining bunds ('dams') in one to three metres of water below the reclaimed southern beaches. At the time of transfer, the bunds were only a few months old and their irregular nature provided many locations for the resiting of corals. A few small colonies of Tunicates and occasional coral settlements had been observed in the area where reclamation had been completed for several months.

No fish were seen on the rock pond prior to the relocation of the corals. The similarity of the environmental condition to the more sheltered parts of Buram Durat suggests that any corals would have a good chance of survival at the new sites.

The potential area for coral relocation is very large, but the quantity of organisms which could be relocated ultimately is comparatively small. Since a scattering of corals over a wide area does not provide a good varied habitat for further colonisation and recruitment by fish and other animals, a concept of 'mini-patch' reefs was therefore developed. Each

'patch' covers an area of some 50 square metres (540 sq ft) with about 40-50% live coral cover over each site.

Volunteer divers were briefed on collection techniques to remove whole corals and other organisms without damaging them and — here is the really clever bit — these were towed at about three knots on specially designed sledges to the new sites. These sleds meant that no animal had to be removed from the water, minimising both damage to them and requirement for more people.

Each completed patch reef will be photographically surveyed and the dimensions of key corals recorded. A fish count will be undertaken over each reef to provide base line data for future counts. The patch reefs will be surveyed over regular intervals and changes in coral cover calculated. The success of the project will be determined by comparison with the control, where only natural recruitment will occur. Brilliant stuff!

## FREDDIE DEAD?

Finally, I read something very disturbing at the end of June. According to a magazine I saw, Freddie, the Ambleside dolphin, has been killed. It didn't give very much detail, so I shall investigate and get back to you. Watch this space.

Meanwhile, I'll see you next time...



*"Just how much money DID you spend on Koi...?"*



Jason Endfield

## Ponderings: The Stickleback Mystery

Collector of irrelevances par excellence, Jason Endfield, tackles the mysterious appearance of Sticklebacks in previously Sticklebackless ponds.



Some people have a strange obsession with obscure facts. Indeed, they could almost be described as 'collectors of irrelevances'. I number myself among these people. To prove my point, take by way of an example, this fact: did you know that the more sardines there are packed into each can, the greater the profit there is for the packer? Why? Well, because the oil that they're canned in is more expensive than the fish. I know — it's amazing.

I bet you didn't know either that Mount Fujiama in Japan is reputed to bend in the wind (?). How did you get where you are today without knowing that?

Once one has started collecting such facts, it's incredibly difficult to stop, and it really does become an obsession to find answers to unimportant questions — not so much 'What is life all about?', more 'How many processed peas are there in each can?'. You can imagine my delight then when

someone asked me how some Sticklebacks had arrived in her rather newly constructed garden pond. Naturally, I looked first for a rational explanation: "Well," I asked, trying to look and sound professional (no mean feat), "could it be that you put them there?"

Not a good theory... the lady looked at me in total disbelief: "Well, not unless I sleepwalked totally unconscious, and I hardly think I'd sleepwalk to the lake in the park, go fishing and bring the Sticklebacks home to my garden, then go back to bed and not remember any of it..." she said. I took her point but reminded her (with many illustrations) that stranger things happen.

I vowed to return to her with the answer to her Stickleback question and went off in search of a reasonable explanation. I wandered (lonely as a cloud) down to the local library. There I sat down with a pile of books, the subjects ranging from 'Amphibians', through 'Water Gardening', to 'Delicious Recipes with Coconut' (the last I picked up



in error, though I can recommend Coconut Jam Pyramids, recipe on p.63).

None of the books provided the answer to my question, although I did learn how to line a pond with concrete and how to tell the difference between a Green Tree Frog and Brown Tree Frog (one is larger than the other). In fact, it's fair to say that of all the books, the coconut one came closest to providing an explanation to my problem, but only because there was a photograph therein showing an exquisite giant fish made entirely of — yes, you guessed it — coconut... truly delightful.

An old man saw my look of despair and came over. "Why," he said, "you look as lonely as a cloud — what's up?" His uncanny observation startled me. I explained the situation and told him about my quest to find an answer to the mystery of migrating Sticklebacks. The old man was obviously a collector of irrelevances himself — I knew this because he pointed to the pine table next to us and told me the exact location of the tree before it was felled to make the table (Lillehammer, Norway, felled 1957).

He pondered on my question for a good while. It was half an hour before he spoke again, during which time I had filled in a few words (all wrong) on the Times Crossword (I knew they were incorrect when I found I had inadvertently made the two words 'pebec' and 'isooko').

Anyway, the old man poured forth his explanation. I was delighted. It sounded both reasonable and acceptable, and I thanked him sincerely. We exchanged a few more irrelevances and I set off on my way back to the lady who had set me the challenging question.

When I arrived, I found her gazing into the murky depths of her two-foot by three-foot pond. "They're still there," she said. "I bet you haven't got an answer as to how they got there."

I smiled smugly. "Ah, but I have," I said. "Ready?"

I related the explanation to her just as the old man at the library had to me. When I was through, the lady stared at me — I wasn't sure whether she was impressed or not. It turned out that she was not — I gathered this from her comment. "I've never heard such utter rubbish in my life," she said. In order to retain friendly relations, I passed on to her my other 'find' — the recipe for Coconut Jam Pyramids — and all was well.

As regards the explanation I put forward, well, I remain convinced of my theory — it's more likely than hers (Martian beings carrying out experiments in teleportation) for a start.

So, what is my theory? Well, it's the same as the old man's theory — namely, that Stickleback eggs are carried by unsuspecting frogs on their feet from one pond to another. Come to think of it, it does sound a bit unbelievable now; indeed, come to think of it, I left the old man in the library talking to a chair!

But I'll stand by the frogs' feet explanation, at least until I hear of anything more convincing... which may not be very long... Any suggestions?



# Books

## Captive Seawater Fishes (Science and Technology)

By: Stephen Spotte  
Published by: Wiley-Interscience  
ISBN: 0 471 54554 6  
Price: £75

I don't know if it's a question of luck or design, but it seems to me that we are entering (or have entered) a phase in aquatics where the 'academic tome' is putting in a more-frequent-than-usual, and very welcome, appearance than in days gone by. One thing is certain: we are now receiving a regular trickle of such books for review, I'm delighted to say.

*Captive Seawater Fishes* is the latest of these 'grey-matter' volumes to land on (or should it be, through?) my desk. It is 942 pages long (with weight to match), and is absolutely wonderful. It falls fairly and squarely within the category that I have referred to more than once in the past as "not for the faint-hearted".

However, if you are not faint-hearted, and if you have an interest in the large-scale exhibiting of marine creatures (as in public aquaria), you should waste no time in placing an order for this hefty book, or getting your local library to fork out the £75 cover price.

Stephen Spotte, the author, is justifiably well-known to all serious marine aquarists, having produced such highly acclaimed earlier works as *Seawater Aquariums (The Captive Environment)* in 1979 and *Marine Aquarium Keeping (The Science, Animals and Art)* in 1985.

In his Preface to *Captive Seawater Fishes* he says that his book is "... iconoclastic in places and eclectic overall".

Examples of the former can be found scattered throughout the text, with quite a few featuring, not surprisingly, within the section dealing with biological processes, where the author sets out to rectify some old-held misconceptions. Among these is the old chestnut of reactivating activated carbon. Stephen Spotte tells us that this practice:

*"is not economically feasible until GAC (Granular Activated Carbon) usage approaches 4000 kg/day. Aquarists have no choice except to discard exhausted GAC and replace it. Contrary to what many think, reactivation cannot be accomplished effectively in the kitchen oven."*

So now we know... and another traditional bit of aquarium practice bites the dust!

It is clearly impossible for a single author, in a single lifetime, to be able to write 942 pages on this subject based exclusively on data personally obtained through experiment and observation. Stephen Spotte

## CAPTIVE SEAWATER FISHES

Science and Technology



Stephen Spotte

(of course) recognises this and puts it beautifully in his Preface when he says:

*"Those who argue that one person cannot cover every subject adequately forget that the same applies to single subjects. The author's objective should be the acquisition of knowledge, not perfection, and the fun is lost in not attempting the impossible. As Albert Szent-Györgyi said, 'It is much more exciting not to catch a big fish, than not to catch a little fish'."*

Wonderfully put, Sir! Having said this, Stephen Spotte probably knows more about more subjects appertaining to marine aquaria and environments than the majority of us put together, so he is able to combine his wealth of knowledge with the best of other people's literary and research offerings. The result is a book on the large-scale exhibiting of marine organisms that is hard to fault in textual content and/or style.

I can't honestly say that I've spotted any glaring omissions — everything from Water as a Solvent, to Bioassay with Fertilized Sea Urchin Gametes, appears to be here, including guidance on photography, discussions on salinity and specific gravity, the design of public aquaria exhibits (including detailed instructions on how to construct artificial corals), fish diseases, digestion rates and digestibility, feeding associations, biotopes, rotifer cultural procedures... and so on, and on, and on.

My only big grumble about this book which, to quote the blurb: "... provides the first fully comprehensive look at the science and technology of maintaining seawater fishes for purposes of aquaculture and public exhibition", centres on the (very few) colour photographs.

Clustered in one block (the cheapest method) near the centre of the book, they consist of just 16 colour plates. Two contain single illustrations (colour name charts), while the others carry four pictures each. To me, the selection seems, to a considerable extent, less than ideal. Pictures of individual fishes or shoals, colourful and interesting though they may be, have all been seen before. *Captive Seawater Fishes* presents an all-too-rare opportunity to show some of the

outstanding public exhibits that exist round the world. Sadly, in my view, that opportunity has been totally wasted.

When one is talking about a book with a cover price of £75, a few pounds more resulting from additional or alternative illustrations which might have taken some effort to track down, would have been a very small price to pay.

Still, you can't have everything. In *Captive Seawater Fishes*, what we do have, in terms of text, is a work without equal, and one that will be highly sought after by anyone interested or involved in the difficult art and science of exhibiting and maintaining large-scale aquaria.

John Dawes

## Nature and Aquarium

By: Berti Gesting  
Published by: Gesting Associates  
Price: £4.95 (inc p & p)  
Available from: Gesting Associates, 6 Ryshworth Bridge, Crossflats, Bingley, West Yorkshire, BD16 2DX.  
Tel/Fax: 0274 569200

It's probably just as well that aquarium keeping is a relatively modern science, for Berti Gesting would have surely been a candidate for the stake, such are the apparent heresies put forward by him in this new book.

Some of his well-founded arguments insist that you can have too much aeration and filtration in a tank and may actually be detrimental to plant growth. How's that for starters?

Next, consider the following statement — "all of the oxygen in the aquarium should only be produced by the plants." By whetting your appetite with such tantalising claims (some might say, contentious), Berti gets you interested in much the same way a detective story has to be followed right to the end in order to see how he's going to get out of the corner into which you're sure he has painted himself.

Although titled *Advanced Aquarium Management*, the first half of the book should hold no technical fears for any reader, as such 'language' has been reduced to a minimum; you soon recognise the principles, if not actually the exact details of the processes involved. The whole spectrum of aquatic living is covered, or, to quote the accompanying sub-heading — Thriving Plants, Healthy Fish, which is surely what we're all after in the final analysis. Main headings discussed are Water, Filtration, Substrate, Lighting, Setting up, Planting and Decorating, Maintenance and Fertilisation, Algae and Snails.

Within each section, Berti presents his own inimitable dissertations, and backs them up with practical information. Although well-known for presenting Dennerle and BioPlast aquarium systems and pro-



ducts, it is to his credit that this little book (and I'm only halfway through at this point) is not used at all to plug products.

The second half of the book presents around 130 water plants. To describe it as a catalogue would only be partly correct, for, with each description, comes a line drawing, cultivation tips and ideas for aquarium use and suitability, in addition to facts about the plant's geographical origins.

Although modest in size and presentation, this book could seriously alter your approach to aquarium keeping (note that I've chosen a phrase other than 'fishkeeping' deliberately). Knowing of Bert's relationship with the European-based approach to things — all a matter of scientific aquaristics, rather than our more hobby-biased attitude (now you see why I was reluctant to use the f-word!), I think he has bridged the differences admirably.

However, whatever one's own views might be, it is all quite academic; in this year of Rio summits and the like, maybe it's time to give Nature a chance. Golly, Bert! I might even be proud of me yet!

Dick Mills

## The Professional's Book of Koi

By: Anmarie Barrie

Published by: TFH Publications Inc  
ISBN: 0-86622-528-5  
Price: £13.95

Although I am at a loss to understand the thinking behind the title (the book addresses principally the hobbyist rather than those who make a living from Koi), I am, overall, impressed by this book.

If you are looking for a comprehensive introduction to the hobby of Koi-keeping, incorporating the best of TFH's previous presentations (and excluding the worst idiosyncrasies), then this should prove to be a worthwhile consideration.

Not for this volume are there reams of advice on pond and filter construction, though each aspect is given appropriate consideration. Neither does this very well-presented volume immerse itself in the traditional 'key to Koi varieties' approach of so many of its shelf-mates.

So what's in *The Professional's Book of Koi* which would make hobbyists (and the 'professionals') want to include it on their bookshelves? The answer is not that simple; especially when there are around 160 pages, most of them illustrated in colour, of pure information: which is exactly what a reference book should contain.

Taking an example chapter, on feeding Koi, we are treated to a 14-page section which delves into this one subject, looking at the role of food for Koi, its constituents and the importance of diet, a comparison between commercially-prepared foods and live foods, and even times of feeding. And each page incorporates at least one full-colour photograph, either of quality Koi, individual products, or colour diagrams. (And, happily, none of those 'juvenile'

drawings of recent TFH releases.)

Interesting additions to the sections on plants, anatomy and physiology, feeding, selection, habitats, filtration and aeration, and breeding, are detailed advice on colouring and terminology, and exhibitions; after all, one of the most exciting activities of the Koi hobby, for many, is the competition of the exhibition arena.

I enjoyed the section on plants and some excellent plant photography and illustrations. And, as I mentioned earlier, there are some superb photographs of some superb Koi.

In conclusion, this is one of the few

specialist Koi books which is refreshing to read. Rather than being bombarded with the intricacies and technicalities of the hobby, the reader is provided with an easy-to-understand guide through the hobby of keeping Koi, so much so that, were I not a Koi-keeper already, I would want to be after reading this book. (My appetite being thus whetted, then I might want to find out more about the technicalities.)

TFH should be congratulated on *The Professional's Book of Koi*. I only wish they had chosen a different title!

Stephen J. Smith

### COMING NEXT MONTH

Great fully illustrated **Tropical Freshwater Supplement** with guidelines from the experts on all the main aspects of the hobby. Make sure of obtaining your copy by booking the October issue of *A & P* early!

## New Book News from Steven Simpson Natural History Books

### 1 Check-list of the Freshwater Fishes of Africa. Vol.4. Cichlidae.

Edited by: J Daget and others.  
1991, 24 x 16cm, 740pp. Softback, £33.50  
post free UK.

Fourth and final volume of this important check-list gives an alphabetical index of scientific names (including synonyms) at all taxonomic levels (family, genus, species and intra-specific taxa), treating 870 species in 143 genera with details of distribution, habitat and size.

Typically, references are given to known aspects of the species' biology, reproduction, food habits, behaviour, aquariology etc. The systematic section is followed by some 3000 references related to cichlids as a comprehensive working reference.

### 2 Freshwater Fishes of the Northern Territory.

By: H K Larson and K C Martin.  
1990, 21 x 15cm, 102pp, 65 colour photographs and illustrations, map. Softback, £17.50 post free UK.

Nearly half of all the freshwater fishes of Australia inhabit the creeks, rivers, billabongs and lakes of the Northern Territory and, with the exception of a few species shared with New Guinea, nearly all are uniquely Australian.

This is the first book on the fishes of the region and is intended as a field and aquarium guide for the naturalist, scientist and aquarist. 58 species and subspecies of freshwater fish are described, each treated separately, and accompanied by at least one

colour photograph. Species accounts include information on habitat, distribution, size, food habits, breeding and aquarium requirements.

A checklist and regional bibliography are included for reference, together with chapters on the ecology of the region, fish names and identification, fish-watching and fish collecting.

### 3 Faune des Poissons d'Eaux Douces et Saumâtres de l'Afrique de l'Ouest. Tome 1.

Edited by: C Leveque and others.  
1990, 28 x 21cm, 384pp, fine line drawings and distribution map for each species. Softback. French text. £38.50  
post free UK.

*The Fresh and Brackishwater Fishes of West Africa, Volume 1* is the first modern scientific account of the fauna, dealing with 23 of the 61 currently described families. The book encompasses the majority of the Sahelo-Sudan basins, except the Nile, and also the western Guinea region, covering the coastal basins from Guinea to the western Ivory Coast.

A systematic approach is adopted to the identification and affinities of the fishes of the region, and although the bulk of the text is in French, bilingual keys are provided for ease of use. Additionally, the fine illustrations and distribution maps more than compensate for any difficulty with the text. Specialists working on each group or family have written the different chapters. The second and final volume of this work is due at the end of this year and will result in a known fauna of 558 species in 160 genera.

All three titles are available from: Steven Simpson, Natural History Books, PO Box 853, Brighton BN1 5DY. Tel: 0273 727328; Fax 0273 203754. Annotated catalogue available on request. Please write stating interests.



# Letters

## Captive Cetaceans

For some time now, I have put up with Gordon Kay's outrageous comments in his *Seaview* column, but he has gone too far in the May issue of *Aquarist & Pondkeeper*.

In referring to the Alan Cooper case he says that it:

... exposed a sinister plot by the dolphin industry to intimidate and discredit a man of great sensitivity and integrity who was campaigning against keeping dolphins in prison.

If it was true, why were no names and establishments mentioned?

Perhaps because Mr Kay knew full well that a phone call to the Crown Prosecution Service would show these allegations up as wishful thinking.

Mr Kay also mentions a newspaper article which pictured Alan Cooper carrying a dolphin-shaped coffin outside Flamingo Land. However, he failed to mention the fact that civil action was successfully taken against the three newspapers which carried the story and photograph. All three have since published a full apology for printing such unsubstantiated propaganda.

There are far too many myths and lies being circulated about dolphins and dolphinariums at the moment. I feel that it is about time some of this misinformation was cleared up. The truth is that both of the UK dolphin facilities have excellent records.

Despite claims by animal rights organisations that "13 dolphins have died at Flamingo Land in the last 14 years", not one dolphin has died there in that time.

There are 11 dolphins currently housed in UK facilities, four of which were born in the UK (at Windsor Safari Park), proving that UK facilities are perfectly capable of housing a stable breeding group of dolphins. Flamingo Land has not yet begun their breeding programme, as their animals have only recently reached full reproductive maturity.

Modern husbandry/training techniques and Government regulations now ensure that all

dolphins receive excellent care and attention around the clock.

There are no welfare or conservation grounds for banning dolphinariums. The only possible grounds are purely emotional, moral grounds. If it is morally wrong to keep dolphins in captivity, then surely it is morally wrong to keep any other animal in captivity, including fish. Think about it!

Do not be so naive as to think that closing dolphinariums has nothing to do with fishkeeping. I have seen an article in an animal rights magazine celebrating the closure of Brighton Dolphinarium, which remarked that, unfortunately, fish are still to be kept there. It went on to say that they would put a stop to this in future years.

Out of curiosity, I recently attended a march in York protesting against dolphinariums. To illustrate how committed these people are, I would point out the jeering and chanting of "Scum, Scum, Scum", at every butcher's shop passed, as well as other extremist animal liberation slogans. To top this off, anti-angling leaflets were being distributed during the march. If the step from dolphinarium to angling can be taken so easily, surely fishkeeping is not far away.

By allowing such blatantly biased publicity to animal rights organisations in your magazine, you are not only making a knife for our own back, but publicly sharpening it!

Mark Ellis,  
Hornsea,  
North Humberside.

[See the August issue of *A & P* for a fuller three-page debate, including comments from Gordon Kay, on this controversial subject. Ed]

## Eheim 'Miracle'

I am writing to say how thankful I am to you for printing in your April edition of *A & P*, my need for an Eheim 2006 Cassette Filter.

To my utter amazement a very nice gentleman (Mike Goldberger) from Swansea 'phoned me to say he had a complete 'new' 2006 filter (unbelievable). Would I be interested? Say no more!

It is now in my aquarium (thanks Mike). Once again, my sincere thanks, *A & P*. You can print all or part of this letter, to show that miracles can happen with perseverance and help from understanding and helpful people like you.

Keith Durant,  
Luton.

[We are delighted to hear the good news Keith, and wish you many years of continued success with the new filter. Thank you, Mike, for your generous response. Ed]

## Auckland Fascination

I write to congratulate you on producing the BEST magazine I have ever laid fascinated eyes on.

I am the proud keeper of a collection of tanks: one marine tank (containing, among others, my pride and joy, "Salvador", the Clown Trigger), a brackish tank, a coldwater tank, a (friendly) tropical community, an 'aggressive' (Oscar, Blue Acara) tropical community, an Arowana in a separate tank, a terrapin tank, two Golden Bell Frog houses, a Skink house (hopefully, one day, to house Geckos as well) and various spare or quarantine tanks.

All of these are 48 x 18 x 18in (120 x 45 x 45cm) or over ... and, would you believe, I started a few years ago with just one bowl of so-called coldwater Guppies ...!

Yop — alias Mosquito fish; they get around, don't they? I was recently reading an article in January's issue: **My Favourite Fish** by John Dawes — (*A & P* arrives through the bookshop 3-4 months late) about the well-travelled Mosquito fish. I therefore thought that you might be interested to know that it also flourishes here in every pond or waterway I've peered into, both fresh and brackish, and that *Gambusia holbrooki* are sold through pet shops at \$1.95 each for people that want something easy to keep and different. I have some in the pond of the frog house; they live it up nicely!

As you can see, your magazine suits me down to the ground with well written, inter-

esting and informative articles relating to all my favourite pastimes. The only parts that are of no use to me are those on Koi, which are unfortunately (or fortunately for native fish) illegal in NZ. It does sadden me to think of all those lovely exotic fish, lizards and amphibians which I have no access to but which are so readily available in England.

New Zealand may be a paradise and a wonderful place to live in, but it is a little restricting. What I would give for a snake or a chameleon! Alas, it's not to be. One day I'll return to England and tour the shops, especially The Goldfish Bowl which sounds amazing. What beautiful photos Max Gibbs takes!

Yours in gratitude for a terrific mag!

Teejay Thornton,  
Auckland,  
New Zealand.

[What can I say?! Thanks a million for the praise, Teejay! Thank you also for the bit of gen on the Mosquito Fish — much appreciated. As to Max Gibbs' pictures — we agree with you: they are magnificent. Ed]

## Straw-based Algal Control

I have been interested to see the increasing mention of the use of barley straw in ponds for the reduction of algae, particularly in John Cavelier's contributions.

Wearing my 'working farmer' hat for a moment, I have long known of the use of hay, and actually supply several village ponds with bales which my wife's extremely choosy thoroughbred event horse has rejected.

As the bales rot down, there is an explosion of bacterial growth which effectively 'eats' the nitrates upon which the algae bloom. I first used this method on a pond in Somerset with help from the Nature Conservancy Council many years ago.

I suspect that in the case of straw (and why not wheat straw, as well as barley?) we are dealing with something different, but without wishing to raise unnecessary alarm, I should



perhaps just mention the following.

I just wonder if it is entirely wise to introduce straw from intensively-grown arable crops, which will have been treated with a variety of herbicides, insecticides, pesticides, growth regulators and fungicides, into a limited water area.

The amounts of these contaminants may be minute, but I spend my life trying to keep these things out of the pond and aquarium environment with carbon and other filtration. If hay has the same effect, it is likely to contain much fewer, if any, of those substances and might therefore be a bit 'greener', in the correct sense!

Charles Harriss,  
Commercial Director,  
Purity on Tap.

## John Cuvelier Comments

It is a number of years now since I was first acquainted with the use of straw as a remedy(?) for the reduction of algae in pool systems. If memory serves me correctly, the first paper I read from Reading University stated that their experiments had suggested that barley straw had proved to be the most effective.

With regard to the second point raised by Charles Harriss, that of contamination of the straw by herbicides etc., I personally feel that, in view of the tiny amounts of straw involved (circa 100 grammes per 1000 galls), and provided the straw was well-washed anyway, the risk should be so minute as to be disregarded.

Needless to say, this view is open to argument, as indeed, anything 'green' is in today's world!

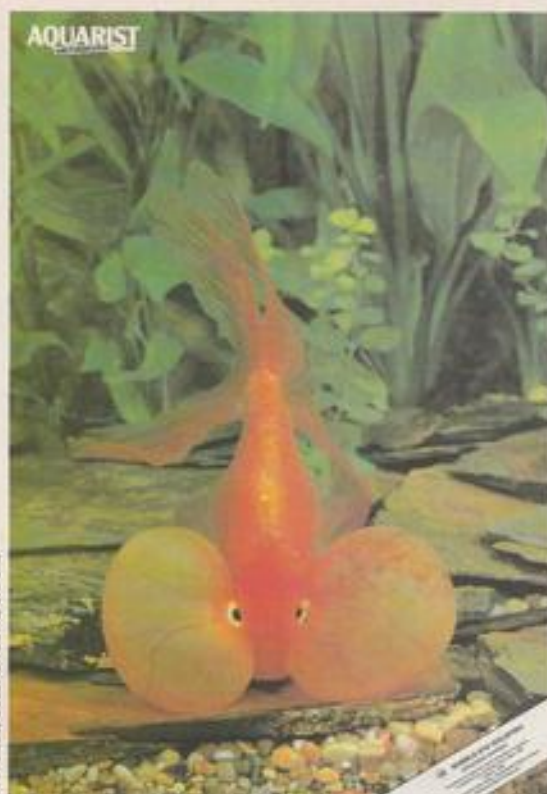
John Cuvelier

## Disgusted of Colombo

Reference the March '92 issue of *Aquarist & Pondkeeper*, I am writing to express my thorough disgust with the Bubble-eye poster you published.

This fish looks so repulsive! When there are so many, many beautiful specimens available to photograph, the choice of such a monster is beyond my comprehension.

I suggest you issue something



The "disgusting" monster on our March poster.

more pleasing to the eye in future magazines.

J A M Alvarez,  
Colombo,  
Sri Lanka.

[While Bubble-eyes and some other of the more fancy varieties of Goldfish are not to everybody's liking, they also enjoy a very enthusiastic following among Goldfish keepers. The specimen we illustrated was a very good example of its kind. What do other A&P readers think? Ed]

## Unusual Golden Minnow Behaviour

Last year I bought six fish advertised as 'Golden Minnows'. I do not know their species, but they look very like golden versions of the common European Minnow, *Phoxinus phoxinus*. They are active surface feeders, thriving on a diet of flake foods and *Daphnia*, and make ideal occupants of a small garden pool.

In August of last year I noticed one of the fish swimming round and round the stem of a lily leaf.

This went on for several hours, and when I deliberately frightened the fish away, it soon returned. I examined the underside of the leaf and found about a dozen eggs attached to it. I removed the leaf to a small tank where the eggs hatched about a week later. Meanwhile, the fish repeated its vigil around another lily leaf. I found that this also had a few eggs attached to it and removed it to the tank. I raised the young fish indoors and released them into the pond at the end of April.

This spawning behaviour seems to be unusual, as most books describe the minnow as laying its eggs among gravel. There is little gravel in this pond, which the minnows share with four small Koi. I wonder if any other pondkeepers have observed this behaviour in minnows?

Richard Bull,  
Sambourne,  
Worce.

[The minnows in question behaved as they did, because they are not European Minnows (*Phoxinus phoxinus*), but golden forms of the American Fathead Minnow (*Pimephales promelas*). Therefore, they were doing what, for them, was quite natural. Ed.]



In some Florida farms (this one belongs to Ekkwill Waterlife Resources) huge quantities of Fathead Minnows are spawned. Males are encouraged (as this photograph shows) to lay their eggs on the underside of polystyrene foam lids (turned over to expose the eggs for the camera).



# OUT AND ABOUT

## HAMPTON COURT PALACE INTERNATIONAL FLOWER SHOW, 1992

By Peter Furze

There can be no doubt that this spectacular show, staged in the grounds of Hampton Court Palace, is now established as a major event in the horticultural calendar. This year, preview day became a Royal Preview Day as Her Majesty The Queen and the Duke of Edinburgh graced the event with their presence; the only disappointment was the weather — it drizzled on and off all day.

Having viewed the 1992 video of the Show (a very short tape), I was saddened that only a few seconds were devoted to coverage of the Aquatics Village so ably organised by Chris Skilton (Aquarist). This section surely deserved far more time, especially as there were some new faces this year.

Tetra backed a winner by joining up with Tony Howells (of A J Howells, Water Gardens, Tolleshunt Knights, Maldon, Essex) whose water garden design 'Stepping Stones' took the coveted Tudor Rose Award — the highest award that can be obtained. The Gold Award this year went to Anglo Aquarium Plant Company whose display entitled 'Water Works', although worthy of recognition, would have been better viewed slightly higher than ground level.

Heritage Stone took the Silver Award for their 'Slate Garden', a staggering piece of water engineering but spoilt for most people by the failure to hide the ugly standpipes that supplied water to the top of the towering pieces of slate. As the cost was reputed to have been a cool £250,000, a few more bob spent on disguising these pipes would probably have gained them a higher placing.

Normally there is only one further award, this being the Merit Award, but the Judges were unable to make a decision between Dorking Aquatics and Walton Koi Centre, so they got one each. If I had been given the

job of choosing, I would have gone for Dorking Aquatics' entry a 'Walk On the Wild Side' which featured a wild garden in a water meadow setting. This intriguing display hid its talents within a marquee, so maybe the judges did not notice it quite so much. Walton's Koi pool was, as ever, an excellent piece of work, although some alert fishkeepers might have noticed that the fish were 'flicking' and 'flashing' quite a lot.



always crowded. Well done, Mark.

The entry from the Aquatic Design Centre featured several freshwater hexagonal-shaped aquariums, plus two large trapezium-sectioned marine tanks; a common feature in every tank was coral decorations. I hope no one went home to set up a marine aquarium as seen, for it contained (as far as I could see) only aeration, hardly a long-term fishkeeping prospect.

Interpet, in conjunction with Airport Aquaria of West Drayton, Middlesex, and DASH (Disablement Association of Hillingdon), produced a garden especially for the physically impaired people; the raised ponds meant for easy viewing, access and maintenance (even from a wheelchair), while the ever-changing water fountain displays (courtesy of a remote control unit in Peter Rambaut's pocket) kept everyone intrigued. The sight and sound of water, coupled with carefully-selected, highly-scented shrubs, meant that even deaf and blind folk could appreciate this garden for everyone.



The proud, and worthy, winners of the various awards (see text for details) display their trophies in the company of the aquatic consultant for the Aquatic Village and other aquatic features, Chris Skilton (third from left) and Adrian Greenoak (wearing the bow tie) the Horticultural Director for the show.

Six awards divided among twelve displays meant, of course, that there had to be six losers. The Reptilium featured 'The World of Amazing Amphibians' promoting the captive breeding project of Mark Hewick. Trying to talk to Mark (even to ask what these animals had in common with a flower show) proved to be impossible — not from the defensive attitude on his part — it was just that his marquee was



Lowara, who provided the pumps for the displays, had a beautifully simple, impressive pebble fountain display.



Network SouthEast (the show sponsors) had a large, impressive exhibit with a suitably aquatic theme.



Minster Water Gardens produced a 'surround display' of ponds of all shapes and sizes (you had to look really hard to see the smallest) to grace the *Aquarist & Pondkeeper* marquee;



A graceful touch of Japan: part of Walton Koi Centre's award-winning exhibit.



Tetra and Tony Howells formed a top-winning partnership, with Tony's 'Stepping Stones' water garden walking away with the coveted Tudor Rose.



This towering Slate Garden won the Silver Award for Heritage Stone.

all the designs, constructed under the guidance of Colin Stone (and Mark Fisher, from Everton Water Gardens), were linked by carefully and painstakingly-placed coloured stone chippings. I was unsure of placing Sterlets (*Acipenser* sp) on view. Despite all outside attraction, plenty of people still found time to go inside and browse around the well-stocked book display and to meet our Editor, John Dawes, and other contributors to the magazine who

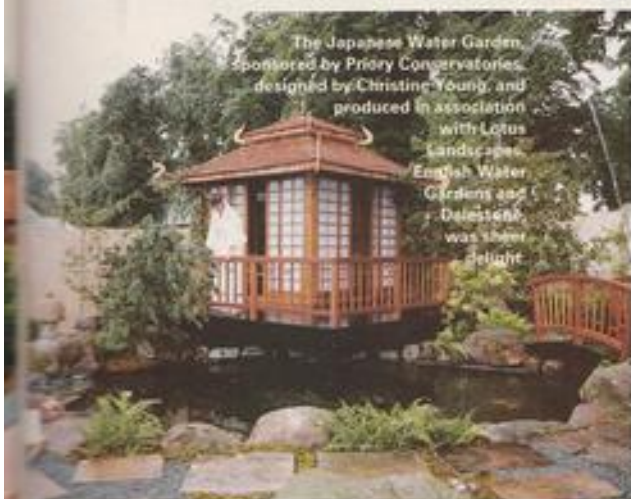
spent time there at the show.

Renaissance Castings' display The Musical Water Gardens was a magnificent display of lead castings. These could have graced the grounds of Hampton Court Palace and complemented the cast lead rainwater pipes and hopper heads.

The Federation of British Aquatic Societies was on hand with a stand with a difference: they were giving away advice, rather than selling products or



The well-thought-out Airport Aquaria/Interpet/DASH display (this is quite a small corner of it) offered a wide range of stimuli and ideas for the disabled (see text for further details).



The Japanese Water Garden, sponsored by Priory Conservatories, designed by Christine Young, and produced in association with Lotus Landscapes, English Water Gardens and Dalestank was shown to delight.

taking orders (except for *Fishworld* magazine). Their display, 'The Lily Pad', featured a three-pond presentation of water lilies beneath a pergola complete with hanging baskets.

The lilies were supplied by Harry Hooper of Mill Lane Nursery & Water Gardens, and secretary of the International Water Lily Society. Two further ponds (one available with liner in hexagonal kit form, the other a simple fibre-glass pond) contained Koi provided by members, whose achievement in getting the fish to a fair size from young simply had to be admired. The fish, themselves took to the display with such abandon that the overnight rain triggered a mass spawning, with eggs and milt

going absolutely everywhere!

Dr David Ford, from 'Aquarian', was on hand to dispense advice, as was Alan Benson, our filtration expert; doing things in a small way (as a change from our surrounding exhibitors). Dick Mills, PRO for the FBAS (also author and writer for *A & P*), showed how to install either a performed or a liner pond — on a table top. Full information as to local society whereabouts or general advice on pond problems was always available, as were directions to either 'the loos' or the nearest refreshment caravan.

One feature very much in evidence all round was the quality of the 'moving water', both in the Aquatic Village exhibits, and in the showground in general. The 'heart' of any such display is, of course, a good pump. These were generously provided by Lowara, who also had their own, very attractive stand with a beautifully effective, uncluttered 'pebble' water display.

Contemplative pond designs were much in evidence, especially the Anthony Nolan Garden of Reflection, although its spooky witch/goblin featured 'trees' might well have induced quite opposite effects!

But that's not all: away from the 'Village' proper, there were other ponds to see: a wonderful triangular, slate covered pond, in one of the marquees, a Japanese pavilion with a jet of water going over the viewers' pathway (plus a bright red dove-cote), a water garden made from recycled materials (no, not old bicycles or shopping trolleys) and a fabulous garden with contra-action fountains, spirally-sculpted trees and a surrounding railway put on by our hosts Network SouthEast.

To sum up, while those exhibitors in the Aquatic Village were always in direct competition with one another, the camaraderie and friendship were second to none; a plant loaned here, a piece of rock there, a helping lift or heaving into position, whatever was needed, there was always someone there to help. Who needs prizes with people like that around?



Red Rainbowfish (*Glossogobius*), while the upper part of the body develops a green silvery colour. The eggs they drop are large, about 2mm (0.08in) in diameter.

After three or four hours I decided I'd had enough. By then, I had collected several Swordtails and Tetras, and my back was rather red from the sun.

I packed my fish and headed south to the village/town of Otavalo.

The first thing I did when I got to my room in the hotel was to check the fish. They were all alive and in good condition. I changed the water carefully. I could smell the chlorine, but the fishes did not react to it. They later showed me just how tough they really were as I travelled around in Ecuador for five further weeks carrying the fish with me in the car all the time.

#### QUININDE AND ESMERALDAS

Soon I was ready for new adventures and hit the road south in the direction of Alóag, where I turned right on the road to Santo Domingo De Los Colorados.

The road to the town Sto Domingo is named after the Indian tribe, Los Colorados. The men in the tribe use a special sort of fruit to colour their hair red, so that it looks as if they are wearing a red cap. But, there are not too many Indians going round dressed in their national costume anymore; most are now dressed in modern fashions.

The next morning after arriving in Sto Domingo, I checked out from the hotel and

set off once more. My destination was the town of Esmeraldas. The road was good and so was the car, so when I came to the town Rosa Zarate (everybody called it Quininde, the name which also appears on the map), I drove through and down to the river ... nearly into the river, actually, because the road ended there!

I turned the car round and had to ask for the direction to the road to Esmeraldas. That's when I really discovered that driving in South America is not quite like driving at home! "Everybody knows" where the roads are going, so why bother putting up signs to tell strangers where to go?!

After about 20 km I saw a small stream about 100 metres down on my left hand side of the road. I slowed down so I could get a better view of the stream and it looked promising. After a while, I came to a house that seemed to offer the best route to get down to the stream.

The people who lived in the house came out and looked curiously at me, wondering what I wanted. I told them that I was interested in getting down to the stream and look for small fishes. They showed me where to go and one of their sons followed me. Even a couple of small pigs were interested and followed me down to the stream.

José, the boy who had followed me down to the stream, watched my preparations for diving in the river with big, surprised eyes. After the first shock, though, he helped me, fetching the fish I collected to the bucket. He didn't say anything but, in his view, I was

probably crazy, watching small fish and behaving like a child.

After four hours in the water, I was getting cold. The current was swift in the stream so I was getting a little bit tired too. I therefore decided to call a halt.

I took some water samples and readings; the temperature was 25.9°C (78.6°F), pH 7.94 and the hardness of the water was 15°DH.

The fish that made me work hardest were an Acara-type cichlid (*Aequidens* sp). It looked like an *Aequidens rivulatus*.

Other fish in this small stream included the livebearer *Priapichthys festae* (or *Pseudopocilia festae*), *Characidium* sp (?), Bristle-nosed *Ancistrus* sp (?), Catfish, *Pimelodella* sp, and a couple of different tetras. However, I only collected the *Aequidens* and the livebearers, since they interested me most.

With help from my new assistant I got everything up to the car and gave him some money for the help. Next stop would be Esmeraldas. But when I came to this dirty town, I very soon decided to drive out and south to Atacames. There — I thought — it should be possible to find some hotels, so when I came to a sign that said Hotel Club de Pacifico 2 km I turned off the main road and on to a dust road that led to the hotel.

If the road was awful, the hotel was a pleasant surprise. They had apartments, not small rooms; the restaurant was very good too. So I decided to stay for a couple of days before I started looking for new places to collect fish. And guess who slept like a baby that night? [148]



DO YOU WANT THE BEST QUALITY, THE BEST SERVICE, THE BEST CHOICE?

THEN COME AND SEE US AT:

28 HIGH STREET  
WELLINGTON  
SOMERSET  
0823 667077

BARTEC 4  
LYNX WEST TRAD. EST.  
YEovil  
SOMERSET  
0935 33550

EVERYTHING FOR THE TROPICAL FRESHWATER, TROPICAL MARINE AND COLDWATER AQUARIST AND PONDKEEPER. ALL THE BEST EQUIPMENT AND LIVESTOCK YOU COULD POSSIBLY WISH FOR!

**AQUATICALLY THE BEST IN THE SOUTH WEST!**



# Koi Talk

By John Cuvelier



## STRIKING A HAPPY MEDIUM

In the last edition, I related a letter received from Chris Light and promised to return and quote a couple more of the points raised by him.

There's no need to guess what his first point was... the thorny and ever-discussed question of filter media. Chris made the very valid point that the criterion of what constitutes an effective medium was not how much it cost, but whether or not it worked!

It is a fact of life that where one person will obtain outstanding results using just pea gravel costing a few pounds, the person down the road may spend many hundreds of pounds and obtain results certainly no better, and possibly not as good. The reasons for this ambiguity are complex, but, in my opinion, they boil down to the fact that keeping Koi is, in itself, a complex operation with too many variables to make hard and fast rulings.

Suffice to say that whatever medium you eventually decide upon, to the outside world, YOURS will be the only one which works effectively, and you'll probably stick to that through hell and high water!

Staying with the subject of media, I'm once again going to tread where angels fear to go and mention Siporax. Leaving aside all the accusations and counter-accusations which have been bandied about regarding this material, much of which has been self-inflicted by certain people possessed of a highly active imagination, I must admit to being a convert!

I feel that this open-pore sintered glass medium is absolutely wonderful, **WHEN USED CORRECTLY**. That means, when it is not expected to filter a large heavily stocked pond, relying upon a small 'Black Box' filter to do the business. If you expect this, you're in cloud cuckoo land, unless your pre-filtration is superb.

Last year, I filtered my hatching/growing on pond using Siporax combined with Lotus foam blocks on submersible pumps. Following a complete season's use, the filter was stripped down and the Siporax examined.

The only observable difference was a very slight darkening in the colour of the rings, with absolutely no sign of coagulation inside or outside, although to be fair, no microscopic examination was attempted. In fact, to all intents and purposes, the rings were brand new. The only problem was the chore of daily cleaning of the foam blocks which was essential. Throughout this exercise, trickle filtration, as opposed to submerged, was used and water quality remained well within limits throughout.

This year, I've gone one better by increasing the quantity of media and installing a pre-filter more in keeping with good practice. A single Amphibious pump of 1,400 gph has an inlet connected to a 'Handy Box' (these are SO useful), containing hair rollers with a covering of pea gravel, the outlet being connected to a 14-litre trickle filter of Siporax. After two months use, there is no sign of blocking, and the water quality is 'A1' (no pun intended!) and I'm highly pleased with the results. I just wish it wasn't so darned expensive!

The other change made to my hatching system was the decision to ignore the usual method of leaving things to nature and allowing green water to rule. This made things difficult where maintenance was concerned, particularly the observing and removal of the inevitable dead fry. This year I've gone totally the other way and concentrated on clear water during the hatching period. It has certainly paid dividends

and the fry really do look better for the improvement in their environment.

## DAPHNIA CHALLENGE

While still on the subject of fry, for a number of years now I've attempted, without success, various methods of cultivating my own *Daphnia* culture. There can be no doubt that for vigorous growth in the early weeks of life, live food cannot be bettered for your fry. Managing to grow it, however, is a different matter.

I have literally tried everything. On one memorable occasion I even dropped a cow pat into a container of water, having been told that this was an effective method of encouraging things to grow. All I got for my pains was a stinking puddle and a gentle request from Sheila to lose it post-haste!

I've tried water with milk, water with peat, water with mud, water with animal slurry, you name it, it's been tried. I've even tried lacing the water with some existing purchased *Daphnia*, all to no avail, as they simply died.

So what is the answer? We now have a disused full-size bath down the garden which is sitting there just gathering as good a collection of midge larvae as one could wish for, but

still no *Daphnia*, so it looks as though I'm going to have to go back to the frozen stuff, costing me an arm and a leg. Unless YOU know better!

I wouldn't be concerned if we, at least, had a local natural pond nearby so I could collect my own but, needless to say, there isn't one.

## BREAD MANIA

I'd like to ask a question of the various manufacturers of Koi food now. Why is it that while my fish will swim quite leisurely towards a handful of Koi sticks thrown into the pond, as soon as I throw a couple of slices of wholemeal bread into the water, the fish go quite mad?

It makes no difference whether or not the bread is broken up into small pieces, the effect is just the same, with fish actually climbing on top of their neighbours trying to reach it. I've also found them to be very partial to a granary loaf which they can demolish in seconds!

No doubt, someone will rush to advise me that this is an unhealthy diet, except in moderation, but my lot appear to thrive on it. I'd go so far as to say they prefer it and will certainly continue to treat them, if only as an excuse to lower the rapidly ascending costs of feeding proprietary foods.



Everybody says it's easy to culture *Daphnia*... so why can't I?



# Your questions answered

Having problems? Send your queries to our panel of experts who will be pleased to be of service. Each query receives a personal answer and, in addition, we will publish a selection of the most interesting questions and responses each month. *Please indicate clearly on the top left hand corner of your envelope the name of the experts to whom your query should be directed.*

All letters must be accompanied by an S.A.E. and addressed to:

**Your Questions Answered, The Aquarist & Pondkeeper, 9 Tufton Street, Ashford, Kent TN23 1QN.**

**Herpetology, Julian Sims, Koi, John Cuvelier. Tropical, Dr. David Ford. Coldwater, Pauline Hodgkinson. Plants, Barry James. Discus, Eberhard Schulze. Marine, Gordon Kay**

## HERPETOLOGY

### D.I.Y. MEALWORM CULTURES

*I am very interested in culturing my own mealworms for my reptiles and amphibians but don't know how to go about it. Your detailed advice would therefore be greatly appreciated.*

Although traditionally used as a 'live food' for many species of reptile and amphibian, Mealworms — the larvae of the beetle, *Tenebrio molitor* — do not provide a suitable source of nourishment if used by themselves. The reasons for this are as follows:

(i) Approximately one-third of a mealworm's body (by weight) is composed of fat. This accumulates in the body tissues of animals receiving a high number of mealworms in their overall diet. Such fat deposits cause damage to the liver and can constrict the gut.

(ii) Mealworms normally contain very little calcium, particularly in proportion to another essential mineral, phosphorus. Their calcium to phosphorus ratio (Ca : P) is about 1 : 3. Calcium is necessary for the healthy growth of most vertebrate skeletons, the formation of eggs (yolk and shell) by oviparous female reptiles, and basic biological functions, such as the contraction of the heart and other muscles of the body.

Yet, even with such potential problems, mealworms do add variety to the diet of captive reptiles and amphibians, and a self-sustaining colony of these invertebrates is a reliable source of livefood — especially in cold weather when other insects are in short supply.

The problem of excess fat deposition should not arise if you don't feed too many mealworms to your livestock too often. The nutritional content of mealworms can be improved by adding dry Complan (a powdered 'bedtime' drink available from chemists and supermarkets) to the bran in which they live and feed. A multi-mineral and vitamin supplement such as Vionate Powder can also be added to the bran so that the mealworms ingest these nutrients with their food.

Alternatively, the mealworms, and any other live insects and other invertebrates used as food for your reptiles and amphibians, can be 'dusted' with a multi-mineral and vitamin supplement. In particular, vitamin D is essential for health, as well as the minerals calcium and phosphorus. Further details about Vionate are available from the manufacturers:

**Ciba-Geigy Agrochemicals, Whittlesford, Cambridge CB2 4QT.**

In case of difficulty in obtaining this product, contact:

**Polcrome Limited, 11 Mount Road, Feltham, Middlesex TW13 3JG.**

Establishing and maintaining a self-sustaining colony of mealworms is relatively easy. A large biscuit tin (with perforated lid) or glass tank (with ventilated cover) is required. A large area is essential because the larvae and adult beetles produce inhibitors which prevent breeding and, thus, overcrowding in small containers.

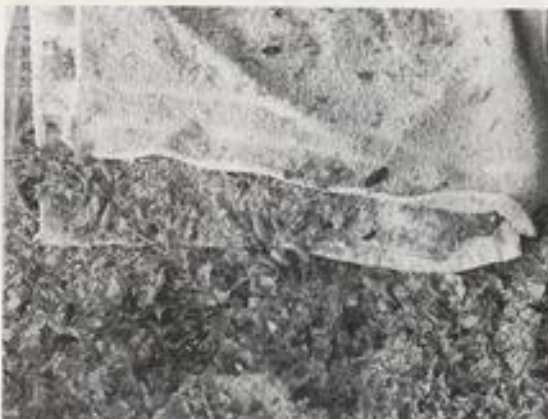
Place DRY bran (obtained quite inexpensively from pet shops) to a depth of 50 to 90mm (2 to 3½in) across the base of the container. Dry bran is essential to prevent the development of

moulds. Cover the bran with pieces of cotton towel or old face flannels. Then place an apple or pear core, or slices of apple, pear or carrot, under the towel every other day. This plant matter will provide all the moisture necessary to maintain the colony. Place mealworms, pupae or adult beetles into the tin or tank and leave for four to five weeks for a good colony to develop. The colony will thrive at ordinary living room temperatures.

As stated previously, the nutritional value of the bran and, therefore, the mealworms which feed on it, can be improved by the addition of Complan and/or Vionate Powder. However, I would not be inclined to add meat products of any kind, and especially not chicken or pork, because of the very real risk of introducing *Salmonella* bacteria into the mealworm colony. Mealworms infected with *Salmonella* bacteria would pass these disease-causing agents up the food chain and into any animal which ate them.

Finally, another word of caution! Clothes moths also find the bran mix of a mealworm colony an ideal place to lay their eggs. To prevent your home from becoming infested with hundreds of small moths, the mealworm colony must be housed in a container with a tightly fitting lid, perforated with fine holes for ventilation.

Culturing details of an alternative live food for reptiles and amphibians — Waxworms, the larvae of the Greater Wax Moth, *Galleria mellonella* were given in **Your Questions Answered**, page 104 of the June 1991 edition of *Aquarist & Pondkeeper*.



Cultured mealworms. Larvae, pupae and adult beetles are all visible in this photograph.



## TROPICAL

### CLOWN QUERY

*I hope you will be able to help me in my quest for information on Clown Loaches (Botia macracantha). I have tried local libraries and even the National Library but have been able to get only limited details.*

The Clown Loach (*Botia macracantha*) originates from Indonesia, Sumatra and Borneo, although most specimens in the trade now come from Singapore, Hong Kong and Thailand fish farms.

The wild fish may reach 12in

(30cm), but aquarium fish are usually 6in (15cm) maximum. The wild fish is eaten and is famous for its fine flavour.

The Clown Loach breeds in the rainy season in fast-flowing rivers fed by mountain streams, the eggs hatching into fry that are swept into slow-moving waters downstream, where they grow to maturity and swim upstream to spawn again. Obviously, these conditions cannot be reproduced in the aquarium.

Most water conditions are accepted and the fish takes all foods; it is omnivorous.

If you succeed in spawning this species, do let us know!

The Clown Loach is one of the most attractive of all loaches. This particular specimen comes from Florida's Tropical Gardens Fish Farm.



HARRY GREAT LORICA TROPICAL FISH FARMS ASSOCIATION

## KOI

### ZEOLITE-BASED QUALITY CONTROL

*Would it be possible to remove the ammonia from a pool simply by means of zeolite, thus making a biological filter redundant?*

*The ammonia would, obviously, not get converted to nitrite and on to nitrate, which might also cut down on my Blanketweed problem. The ammonia could be kept in separate containers and the flow switched between these while the zeolite was being re-charged.*

*If this is feasible, is it possible to give an indication of how much zeolite would be required to remove the ammonia from about thirty fish averaging about 12-15in (30-38cm) in length?*

The idea of relying totally on zeolite for pond filtering is certainly novel, but I fear, not really practicable for the following reasons.

Although you do not specify the gallonage of your pond, the number of Koi quoted will, in the course of one season, excrete a tremendous amount of both liquid and solid waste. In addition, they will, grow larger.

Zeolite in sufficient quantities to matter, would be both heavy to handle and bulky. As it requires around 48 hours to recharge zeolite, you would need to have a quantity on a continuous cycle of recharging to ensure that the water was not subjected to any biological shock during the changeover periods.

You would also require the use of a considerable amount of salt, as it is normally used at the rate of 2 pounds per gallon of water (approx 1 kg/4.5 litres) and needs to be very well washed and rinsed during the recharging process.

Additionally, constant monitoring of ammonia and nitrite levels would be essential and I feel this would, in time, become quite tedious. I also have reservations about your belief that these efforts would prevent the attack of Blanketweed, etc, as these problems appear to arise whatever the condition of the water.

Should you decide to go ahead anyway, I would be most interested to hear how you get on.



**Zeolite is great stuff, but even so, it needs just a little help to perform miracles!**

## PLANTS



*Sagittaria platyphylla* — a good plant for a coldwater aquarium.

### COLDWATER PLANT STRUGGLE

*I am struggling to grow plants in my coldwater-aquarium, partly owing to my Goldfishes' vegetarian nature.*

*I have thought about using pot-grown plants, a Trulite No 1 tube and adding fertiliser. My lighting at the moment consists of a single Grolux tube.*

I am not surprised that you are having problems. First of all, you will need something like two Triton lamps to give adequate light for your plants. Keep these on for 12 hours per day for coldwater aquaria.

Try *Sagittaria platyphylla*, *S. subulata*, *Ludwigia mullertii*, *Egeria densa*, *Hydrocoyle vulgaris*, *Acorus* species and *Samoilus floribundus*. All these are easy plants and should give you good results. Weight them firmly

with lead to prevent the fish uprooting them before they have had a chance to establish themselves.

### BLANKET PEST

*My friend's pond (24 x 12 x 3ft — 7.3 x 3.6 x 0.9m) contains a great deal of wildlife and numerous plants. However, it is still plagued by Blanketweed. How can this pest be controlled?*

I am afraid that Blanketweed is one of the commonest problems in garden pools. Apart from removing it by hand, the only other answer is to kill it with a good algicide.

I would recommend a relatively new product by Interpet called 'Pond Balance' which they claim does the job without harming the other plants in your pool. The price is about £4.95 which treats ponds up to 1,500 gallons (c 6,800 litres).



## COLDWATER

### BIG FISH — SMALL POND

*We have a pond that measures 10 x 8 x 2ft (c 3 x 2.4 x 0.6m) in which we keep two 18in (45cm) Orfe. We are interested in breeding our fish and would therefore welcome your advice.*

The Orfe (*Leuciscus idus*) is a really handsome fish which is popular with many pond owners. They are usually freely available from the aquatic trade. However, I do think that the trade really ought to point out to people that these fish are fast growers; they also grow large and, quite frankly, are not suitable for small ponds.

In Europe, Orfe inhabit lowland lakes, large rivers and estuaries and in such waters, they are capable of attaining a length of 3ft (90cm). It is the Golden variety which the pond owner usually keeps, and in large ponds, these may reach a length of about 2ft (60cm), so by keeping them in the confines of a small pool their growth rate is restricted and stunted.

Another reason which also points out that small pools are unsuitable is the fact that Orfe are fast swimmers, so, again, they will be restricted. They need cool temperatures and, in

warm weather, small volumes of water heat too quickly and too high in temperature, so the fish are under a great deal of stress. During thundery weather, the water in small ponds lacks suffi-

cient oxygen for these fish; therefore, there is a real danger that they may die.

Orfe are shoaling fish and are not happy kept singly or in pairs; at the very least, the number should be four — yet another reason why they are unsuitable for small ponds.

I am sorry to paint such a dull picture, but I believe people prefer to learn the true facts as they are, in the interest and well-being of the fish. To be perfectly honest, I do not hold too much hope that you will be successful in breeding your fish due to the limitations of your pond, even though they are perhaps large enough to spawn.

You will need to have a fountain or running water to keep the water circulating and fresh, which will go some way towards helping to add a little extra oxygen to the water.

Orfe prefer live foods and are very good at catching winged insects landing on the surface of the water, or those hovering above. They also enjoy mealworms, and earthworms; in fact, most insects are eaten.



The Orfe — in whatever form — is a large active shoaler which is best suited to large ponds.

## MARINE

### 48in LOW-DOWN

*I am planning to set up a 48 x 18 x 18in (120 x 45 x 45cm) marine aquarium and would welcome advice on suitable equipment to run such a system efficiently. I also have a 48 x 12 x 12in (120 x 30 x 30cm). Is this too shallow?*

*My area (West Midlands) appears to be low on good 'fishy' shops. However, I have trouble moving about some days, so if you know of a good shop near me, please let me know.*

Basically, the easiest and most cost-effective way to filter an aquarium is the undergravel method in standard 'down flow' mode. To set this up, you would need the following equipment:

① All-over-fitting undergravel filter plates. (The best product, in my opinion, is one which is a small plate that can be slotted together to form any size, or simply cut to form any shape required.)

② Calcium-Plus at the rate of

10 lb/sq ft (4.5 kg/900 sq cm).

③ Coral sand at the same rate.

④ A Gravel-Tidy to fit the tank. This is a sheet of perforated plastic which separates the sand and the Calcium-Plus, but allows the through-flow of water. This is not a necessity, but will be appreciated should you need to strip down the aquarium.

⑤ Two powerheads to pump water through the filter bed. I shall assume that you know



Powerheads will ensure a good turnover rate for undergravel filters. This particular model actually provides a direct reading of turnover rate.

what a powerhead is, but I should stress that you need two to get an even flow through the filter. To calculate what size powerheads you need, calculate the probable net capacity of the tank i.e. 48 x 18 x 18in divided by 1,728 (1,728 = No. of cu in a cu ft) x 6.25 (there are 6.25 gals in a cu ft) = 'X' gallons, minus 15% for decorations, and then multiply by three, because the water in the aquarium should be turned over three/four times an hour. Then divide the answer by two and this will give you the size of the pumps you need.

In the case of your tank, the figures work out as follows:

$48 \times 18 \times 18 = 15,552 \text{ cu in} \div 1,728 = 9 \text{ cu ft} \times 6.25 = 56.25 \text{ gals.}$

$15\% \text{ of } 56.25 \text{ gals} = 8.4 \text{ gals.}$   
 $56.25 - 8.4 = 47.85 \text{ gal} =$  furnished capacity of aquarium.

$47.85 \text{ gal} \times 3 \text{ (turnover rate/hr)} = 143.55 \text{ gal} =$  hourly turnover required for the aquarium.

$143.55 \div 2 \text{ (No. of powerheads)} = \text{c } 72 \text{ gal/powerhead}$  (c 330 litres).

⑥ Two heater/stats — 200 watts each.

⑦ A good book!

This is necessary, basic equipment, but there are other, optional items which are worth thinking about. These are:

(i) A Protein Skimmer — an air-driven one is OK, but a powered one is better.

(ii) A good air-pump to drive the skimmer, or to give improved aeration/circulation.

(iii) A small power filter with which to use activated charcoal.

You mention that your area is low on good dealers. There is, in fact, one of the best aquarium retailers in the country just down the road in Walsall. It's called Something Fishy in Bridge Street, opposite a large supermarket. Finally, an aquarium of 48 x 12 x 12in would be fine, as it would allow good light penetration.



# Herpetology matters By Julian Sims

## LONDON'S GILA MONSTERS

The long-term future of London Zoo has been in doubt for some time and, in particular, the last few months have seen many headline news items in the press and on television about its imminent closure. emotive stories concerning elephants, giraffes and ground squirrels have been used to publicise the financial problems of the Zoo.

However, the important captive breeding programme which London Zoo has undertaken with Gila Monsters (*Hemidactylus marmoratus*) has received virtually no publicity whatsoever — an article in the February '92 edition of *The Zoological Society of London* by Dave Risley (Collection Manager/Keeper in Charge, Reptiles) being a notable exception.

The Gila Monster from Sonora, Mexico and the south-western United States, is one of only two species of lizard in the world known to produce venom. Unfortunately, due to over-collection and destruction of its natural habitat, the Gila Monster is now seriously threatened with extinction throughout much of its former range.

The first Gila Monster to be exhibited at London Zoo arrived in 1882. Since that time, these reptiles have generated a great deal of public interest, not just because they are venomous, but also due to their stocky build, contrasting body coloration of orange, yellow or pink with black, and their characteristic deliberate movement.

From the initial days of maintaining this species, until over a century later, no conscious effort was made to breed Gila Monsters in captivity, even though eggs had occasionally been found in their vivarium. In 1984, this attitude changed and London Zoo obtained new stock — a true pair from the Arizona Sonora Desert Museum.

Published research papers were also carefully read and, as a result of the information gained, various changes in captive conditions were introduced. For example, it was found that a period of hibernation was required to induce reproductive metabolism, and a change in diet was also necessary. Processed meats and a high proportion of egg were replaced with whole animals, including skeletons which provided a source of calcium and phosphate.

These improvements in husbandry led to four fertile eggs being laid in 1987. A hatchling Gila Monster emerged from one of these after 133 days of incubation. Unfortunately, the young reptile left its shell before the remains of the yolk-sac had been fully absorbed and it died five days later.

During 1987 and 1989, another seven Gila Monsters (three males and four females) were obtained by London Zoo. In 1989, six eggs were laid, and hatchlings emerged from two of these after 135 days. These young reptiles survived and were the first captive-bred Gila Monsters to be reared in the United Kingdom. Fertile eggs were also successfully incubated in 1991.

Glasgow Zoo also maintains a population of Gila Monsters, and close liaison between the two establishments has occurred — including the exchange of adult and juvenile reptiles this year. If London Zoo is finally forced to close, then at least, there is a possibility that this little-publicised but very worthwhile captive breeding project will continue north of the border in Scotland.

## CHELONIA IN CAPTIVITY

The People's Dispensary for Sick Animals (PDSA) have recently published a 16-page booklet in their Pet Care series entitled *Tortoises and Terrapins*.

This useful booklet is divided into two sections, giving eight pages of information about two species of European tortoise — the Spur-thighed (*Testudo graeca*) and Hermann's (*T. hermanni*) — and six pages about freshwater turtles (terrapins) — particularly Red-eared Sliders (*Trachemys scripta elegans*), although Soft-shelled Turtles (*Apalone* sp.) and Snapping Turtles (*Chelydra serpentina*) are also mentioned.

Information about maintaining tortoises in captivity includes sections on handling, housing, feeding and some very timely advice about hibernation. A diagram of a double-walled, insulated hibernating chamber illustrates the text and emphasises the dangers of frost (which can cause blindness) and very low temperatures to tortoises in winter. The next section on 'waking up', provides guidance on the care of tortoises emerging from hibernation in the spring, especially if the days of March and April are cold and/or damp.

Details about the maintenance of freshwater turtles include signs of good health and guidance on handling, feeding and life cycle, with reference to nesting and the incubation period of eggs.

Three very important sections on housing, winter resting and waking up draw attention to the fact that some species of adult and semi-adult freshwater turtle can be kept out of doors in garden ponds. However, it is most important that aquatic reptiles which have been kept in the constant warm environmental conditions of an indoor aquarium are carefully acclimatised to the variable temperatures experienced in an outdoor pond.

For example, freshwater turtles which have only spent one summer outside should be brought in at night during the autumn and kept in a tank of unheated water which has an island of rocks for clambering

on. During the winter months (December through to the end of February), these turtles will undergo a 'rest period' — a state of semi-dormancy induced by low environmental temperatures of around 10°C (50°F). At these relatively low temperatures, freshwater turtles are less active and take little or no food.

DO NOT 'rest' any turtle which is sick, underweight or less than a year old. These reptiles must be encouraged to continue to feed and be maintained in water at a temperature of around 24°C (75°F) throughout the autumn and winter.

As spring approaches and temperatures begin to rise, 'resting' turtles become more active again, and require much more food.

A number of helpful contacts are given on the back cover. These include the addresses of the British Chelonia Group, the Tortoise Trust and the British Association of Tortoise Keepers, as well as the telephone number of the Tortoise Helpline.

Copies of this useful and informative booklet are available free of charge from the PDSA, although a donation towards the cost of printing and a stamped addressed envelope (A5 size) would be appreciated. Write to:

PDSA,  
Head Office,  
Whitechapel Way,  
Priorslee,  
Telford,  
Shropshire TF2 9PQ.



A Spur-thighed Tortoise (*Testudo graeca*). Seasonal advice about





# OSCAR - WINNING

As Dr David Tipping and Angela Hollyfield show, courtship in Oscars can be quite a turbulent affair

Photographs by the authors

**C**ichlids exhibit more parental reproductive behaviour than fishes of any other family. Quite correctly, much published work is dedicated to the fishes' care of the eggs and fry. However, an important and interesting aspect of cichlid reproductive strategies is their courtship behaviour.

Courtship behaviour is a complex phenomenon. This is hardly surprising when you consider that, for a prospective parent, the ability to find a suitable mate is of crucial importance. Courtship behaviour in cichlids allows an assessment of the quality and commitment of the potential mate, and the formation and enhancement of the pair bond.

## MAIN CHARACTERISTICS

The key factor to be considered in large cichlid courtship behaviour is space. In a nutshell, aquaria (of any size) are small; rivers are large. The upshot of this inescapable

situation is that the stress which large cichlids experience while breeding in captivity is far greater than in nature. In this sense, the study of large cichlid courtship in aquaria is a science in itself, and bears little relation to the wild situation.

## Aggression

The overriding feature of cichlid courtship is aggression. Cichlids are normally aggressive, but become even more so during the reproduction period, particularly towards alien fishes which invade their territory. Cichlid pair bonding is inherently unstable because the fishes temporarily transfer their mutual aggression to a third party.

In the wild, a courting pair will defend their territory all day against any fishes which happen to invade. Such intrusions are likely to be frequent, but the aggression directed to each outsider will be minimal. In aquaria, 'intruders' clearly cannot escape,

with the result that both courting pair and intruder are highly stressed.

In the case of Oscars (*Astronotus ocellatus*) it is unfeasible to expect a pair to share space (once courting) with any other aggressive fishes. Most, if not all, of the other fishes should be removed, apart from possibly one (see below).

## Jaw-Locking

Aggression between the pair is also very significant. The most direct form of aggression in many cichlids is jaw-locking, when the fishes grip each other's mouths and try to force each other backwards and forwards. Jaw-locking allows each fish to assess the other's strength, presumably to give an indication of the other's ability to defend the young. Equally matched pairs will spawn, while inferior suitors are chased away.

It is very likely that jaw-locking as a courtship phenomenon developed from genuine aggressive behaviour, which still occurs between males.

Subsequent bouts of jaw-locking do not always involve the actual grasping of the opponent's mouth, but is somewhat ritualistic, with the fishes going through the





Far left above, gill-flaring — an interesting aspect of courtship behaviour.

Far left below, courting Oscars remain close to each other for long periods of time.

Top centre, jaw-locking is frequent as a courting pair test each other out.

Left, slate cleaning is an essential component of Oscar courtship.

Above, courtship also involves the vigorous defence of a territory.

# PERFORMANCE

motions of moving backwards and forwards, without actually making contact with each other.

## Other Types of Displays

In addition to this direct confrontation, there are more subtle behaviour patterns which test the commitment of the prospective mate. These take the form of gill flaring, and quivering of the body and fins while the fishes are alongside each other.

Gill flaring is common in cichlids in a variety of situations, and is a signal to others that they mean business. Such intimidating tactics are designed to call the bluff of any uncommitted potential mate. Other courtship behaviours demonstrate more obvious intentions. In substrate spawning cichlids, two essential activities in the spawning season are substrate excavations (which may later house the fry) and cleaning of the chosen spawning site. Most cichlids are intolerant of plants during courtship behaviour (and often all the time), and relentlessly uproot them. Digging and clearing duties do not just follow the preliminary jaw-locking activity, but intersperse it as well.

All of the behaviours described above may occur at any time during courtship, which may last several hours. However, most of the behaviour occurs in proximity to the spawning site. The hormonal changes which drive these behaviour patterns also induce an intensification of the coloration normally shown by the fishes, or may induce completely different colours.

Some cichlid courtship behaviours are seen between 'pairs' of females in aquaria (if a suitable male is absent) as a behavioural prerequisite for the expulsion of eggs. In this situation, the eggs will not be fertilised and will succumb to fungus. More common is the 'trial run' of fishes which have not spawned before, which, unlike the case in females, does not result in eggs being released.

## ADEQUATE PREPARATIONS

Potential owners of large cichlids such as Oscars should be prepared for courtship behaviour in their charges.

## Physical Damage

Courtship behaviour, by its very nature, involves lots of aggression on the part of the

fishes, and can lead to physical damage. Damage to the flanks and mouths of the fishes is particularly common during jaw-locking encounters. This is because jaw-locking fishes frequently try to twist their mate while pushing, leading to one or both being scraped along the gravel/rockwork, or conversely, pushed up to the water surface.

Obviously, a tight-fitting lid is therefore essential, and the removal of unnecessary rocks and bogwood will prevent more damage than is unavoidable.

Proud owners of large cichlids should consider the possibility of damage to their pets before attempting to breed them. Two unacquainted large cichlids should be separated for a time before they are introduced, but even the temporary use of aquarium dividers only delays the inevitable encounter between two powerful fishes.

## Sexing Difficulties

If you have two (or more) Oscars which are already acquainted, the prospect of courtship causes a particularly difficult dilemma, caused by the lack of sexual dimorphism.

In the vast majority of cichlids, males are significantly larger than females, mainly



towards egg (yolk) production, rather than muscle deposition. The energetic costs of testicular development are very slight compared to those of ovarian proliferation.

However, Oscars are notoriously difficult to sex at any size, and show no obvious breeding coloration. This similarity between the sexes poses a problem with catering for the female's safety. In other fishes it is common to divide the aquarium in half, but leaving a female-sized space through which she (and only she) may escape to the other side. Clearly, such an arrangement is unsuitable for Oscars. So what is the most satisfactory alternative?

### Aggression 'Targets'

There are two ways in which the inevitable aggression found in such powerful fishes can be channelled. The first is to redirect aggression away from the pair to other fishes. This need not be as cruel as it sounds.

The best way is to divide off a section at one end of the aquarium securely and place another fish in it (i.e. a 'target' fish). The best target fish to use is probably a cichlid of a different species. Such an arrangement would ensure that any threat displays were understood by the fishes on each side. Using a cichlid of the same species would probably arouse unnecessary aggression from the courting pair.

In some cases, target fishes may be left in the same aquarium as the courting pair, but

limited. Only large armoured catfishes are really suitable, such as *Hypostomus* or *Pterygoplichtkys*. However, even these fishes will sustain damage, especially to the tail and fins, if left with the pair. Such catfishes are also unsuitable because they have a reputation for eating cichlid eggs under cover of darkness.

The second way to safeguard the courting fishes is to allow them to redirect their aggression to objects in the tank. Initially, any dangerous objects, such as bogwood and large rocks, should be removed. However, the addition of more flat slate-like rocks will be beneficial. Oscars will often redirect aggressive activity towards slate cleaning and digging. If the pair are undecided as to the most appropriate spawning site, the addition of more slates will increase the proportion of the time spent cleaning.

The best solution is probably the combination of both strategies, with a target fish behind a divider and the provision of several slates for the pair. This will have the advantage that the fishes will reinforce their pair bond through their common aggression towards the target fish. If left with no target, the courting pair may renew their inherent antagonism towards each other and fight.

Some authorities recommend the placement of a divider resting on the spawning slate, with the pair separated on either side, in the hope that enough of the male's sperm will cross underneath/through the barrier to fertilise a proportion of the eggs. Such a

procedure cannot involve a target fish in a very satisfactory manner however, and may lead to the disintegration of the pair bond.

### Meeting the Challenge

In the confines of a home aquarium, courtship (let alone dominance) struggles can prove fatal, and for the average hobbyist are probably not worth attempting for the more aggressive cichlid species, even with the use of dividers. However, since the challenge of breeding these fishes is so great, I suppose the most appropriate advice must be that if you're going to try to breed large cichlids, do it in an aquarium as large as you can afford (at least 48 x 15 x 15in — 120 x 38 x 38 cm, and preferably larger than this), and quickly remove any fishes which are taking punishment beyond that expected in genuine courtship behaviour.

Of all the large cichlids, Oscars are relatively peaceful, and are probably the best compromise between pacificity and the ability to withstand punishment. The popularity and availability of Oscars, coupled with their relative affability and hardiness, make them the best choice for a carefully planned and managed breeding project involving large cichlids.

At least, if you successfully breed your Oscars, you have a good chance of finding potential owners for the juveniles. However, the sudden appearance of a few thousand eggs may create even further problems for the unprepared aquarist!

ASP

Pay a visit to

## WHOLESALE TROPICALS (RETAIL ONLY)

Large selection of Tropical Fish always in stock  
Plants and Equipment

Many of our customers say we have one of the best selections of tropical fish in London, and probably the country. With over 20 years experience supplying the aquatic trade.

**A special offer on all Eheim filters and water-pumps in stock**  
1005 Power Heads £18.40    2209 Int Filter ..... £21.00  
1007 Power Heads £11.00    2211 Ext Filter ..... £32.20  
1209 Power Heads £16.95    2213 Ext Filter ..... £42.45  
2007 Int Filter ..... £14.75    2215 Ext Filter ..... £57.70  
2217 Ext Filter ..... £88.35  
**All External Filters include medium**  
**All 240 volt and covered by full manufacturer's guarantee**

**150** Tanks of tropical fish which normally include 20 species of *Synodontis*, 30 species of *Corydoras*, 25 species of killies, Blue Brown Tefe — Turquoise — Heckel discus. Clown — Blue-eye, a good selection of *Cichlasoma Apistogramma*, and many others. Also *Corydoras Panda* and *Brochis Britskii*.

A selection of aquatic grown *Cryptocorynes*

### ● SPECIAL OFFER — CASH ONLY AT THESE PRICES ●

Tank, nylon-coated F/top cover, heater, thermostat, internal power filter, GroLux lighting, thermometer, gravel.  
24" x 15" x 12" £58.50 — 36" x 15" x 12" £75.00 — 48" x 15" x 12" £90.00 k/down tubular steel stand 24" £23.20 — 36" £26.50 — 48" £32.00  
All-glass aquariums 24" x 15" x 12" £10.75 — 36" 15" 12" £14.00 — 48" x 15" 12" £17.50  
Any size of All-glass aquariums made to order at competitive prices

Eheim fountain 3250 (1200 Lt ph) £47.50 — 1250 Universal pump, internal or external (1200 Lt ph) £41.50

If you are in the area please pay us a visit      Ask for Terry — Club visits welcome  
Open: Mon, Tues, Wed, Fri, 10am-6pm. Thurs, 10am-2pm. Sat 9am-6pm. Sun 9am-1.30pm.

**10% DISCOUNT WITH A CUTTING  
OF THIS ADVERTISEMENT,  
APART FROM SPECIAL OFFERS**

**On No 8 Bus Route — Opposite main Post Office**  
220 BETHNAL GREEN ROAD, LONDON E2 Tel: 071-739-5356 Fax: 071-729-2444

PRICES CORRECT AT TIME OF GOING TO PRESS



# Breeding:

## WHIPTAIL CATS

Harry Montagu recounts his experiences breeding the graceful and peaceful *Farlowella acus*.

Photographs, unless otherwise indicated, by the author



The elegant, slim-line *Farlowella acus*.

**M**y experiences in breeding the Whiptail Catfish, *Farlowella acus*, happened accidentally. I had kept the species with mixed success for about three years, as they are somewhat delicate and prone to give up the ghost in the event of a sudden water change, becoming paler and not feeding until they succumb. However, if they survive four weeks after purchase, then there is a reasonable chance of success.

In the early part of last year, I obtained two specimens, one about 12cm (4.7in) in length and the other some 8cm (3.2in) long. Happily, both settled down in about two weeks, feeding regularly and rapidly regaining their customary dark colour; their diet of algae was supplemented by feeding them once daily with a few catfish food pellets.

### TANK SET-UP

My tank, which is a community one, contained a number of small fish, such as Cardinals, Beacons, Marbled Hatchets and

Harlequins. As the water where I live is very hard, I have found that by deionising it, a number of plants grow very happily during



Male (note the fine 'down' on its snout) guarding a batch of eggs laid on the front glass of the aquarium

the 10 hours of artificial light which the tank receives daily. The tank is a Minireef, 39 x 16 x 16in (c 100 x 40 x 40cm) supplied with 2 x 30 watt fluorescent tubes, one a Glowlight and the other a Northlight.

The main plants comprise *Vallisneria spiralis*, *Nymphaea stellata*, various *Cryptocoryne* and *Anubias* species and, on the surface, a limited amount of *Salvinia auriculata*, plus the inevitable *Lemna*, or Duckweed, as it is better known. The pH is 6-7, water temperature 78-80°F (25.5-26.6°C) and about 10% water changes are carried out around every 10 days.

### FIRST SPAWNING

In September last year, I noticed that the female was swelling abdominally, presumably owing to the presence of eggs, and on 12 October, some 50 eggs were seen on the front glass, with the male in attendance guarding, fanning with his pelvic (ventral) fins to aerate them, and periodically apparently cleaning them. He only left them for short periods to feed, while the female took no further interest either in the eggs or subsequent offspring. The male at this time had developed fine 'down' (whose purpose seems unknown) on his snout. The oval eggs, when first laid, were approximately 2-2.5mm (0.08-0.1in) in diameter and slightly yellow in colour.

At this point, a decision was taken to remove all the other species of fish in the tank to a hurriedly set up second tank so as to cause the least possible disturbance to either the two parent *Farlowella* or the expected fry.

### HATCHING AND REARING

Hatching began on 20 October and was completed by the morning of 22. The fry, which were initially about 0.8cm (0.3in) in length, attached themselves to plant leaves



with their sucker mouths, and gradually seemed to move towards the top of the tank, possibly being attracted by light and the likelihood of food.

Prior to hatching, Liquifry No 1 had been introduced into the tank to increase the supply of algae and Infusoria, the natural food of the fish. A few days after hatching, small quantities of Tetramin 'E' were dropped on the *Nymphaea* surface floating leaves about three times daily, plus some chopped spinach and a few lettuce leaves to encourage the growth of Infusoria further. To encourage algal growth, the duration of artificial light was increased from 10 to 12 hours daily.

The egg sac was used up in several days and, after a week, the fry were more active, browsing on algae, like their parents, and swimming up the tank sides and gliding on to the plant leaves. A week after hatching, the male parent appeared to shed the mysterious 'down' on his snout.

On 6 November, the fry averaged 1.5cm (0.6in) in length, but their number was dwindling rapidly and, four days later, only five were sighted; the following day, only two were left and, after this, none could be located. Their loss was attributed to my failure to provide sufficient quantities of the food, as in the natural state, one assumes they bask in an algal soup — a very difficult environment to provide in our winter!

## SECOND SPAWNING

On 7 December, a second batch of some 54 eggs were observed on the surface on an *Anubias* leaf growing vertically in the left rear corner of the tank. The leaf was removed and placed in a small floating breeding trap with a view to providing a more or less continuous feeding routine after hatching. However, my good intentions were largely frustrated by the fry being able to wriggle through the baffles at the base of the trap which had been designed for other purposes!

Hatching commenced on 16 December and was completed by the following day. Once again, Liquifry No 1 was used but, this time, the Tetramin 'E' was made into a paste and 'rained' on the *Nymphaea* leaves floating just below the surface and also the submerged *Cryptocoryne* and *Anubias* leaves immediately after the egg sac was exhausted. Small lettuce leaves were also floated in the tank. The Tetramin was fed in the paste form just described up to four times daily at, say, 9.30 am, 12 noon, 4 and 7 pm.

By Christmas Eve, the fry were 14mm (0.55in) long and by the end of December had attained 15-18mm (0.6-0.7in). By this time, Tetramin 'L' was added to the paste mix.

From 1 January, brine shrimp eggs/larvae were added to the diet once every two days, but I am not sure as to what extent the fry devoured either, as I have a healthy, or some would say unhealthy, snail population which certainly feasts on the brine shrimp eggs.

At four weeks, the fry measured between 2-2.5cm (0.8-1in) and growth was more rapid. They congregated on the *Nymphaea* leaves making feeding much easier. On 12



Three-day-old fry hanging on to a lily leaf.

January, I counted 18 fry measuring up to 2.75cm (1.1in) in length and, by 10 March, their number had dropped marginally, the largest measuring just under 3cm (1.2in).

## SUBSEQUENT SPAWNING

At about 7 pm the previous evening, the two parents had been observed 'flirting', with the male buffeting his mate with his snout and, as the tank light went out, they were observed alongside each other on the tank gravel. At 9 pm I noticed that a batch of eggs had been laid on the front glass of the tank about 11cm (4.3in) from the surface and, by 11.30 pm, some 52 eggs were laid. Unfortunately, no fry were seen and it appears that, on this occasion, the father was responsible for infanticide, possibly as a result of stress or any one or more of numerous other possible contributing

factors, though he had been an exemplary parent up to the time of hatching.

On 15 April of this year, a further batch of 54 eggs were laid on the front glass, with hatching starting about 8 days later, but mortality was unexpectedly high and, by May, the survivors had been reduced to two.

In early June, there were about 10 survivors from the December batch of eggs and they measured between 2 and 6cm (0.8-2.4in) while only one (about 1.5cm — 0.6in — long) remained from the last batch.

The food cycle described above is being maintained and I have supplemented the 'dry' content by adding a proportion of about 50% granulated, 50% protein Promin 'Fine' to the paste mixture. I hope that these young fish will reach maturity like their parents and that, thereby, I will gain further insight into the life and habits of this enigmatic and fascinating species. A&P

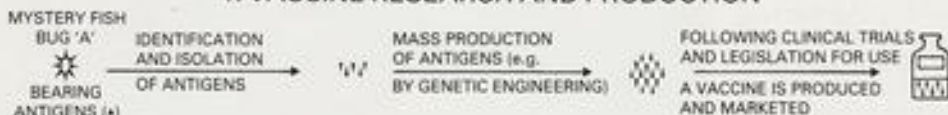


Small group of six-month-old juveniles resting on a submerged lily leaf — their usual feeding spot during the early months.

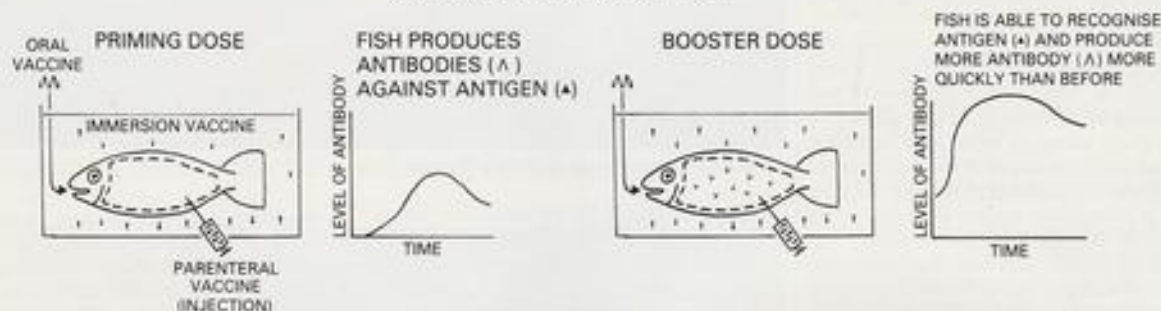


# Focus on: *Health*

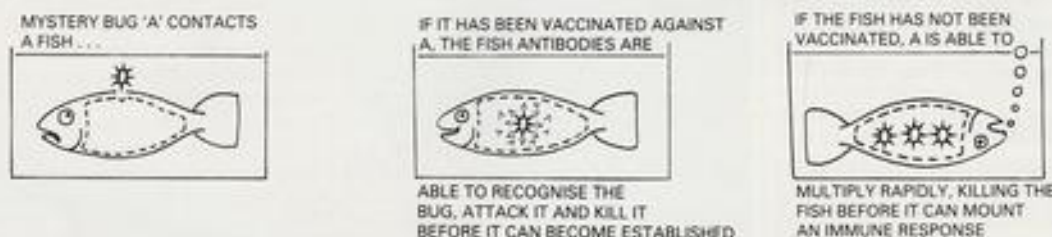
## 1. VACCINE RESEARCH AND PRODUCTION



## 2. IMMUNISATION OF FISH



## 3. FISH MEETS BUG



How it all works. Vaccine development, vaccination and the immune response.

# VACCINES FOR THE AQUARIST

A clear vision of the future, or just spots before the eyes? Fish health scientists **Frank Cross** and **Peter Burgess** present a realistic update of existing practices and future possibilities.

*Illustrations by the authors*

**W**e've all suffered it, haven't we? A tank full of wonderful cichlids, just the kind that you've always wanted, are just begging to be bought from the local aquarist's. But there's a problem — a couple of the fish in the tank have a few, just a few, white spots on their tails

Knowing the shopkeeper would refuse to sell if he had noticed the disease, you decide to feign innocence and buy two of the fish. Back home, you give the fish the recommended two weeks' quarantine before introducing them to your prized community tank.

Things go well at first, but then, after a couple of days, a few of the fish start

'flashing'. The tank occupants become increasingly lethargic over the next few days, and then you notice it — each fish is covered in hundreds of white spots.

As the disease progresses, it becomes obvious that you have to act. This involves an ignominious trip back to the aquatic shop to buy some chemotherapeutic (treatment compound), having prepared the line, "Oh, it's for a friend's tank; he's just starting out," to fend off the inquisitive shopkeeper (while there, you notice that the cichlid tank is now bright blue, with a sign displaying "Not for Sale" ...).

Back home, the forlorn sight of moribund fish, now proudly displaying hundreds of large white spots each, greets you. You now face a dilemma — will these fish survive the stress and rigour of a chemical treatment? If only there was some way that all this could have been prevented. Well, maybe there is.

## VACCINES ON THE SCENE

The use of prophylactic (preventive) vaccines to control diseases in fish is not new. Research started in earnest in the mid 1970s, and there are now commercial vaccines available to the fish farmer for the prevention of Furunculosis, Enteric Red Mouth and Vibriosis. All very well, but when did you last hear of an outbreak of Furunculosis since *Next Time*?



With the annual revenue generated from the hobbyist fish trade currently in excess of £150 million, and very significant losses being incurred by disease outbreaks, the market potential for the development of vaccines to combat such aquarium horrors as White Spot must be huge. This is particularly true when one considers high-value species such as Discus, Koi and tropical marines.

## HOW IT ALL WORKS

The aim of vaccination is to prime the fish with certain fractions of a pathogen (termed 'antigens'), so that when that particular bug attacks, the fish is able to recognise the fractions as 'foreign' and produce a defence response to 'neutralise' it. This defence response usually involves the production of 'antibodies' (blood-borne molecules which recognise specific antigens).

Following vaccination, the fish immune system is able to remember what that particular bug's antigens 'look like'. If the pathogen bearing these antigens subsequently tries to attack an immune fish, this memory is jogged, and the fish is able to produce lots more antibody very quickly. These antibodies circulate in the body (or are secreted in the mucus of the skin, gills and gut) and are able to bind to the pathogen, often killing it.

It is worth bearing in mind that, with many pathogens, infection itself will naturally introduce antigens to which the fish's immune system is able to produce antibodies and thus kill the pathogen. (For example, think of human colds — eventually, we get over them because our immune system copes with antigens from the cold virus and produces a response to neutralise it).

But where vaccination has the edge is that it prevents the pathogen from becoming established in the first place, and thus prevents the disease breaking out. This is particularly important with respect to virulent pathogens, such as bacteria and viruses, which are able to reproduce rapidly and can often kill the fish before it can mount an immune response. (Again, think of human diseases; would you risk contracting tetanus and then waiting for your immune system to clear it naturally?).

## METHODS OF VACCINE ADMINISTRATION

Vaccination of fish currently employs two basic methods: injection of antigens, or the administration of antigens free in the water (immersion or 'bath' vaccination) — although current research is being directed toward the development of oral vaccines, where antigens are incorporated into food, much like the human polio vaccine.

Injection is usually reserved for larger fish, and may be of limited potential for the majority of tropical species. Furthermore, this method has the obvious disadvantage of being very stressful and often damaging to the fish, and it requires a skilful (as well as steady!) hand. However, it is currently the only means of administering some vaccines.



Above, vaccination by immersion. Several small fish (Jewel Cichlids) can be 'bath' vaccinated at one time. The vaccine can be taken up by the fish very quickly, and so, a two-minute bath may be sufficient.

Above right, vaccination by injection. A ghost Koi is given an intraperitoneal (i.p.) vaccine. This method is very effective but time-consuming.

Right, oral vaccine. Incorporation of the vaccine with the food could provide a simple, stress-free way of vaccinating fish. As yet, such vaccines are not available.



Immersion vaccination applies the antigens to the fish in the water. Quite how the antigens then enter the fish is conjectural, although it is thought to be via the gills or the gut. This method is far less stressful, and large numbers of fish can be treated in one go.

However, the most attractive proposition is oral vaccination. Some progress is being made toward the incorporation of antigens into food to initiate an immune response in fish, although the problem is that a lot less is known about the immune system of fish than of mammals and, consequently, progress in this field is slow as research starts to unfold the mysteries.

## LIMITATIONS AND NOTES OF CAUTION

It should be borne in mind, however, that vaccination is not, and will never be, the be-all and end-all of fish disease control. Good husbandry practices are of paramount importance, not only to prevent any diseases reaching your aquarium in the first place,

but also to keep the fish healthy so that they are able to fend off pathogens. Fish which are stressed (e.g. due to poor water quality or overcrowding) are less able to respond immunologically to control pathogens, and under such conditions even vaccinated fish may fall foul to disease.

Very young fish should never be vaccinated, since their immune system has not yet fully developed at this stage. The amount of vaccine administered to fish should never exceed the stated dose either; this can have disastrous results, as fish are unable to recognise the antigens as 'foreign'.

Finally, remember that vaccination is highly specific for the disease which you have immunised against: if you vaccinate against bug A, you should not expect that your fish will be protected against bug B.

## THE FUTURE FOR VACCINE DEVELOPMENT

Despite these reservations, vaccination remains a very attractive and realistic proposition for the control of diseases in fish.



The benefits of vaccination. Infective stages of the marine White Spot pathogen, *Cryptocaryon irritans*, placed in fish blood. In blood from a 'normal' fish, the parasites swim normally and are able to infect the fish.

In blood from a fish which is immune to *Cryptocaryon*, the specific antibodies in the fish's blood have immobilised the parasite (and caused them to glue together). These won't be infecting anything!

The parasites are just over 50 microns in length (about 1/500in).



However, much more research (both basic and applied) is required before any further progress can be made.

Compared to chemotherapy, vaccine research and development tends to attract less funding because there is no guarantee of a quick result. If the current level of financial

support for this work is maintained, it could be years before we see fish vaccines available over the counter to the hobbyist. To make real progress, we therefore suggest that future research projects might be centrally funded by the industry, rather than left to private enterprise.

In the meantime, the next time that you get an outbreak of White Spot in your aquarium, we suggest that you go down to your local aquatic shop, and humbly request some of that wonderful liquid that turns your tankwater bright blue. . . .

## VACCINES

The table lists those vaccines which are commercially available in the UK. Note that they all relate to bacterial infections; vaccines for viruses, protozoa and macroparasites (e.g. Sealice) are still underdevelopment in the UK. In the USA, vaccines for other bacterial diseases are available, such as against *Edwardsiella* which infects several species of fish, particularly Ictalurid catfishes which

are susceptible to *E. ictaluri*. The *Edwardsiella* vaccine is interesting in that it is administered by immersion, with a booster subsequently given orally.

A vaccine for the viral disease SVC (Spring Viraemia of Carp) is produced commercially in Czechoslovakia, but is not currently available in the UK.

### FISH VACCINES COMMERCIALY AVAILABLE IN THE UK

Disease	Causative agent(s)	Main fish species vaccinated	Usual method of vaccine application
Enteric Red Mouth	<i>Yersinia ruckeri</i>	Salmonids	Immersion
Vibriosis	<i>Vibrio anguillarum</i> ; <i>Vibrio ordalii</i>	Salmonids	Immersion
Furunculosis	<i>Aeromonas salmonicida</i>	Salmonids Cyprinids <sup>1</sup>	Injection/ Immersion Immersion

<sup>1</sup> Used successfully to treat carp, including Koi, Goldfish and Orfe. (See *Carp Vaccine Breakthrough*, *Aquarist & Pondkeeper* page 36, December 1991).

All vaccines in the table are available from **Aquaculture Vaccines Ltd**, 24-26 Gold Street, Saffron Walden, Essex CB10 1EJ. Tel: 0799 528167; Fax: 0799 525546.

## HIGH GRADE JAPANESE BABY KOI

THESE ARE THE VERY BEST SIZE ONE AND SIZE TWO KOI WE HAVE EVER IMPORTED AND ARE IDEAL FOR GROWING ON

**MIDORIGOI, GIN RIN OCHIBA SHIGURE, SHIRYO UTSURI, SEIJURO SHOWA, TANCHU KOHAKU, DOITSU SANKE ETC**

IF YOU ARE LOOKING FOR HIGH GRADE JAPANESE KOI THEN YOU WILL NOT BE DISAPPOINTED WITH OUR SELECTION OF OVER

**6000 JAPANESE KOI IN 50,000 GALLONS OF WATER**

NOT TO MENTION THE MANY THOUSAND KOI IN 12½ ACRES OF NATURAL LAKES GROWING ON FOR NEXT SEASON. BECAUSE OF THIS UNIQUE CONCEPT OF ACCLIMATISING AND GROWING ON KOI WE HAVE

**18" + KOI AVAILABLE AT UNBEATABLE PRICES!**

END OF SEASON DISCOUNTS ON ALL DRY GOODS. PHONE FOR BEST PRICES

CONGRATULATIONS TO ALL OUR CUSTOMERS WHO DID WELL AT THE 1992 NATIONAL KOI SHOW AND LOCAL SECTION SHOWS.

## HAWKHURST FISH FARM

ON THE B2244 (Formerly A229) HAWKHURST — BODIAM ROAD  
HASTINGS ROAD ☆ HAWKHURST ☆ KENT

Telephone 0580 753813 Fax 0580 754182

Closed to Retail customers Monday & Tuesday





Focus on: *Health*

# DISEASE PREVENTION:

## Part 1 AIMS AND IDENTIFICATION

Veterinary surgeon Lance Jepson takes a 'two-part' look at the problems involved in trying to keep fish healthy.

*Photographs by the author*



Everybody's aim: healthy fish — in this case, Koi.

**B**ack in 1954, M C Meyer wrote to the effect that, under conditions in nature, there is rarely an individual fish which is unparasitised in some way. This raises two important points which need to be addressed:

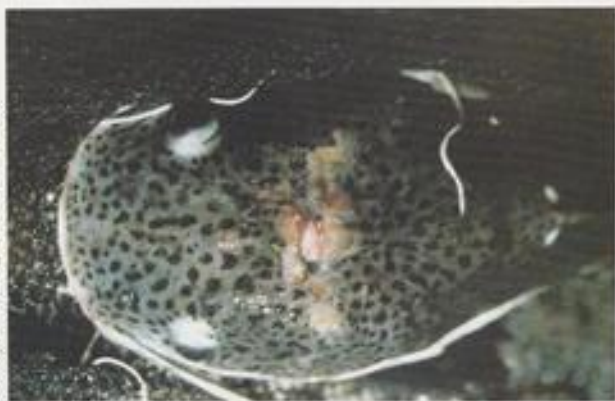
① The term "parasitism" can be described as the relationship between one life-form (the parasite) and a second (the host) in which the parasite relies upon the host for its food, shelter and reproductive success. This is usually achieved at detriment to the host (it may cost the host its life!).

In its broadest sense, the definition of a parasite includes not only the worms, protozoa and crustaceans, but also fungi, bacteria and viruses, although these last three are usually arbitrarily considered as 'infections' and not 'parasites'.

② To keep everything in perspective, we

must distinguish between the presence of a potential disease-producing organism (pathogen) and the disease itself. To illustrate this, many perfectly healthy fish harbour low numbers of *Aeromonas*

Many diseases arise as secondary infections. In this picture, a Red-tail Cat (*Phractocephalus hemiolepis*) has developed an ulcer on its head — as a secondary effect of poor water conditions.



bacteria; indeed they are considered part of the normal skin flora.

However, if a scale is dislodged during careless handling, these bacteria can breach the skin defences and, if the stressed fish is unable to mount an adequate immune response, then an ulcer can result, i.e. a disease.

In the wild, the above is probably true of the majority of parasites where low numbers are tolerated by otherwise healthy fish. Such parasite-host relationships have evolved over countless generations to an uneasy *status quo*. Let's face it, if you intend to live off another organism, it's suicidal to kill it outright. The low-grade presence of potential pathogens is often referred to as a subclinical infection and, in the case of ornamental fish, this must apply to all wild-caught fish, and those kept in semi-feral (semi-wild) conditions in dirt pools.

### ROLE OF PREVENTIVE MEASURES

Preventive medicine must play an important part in the control of disease within the ornamental fish trade due to the combination of:

- ① The high incidence of infection (often subclinical, especially in wild fish).
- ② The eventual pooling of large numbers of potentially susceptible individuals at exporters' / importers' / retail premises, often from widely different geographical origins.
- ③ Immuno-suppression due to stress, following capture and transport and/or unsuitable water/environmental conditions.





Post-mortem view of a Goldfish which died from an overwhelming *Aeromonas septicaemia*. Note the extensive haemorrhages on the fins and body, plus ulcers and oedema (Dropsy).

As an example, in one study by Gratzek, Shotts and Blue (1978) seventy seven bags of ornamental fish imported into the USA from Hong Kong, Taiwan, Singapore and Bangkok, were examined for parasites, bacteria and viruses. Their results indicated that 61% contained fish which were parasitised in some way. In addition, bacterial infections were noted in 51 bags and represented 11 genera of bacteria. Only one virus was isolated — this was a herpesvirus associated with Kuhli Loaches (*Acanthophetalus* sp).

Preventive medicine involves:

③ the IDENTIFICATION of a potential disease problem and, based on knowledge of that disease:

④ CONTROL, usually by one or more of the following means:

- 1 — Alleviate stress.
- 2 — Quarantine +/- drug treatment.
- 3 — Destruction or reduction of a link in the life cycle.
- 4 — Test and slaughter.
- 5 — Drug treatment alone.
- 6 — Vaccination/disease resistance.

7 — Water 'sterilisation'.

8 — Removal or reduction of toxic substances.

9 — 'Cleaner species'.

NB Within the framework of preventive medicine, correct husbandry with the maintenance of correct water quality is essential.

#### IDENTIFICATION

Conroy et al (1982) stated that, in their experience, it was quite feasible to carry out a rapid clinical inspection in commercial shipments to detect the presence of certain common disease conditions. These are:

① **White Spot Disease**, i.e. Ichthyophthiriasis, the classic White Spot, myxosporean cysts and the encysted stages of certain worms.

② **Dermatomycosis**, i.e. fungal and mycobacterial diseases such as Mouth Rot.

③ **Monogenetic Flukes**, such as *Dactylogyrus* and *Gyrodactylus*, are often suspected if the fish are flicking off objects. These para-

sites are easily detectable with a microscope from skin scrapings.

④ **Eye Fluke**

⑤ **Black Spot Disease**

⑥ **Yellow Grub Disease** — these three last names describe the conditions caused by the encysted intermediate stages of certain flukes.

The full life cycle usually involves the eggs being eaten by a mollusc, such as a snail, in which the parasite's development starts. If the snail is then eaten by a fish, the fluke develops further, but is only able to reach adulthood if the fish is eaten by a bird. On reaching adulthood, eggs are released in the bird's faeces, along comes a snail, and so on. . . .

⑦ **Ectoparasitic Crustaceans**, such as *Argulus*, the Fish Louse. Other conditions mentioned which are often apparent are:

⑧ **Bacterial Fin Rot**, manifested by areas of fin erosion, often with a reddened (haemorrhagic) border and increased mucus production.

⑨ **Haemorrhagic Bacterial Septicaemias**, where infections are spread throughout the body. They usually show as any (or a combination) of the following: blood-streaked fins, Fin Rot, areas of raised scales and ulcers.

⑩ **Tuberculosis** usually presents a severe and longterm weight loss, although occasionally, collapse of infected vertebrae may give rise to a deformed backbone.


⑪ **Opacity of the Skin** refers to the increased mucus production triggered by the presence of large numbers of ciliate protozoans, such as *Trichodina*, *Ichthyoboda/Cosmia* and *Chilodonella*.

⑫ **Hexamitiasis** can present as weight loss, stringy faeces and, classically, as holes and depressions developing around the head and lateral line.

In addition, I feel that other obvious conditions would be:

⑬ **Lymphocystis**, a viral disease characterised by huge cauliflower-type growths, usually on the fins. These growths are actually grossly enlarged single cells mutated by the virus.

⑭ **Tumours**. These can occur anywhere in or on the fish and are often obvious.

Rapid identification of any of these disease problems will enable treatment to commence as soon as possible, thereby preventing potentially disastrous outbreaks. Indeed, the vast majority of aquarists, even those without any knowledge of fish diseases, will subconsciously run through a similar checklist with every prospective purchase! In many ways, the ultimate preventive medicine is to avoid buying any suspect fish. (TO BE CONTINUED) 



Discus (*Symphysodon*) showing early Hexamita lesions on the head. Note the abnormal faeces.



## Focus on: *Health*

# NELSON'S PROGRESS

Steve Hickling of World of Koi, retells the story of a remarkable recovery made from injury by a Chagoi called Nelson.

*Photographs by the author*



The horrific injury.



By early June, healing was already well underway.

In November 1990, we imported a number of high-quality 18-24in (45-60cm) Koi of mixed varieties, one of which was a very clean 24in Chagoi. Following the quarantine period, and after taking several skin scrapes, the Koi were all transferred to our 10,000-gallon (45,000-litre) sales pond.

Although there were a number of very nice fish in this shipment, I took particular interest in the Chagoi because the scale definition was perfect and it had a nice clean head. Not only that, but she seemed to have a personality all of her own. I know that may seem a strange thing to say about a fish, but I am sure that most Koi keepers will know what I mean.

### DEVELOPING FRIENDSHIP

It seemed that whenever I approached the pond (which wasn't very often owing to endless administration duties) the Chagoi would appear instantly and follow me around. I didn't really notice this at first but, eventually, I would hear her gently sucking in imaginary pellets near where I stood.

The pond is heated by a 60,000 BTU gas boiler maintaining a constant 60°F (15.5°C), so it was not uncommon to see fish constantly looking for food. I took a handful of pellets and held them just above the level of the water and, to my astonishment, this fish that had only been in the country a month, popped her head straight into my hand and gently sucked in all the food.

A few months passed and the Chagoi grew even friendlier, and the other fish in the pool soon came to realise that unless they came up and fed from the hand, she would get the lot!

### RELUCTANT SALE

In early March, the day I dreaded arrived. A customer asked if he could have a closer look at my Chagoi. Reluctantly, I put the floating basket in the pool and, as usual, every fish except the Chagoi dived to the bottom vainly searching for a hiding place.

I tried to make the catch look difficult but, in truth, the Chagoi almost swam into the net. After studying the fish for some time and asking a few questions about its background, the customer asked the price. I told him and, to my horror, he said he would buy her. I almost felt like out-bidding him.

There was some consolation however; she wasn't to leave right away. As the buyer's pond was ten degrees lower than ours, he wanted to wait and collect her when the temperatures were similar. He paid a small deposit, then left.

I feel that I should mention at this point that I don't get screwed up over a fish very often. If I did, we wouldn't have very many for sale! It was probably because she was so friendly and oozing in personality that I didn't want to see her go. I am sure she gave me a sideways look when I let her out of the



basket. Nevertheless, the deed had been done and there was no turning back now. After all, I had a deposit.

Guilt kept me away from the main pond for a few days. I was trying to avoid the Orca-like stare that I was bound to get from the Chagoi.

## DISASTER!

Unfortunately, I was the first to arrive one Thursday morning. One of the chores at that time includes backwashing the sand filter. I walked around the main pool to the filter housing, not looking directly in the pond and set the multi-port valve in the backwash position.

I picked up a few pellets and threw them into the water. Seventy or so half-starved Koi lunged at the breakfast greedily and the pond exploded in a mass of colour. When the initial fury settled down, my eyes searched for the Chagoi. Uncharacteristically, she was nowhere to be found.

I then noticed a brown shadow on the bottom about 6ft beneath the waterfall. I turned the sand filter off to get a better view and the shadow moved toward the surface.

When she appeared near the top, I was horrified to discover that the cute sun-tanned face was suddenly horribly disfigured, with her left eye protruding about 1½in (c 3.2cm) from the socket, giving her Quasimodo-like features. However, as she came to the surface, she swallowed two or three pellets then swam away, hardly troubled at all. I concluded that she must have jumped and either hit one of the rocks around the pool or bashed herself on a venturi (aeration device).

## DIFFICULT DECISIONS

The question now was what course of action should be taken to treat the fish. After much deliberation we decided to leave her for the time being and not risk any further stress; after all, she was still feeding.

A few days passed and she continued to feed by hand as usual, but the eye did not look any better. In fact, there seemed to be a build-up of pus developing behind the eye on the operculum (gill cover). A few people commented on her state over the weekend. It became clear that, as she was not improving and was becoming the object of unfavourable remarks, she would have to go into quarantine.

None of us really favoured this option, as she didn't act 'ill' as such, but merely looked unsightly. My weekly leave started on Tuesday, so I decided that it would be better for the fish if I were to take it home to my own 5,500-gallon (25,000-litre) pond. A skin scrape of the mucus was taken and after verification under the microscope that she was free of parasites, I carefully bagged her up and took her home.

My pond was heated to 70°F (21°C), so I floated her for half an hour before releasing her in the water. She swam away and, after acquainting herself with her new surroundings, was feeding within the hour. Over the next few weeks, I watched her closely and



Two weeks later and things were beginning to look hopeful.



By mid-July even the pigment was returning. Note the depression left where bone used to be.



The depression was still detectable in September but recovery could now be regarded as almost complete.

saw that the pus was continuing to develop and was now covering an area of about 3in (c 7.5cm) in diameter on the gill plate behind the eye and was around ½in (about 1.3cm) thick.

It seemed to me that this pus was building up in order to support the eye which was still protruding 1½in out of its socket. Without this pus however, I feel sure that the eye would have fallen out.



## FIRST TREATMENT

Although the fish continued to feed happily, the pus thickened to 1in (c 2.5cm) and I felt that I needed to act. On 14 May I anaesthetised her and lay her on a wet towel and studied the damage. The top layer of the yellow pus was flaky but quite thick and looked awful. I touched the eye gently with a cotton bud and it seemed to be hanging on by a mere thread; it looked as though it would fall out at any time.

I then dried the area with a swab and covered the eyeball, revealing the thick yellow substance. A corner of the towel covered the entrance to the gill and I carefully sprayed the affected area with Terramycin, holding the can about 6in away. As she was still feeding and did not appear to be at all worried by her predicament, although tempted, I decided not to inject her.

## HEALING UNDERWAY

Nelson, as she was now affectionately known, continued to swim around and feed normally and, for the time being, I left her to see what progress she made on her own. Nearly a month had passed before I netted her to have a closer look in the floating basket. The yellow gunge on her gill plate had started to fall away, leaving no trace that it ever was there at all.

Using a Koi handling net, I carefully placed her in the anaesthetic (MS222) and when she became unconscious, transferred

her to a wet towel. I could now get a better look at the affected area, which confirmed that the healing process had begun.

Again, I dried the pus with a swab, covered her eyes and gill, but this time applied Mercurochrome on the site. It is well known that, within a short time, Mercurochrome washes off, even with Polybase cream applied over it, but we have found that Orabase cream, which is used for mouth ulcers on humans, is a perfect sealer as it is designed to adhere to mucus. I spread the Orabase cream over the antiseptic and put the fish back in the basket to recover.

## DRAMATIC IMPROVEMENT

Over the next five days, Nelson's improvement was dramatic, with the pus falling away completely, revealing a hair-line crack on the gill plate.

I needed to examine this more closely, so I popped Nelson in the MS222 once again. She seemed to know the procedure, and allowed herself to slide into the handling net without a struggle, to be transferred to the sleep-inducing mixture with ease. When I lay her on the towel and looked at the crack, I found that instead of a straight line, it was circular, about the size of a penny.

I touched it gently and it moved freely. There seemed little point in applying antiseptic or cream as the area was perfectly clean, so I put her back into the basket. The only thing that concerned me now was whether or not the bone would knit together.

My answer came a few weeks later when I netted her for the last time. The bone had, indeed, come away, but a brown skin had formed in its place and was totally sealed. There is a slight indentation behind the eye where the bone had previously been, and I believe that it is possible, given time, that it may eventually grow back.

Nelson (the name has now stuck), spawned recently and has now become a permanent resident in my pool, having refunded our customer his deposit. I think this lengthy, patient episode has highlighted two important points:

- ① Koi are a lot stronger than we give them credit for, and have the ability to repair themselves, given the right environment, and
  - ② it is not always necessary to reach for the antibiotics when a problem arises.
- In addition, they make wonderful, friendly companions... even if we can't take them for walks!

## ACKNOWLEDGEMENT

This article is based on a two-part feature written by Steve Hickling, entitled: *A Fish Called Nelson*, and published in the Winter and Spring '91-'92 editions of *Nishikigoi International* (Tel: 0942 726864), to whom we extend sincere thanks for their assistance.



# Project -

## NEW EXTERNAL FILTERS

*Project, manufacturer of aquarium pumps, filters and heaters, fountain pumps and pond filters, presents a complete new range of*

### External Filters for Aquariums

- \* Easy to install
- \* Maintenance free
- \* Low wattage

PJF 201  
190201-W4-L/h 290

PJF 501  
190501-W10-L/h 550

PJF 1001  
191001-W16-L/h 1000

PJF 1501  
191501-W26-L/h 1450

PJF 2001  
192001-W35-L/h 2000

STAND INTERZOO '92 - NÜRNBERG NR 3-28  
36056 TEZZE SUL BRENTA (VI) - Italy - Via Fornace, 48  
Tel. 0424 539336 r.a. Fax. 0424-539300





# Growing Tips

By Barry R James

## NEW FROM DENNERLE

The Interzoo show held recently in Nürnberg had many items of exclusive interest to plant devotees.

A new fluorescent lamp from Dennerle called the Trocal 3085 claims, among other things, to inhibit algal growth, while providing all the spectral elements for healthy plant growth. At the moment, they come in three sizes:

15 watt (44cm — 18in)

18 watt (60cm — 24in)

30 watt (90cm — 36in).

These will have been available from the 3rd week in June. I will put a couple on test and report my findings later in the year.

Also from Dennerle, are a big range of HQL lamp fittings with some exciting new designs in reflectors. All incorporate the new lamp called the Brenner Sylvania 'Super Comfort' lamp, which is designated at 125 watts.

Also offered, are a range of 12-volt Halogen Systems incorporating a 50 watt Aqua-Spot Lamp. These systems are accompanied by no fewer than ten different reflector designs, which are offered to complement any style of modern decor.

On the CO<sub>2</sub> injection front, they have upgraded their Cyclo series of diffusers to cope with larger tanks up to 5,000 litres (c 1,100 gals) in capacity.

The star offering, however, from this innovative German company must be the new 24-volt system. A 24-volt transformer christened The Power Station supplies the new Duomat thermostat (which controls both the cable heater and the water heater and new 24-volt versions of the COC.200 and COC.400 filter stations). Two complete kits are available for smaller and larger aquarium systems.

## NEW FROM AQUA-FLORA

Now that both phosphate and nitrate removers are available, the weapons the aquarist can employ to combat algal growth are increasing all the time. I think that with modern

algicides, a complete strategy is available for eliminating this pest.

However, I see that Aqua-Flora Vinkeveen of Holland is offering specimens of that very attractive 'ball' alga *Cladophora* for sale. This is an intriguing and most attractive plant.

## NEW PLANTS

I have had many phone calls this year from pondkeepers enquiring about, and requesting information on, some of the new water lily varieties appearing on the market. There is a dearth of literature on these new types.

One such new type is *Hollandia*. This super variety has been around for some years now, and provokes very favourable comments from customers when in bloom. This strong-growing lily has blooms about 4in (10cm) in diameter. It is 'very double', with several rows of shell-pink petals. The outer row are paler, almost white, on opening. The stamens are pale yellow. It is one of my favourite pinks and very free-flowering.



The beautiful doubleness of the bloom of 'Hollandia' can be fully appreciated alongside the rather-more-single-flower of 'Mrs Richmond'.

A new aquarium plant attracting much interest in the plant house is *Ludwigia perennis*. This plant from the New World is a bright-red leafy aquatic. The trailing stems extend to 12-18in (30-45cm) in length. The lanceolate leaves have very short petioles.

The underside of the lamina (leaf blade) is dull red, while the upper side varies from olive-green to wine-red, depending on the strength of the illumination. The most outstanding



*Ludwigia perennis* (centre) shortly after arrival in the UK.

feature of this plant is the prominent mid-rib which is in a contrasting shade of red and stands out strongly.

The leaves reach a length of 3in (7.6cm), with a width of 1in (2.5cm). It goes without saying that this plant requires a lot of light in the aquarium, but is well worth the challenge.

## AQUATIC PLANT HERBALISM

Many aquatic plants are of economic use. Some are eaten, some are the source of fibres and many are used in herbalism for the treatment of various diseases. I thought it might be fun to research this aspect of aquatic plants, and summarise my findings below:

**Bear's Breeches (*Acanthus mollis*)**

A moisture-loving plant, the crushed leaves of which are used for scalds and burns.

**Sweet Flag (*Acorus calamus*)**

This iris-like marginal plant has a long history in medicine. The dried rhizome is a carminative and vermifuge, as well as being spasmolytic and diaphoretic (promotes sweating). It has a slight sedative action and is best used for flatulence, colic and dyspepsia.

**Marshmallow (*Althaea officinalis*)**

Will grow in wet or moist situations. An anti-inflammatory poultice of this plant is used for leg ulcers. Young tops may be eaten in salads. Source of marshmallows!

**Water Agrimony (*Bidens tripartita*)**

Moist or wet soil. A British native which produces a volatile oil formerly used for a variety of conditions. Now used only as a diaphoretic and as an anti-haemorrhagic remedy.

**Lady's Smock (*Cardamine pratensis*)**

Wet and moist soil. Infusion of the leaves is nutritive; contains vitamin C, minerals and mustard oil; it is also used to promote the appetite or cure indigestion.

**Horsetail (*Equisetum arvense*)**

A British native abundant in moist ground, i.e. by pools and ditches. The dried sterile stem, or the fresh juice, are used as a diuretic, vulnerary (aids healing of wounds), and genital and urinary astringent, while, in the form of a poultice, it was said to promote the healing of wounds. It has many other uses in herbal medicine, too numerous to mention here.

**Hemp Agrimony (*Eupatorium cannabinum*)**

Water Hemp is dried and is a cholagogue (purgative), diaphoretic, emetic (causes vomiting) and expectorant.

**Meadowsweet (*Filipendula ulmaria*)**

Common plant of wet and moist soil in all parts of the British Isles. Probably the most effective remedy for hyperacidity and heartburn. Contains alicylic acid, the constituent of aspirin. It is anti-pyretic, anti-rheumatic, astringent, anti-spasmodic, diuretic and anti-septic. Has many other medicinal uses besides.

The above list is purely a sample of the medicinal properties enjoyed by many aquatic plants. *Hydrocotyle*, *Iris versicolor*, *Mentha aquatica*, *Menyanthes trifoliata*, Water Cress (*Nasturtium officinale*), *Nymphaea alba*, *Rheum palmatum*, *Lysichiton americanum*, *Veronica beccabunga*, *Eurayle ferox* and *Nelumbo* are just a few of the other aquatic plants used throughout the world in herbal and orthodox medicine.





Red Sea Whip Gorgonian, probably a *Eugorgia* species, in the aquarium. These animals are extremely sensitive to nitrate pollution.

off chloramines from aquarium water.

Chloramines can break down in water to produce ammonia and chlorine. Any chlorine arising in this way will diffuse into the atmosphere, as mentioned above, as will much of the ammonia; any residual ammonia should be cycled out by the filter bacteria in the aquarium.

Alternatively, several companies sell dechlorinating compounds which can be added to water just before use. These will instantly render chloramine harmless, thus allowing treated water to be used immediately, and they will also remove chlorine; some are even formulated to dispose of any ammonia resulting from chloramine breakdown.

Both chlorine and chloramine can also be removed from tapwater by such methods as reverse osmosis and carbon briquette filtration.

## Hardness

Substances which find their way into the water supply accidentally are more numerous and more difficult to deal with. Perhaps the most familiar to aquarists are the calcium and magnesium salts which are responsible for the hardness of water.

From the aquarist's point of view, water hardness is divided into three types: general hardness (which represents the concentration of calcium and magnesium in the water), carbonate hardness (which represents, as the name suggests, the bicarbonate and carbonate concentration), and permanent hardness (which is defined as general hardness minus carbonate hardness). Carbonate hardness is not 'permanent' because it can be removed by boiling; permanent hardness cannot.

Hardness is measured as degrees of hardness ( $^{\circ}$ dGH for general hardness, and  $^{\circ}$ dKH for carbonate hardness), a system which was devised by German chemists, one degree of hardness being the equivalent of 10 mg/l of calcium or magnesium oxide. Test kits can be purchased to measure both general and

carbonate hardness in freshwater aquaria.

In terms of general hardness, water of more than about 10 $^{\circ}$ dGH can be considered hard. Hard water is good news if you keep marines or Rift Lake Cichlids, and bad news if Discus or tetras are your interest. Hardness can be removed from water by some of the methods detailed below, such as deionising and reverse osmosis, or, alternatively, commercially available water-softening resins can be used in the aquarium's filter system.

## Pesticides, Herbicides and Fertilisers

Calcium and magnesium salts in water are the result of it being collected from areas with a limestone bedrock, and it is a completely natural phenomenon. Most of the undesirable compounds in tapwater are the result of human interference, however, with farming being the major source of most of them. The presence and effects of pesticide and herbicide residues in water remain controversial, and will not be dealt with in detail here.

Fertilisers, however, produce more obvious problems. The fertilisers which are liberally distributed over farmland tend to contain three major ingredients, which, as any horticulturalist knows, are the key requirements for plant growth: potassium, nitrogen and phosphorus. Two of these, namely phosphorus in the form of phosphates, and nitrogen in the form of nitrates, can lead to problems in aquaria.

The action of rain on heavily-fertilised fields is to wash much of the fertiliser into the nearest river, where it will cause environmental problems by stimulating the growth of algae to an excessive degree, which can lead eventually to the loss of much of the other flora and fauna of the river, a process known as eutrophication. The components

of the fertiliser also find their way into the domestic water system when water is extracted from the river, and there the problems begin for the aquarist.

## Nitrates and Phosphates

In freshwater tanks, high nitrate levels are only really a problem for very delicate fish such as Discus, and phosphate is not a problem at all. In any case, in planted aquaria, the plants will take up these compounds as food. Much the same is true of fish-only marine tanks, where cultivating *Caulerpa* algae, or allowing filamentous algae to grow unchecked, plus regular partial water changes, will keep both nitrate and phosphate levels at harmless levels, though some marine fish can be intolerant of nitrates, especially some Angels and Butterflies.

In miniature reef aquaria, or tanks devoted entirely to invertebrates, these two compounds can cause real problems. Nitrate levels over 20 parts per million can be very detrimental to most corals and anemones, and especially to very delicate species such as gorgonians. It is probably worth noting that the nitrate level of clean oceanic waters is generally less than 0.006 parts per million.

Phosphate, even at extremely low concentrations, can cause severe problems with fanworms, soft corals, gorgonians and corallimorphans (mushroom polyps).

## N and P Control

These two compounds must therefore be kept at as low a concentration as possible. Both will accumulate in the aquarium anyway, as products of the metabolism of the inhabitants, and so, even if purified water is used for partial water changes, steps must be taken within the aquarium system to control nitrate and phosphate levels.



*Tridacna* clams are superb nitrate removers but you need quite a few to keep things under control.



Algae, of course, will consume both compounds as fertiliser, but many miniature reef keepers find that keeping algae under control is quite difficult, and left to their own devices they will overgrow the sessile invertebrates in the tank, shading them from the light essential for the growth.

Nitrate is generally much easier to deal with than phosphate. Assuming that purified water is used to make up the seawater for partial water changes, the nitrate in the tank water originates as the end product of biological filtration. Ammonia, the chief waste product of the tank's inhabitants, is oxidised first to nitrite, then to nitrate, by aerobic (oxygen-dependent) bacteria. It is possible to remove this nitrate using anaerobic bacteria (bacteria which can function in the absence of oxygen).

The metabolic processes involved are complex, and vary between species of bacteria. Some species reduce nitrate to nitrite and thence to ammonia, a reversal of the aerobic biological filter's process, but the ammonia is not released. Instead, it is incorporated into the bacterial cell via even more complicated biochemical reactions.

Other species can only convert nitrate to nitrite, which they, again, use as a source of nitrogen. The final group, including various *Pseudomonas* species, are of greatest importance to the aquarist as they can actually reduce nitrates via nitrous oxide to nitrogen gas, a process known as denitrification.

These processes of nitrate removal can be employed in the filter systems of aquaria by providing a flow of oxygen-depleted water (for example, water which has just been through the 'dry' section of a trickle filter) over the filter media. This occurs in the wet section of trickle filters and also in ordinary canister filters when using specialised media such as Siporax. Special nitrate-reducing filters can also be either made at home or purchased, but these need more careful management, as the maintaining of anaerobic bacteria is a tricky business, and if conditions are not quite right, some very toxic compounds, such as hydrogen sulphide, can be produced.

An alternative approach to nitrate removal is to incorporate nitrate-binding agents in a canister filter or in the sump of a trickle filter. One last way of getting rid of nitrate is to cultivate clams of the genus *Tridacna*, which are frequently kept by reef aquarists, as they have an ability to take up nitrates directly from the water. It would need quite a few clams, however, to deal with the nitrates of an average tank, and at £20-plus per clam, this is not an economic option!

None of the methods described above will get rid of phosphates, as bacteria will not remove them. Growth of algae and the use of special phosphate-binding compounds, of which several are available, are the only ways to remove these harmful compounds. It is much better to introduce as little phosphate into the aquarium as possible, and it is clear that introducing extra nitrates is not a good policy, either. Therefore, when doing partial water changes, it is best to use purified water to make up artificial sea water.

## WATER PURIFICATION

### Distillation

There are several ways of purifying water for aquarium use. Distilling water is impractical, as vast amounts of electricity are required to run a still, and even in laboratories, this method is going out of favour owing to its running costs.

### Reverse Osmosis

By far the best method is to use a process called Reverse Osmosis. In this technique, water is passed through a membrane with 'pores' so fine that only very small molecules, such as water molecules, can pass through easily. The water is usually filtered before being passed through the membrane, to prevent clogging by invisible particles, which are nonetheless large by molecular standards.

Reverse Osmosis will remove most (though not 100%) of the nitrates, phosphates, calcium salts and organic molecules (pesticide residues, for example) from tapwater. Domestic models operate under mains pressure, and require no electricity supply and can produce up to 30 gallons (136 litres) a day of purified water. At the moment a unit costs about £200 which seems like a lot until you think about the value of the stock in an invert tank.

### Deionisation

Another practical, and much cheaper, method of water purification is deionisation. At the core of this process is what is referred to as mixed-bed ionising resin. This resin consists of beads which, at a molecular level, carry positive or negative charges on their surfaces. Mixed-bed resins contain beads which carry both positive and negative charges. Charged molecules (ions) in the water passing over the resin are attracted onto the surface of the beads, and are thus removed from solution.

Many of the unwanted compounds in tapwater, including calcium salts, nitrates and phosphates, exist as ions, and can thus be removed from the water by a deioniser. A mixed-bed resin is required because some ions, such as calcium, are positively charged, and others, nitrates and phosphates for example, are negative.

Uncharged molecules, however, such as many organic chemicals (including most pesticides and herbicides) will pass through a deioniser without being removed. However, the role of these compounds in causing problems in the aquarium is not clear, whereas it is clear that the compounds which are removed by deionising definitely do lead to difficulties, so the use of a deioniser should not be discounted, especially when a basic unit costs less than £50, and can go a long way towards producing ideal water.

One note about deionisers is that water from them should ideally be passed through activated carbon, as some deionising resins can release amines into the water; downstream carbon treatment has the further

advantage that it will remove at least some of those organic chemicals that the deioniser cannot adsorb. Another point is that the resin will eventually become exhausted, and should be changed regularly, according to the manufacturer's instructions, to ensure continued efficiency.

### Carbon Briquettes

One final method available to the aquarist is the use of filters containing carbon briquettes, or a combination of carbon and deionising resins. These systems fall between deionisers and Reverse Osmosis systems in price, though running costs will probably make the price per gallon of water higher than that for Reverse Osmosis, since carbon cartridges, like all activated carbon systems, require regular renewal and the cartridges account for a large proportion of the price of the system.

The advantage of these systems is their high flow rate; a Reverse Osmosis unit of the type used by aquarists will produce 10 to 30 gallons (45-136 litres) of purified water per day, whereas a carbon briquette system can be run at up to 10 gallons (45 litres) per minute.

Most of the carbon briquette systems on sale are of a modular construction, so the user can purchase a system suited to his or her exact needs. These units are particularly useful for pondkeepers, due to their high flow rate, especially for Koi pools where the plants which usually keep nitrates and phosphates under control are absent, a situation which leads to these pools being particularly susceptible to algal blooms.

### Ultra-Pure Water

Few aquarists could ever aspire to the kind of water purification unit used to produce ultra-pure water for laboratories. In these systems, a fine mechanical filter is used to remove particulate matter, then the water is pumped at high pressure through a Reverse Osmosis membrane before finally passing over a deionising column. Such systems can produce hundreds of gallons per day of water of the highest purity; unfortunately they also cost thousands of pounds.

The fishkeeper can approach their efficiency, however. For those with marine invertebrates or other very sensitive animals in their tanks, a domestic Reverse Osmosis unit feeding its output into a deioniser, with the deionised water passing over carbon, is, in my view, the ideal solution. The Reverse Osmosis unit will remove most contaminants; those which get through will mostly be small ions, and these can be picked up by the deioniser.

It all sounds like a lot of trouble and expense, but the quality of our tapwater is unlikely to be raised to the levels of purity required for these applications, especially where human health is not at risk, so it's really up to the aquarist to clean up his or her own water. After all, the inhabitants of the aquarium depend on the quality of the water, and their best interest should be our first priority.





## HIGH GRADE JAPANESE KOI & CHINESE FANCY GOLDFISH IN 70,000 GALLONS OF INDOOR PONDS, PLUS ALL RELATED EQUIPMENT AND FOOD, ETC.

Open WED-SUN 9.30 - 5.30 - PLUS BANK HOLIDAY MONDAYS

GATE HOUSE FARM  
STOCKLANDS LANE  
HADLOW DOWN, EAST SUSSEX. (0825) 830586

( HEATHFIELD 5m  
UCKFIELD 4m  
TUNBRIDGE WELLS 12m )

# Diary dates

## Sunday 6 September

**Cardiff & District Fishkeepers' Society:** This year's Open Show will be held at a new venue: The Roath Community Hall, Roath, Cardiff. For more details, ring the Club Secretary, Michelle Aubin, on 0222 7513497.

**Thorpe and District A.S. of Norwich:** The Annual Open Show will be held at The Hewitt School, Hall Road, Norwich. Full details from Paul Sparks, 5 Gowing Close, Hellesdon, Norwich. Tel: 0603 406276.

## Saturday 12 September

**Snakes, Reptiles and Amphibians Society:** This year's Reptile Fair and Annual Show will be held at The Labour Hall, Collingwood, Road, Witham, Essex. Opening times: 10 am to 4 pm. Admission: £1 (adults); 50p (children and senior citizens). For further information, contact the secretary, Mick Powell, 44 Wedderburn Road, Barking, Essex IG11 7XG. Tel: 081 591 3484.

## Sunday 13 September

**Catfish Association (Northern Area Group):** The Northern Catfish Open Show will be held at Darwen Library Theatre, School Street, Darwen, Nr Bolton, Lancs. Benching: 11.30 am-12.30 pm. Public viewing: from 1.30 pm. For further details, contact R. Thompson on 0942 224059 or Brian Walsh on 0254 776576.

**Darlington Fishkeepers' Club:** Open Show at East-

bourne School, Hundens Lane, Darlington. For details, ring Steve Wood on 0325 288934.

## Saturday 19 September

**Plymouth Aquarists' & Pondkeepers' Society:** The 1992 Open Show will be held in the main hall at Polytechnic South-West, Plymouth. Doors open: 12.30 pm. Contact D Hilton, Show Secretary, 5 Connaught Avenue, Mutley Plain, Plymouth, Devon PL4 7BT, for further details.

## Saturday 19/Sunday 20 September

**Anabantoid Association of Great Britain (Yorkshire Group)/Scarborough and D.A.S.:** The above societies will be holding their second English/German Open Fish Show for Anabantoids under the auspices of Mayor (Oberbuergermeister) Norbert Winterstein, in the Buergerhaus at D-W 6090 Ruesselsheim, Bauschheim, Germany.

The show will be held under English Rules with the following judges officiating: Mick Price (Leeds), Kevin Webb (York) and Patricia Jones (Scarborough). All entries must be received by 11 am on 19 September. Entries: DM2.

An international Betta Show will also be held on the day by the International *Betta splendens* Club Saint Avoird (France).

On the same day (19 September), the first part of the Autumn Meeting of the IGL

(International Community of Labyrinthfish) will be held at the same venue, starting at 2 pm. The second part will be held the following day (10 am start) at the Hotel Peters Eck, Martpalatz 2. Lecturers include Hans-Joachim Richter, Allan Brown, Willi Harvey and Juergen Schmidt. There will also be an auction.

For full details, contact Heinz Saddey, Duesseldorferstr. 21, D 6090 Ruesselsheim, Germany. Tel/Fax: 06142/4 67 88, or 19 Alder Grove, Balby, Doncaster, South Yorkshire DN4 8RF. Tel: 0302 859666.

## Sunday 20 September

**Dunfermline and District A.S.:** The D. & D.A.S. 1992 Open Show will be held at the Parkgate Community Centre, Parkgate, Rosyth. Entries accepted: 10 am to 1 pm. Show open to public: 4 pm approx. Further information available from Mrs M Mills, Secretary, 14 Braemount, Cowdenbeath, Fife KY4 9RB. Tel: 0383 513773.

**Otley Aquarist Society:** A raffle, auction and 37 classes of fish will form part of this year's Open Show due to be staged at Prince Henry's Grammar School, Farnley Lane, Otley. Further details from Simon Midcalf, Show Secretary, 23 Riverdale Drive, Otley, North Yorkshire LS21 2RU. Tel: 0943 464632.

**Basingstoke & D.A.S.:** This year's Open Show and A of A Superbowl will be held at the John Hunt of Everest Secondary School, Popley, Basingstoke. For more details, contact Paul Dean, 11 Spencer Close, Pamber Heath, Nr Basingstoke, Hants RG26 6XL. Tel: 0734 701461.

## Saturday 26 September

**The East London Aquarist and Pondkeepers' Association:** The 44th Breeders Open Show will be staged at Catterall Hall, Cecil Road, Chadwell Heath, Essex. Commemorative prizes for 1st, 2nd and 3rd places, plus cards, will be awarded.

There will also be a Children's Painting Competition — three age groups. Each entry must carry the full name, address and age of the competitor on the reverse. All entries must be received by the Show Secretary, Tony Stevens, 35 Tavistock Gardens, Seven Kings, Ilford IG3 9BE — by 25 September at the very latest.

The show will be open to the public from 3 pm. Show schedules and further details available from Tony Stevens.

## Sunday 27 September

**Darwen A.S.:** The 15th Open Show is due to be held at the Library Theatre, Darwen. Benching: 11.30 am to 1 pm. Judging: from 3.15 pm. Added attractions include: raffle, refreshments, members' stand and specialist fish auction. For more information, ring 0254 776960 or 0254 776567.

## Sunday 3 October

**Goldfish Society of Great Britain:** The GSGB 1992 Open Show will be held at St Paul's Church Hall, Chigwell Road, Woodford Bridge, Essex. Refreshments will be available all day. Fish auction: 1 pm. For full information, ring the Show Secretary, Stuart Elton, on 0206 563844.



# Patently speaking

New Series

By Anthony Edwards



**W**elcome to **Patently Speaking**, a brand-new series in which I will be presenting summaries of some of the latest inventions to appear on the aquatic scene.

Out of the countless creations that arise out of the fertile minds of inventors, a handful go on to become successful and well known, while others sink without trace. Some would, or could, develop into worthwhile additions to the existing range of products currently available... if only they were brought to the attention of consumers (hobbyists, distributors and manufacturers).

Through **Patently Speaking**, I hope to provide such a 'service' to any 'aquatic inventions' that I manage to track down. My summaries will consist largely of details of features embodied in the official patents for the said products. I do not, therefore, plan to provide any assessment or personal opinion about the validity/usefulness/applicability of the products mentioned.

## OBTAINING A PATENT

Before moving on to my first selection, here are a few 'scene-setting' points relating to the world of patents.

To be given a patent, an invention must be capable of being made or used in an industry. A company or individual cannot, for example, patent a scientific theory, an aesthetic creation or a mathematical formula.

A UK patent lasts for 20 years from the date of filing the application, and annual fees must be paid after four years to keep it in

force. While a person or company does not need a patent to market an invention, it gives the owner the right to take legal action to prevent others from exploiting the idea.

After a patent application has been filed, a period of time elapses during which the commercial value of the idea can be explored or finances sought.

The application next undergoes a preliminary check and a search is carried out by a Patent Office examiner to see that the claimed invention is new. A search report is then issued by the examiner which enables the inventor to make amendments if this is thought necessary. A further and full substantial examination is next made before the patent is granted.

Various fees are payable during most of these stages. It is also advisable to employ the services of a registered patent agent.

The whole process of being granted a patent can therefore be quite an expensive one but the system ensures that patents are a valuable source of technical information and often the earliest source of a disclosure.

## THIS MONTH'S SELECTION

And now, for my first selection of aquatic products. I've chosen to kick off with a product that has been around for a little time and with which *A & P* readers are already familiar.

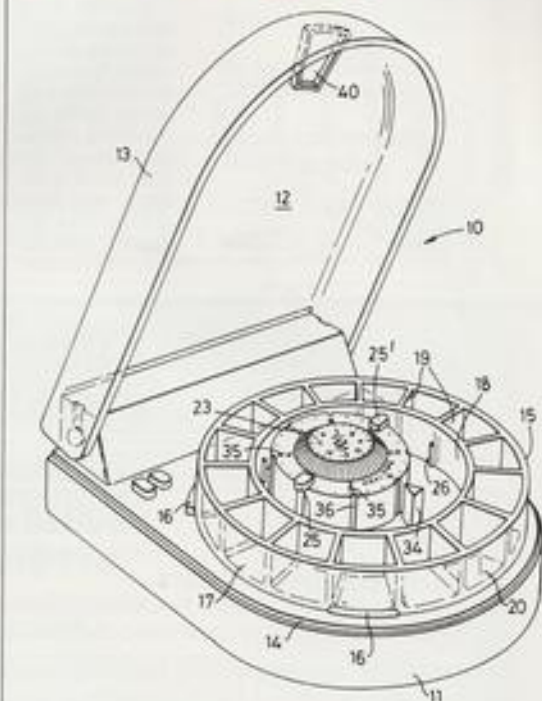
### Food Dispensing Device

In UK patent 2240020, **Pet Mate Ltd** describe a dispensing device for automatically feeding fish.

The base (11) has, mounted on its upper surface (14), a drive constantly rotated by a small, highly-g geared battery-powered stepping motor, controlled by a quartz-controlled electronic circuit. A ring (15) of compartments is freely rotatable and has, on its inner periphery, spaced ribs (26), one of which is engaged by a pawl (25) of the drive member (23) so that the ring during each revolution. The ring (15) is thus periodically displaced accurately.



The Pet Mate food dispenser 'in situ' on an aquarium.



The compartments of the ring are open at top and bottom, and are brought successively into alignment with an aperture (20) so that fish food located in the compartments is discharged by gravity through the aperture.

Each pawl is removably pegged into a selected one of a total of eight holes (35) distributed circumferentially on the top of the drive member (23) so that the number of times when the ring will be displaced during each revolution of the drive can be selected.

### Tank and Filters

In UK patent 2239402, **Nihon Sulso Industry Co Ltd** describe an aquarium and filters.

The tank is transparent at the front and sides, and encloses a slotted base for supporting a layer of gravel or glass balls, and a rear partition behind which are located two filter chambers and a pump chamber.

The pump draws water from the main part of the tank, firstly down through the gravel on to the base, where biological fil-



tration occurs, and, secondly, through slots and the fibrous filter which removes particles. Most of the water returns from the pump to the tank through an upper distributor, but some is diverted and recycled through an active carbon filter in one of the chambers and then travels back to the pump inlet space under a partition. This space also accommodates a heater. The tank lid accommodates lights.

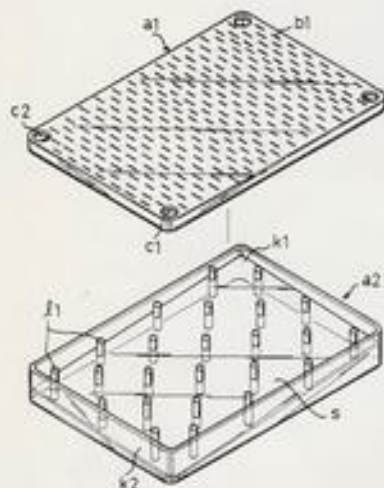
### An Improved Floor Board Structure for Aquaria

In UK patent 2232862, Chi Shiang Lee describes a floor board (a1) for aquaria.

It comprises a rectangular slotted board provided with a dense arrangement of slots (b1) and having a hole (c1) at, at least, one of its four corners (k2) for receiving a circulating tube

(d). There is a supporting frame (a2) in which sloped walls are provided. The sloped wall dips towards one corner from a diagonally opposite corner of the slotted board.

With the slope, even a weakest circulation in the vicinity will cause the water in an area remote from the circulating tube to shift along the slope to the circulating tube, thus eliminating all stagnant dead corners of circulation.



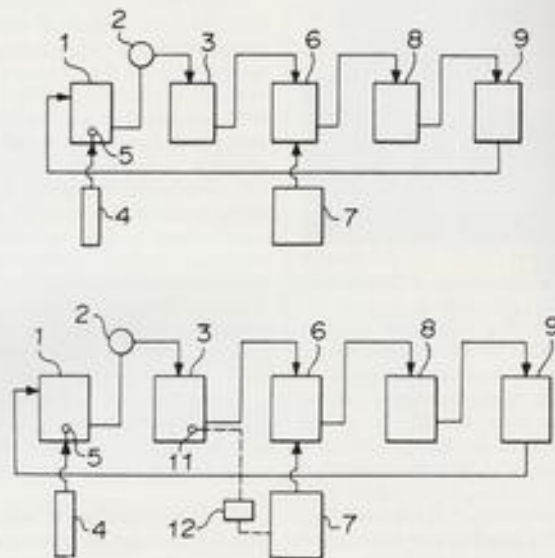
### Fish or Shellfish Breeding Apparatus

In UK patent 2238451, Mitsubishi Denki Kabushiki Kaisha describe a fish or shellfish breeding apparatus.

It comprises a breeding water tank (1), an ozonising device (6, 7), and an activated carbon device (8). There is a means of

circulating breeding water, consisting of seawater or a mixture of seawater and plain water, in series in these devices.

The ozonising device (7) is located at the upstream side of the activated carbon in relation to the flow of breeding water. A further filter (3) and pH adjusting means (9) may be provided.



## ORNAMENTAL FISH CONSOLIDATORS LTD.

371A High Street, Harlington, Hayes, Middlesex UB3 5DQ  
 UNITED KINGDOM  
 Tel: 081 897 3099/081-897 3702  
 Fax: 081-897 6550

#### Offering WEEKLY DIRECT IMPORTS:

Freshwater tropical Fish, Marine Fish/Invertebrates and Aquatic Plants from SINGAPORE/BANGKOK/SRI LANKA/INDONESIA/HONG KONG/SOUTH AMERICA/JAPAN/ISRAEL/CHINA

**BANGKOK:** Monthly special offers available

#### COLDWATER FISH

HONG KONG — Chinese Goldfish  
 JAPAN/ISRAEL — Goldfish and KOI  
 CHINA — Direct Import

} Please contact us for new price list

#### SOUTH AMERICAN, AFRICAN & COLDWATER FISH (GOLDFISH/KOI):

We have a large selection in stock and all have been well quarantined on the premises.

**ALL SHIPMENTS WILL BE COLLECTED ON MONDAYS**

#### PLYMOUTH/SOUTH WEST REGION

Customers in Plymouth/nearby area — boxes can be collected at our appointed destination.

\*\*\* For enquiries, please contact RICHARD CHANG \*\*\*

**STRICTLY FOR TRADE ONLY**



# Trade Talk

## Responsible Attitudes Prove to be a Boon to the Hobby

Companies involved in the aquatic industry are, on the whole, extremely responsible in their attitudes towards the hobby. Trade Talk, which is developing in stature month by month, is always willing to provide a constructive platform by praising success when it is due, and assisting when, and if, problems arise.

Occasionally, these problems may be as a result of the success of a particular product; while the very nature of the biological world of fishkeeping means that things may not always go according to plan.

So it was heartening to see two established companies in the aquatic industry responding in positive manner, and to the ultimate benefit of the hobbyist, to two quite different sets of circumstances.

As a result of reported continued success of Triogen Ozone Systems' compact range of ozone generators, the company has informed customers of an amendment to the availability of these systems and ancillaries, which are now subject to a four-week delivery.

Triogen are keen to ensure that customers are not disappointed, and have urged suppliers to order equipment at least four weeks in advance of requirement.

Explained Triogen's sales co-ordinator Andrew Ferguson, "We appreciate that this change may cause a certain amount of difficulty in the short term, and will attempt to assist with specific problems whenever we can, but in the longer term, we would expect adherence to these new delivery times".

Andrew added that, after a reasonable time, it may be necessary to impose a surcharge on orders requiring a shorter delivery time, owing to consequent re-scheduling of manufacturing operations.

The interests of the hobbyist are always of prime importance to aquarium treatment specialists Interpet, whose award-

winning range of pond treatments has proven extremely popular. However, the company has been unhappy with individual isolated incidents in relation to the recently-introduced Anti-Parasite 3L and, to safeguard the hobbyist, has withdrawn the product from the range.

"The product was developed following years of intensive research and field trials, as a successful treatment against fish lice, anchor worm, leeches, and gill maggots," explained Interpet managing director Mark Senior. "Despite the success of the product in sales terms, and the numerous plaudits we have received on its efficacy, there have been a handful of isolated incidents which we have found unacceptable."

"Therefore, in order to maintain the high standards of integrity and service which our customers would expect from Interpet, we have taken the decision to withdraw the product from the market place until we have dealt with the problem."

Retailers have been encouraged to return stocks of Anti-Parasite 3L to Interpet through the normal channels, and the company will issue a full credit, while they have also been asked to notify customers they have supplied of Interpet's decision.

Isn't it good to know that the hobby is in safe hands...

Triogen Limited, Triogen House, 117 Barfilan Drive, Craigton, Glasgow G52 1BD. Tel: 041-810 4861; Fax: 041-810 5561.

Interpet Limited, Vincent Lane, Dorking, Surrey RH4 3YX. Tel: 0306 881033; Fax: 0306 885009.

### Aquarama Accolade for A & P Editor

Aquarist and Pondkeeper editor John Dawes has been



John Dawes, right, A & P Editor and newly-appointed conference and judging consultant to Aquarama '93, in consultation with the late Rodney Jonklaas during judging at Aquarama '89.

appointed as conference and judging consultant to Aquarama '93, to be held at the World Trade Centre, Singapore, 24-27 June 1993.

John has been involved with the hugely-successful Aquarama series of aquarium fish and accessories exhibitions and conferences since their official inauguration in 1989, as well as with a pilot event two years earlier.

For the 1993 event, he will be advising the organisers, Expoconsult of Singapore, on themes for the conference and recommending popular international speakers to present papers.

"I shall be working on helping to present a conference which will have direct relevance to the trade," John told Trade Talk. "In addition, I shall be assisting in the establishing of certain judging criteria for the fish competition."

### Environ Appoints Fish Labelling Distributor

Coral Reef Technology has been appointed by Environ as UK distributors of the Environ Fish Labelling System. The product (featured in A & P in December 1991 and — most recently — in August 1992) won the European Pet Product of the Year award for 1991 and is approved by many conservation, trade, animal welfare, and hobbyist organisations. According to Coral Reef Technology, a database of over 3,000 species is currently held, and this is, apparently, expanding on a daily basis.

Paul Davies, director of Coral Reef Technology explained: "The system enables the public to see clearly, by the use of pictograms, the major habitat and environmental requirements for any particular species, and will, hopefully, enable customers to take a more

informed decision when making their purchase as well as giving the retailer the opportunity to provide an extra information service to their clients." Contact: Coral Reef Technology Ltd, 62 High Road, Byfleet, Surrey KT14 7QL. Tel: 0932 355121; Fax: 0932 349718.

### Pond Pride Acquired by King British

The registered name Pond Pride has been bought from BP Nutrition by King British, who have been acting as distributors for the brand for two years.



Pond Pride, recently-acquired by King British.

King British managing director Keith Barraclough said, "The product fits well with the rest of our range, so it was a natural step to acquire this popular name. Fishkeepers can be assured that Pond Pride will maintain its original quality and consistency, and will continue to provide the source of nourishment required for medium-sized fish".



## Birth of BioPlast (UK) Ltd

Some six years ago, **Berti Gesting**, Aquatic Consultant and Managing Director of BioPlast (UK) Ltd, started in this country with his aquarium shop known as **Aquatic World** in Bingley, West Yorkshire.

Berti says: "Being German myself, I dealt from the start with German suppliers, their methods and their approach to the hobby. The response from aquarists has always been extremely good, and I soon established myself as distributor to the trade for several top-ranking German suppliers.

"Over the years the shop side of the business took more and more of a backseat as the distribution to the trade increasingly demanded more of my time. Towards the end of 1990, the company, **Gesting Associates**, was formed to supply a comprehensive range of innovative German aquarium support hardware and treatments to the trade, with rapidly growing success."

The company's aim was to bring top class German aquarium products to the aquarist — but at prices the British market could afford. Berti's aim was, however, clear: to find one single manufacturer to supply the entire range of products needed for the British market direct to him.

The German company **BioPlast GmbH**, based in Erkrath, has been, for many years, an established manufacturer and product developer for several well-known companies in the aquatic trade. Two years ago, the company decided to produce their own product range under the brand name **BioPlast**.

"Being the exclusive trade partner for Europe of the world's largest Bentonit producer, the American Colloid Company, **BioPlast** is set to be a big hit in the entire pet trade," continued Berti.

"Anything is possible now," confirms **Horst Ksiensyk**, Managing Director of **BioPlast GmbH**, in Germany, "from food-binding agents to cat litter, and even products for such areas as horticulture and agriculture. With our young, creative team of 40 employees in Germany. We have consistently followed our direction as independent, innovative product developers for other brand

names within the entire pet industry, with the aquatic sector as a very strong base."

As Berti Gesting explains, "We have now gone into partnership with **BioPlast**, Germany, and formed the new **BioPlast (UK) Ltd**. We offer the broadest range of top-class German products for the aquatic trade in Europe, with new products for garden ponds and for the rest of the pet trade to be added over the next few months, all at realistic prices. I am absolutely convinced that the future of our trade will be shaped by the competent and caring specialist dealer who is noted for sound and comprehensive knowledge, expertise and the ability to strike a healthy balance between customers' wishes and the requirements of the fish or other pets. Overpriced aquatic technology has already missed the boat..."

**Berti Gesting, BioPlast (UK) Ltd, Unit 1, Old Railway Goods Yard, Kildwick Crossing, Crosshills, Keighley, West Yorkshire BD20 7DA. Tel/Fax: 0535 630230.**

## Shop Talk

'Talking Shop' was the theme of this year's **Aquatic Trade Conference** at Sparsholt College, 29/30 June. A series of lectures, presented by no fewer than 11 speakers, incorporated subjects as diverse as: Threats and Opportunities for 1993, Conservation and Trade in Wildlife, Legal Advice and the American Scene.

Among the 55 delegates in attendance were representatives of major manufacturers throughout the trade, including 'Aquarian', **Tetra**, **Underworld**, **King British**, **Hagen**, **JMC**, **Norwood**, **Interpet** (who sponsored a Sunday evening barbecue) and **Coral Reef**.

Among the speakers were **Cathy** and **Ed Taylor** from America, who were sponsored

by 'Aquarian'. The couple run an aquarium rental scheme, supplying aquariums to homes and professional establishments in the USA, including shopping malls, doctors' waiting rooms, and even McDonald's restaurants. **Cathy** explained how the system works, the equipment required, and warnings about the problems of around-the-clock guaranteed maintenance.

**Ed Taylor**, a former editor of **TFH** magazine and an aquatic consultant, provided a lecture on Florida fish farming, accompanied by slides of several fish- and aquatic plant-producing farms, as well as statistics of Florida fish farming. These included details such as: there are over 200 ornamental fish farms and 100 part-time farms located around Tampa and Miami; the turnover of fish and aquatic plants is worth approximately \$170 million (retail); live tropical fish are the largest single item of freight flown out of Florida, with approximately 20,000 boxes of fish shipped each week; there are over 21,000 culture ponds in production in Florida, many of which date back to 1926 when the business was first started; currently, 40% of all freshwater tropicals sold in the USA originate in Florida.

Additional lectures were presented by **Chris Bean**, of the Veterinary Medicines Directorate, who explained licensing procedures under the Medicines Act; while aquatic consultant **Peter Wheeler** showed slides of Israeli Koi Farms; and **Bill Heritage**, chairman of the International Water Lily Society, explained the history and future of the water lily.

**Dr Gordon McGregor Reid**, of Chester Zoo, described the technology adopted by British zoo aquaria to maintain and conserve the world's exotic fishes; and this theme was expanded by **Steven Broad**, of Worldwide Fund for Nature's

**TRAFFIC International**, with a talk on wildlife controls; while the **COSH** (Control of Substances Hazardous to Health) regulations were explained by environmental health officer **David Wordley** and **Interpet's** **Graham Wilson**. Trading standards officer **Jane Rogers** dealt with The Law and the Retail Aquatic trader, providing an insight into the Trades Descriptions Act.

As important as the lecture subjects was the Conference Dinner, which took place on the Monday evening and provided delegates with a chance to talk informally about their businesses.

## New Premises for Greenaway

Pond filtration and purification unit manufacturer **Greenaway** has moved into new custom-built factory premises. **Greenaway** was established in 1989 and claims to be the first company to combine ultra-violet and biological filters in one integral unit.



**Dick Roper**, managing director of **Greenaway Filters**, which has expanded to new premises just four years after being established.

The company now boasts over 40 different items within its product range and, in addition to its pond filter products, has designed and developed an ultra-violet device, called **Counter-fit**, to identify forged bank notes, credit cards and cheques.

**Greenaway's** new address details are: **Greenaway Filters, Bull Lane Industrial Estate, Long Melford, Sudbury, Suffolk CO10 9LN**. Trade Talk assumes **Greenaway** will have taken their existing telephone number with them, which is: 0737 71351. Contact: **Dick Roper**.



Delegates at this year's **Aquatic Trade Conference** held at Sparsholt College.



# What's your opinion?

By Billy Whiteside,  
BA, ACP

## GEORGE'S OPEN VIEWS

"If you use this, please don't print my name, as I'll probably join one of the clubs I am talking about," writes the author of the first of this month's letters. I'll call the writer 'George' for convenience. He continues: "I write regarding the practice of giving prizes — such as show tanks, heaters, stats, food, etc — instead of a trophy for class winners at Open Shows. In my opinion, a trophy would be more appreciated, as it could be displayed with pride. All of the local clubs in my area are giving prizes. I wonder if this is one of the reasons why Open Shows are not as well attended as they used to be."

"As there is a limit to the amount of equipment a fish-keeper can use, most of these prizes are destined for the next society auction. I have attended a couple of shows this year and I know they are taking enough money to pay for trophies. So, why no trophies? If you take the trouble to attend a show, they could at least supply the winners with a decent trophy. I would like to know if this practice is restricted to the North-East, or if it is happening nationwide."

I'm not sure that everyone would agree with you, George. If I had the choice of equipment or a trophy, I should probably opt for the equipment. It's a subject I don't know anything about, but I should imagine that numbers of shows are sponsored to a greater or lesser extent by manufacturers and retailers and they probably find it less expensive to give some of their products rather than cash or a trophy. It might also provide better publicity for the sponsor if the prize were its products with its company name splashed well over them. What do other readers think — especially those who enter shows and who win prizes? Perhaps a trophy and some equipment would be the best solution?

## MIXED CATS

Mrs M A Woodhams lives at 138 Bushy Hill Drive, Mellow,

Guildford, Surrey, and writes: "I was very interested in the June issue of *A & P* on non-reading cats. I have had many successes breeding Peppered and Albino Cats, so much so that my so-called community tank is now the home mostly of catfish."

"However, my biggest success was when my male Bronze and my female Black-Band got together despite the fact that they both have plenty of their own species. The result of this spawning is 11 baby fish of varying sizes and colours, and a name as long as your arm — *Corydoras aeneusxygatus*."

## RON'S WHEREABOUTS

In the February issue I asked about the whereabouts of Ron Wright, a former letter-writer to this column and who was the then secretary of the Anabantoid Association of Great Britain. David Armitage, who is still editor of the AAGB journal *Labyrinth*, and whose home is at 2 Close End, Robert Road, Hedgerley, Bucks, writes: "Several years ago (Ron) emigrated to Australia, near Nabisac in New South Wales. He still corresponds with me and, after building his house in Oz, he has spent his time angling, market gardening and, from what I can gather, he still keeps his hand in at personal computing and light engineering. In other words, his energy is still not dissipated!"

"Despite this loss, AAGB still survives — as you will see from the enclosed journal, wherein you will find the address of the current secretary; and an excellent one he is too."

It's good to see that the AAGB's newsletter, *Labyrinth*, has reached number 63. The current secretary of AAGB is T Groom, of 12 Pinefield Road, Barnby Dun, Doncaster DN13 1QT.

## 'LEADING' QUESTIONS

The photograph shows one of my tanks that includes the plant *Heteranthera zosterifolia* — at the extreme edge of the shot. A couple of people asked about the species after I gave it a mention. A small strip of lead is

useful to clump a group of shoots together and anchor them to the bottom.

Incidentally, the water in my part of the country is quite soft and lead is slightly soluble in soft, acidic water. Has anyone had any problems with dissolved lead affecting fishes in aquaria? I know on rare occasions when I have cleared out a decorative aquarium after some years I have been amazed by the amount of lead in the gravel. Little pieces used to weigh down plants over the years have accumulated and passed unnoticed until a clean-out.

Are there any aquarium treatments which may be added to aquarium water which would render lead pieces even more soluble? Perhaps we unwittingly poison our aquatic environment each time we use lead to keep aquatic plants in the gravel. I'd be pleased to hear from some of our experts in heavy metals and water chemistry.

## PLANT TRIALS

Steve Wallis's home is at 775 Oxford Road, Reading, Berks, and he writes: "I was spurred to write to you having read your comments regarding 'over-cleanliness' in fish tanks (WYO? March 1992). I do tend to agree with you. When I first started to keep tropical fish, my greatest disappointment was my inability to keep plants growing. Later on, while living in a flat and unable to keep fish, I spent a great deal of time commuting by train. I bided my time by planning my next tank and reading *A & P* and every aquatic book in my local library. I decided that my undergravel filters had been my main problem."

"Upon re-establishing myself as an aquarist, I started to use sponge filters, with little further success. *Cryptocoryne* species

being the only plants to live — but I couldn't describe them as flourishing. During some decorating upheavals I moved the few remaining plants into an old tank in my greenhouse. When I came to replace them into the tank they had spread. My first success!

"I wasn't sure whether this was due to the extra light they were received, or the fact that I had covered the base with peat instead of gravel, or a bit of both. I had then built a stand that contained five tanks: two x 36in tanks (90cm) on top of three x 24in (60cm) ones. I decided to set up three in a different way. A 24in tank containing Tiger Barbs was filtered using an undergravel filter; my daughter's 36in community tank was filtered with sponge filters; and my 36in Angelfish and *Corydoras* tank had a small, internal, power filter with a layer of peat underneath the gravel."

"Within weeks the plants over the undergravel filter were dead, while those in the sponge-filter tank were holding their own, but nothing spectacular. However the Angelfish tank needed thinning out. The UG filter has now gone, the sponge filters are still working, but I'm planning to strip the tank and add peat. All the tanks are receiving plants from the Angel tank as the plants there spread rapidly."

"As I said earlier, the Angel tank is filtered by a small internal filter, a Fluval 1, with only a basic sponge insert. This filter is recommended for a 24in tank by the manufacturers, and yet, I use it in a 1 metre by 15in x 15in (39in x 38cm). I calculated the tank's capacity at about 120 litres (26gal). As the Fluval 1 has an advertised turnover rate of 180 litres an hour (c40gph), I am turning over the capacity every hour — which surely is enough. I feel that the recom-



*Heteranthera zosterifolia*, the 'tall' plant growing by the smaller of the two large pebbles, can grow at an amazing rate when conditions are right.



# Koi Calendar By David Twigg

## APOLOGY

I start this month with an apology. It seems that I have been publishing the name of the wrong person against one of the BKKS Section meeting entries. In mitigation I can only say that I do my best to ensure accuracy and do spend a lot of time on the telephone and writing letters to ensure that I get the latest and accurate information.

Please, if you spot a mistake or omission, do get in touch right away to prevent a continuing error.

Thanks.

## JOBS FOR THE MONTH

The evenings are drawing in and water temperatures are starting to fall. If you have them, it will be well worth your while getting the winter covers out and pressing on with any repairs or modifications that might be required.

Feeding rate must be adjusted to compensate for the falling water temperature and it will be worth mixing a little of the 'wheatgerm' variety of pellet into the daily diet. I have found that the gradual introduction of any change of food is far more acceptable to my Koi than a sudden switch when a particular food is used up.

## SEPTEMBER SHOWS

We have two shows this month on the same weekend, one in the south-east and the other in the south-west.

5/6 — **Mid-Somerset Section BKKS.** Exhibition. Royal Bath & West Showground, Shepton Mallet. Show organiser **Alan Furnell** tells me this will be the largest show in the south and south-west. Koi dealer stands and craft stalls are attending. This Koi show is part of the Country-side Cavalcade, and just about every event and exhibition of livestock possible is held. Heavy Horse Championships, 'Fur & Feather,' aerial, vintage and traction displays are designed to make this an attractive day out. Contact **Alan** on 0458 72132.

5/6 — **Crouch Valley Section BKKS.** Open Show at Prince

Avenue Primary School, Southend-on-Sea.

## SHOW REPORT

In July, Lyn and I were invited by some Koi friends, **Maurice and Marie Welham**, to stay with them for the weekend at their home in Southend-on-Sea. By Koi-incidence [*Great word! Ed*] there just happened to be a Koi show on the Sunday just a couple of miles away.

This show was put on by the **Lower Thames-side Section** of the BKKS and attracted a host of dealers, as well as lots of lovely Koi.

**Maurice** and I went along on the Saturday afternoon to see how the setting up was coming along and I was immediately impressed by the tenting used to give shelter to all the stands. The covers were not of the conventional marquee type, but comprised a colourful awning over a metal frame. They were very effective and, as can be seen from the photograph, were a very bright and cheerful part of what was, unfortunately, a damp and mostly overcast weekend.

Sunday morning saw the usual pre-show ritual of standing around the pond, discussing and deciding which of the best fish should be bagged for inclusion in the show. Decisions made, fish snugly bagged and boxed, it's off to the show-ground for benching.

Benching staff had allocated **Maurice** a large corner vat. We transferred the bagged Koi from the van to the vat which was to be their home for the next few hours and allowed the

benching team to decide the class, variety and size of his fish. Then it was up to the judges to decide!

The judges, led by **Roy Winterbourne**, were **Kate McGill, Ian Birkinshaw, Ron Angel, Tony Sheffield and M Sanders**. Their difficult task of sorting out the winners from the 237 Koi entered was completed by the award of **Grand Champion** to the magnificent **Kohaku** entered by **Alan Rogers**. Other major winners were as follows:

**Best in Size:** Size 1 — **Kevin Stevens**; Size 2 — **Jill Coleman**; Size 3 — **Mick Rogerson**; Size 4 — **Albert Hutton**; Size 5 — **Alan Rogers**.

**Best Baby Koi:** **Kohaku** (**Jill Coleman**).

**Best Adult Koi:** **Hikari Moyo** (**Albert Hutton**).

**Best Mature Koi:** **Kohaku** (**Alan Rogers**).

Section Chair **Linda McKenzie** and her Show Chairman **Albert Radley**, together with their team of gallant helpers, are to be congratulated on putting on this excellent show. Well done to you all.

## WHAT'S ON IN SEPTEMBER

1 — **Yorkshire Section BKKS.** Holme Leas Inn, Ossett, Nr Wakefield. Contact **Fred Harston** on 0226 722578.

2 — **Suffolk & North Essex Section BKKS.** 7.45 pm at the Prince of Wales PH, London Road, Marks Tey, Colchester, Essex. Contact **Dennis Preou** on 0371 856450.

3 — **Middlesex & Surrey Borders BKKS.** Hampton Football Club. Contact **Joy Fraser** on 0737 844338.

**The Potteries & District Koi Keepers Society.** 8 pm at The Biddulph Arms, Biddulph, Stoke-on-Trent. Contact **Graham Platt** on 0782 396670.

**North Wales Koi Club.** A talk illustrated with slides by **Dave Morris** of Welsh Water. 7.45 pm at David Bryant Bowling Centre, Frith Beach, Prestatyn. Contact **Eileen**

Price on 0745 591730.

6 — **Worthing & District Section BKKS.** Visit to Middlesex Section. Contact **Steve Willard** on 0243 267893.

**Suffolk & North Essex Section BKKS.** Visit by Northampton Section. Contact **Dennis Preou** on 0371 856450.

**Central Section BKKS.** Visit by South Wales Section BKKS. Contact **Mike Higginbottom** on 0922 37682.

7 — **Northern Section BKKS.** Beginners' Seminar. 8 pm at Prestwich. To book contact **Liz Donlan** on 061 643 9107.

**Kennet Valley Section BKKS.** 8 pm at Newbury Rugby Club, Pinchington Lane, Newbury, Berks. Contact **Bob Thompson** on 0734 713640.

8 — **Chiltern Section BKKS.** contact **Ann Howard** on 0462 679315 or **Mike Reed** on 0525 375418.

9 — **South Hants Section BKKS.** Denmead Church Hall, Hambledon Road, Denmead, Hants, commencing 8 pm. Contact **Roy Moody** on 0705 450530.

**Merseyside Section BKKS.** Millbrook Manor Restaurant, Knowsley Village. Contact **Phil Adamson** on 051 220 2970.

10 — **East Pennine Section BKKS.** The Phoenix, Platts Common, Barnsley (5 mins from M1, J36). Contact **John Timmis** on 0226 289507.

12 — **Heart of England Koi Society.** Warwick. Monthly meeting. Contact me on 0926 495213.

13 — **Mid-Staffs Section BKKS.** Visit East Pennine Section pools. Contact **Don Dye** on 0543 425178.

**Central Section BKKS.** Visit to pools of Crouch Valley Section BKKS. Contact **Mike Higginbottom** on 0922 37682.

**Essex Section BKKS.** Visit by Middlesex & Surrey Borders Section. Contact **Bobbie Barton** on 0702 611750 or **Margaret Bishop** on 0702 522388.

**Northern Section BKKS.** St James Hall, Pendleton, 2 pm. Speaker



The Grand Champion — **Alan Rogers'** superb Kohaku.



- is John Woodall of DJ's Koi. Contact Tony McCann on 061 794 1958.
- 14 - Northants Section BKKS. Casuals Rugby Club, Northampton. Contact John Byles on 0604 718648.
- 16 - Mid-Staffs Section BKKS. RNA Club, Elmore Green Road, Bloxwich. 8 pm start. Contact Don Dyeche on 0543 425178.
- 17 - Wirral & District Section BKKS. Lever Sports & Social Club at 8 pm. Contact Jean Moffat on 051 678 1769.
- 20 - South Hants Section BKKS. Visit to London Section BKKS ponds. Contact Roy Moody on 0705 450530. Worthing & District Section BKKS. Auction. Contact Steve Willard on 0243 267893. Lea Valley & Harlow Section BKKS. Visit from Chiltern Section. Contact Barry Ford on 0279 419101. Northern Section BKKS. Visit by Yorkshire Section to view ponds. Contact Tony McCann on 061 794 1958.
- 23 - London Section BKKS. Ruskin House, Coombe Road, Croydon, starting 8 pm. Contact Keith Nind on 081 673 3574.
- 27 - Mid-Staffs Section BKKS. Pond visit by North Wales Section. Contact Don Dyeche on 0543 425178. South East of England Section BKKS. Chelsfield, Kent. Contact Mick Wright on 0634 718943. Essex Section BKKS. Visit to Northants Section. Contact Bobbie Barton on 0702 611750 or Margaret Bishop on 0702 522388. Japanese Water Gardens Koi Auction. Contact JWG on 0602 397926.

### COMPETITION REMINDER

This is your last chance to get your entry in if you wish to win one of the Stuart Turner pumps being offered as prizes in our Photographic Competition. If you would like to win one of the latest Koi pond pumps on the market, then get out your camera and take some shots of your

Koi pond and send the best to us.

The only Rule we have is that entrants, should they win a prize, be willing to allow *A & P* to pay a visit so that the pond can be featured in a later issue of the magazine.

Stuart Turner, the well-known British pump manufacturer, has kindly offered us two pumps as prizes for this competition.

First prize is a top-of-the-range XB190 pump that is ideal for Koi pond applications. These pumps have been designed to offer maximum flow with minimum power consumption and to provide the quietest possible operation. A totally enclosed fan-cooled motor meets the exacting standards relating to pond applications, and added protection is provided by a built-in thermal overload and automatic reset.

The second place winner will receive a Stuart 250 submersible pump from the Stuart Turner range of pumps suitable for the smaller Koi pond, where such a large turnover rate is not required.

These prizes will be awarded to the persons who have the best and most attractive Koi pond as judged from the photographs and/or slides submitted to us. A brief written description of your system would also be helpful to the judges in making their decision.

The challenge is therefore set: get your cameras clicking and, remember, your Koi pond does not have to be big to be beautiful! Some lovely Koi are kept in beautiful ponds in wonderful settings, so let us see yours... please.

Entries - coloured photographs or slides - should have your Name and Post Code clearly marked on them for identification. They should be sent with your FULL NAME AND ADDRESS (confidentiality respected) to: "The Koi Competition", Aquarist & Pondkeeper, 9 Tufton Street, Ashford, Kent TN23 1QN, to arrive not later than 30 September 1992.

If you would like your photograph returned, then please enclose a stamped, self-addressed envelope of the appropriate size.

Judging will take place during the first two weeks of October, and winners will be announced in the December issue of *A & P*.

## A PASSION FOR HEALTHY FISH

We are happy to inform our customers and the trade at large, that in the same way that we have during the last seasons supplied quality coldwater fish, we will from the 1st August be extending our services to tropical fish supplies. A comprehensive range of tropical fish and plants will be available from our wholesale tanks at Tewin Mill Fish Farm. All major countries supplying tropicals will be in stock. We will also continue to hold in stock a complete range of fancy goldfish and other coldwater fish throughout the year. All our fish are acclimatised and quarantined before reaching our customers, a **must for the future of our trade.**

**HEALTH - QUALITY - QUARANTINED TROPICAL - FANCIES - COLDWATER**

**EXPERIENCE IN FISH - NOT FISH IN BOXES**

### Pisces Aquaculture Tewin Ltd



Tewin Mill Fish Farm,  
Kingsbridge, Tewin,  
Nr Welwyn, Hertfordshire,  
England AL6 0LJ  
Tel: 043 871 8558/7050  
Fax: 0438 840096

### BLACK KNIGHT FILTER BRUSHES



**AN UNCONDITIONAL GUARANTEE.** If you do not agree that BLACK KNIGHT Filter Brushes are the best filters and the best value in the U.K., then return the brushes to us (used or unused) in 7 days from their receipt and we will refund full purchase price and your return postage. This guarantee is in addition to your statutory rights.

BLACK KNIGHT Brushes are made with Non-toxic Polypropylene and Non-toxic 302 Stainless Steel Wire. All Brushes are 4" in diameter and have a loop for hanging (length of loop not included in dimensions).

Prices include VAT and Postage. Orders under £25 - please add £2 packing charge.

9" Brushes £1.40 each	12" Brushes £1.65 each	16" Brushes £2.00 each
20" Brushes £2.40 each	30" Brushes £3.60 each	39" Brushes £3.90 each
102" Spawning Barrier (Very Soft Polypropylene) £9.50 each		

(Ask for our Leaflet "Breeding Fish with Black Knight Spawning Barrier")

**EXPORT ORDERS** Ask for competitive quotes.

We are the actual manufacturers since 1951. BLACK KNIGHTS are the accepted market leaders. Fully automated production allows us to offer top quality at low, low prices. BLACK KNIGHTS are in use in Fish Farms, Hatcheries, Aquaculture Institute, National Water Authority and many thousands of Ponds, both in Britain and overseas. For Setting and Biological.

Callers are welcome. Take the B2173 turnoff from the Junction 3 Roundabout on the M25. Kingswood Avenue is about 1 mile on the right hand side. Our factory is the first building on the left. Open 9am to 5pm and 2.30pm to 5pm. Monday to Friday.

Send a Stamp for a copy of "THE AMAZING BLACK KNIGHT FILTER BRUSHES" - how to make fine filters at low cost (this Booklet is also sent with all orders).

BLACK KNIGHTS are available from selected Aquarists but if in difficulty, and you cannot call, then post your Order today with payment (cheque, M.O., etc.) and your brushes will be in the post tomorrow. Ex Stock - By Return - No Messing. Post to:

Telephone THE SPEEDY BRUSH CO. LTD.  
0322 Mercury Works, Kingswood Avenue,  
662480 Swanley, Kent BR8 8AW.



mended Fluval 3 with its 540 litres per hour (c120gph) turnover would create too great a current for both the fishes and the plants. As it is, both fishes and plants are flourishing, and I feel I have achieved a great goal.

### Snail Control

"For future articles, what is your opinion regarding the presence of snails in a fish tank? I find that the introduction of plants into a tank inevitably brings a new batch of snails, no matter how vigilant one is. However, I find very little uneaten food in my tank, and when a small fish dies hidden in a well-planted tank, the snails usually attack the corpse before the balance of the tank is upset. While the presence of snails is no replacement for the aquarist's cleanliness and vigilance, they can help.

"Too many snails are, of course, unsightly, and I refuse to use any of the chemicals intended to kill snails in a tank of fish on the basis that anything intended to kill a living creature cannot be good for the fish. I use such chemicals in an empty tank, or remove the snails and place them in a separate container of the snail-killer. One way I have found is to place a food tablet in a miniature spirit bottle set on the bottom of the tank. Snails soon seek out the food; but the neck of the bottle is too small for fish. The bottle soon fills up with snails which are then placed in the aforementioned container of snail-killer. Thank you for an excellent column."

### MY VIEWS

I haven't used peat under aquarium gravel for many years but did give it a try in my younger years. It certainly helped some plants to grow better — in particular, *Cryptocoryne* species which used to form a dense carpet on the floor of the treated tank. The problem was thinning out the plants. Soaked peat can make a dreadful mess of an aquarium if released into the water — when planting new plants, servicing or whatever. Digging cichlids and catfish can also release it, making a mess. The aquarium water also tends to take on the amber colour of the peat as substances such as tannic and humic acid are released, but this is quite attractive if, say, the aquarium

and fishes are from a 'black-water' area of the jungle.

I attempted to retain the peat in place by placing it in an old nylon stocking, or the leg of a pair of tights. I then allowed it to soak in a bucket of rainwater for about a week, squeezed out the water, and placed the bag of damp peat on the base of the aquarium. It then had to be covered with a good, deep layer of gravel. Plants rooted down through the gravel and the roots grew into the bag of peat. One problem was that caused if one wanted to thin out the plants at a later stage.

Occasionally, the network of roots in the peat bag was so thick that the whole base tended to lift if one tried to tug out excess plants. Of course, they could be snipped out with oil-free scissors or a razor blade. The nylon tights method of retaining the peat is not fool-proof, so if you ever try it, don't assume that at some stage you will not have a tank clouded with peat particles in the water. Another point: not all fish like water conditions produced by a peat base; and peat can slowly decompose too.

I prefer to keep snails out of my tanks — but if you like snails, then I suggest you try some Malayan Sand (Livebearing) Snails. They spend most of their lives in the gravel, keeping it turned over and clean (allowing for the fact that they, obviously, produce their own faeces etc).

They tend not to eat plants. Malayan Sand Snails tend to remain hidden in the gravel during the day and come out after darkness. One can be surprised by their numbers if they breed well and are suddenly seen after dark when the tank light is switched on. This is the one species of snail I don't mind in my tanks.

### FUTURE TOPICS

Drop me a few lines if you have any stories about the more amazing or amusing aspects of fishkeeping.

I'd also like to receive your letters and opinions on: (a) breeding cichlids; (b) power filters; (c) food for fry; (d) 'home' or home-made food for fish; (e) your largest pond or aquarium fish; (f) your oldest fish; (g) breeding barbs. I look forward to hearing from you c/o WYO? A & P, 9 Tufon Street, Ashford, Kent TN23 1QN.

## BRISTOL TROPICAL FISH CLUB 31st ANNUAL OPEN SHOW

SATURDAY, 26 SEPTEMBER 1992

at

All Saints Church Hall  
Grove Road, Fishponds, Bristol

*F.B.A.S. Trophy Class 0 (Male Guppies)*

SHOW OPENS — 9.30 am  
BENCHING — 9 am-12 noon  
FISH AUCTION — 1.30 pm  
MAIN SHOW — 3 pm (subject to judging)

### TRADE STANDS

SPECIALIST SOCIETIES REPRESENTED  
*i.e. BRITISH CICHLID ASSOCIATION and  
CATFISH ASSOCIATION OF GREAT BRITAIN*  
REFRESHMENTS AVAILABLE ALL DAY

FOR FURTHER INFORMATION  
TEL: TONY HATCHER, 0272 324583



Aquarium Mail Order Specialists

# FREE

The NEW Aquamail Catalogue  
TELEPHONE 0624-801849  
FAX 0624 801676  
For your FREE copy or write to:  
AQUAMAIL  
Tynwald Mills, St. Johns  
Isle of Man



ACCESS & VISA ACCEPTED

Please send a catalogue to:

Name .....

Address .....

Post Code .....



# PRODUCT ROUND-UP

BY DICK MILLS

## Hawkins & Manwaring

If you had a product that was useful in such diverse locations as Mount Everest and deep-sea diving off Belize, you'd think you had the whole world covered. Such a product is the AQUASCRIBE from HAWKINS & MANWARING.

It enables you to make written records anywhere where the slightest moisture might otherwise obliterate your carefully composed 'on-the-spot' notes. Just the thing for that damp fish-house or pond-side location. Taking things a bit further, you can even keep the



written log inside the aquarium — make a note of a fish's actual length, paste it on the inside glass of the aquarium and see how the fish growth compares over succeeding months.

The secret is, of course, in the waterproof paper which can be formatted into several handy designs, from very ergonomic pads, to more complex record-containing folders, waterproof labels, etc. Personalisation on all formats can be achieved as required.

Details from: HAWKINS AND MANWARING, Newark, Westborough, Nottinghamshire NG23 5HJ. Tel: 0400 81492; Fax: 0400 81375.

## Interpet

The figures 4, 9 and 10 feature prominently in recent produce releases from INTERPET. No fewer than nine sizes of fluorescent tubes can be accommodated by a range of just four COVERTAGEAR lighting control units.

Apart from the obvious sizes in tube lengths (according to wattage), there is also the matter of the tube diameters to be considered. Specially-designed endcaps which can be adapted to suit either 26mm (1in) or 38mm (1½ in) diameter tubes are the answer.

An ON/OFF switch and 2-metre (c 6.5ft) tube-connecting leads will allow easy installation to any aquarium. Add to this the very important factor that the units fully comply with BS 5433:102.1:1990 and EN 60598, plus the fact that dealers won't have to stock so many variations, and you'll appreciate that the expected popularity of the range will soon be in evidence.

Moving on to the magnificent 10 we come to the range of AQUARIUM TREATMENTS. Instantly recognisable by the colour illustrations of individual fish species, the treatments are designed for coldwater and tropical aquarium systems incorporating an effective range of fish medications, as well as water quality additives. Each bottle contains

100ml — enough to treat 500 gallons (c 2,270 litres) or, looking at it another way, an aquarium 5 x 2 x 2ft (150 x 60 x 60cm). A pipette for easy dosing is also included.

The ten treatments are:

- ① FRESH START — Tap-water conditioner.
- ② FLORA BOOST — Nitrate-free plant food.
- ③ FILTER AID — Clumps suspended particles together for easier mechanical filtration removal.
- ④ GREEN AWAY — to clear green water.
- ⑤ LIQUISIL — reduces background levels of bacteria, Fungus and parasites.
- ⑥ ANTI-WHITE SPOT — eliminates White Spot parasites.
- ⑦ ANTI-SLIME and VELVET — to cure Slime (flukes and protozoan) and Velvet Diseases.
- ⑧ ANTI-FUNGUS and FIN ROT — cures Fungus, Mouth Rot and Fin Rot.
- ⑨ ANTI-INTERNAL BACTERIA — cures bacterial Gill Rot, Dropsy, Ulcers and Septicaemia.
- ⑩ METHYLENE BLUE — prevents Slime Diseases, Fungus on fish eggs and flukes.



The full quality of the range cannot, obviously, be appreciated until the various products are used following the diagnostic guide and leaflets on fish health which are included within each packaging to make for proper use of each treatment. The whole range is designed to comply with the latest VMD requirements; only one product (Methylene Blue) contains any dye substance. This 90%-dye-free treatment is the result of extensive research, and only public demand (the customer's always right) has prolonged the commercial life of Methylene Blue.

As another example of user-friendly matters, Anti-Internal Bacteria is the first non-prescription effective treatment on the market, while Anti-White Spot has (it is claimed) been proven to equal or outperform the comparable products in tests. Accurate diagnosis is vital, of course, and to this end, Interpet supply a FREE diagnostic chart for retailers and public alike. (Your own FREE copy is attached to this issue of A & P.)

Full details from: INTERPET LTD, Vincent Lane, Dorking Surrey RH4 3YX. Tel: 0306 881033; Fax: 0306 885009.



## Tetra

The TETRAPOND range of products from TETRA has been enlarged by the addition of ALGOREM, the environmentally-friendly way to control water-borne algae (green water).

The premium ingredients in Algorem bind together the algae and other suspended particles into biodegradable clumps which settle on the floor of the pond, from where they can be netted, siphoned or vacuumed out. Algorem is harmless to fish, plants and other pond life, and can be used safely with other TetraPond products.

In addition to foods (Floating Foodsticks, Floating Koi Sticks, Koi Growth Food and Flaked Fish Food) the TetraPond range also includes MediFin (treatment for fish diseases and parasites), AquaFin (tap-water dechlorinator and conditioner), Koi-Vital (supplement-



ary vitamins, trace elements and colour enhancer), FloralFin (plant fertiliser), ClariFin (clears turbid, hazy or misty water) and LilyFin (Waterlily fertiliser).

New to TetraPond care products is the TETRAPOND KOI LABORETT, a complete pondwater testing kit. The pH range is broad-based for freshwater applications, while a separate pH kit is available for the specifically higher values found in marine aquariums.

The DORO range of foods now includes DORED FOODSTICKS (a replacement for TetraMin Ruby as a tropical colour enhancer) and DOROGREEN (has a high vegetable content, particularly suitable for Malawi Cichlids).

Details of all Tetra Products, Tetra Information Centre and Tetra Club Membership from: TETRA, Lambert Court, Chestnut Avenue, Eastleigh, Hampshire SO5 3ZQ. Tel: 0703 643339.

## A-Tech

Readers of Product Round-UP (A & P, June 1992) will, no doubt, remember that A-TECH previewed a system for controlling the brightness of fluorescent tubes to give a sunrise and sunset stress-reducing effect for aquarium or fish-house lighting. The BASIC SOLAR SYSTEM hit the market at the beginning of September, with the ADVANCED SOLAR SYSTEM to follow in November.

Recapping briefly, the idea is that the system turns up (or down) the brightness of the fluorescent tubes over a period of 30 minutes, thus preventing panic in your tanks as the fish

otherwise dash about in sympathy to sudden light or darkness. The system control units (salt-and splash-proof, of course) are available to operate with either 2 or 4 tubes, with each format divided again to cope with 42/48in - c 105-120cm - (32/40 watt) or 60in - 180cm - (50/60 watt) tubes, and come complete with mains lead and fluorescent endcap connectors. Simply connect

to any normal mains timer.

The Advanced Solar System will have its own digital timer and will also switch on full brightness of other associated lighting (once the tubes have reached their full luminance) and switch them off again before the tube-dimming process begins. For instance, the fish-house lighting could be brought up to full brightness, at

which time individual tanks' lighting are switched on.

For details of the Solar System Units (and to place your priority reserve order number) contact: A-TECH WATER MANAGEMENT SYSTEMS LTD, PO Box 18, Aylesbury, Buckinghamshire HP18 0UG. Tel: 0296 770034; Fax: 0296 770038.



## PRODUCT NEWS

### Juwel Aquarium Filter Tests

Reading manufacturers' product brochures is one thing, obtaining evidence to back up their claims is quite another, so it is with pleasure that we are able to bring you a definitive test result report for one such product - JUWEL AQUARIUM FILTERS.

Although the principle of matching filters to corresponding aquarium sizes is gaining ground, it is not universally practised, and while 'over-filtering' is often inadvertently employed, using an undersized filter is equally to be deplored. The internal filters under test were the JUWEL COMPACT (pump 5 watts, flowrate 660 lph), JUWEL STANDARD (pump 12 watts, flowrate 1,450

lph) and JUWEL JUMBO (pump 20 watts, flowrate 1,560 lph). Each was fitted to JUWEL RIO 100 AQUARIUMS (100 x 500 x 40cm), all set up with the same lighting, heating and water conditions. Both biological and mechanical filtration are carried out within the filter by sponge material.

It was decided to 'crash test' the products, that is, by adding more fish and food than the

filter could possibly cope with, abandoning the test before really lethal levels of toxicity were reached. All aquariums were stocked with 20 fish at the beginning: 10 Sumatra Barbs and 10 Checker Barbs; food used was Tetra Ruby (1gm daily to begin with, rising to 7gm in the crash test, with no more than 4gm being given at any one time).

Daily measurements were





made on the following parameters: Ammonium, Nitrite, Nitrate, Carbonate and General Hardnesses, pH, Oxygen Content, Redox Potential and Conductivity. No gravel, plants or decorations were used in the tanks to avoid these affecting the test figures. All tanks and filters were set up from new. The tests were divided into three phases: the Initial Phase; Reserve Zone Phase and Crash Test Phase.

## RESULTS Initial Phase

Interestingly, in the Initial Phase, the maturing period was the same — 4 weeks — irrespective of pump size used.

### Ammonium

Reached peak levels (3-3.5 mg/litre) after 14 days and, at pH 7.5-7.8, a significant part of the ammonium was already available as free ammonia. After 3 weeks, ammonium levels sank to an insignificant amount. Ammonia is therefore only critical during this initial stage.

### Nitrite

Levels followed those of ammonium and, after 4 weeks, fell below 0.1 mg/litre.

### Oxygen

Oxygen consumption by the increasing bacterial colony rose during the initial weeks as fish wastes built up, but levels always remained above 4 mg/litre.

### Summary

The results correspond to other trials involving setting up

new aquariums. Maturing periods can be shortened by using bacterial 'starter cultures', but these should not be relied upon to avoid the settling in periods altogether. It is important to increase fish numbers slowly and to feed sparingly during the first few weeks.

## Reserve Zone and Crash Tests

### 1 Juwel Compact

Once the Initial Phase ended, fish numbers were doubled and the amount of food increased to 2 mg per day. Oxygen levels dropped immediately; nitrite levels rose, but sank back after 6 days.

A further increase of fish numbers (20 Platies), plus an increase to 3 gm per day of food (three times normal required amount) showed a brief rise in nitrite levels, which then stabilised at 0.05 mg/litre, together with a fall below 4 mg/litre of oxygen which then settled at 3.6 mg/litre.

More food (4 gm per day) led to additional aeration being required as the oxygen level fell below 3 mg/litre and, as the nitrite level also rose above 2

mg/litre, it was considered a wise move to reduce the food level to 3 gm per day, following which, the oxygen and nitrite levels re-established at acceptable levels once more.

Throughout the test, nitrate content increased at a steady rate. Despite a partial water change, it reached 290 mg/litre after 2 months.

### 2 Juwel Standard

This filter coped with the increased loads more easily; even after 6 gm of food per day, the oxygen levels stabilised at 3 mg/litre with no extra aeration being needed.

The Reserve Zone of the filter reached 4 gm of food per day (with 100 fish) but, at 6 gm per day, the 2 mg/litre nitrite point was reached and did not recede until food input was reduced.

### 3 Juwel Jumbo

Reserve Zone reached at 6 gm of food per day, with oxygen levels higher than in the other two filters without extra aeration being needed.

Only at 7 gm food per day did oxygen levels fall to 3 mg/litre and nitrite levels rise to over 1.5 mg/litre.

A reduction in food input to 6 gm per day rectified matters.

## Analysis of Filter Material

Both upper sponges showed a high degree of biological activity; in the lower section, a large amount of stabilised detritus showed that, because of slower water currents, this area acted mechanically. However, the organic material was already so well decomposed that there was no danger of denitrification and uncontrolled nitrite formation occurring.

This analysis shows the importance of maintaining the upper sponges in good condition for maximum effect; regular rinsing in aquarium water will help to retain water flow through the sponges, and the bacterial colony will not be harmed, unlike the effect of using raw tapwater.

## Final Evaluation

The Juwel Filter System fulfils the job it is intended to do.

The Compact Filter should only be used in aquariums up to 200 litres (c 44 gal) capacity (based on the ability of its pump to provide oxygenated water rather than its overall biological performance).

The Standard and Jumbo models can be used in aquariums up to 600 litres (c 130 gal).

The biological capacity of all three filters is such that, in normal use, there is a large safety margin.

**NOTE:** The above report is based on the findings of a series of tests carried out by Dr Manfred Schüter, published in the German aquarium magazine DATZ.

For full details of Juwel products contact: RUTO (UK) LTD, 123 Green Lane, Buxton SK17 9DQ. Tel: 0942 821114; Fax: 0942 826396.



Immaculate water and superlative fish c/o Juwel Aquarium filtration.

## FISH HEADS





# Coldwater jottings

By Stephen J. Smith



## SNAP HAPPY

It would appear that my comments about the dearth of good photographs of Fancy Goldfish on aquatic packaging, advertisements and leaflets (see 'Model Goldfish' — *Coldwater Jottings*, May 1992), have fallen upon fertile soil.

Koi and Goldfish keepers are being given the opportunity to have their favourite fish featured on new package designs for Koi and Goldfish foods, and win a bumper food pack.

Koi Food manufacturer Gold Line Feeds is in the process of re-designing the packaging for their Phoenix 2000 range of foods, and has invited Koi and Goldfish keepers to take part by submitting photographs of their best fish for consideration on the new package design of the Koi food and a newly-launched Goldfish food. Every entrant whose photograph is chosen for the packaging will receive a 10kg pack of Gold Line Feeds fish food of their choice.

All UK Koi and Goldfish keepers are eligible to enter, and entrants should submit their photographs, together with their name and address details (in block capitals), direct to Steve Kuzio, Marketing Director, Gold Line Feeds, Pinfold Farm, Welham, Retford, Notts. DN22 6SQ. Closing date for receipt of entries is 30 September.

## FAIRGROUND FANCY

My own interest in aquatics, and particularly in the Goldfish, started at the tender

age of six with the acquisition of a Goldfish at a fairground after (miraculously) pitching three ping-pong balls into a Goldfish bowl. This was the first time I had ever won anything and, on reflection, I won more than a fish that evening; in common with many an aquarist, this fairground prize was the beginning of what was to become a most pleasurable pursuit of fish-keeping.

However, there is some debate about the suitability of live animals (and Goldfish are animals, despite what some people might imply) for prizes, so I am indebted to Peter Margen of Caister-on-Sea, Great Yarmouth, for raising the issue in a recent letter. Peter not only wonders if we can stop fairgrounds and travelling fairs from displaying Goldfish in plastic bags as prizes from their stalls, but also raises a further issue:

"I thought this practice had been outlawed some years ago, but my grandson came home with a Goldfish which he had won while visiting a travelling fair," explained Peter. According to Peter, his grandson had chosen to win his prize by using ping-pong balls, "having refused the option of throwing darts at suspended plastic bags containing the fish."

Peter concludes: "I am sure anything you can do to stop this mediaeval practice would be appreciated by most feeling people."

This letter raises two direct questions:

- 1) should fish be used as prizes?
- 2) should fish be used as targets for darts?

I am sure every reader of this publication is as appalled and outraged as I am that the second question should even need to be asked. If the practice is as Peter Margen alleges, then an immediate telephone call to the RSPCA would, I have no doubt, achieve an instant positive response from that organisation.

The former question tends to elicit a mixed reaction, though my own feelings are clear. OK, so a fairground Goldfish prize was the first childhood step for many in the appreciation of the aquatic hobby. But at the cost of how many thousands of fish?

And among these thousands are not just those which were inevitably flushed 'down the loo' within a few days (partly, perhaps, out of sheer ignorance), but includes those subsequent charges which receive similar ignominious treatment in an attempt to overcome the disappointment of losing the first one. (It is testimony to the hardness of the Goldfish that some are able to survive their conditions).

The unfortunate legacy of the fairground fish is that, to many people, these particular animals are 'only a fish' and thus, it would seem, appear to deserve less respect than the pet dog, cat, rabbit, hamster, gerbil, or budgerigar...

Peter, thank you for your letter; my hackles have most certainly been raised. I only hope that our readers have become similarly afflicted...

## EYE FLUKE

I was delighted to hear from Jean and Ron Walters of Bredbury, near Stockport, who were featured in *Coldwater Jottings* in March. Happily, Jean and Ron took my advice with regard to fish stocking levels (which was: more space, fewer fish) and have obtained a four-foot planter. "It makes an ideal decoration for the garden," explained Jean. "Four of the largest fish are enjoying being outside and feeding well."

The couple were also excited to report the first spawning of

their hobby, of which they are deservedly proud: "All chubby with nice tails," added Jean.

However, they are puzzled by the condition of a three-year-old Moor, which they think has developed a cataract on one eye: "She is a lovely fish with healthy fins, but although she shoots to the top of the water to feed, she immediately sinks to the bottom. I moved her to another tank where she doesn't have to compete for food and, within 24 hours, she shed a large number of eggs."

It sounds as though one of the 'problems' has been solved for you, Jean and Ron, in that the 'sinking feeling' was quite possibly a result of being heavily egg-laden or gravid, and the change of water triggered the fish to shed her eggs.

The cataract symptoms sounds as though it may be Eye Fluke, which is a parasitic infection often seen in telescope/globe-eyed Fancy Goldfish, among others, and can often go unnoticed. Poor water quality can often be a cause of it appearing, and I would suggest cleaning the filter medium (in water removed from the aquarium), a partial water change, using aged water, and a proprietary treatment against parasitic infections.

NB: If you have charcoal medium in your filter, this will remove the treatment, so either remove your filter for the duration of the treatment, or treat the fish in a separate tank with a non-charcoal filter element.



JOHN DAVIS

Fairground Goldfish prizes — many people's controversial early introduction to fishkeeping.



# OUT AND ABOUT

## AQUARIUM '92

By Gina Sandford

Photographs by Mike Sandford

The beginning of June has become known in the aquarist's calendar as the time of the 'Sandown Show'. And, sure enough, at 9.45 in the morning on Saturday 6 June, a queue was developing outside the show hall. Inside, the frantic activity was evident as traders and hobbyists put the final touches to their stands before the public were let in.

For the first two hours, a steady stream of people flowed through the hall but, after lunch the place died, and on Sunday, although there were people coming in throughout the day, there were never enough to make up for the deficit the day before. This must have been very disappointing for the sponsors, Argus, who, with much experience at organising exhibitions, had aimed at upgrading the look of the show and deserved a better attendance than fewer than 5,000 people.

Each specialist organisation, club and trader had a minimum of a ten-foot shell unit and this gave the show a much more professional appearance than its predecessors — it looked as if everyone belonged together, instead of the old hotch-potch of do-it-yourself stands.

The hobby side of things was organised by the Association of Aquarists. The show attracted several hundred fish entries but we cannot, unfortunately, bring you our usual winners' table listing the relevant details regarding the top awards, since these had not been supplied to us at the time we went to press.

A total of 14 tableaux/information stands were entered, with participants travelling from as far afield as Lancashire. Hounslow AS walked away with the prize, and deservedly so. Their entry was just what the public needed to see, elegantly planted tropical freshwater aquaria, a selection of coldwater fishes, again in planted tanks, and even a marine aquarium — something

for everyone. Indeed, they were kept busy answering all the questions put to them by an

interested public.

Second was a display featuring an Open Show, manned by



Peter Cairns of Hounslow A.S. enjoys a joke with a visitor to his society's winning stand.



Ready for action: the CAGB stand (Northern and Yorkshire Groups).



Crèches at fish shows, such as this one at Aquarium '92, provide welcome relief for young children... and parents!

Milton Keynes AS; third was TV Cats and fourth Toogham AS.

Another notable tableau was that of Basingstoke AS which displayed live foods. This certainly caused such comments as "Yeuk" and "Aren't they horrible", but at least, people were keen to find out about what they could feed their fish as a supplement to the commercially prepared foods.

I'm not sure if it was my imagination, but it seemed as if the numbers of traders participating was down on last year; certainly, there was only one stand offering tropical fish and plants and another with coldwater. People jostled around JMC's stand to see who could get to the fishy bargains first.

Dry goods were well represented, though, and you could buy anything from large filtration systems to a small fish net. A rather unusual table lamp was on offer on the Luscombe Interiors stand and it caused quite a stir until enquiries revealed that there was no risk to the fish (see also *Coldwater Jottings* in this issue of *A & P*).

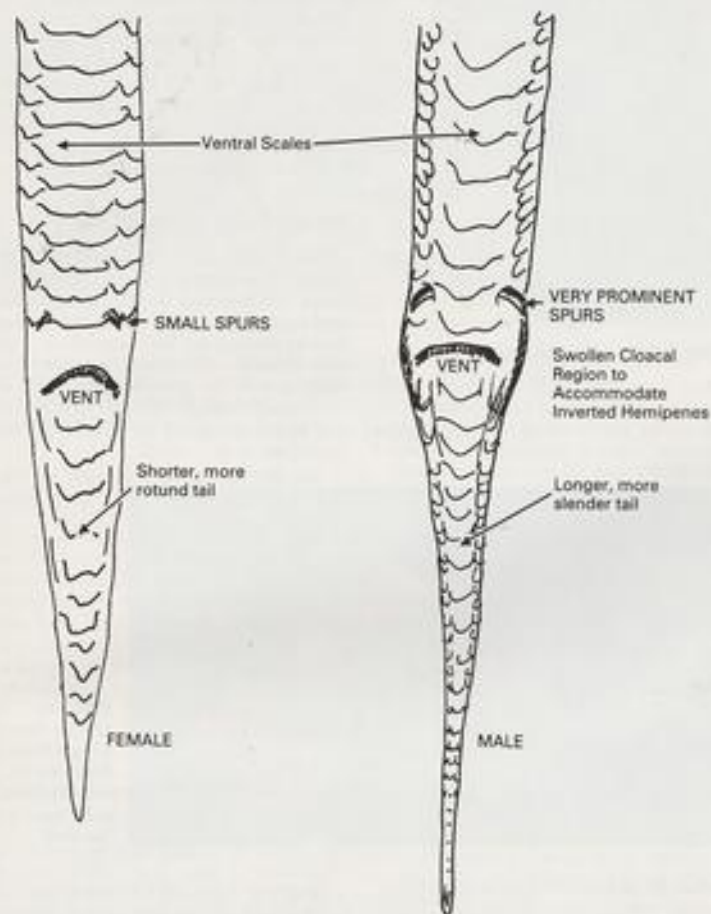
Despite fish for sale being in short supply, plants were plentiful. One end of the hall was taken over by a display of ponds and garden furniture. This large exhibit was very professionally presented, with formal plantings around the perimeter and a good range of pond plants.

To add icing to the cake, throughout the two days there were lectures by some of the leading authorities in the aquatic world: David Ford (Nutrition); Brian Walsh (Characins); Mary Bailey (Cichlids); Len Eldridge (Killifish); Derek Lambert (Livebearers); Stephen Smith (Coldwater).

Let's hope that, next year, more traders will participate in this event. Also, to encourage the public to attend, perhaps the show would benefit from a more extensive advertising campaign.



DIAGRAM TO SHOW SEXUAL DIFFERENCES IN BOIDS



# Small Boas and Pythons

*Part 1*

## Species and their Care

Marc Staniszewski begins a two-part review of these popular and attractive snakes.

*Illustrations by the author*

For many people, the mere sight of a huge python or boa instills a feeling of horror and repulsion, whether this is because of their long, 'slimy' and legless appearance, or their jaws which can stretch to swallow a pig or deer. Yet, at the same time, these serpents are a source of entertainment to audiences all over the world; in circuses, magic shows, dancing acts and zoological exhibitions. This, in turn, has not only served to increase these snakes' popularity as both an exotic 'pet' in the home, but also to increase the numbers being kept by people who have a genuine interest in snakes.

Unfortunately, in both of these categories, boids are often acquired as juvenile to sub-adult specimens, and a common mistake is to give no consideration to the eventual size they can attain and hence, the space they will require. Another equally serious concern is the strength and temperament of these snakes. For 99% of the time, they appear sluggish and docile but sometimes, whether through stress, hunger or irritation, they can become quite nasty and may bite and even attempt to constrict.

It is my view that when these snakes reach such a size that they are potentially dangerous creatures, they should only be kept by more experienced keepers and zoological societies who have the space to provide a comfortable captive environment. However, for those people who may have had the intention of acquiring a boid, this primitive family still beholds a number of smaller species which must rank among the most beautiful and even-tempered of all serpents.

### THE SPECIES

The family Boidae is split into four recognised subfamilies, consisting of approximately 110 species. The two major subfamilies are the Boas — Boinae (76 species) and the Pythons — Pythoninae (31 species), while the other two, the Loxoceminae and the endangered Bolyeriinae from Round Island, Mauritius, contain just one and two species respectively, and the latter are not available in captivity.

### Boinae

Members of the subfamily Boinae give birth to live young and predominate mainly in the warmer regions of the New World, although four of the fifteen genera occur outside the Americas in the Mediterranean region, Madagascar, Pacific Islands and New Guinea. The Boinae contains many smaller species suitable for large vivaria and the majority of these are available as captive bred juveniles.

### Sand Boas (*Eryx*)

These small burrowing boas, of which there are eleven known species, occur in loose soils and sandy semi-arid regions in the wild, and all grow to less than 100cm (39.37in). They live quite happily in an aquarium  $\frac{1}{3}$  filled with dry, washed river sand and heated to around 80°F (26.7°C). A





Basic vivarium for terrestrial boas.

36 x 18 x 15in (90 x 45 x 38cm) aquarium comfortably houses up to four adults.

In the last few years, several species have been bred in captivity on numerous occasions. These include the popular West Asian Sand Boa (*E. jaculus jaculus* and its subspecies *turcicus* and *familiaris*), the Rough-scaled Boa (*E. conicus*), the Rusty Coloured Indian Boa (*E. johni*) and the attractive Kenyan Boa (*E. colubrinus loveridgei*).

### Rainbow Boa (*Epicrates cenchria*)

From Latin America comes one of the most beautiful of the small to mid-sized Boas. The Rainbow Boa and its several subspecies are now being bred on a regular basis, at last! Large specimens can attain 200cm (79in), although the normal is around 152cm (60in). The stunning multi-coloured iridescent patterning of this snake makes it one of the most desirable herptiles, and healthy, feeding juveniles can be quite expensive to obtain.

Essentially an arboreal species, it needs a lofty vivarium with sturdy branches and a large water bowl in which to bathe. A 36 x 36 x 60in (90 x 90 x 150cm) glass-fronted wooden vivarium will house one pair of adults.

The most beautiful of the subspecies is the nominate Brazilian Rainbow Boa (*E.c.cenchria*). The Argentine Boa (*E.c.alvarezii*) and the Guyanan Boa (*E.c.maurus*) are also regularly bred but are not as colourful.



Most pythons (this is *P.regius*) enjoy bathing in warm water for hours on end.

### Tree Boas (*Corallus*)

Also from the humid tropics of South America, the species of the genus the *Corallus* are the masters of the trees. This genus contains several stunningly coloured



Arboreal species like Cook's Tree Boa must be provided with suitable 'perches'.

species, the largest of which reaches approximately 7 feet (213.4cm), but the usual length is around 4½-5ft (137.2-152.4cm). As with Rainbow Boas, a tall vivarium with lofty branches and a few sturdy living plants is required. These snakes also require high humidity.

The most commonly encountered species in captivity is the Garden Tree Boa (*Corallus enydris enydris*) which is a brown colour with

dark diamonds along its flanks. Perhaps the best known subspecies is the smaller and more colourful Cook's Tree Boa (*C.c.cookii*) which can be found in several colour forms, such as red, orange and brown.

The most sought-after *Corallus* is the Emerald Tree Boa (*C.c.rossi*) which is on a par with the Brazilian Rainbow Boa in terms of beauty. Unfortunately, it is a temperamental species which is difficult to maintain. Its long, inward curving teeth used to capture birds can inflict an extremely nasty bite.

### Pacific Boas (*Candoia*)

These small robust snakes are found in the warm, humid forests of islands in the Pacific Ocean. Many species are semi-arboreal and semi-aquatic but spend much of their time hunting through the leafy forest floor. They make excellent captives and, because of their docile nature, live quite happily in a relatively small vivarium where they will attain a total length of between 84-127cm (33-50in), depending on the species.

The species most likely to be encountered are the Pacific Ground Boa (*Candoia carinata carinata*) and the subspecies, the Solomon Islands Ground Boa (*C.c.pasadeni*), the aptly named Viper Boa (*C. aspera*) — although all species have zigzag markings along the back, it is in this species that it is most prominent and the larger Fiji Ground Boa (*C. hirtvossii*).

### Other Species

Other small boas which are worth seeking include the attractive Rosy Boa (*Lichanura virvaga*) which has broad pink stripes and seldom grows more than 100cm (39.4in), and the Rubber Boa (*Charina bonae*) which is even smaller at just 76cm (30in).

Both are native to western North America and the Rubber Boa, in particular, is a relatively hardy species.

### Pythoninae

The subfamily Pythoninae, unlike the Boinae, consists of egglayers and contains seven genera distributed through warm regions of the Old World. Most of its members are creatures of huge proportions; the Reticulated Python (*Python reticulatus*) is





Burrowing boids like the Egyptian Sand Boa need an appropriate substrate in the vivarium.

almost certainly the longest living snake in the world. This subfamily contains a small species which is probably the most popular boid kept in captivity today.

### Ball or Royal Python (*Python regius*)

This is an attractive species rarely attaining more than 4½ feet (137cm), which originates from West Africa. Captive-bred or -born specimens should be preferred to those taken from the wild, because they are far easier to feed.

This species gets its common name, Ball Python, from its behaviour of wrapping itself up into a tight ball when molested. Overall, this is a docile, good tempered snake ideal for beginners if captive-bred.

### Calabar Burrowing or Ground Python (*Calabaria reinhardtii*)

A unique python because of its subterranean activities, this small serpent from West Africa grows to around 3 feet (91cm) and is now regularly seen on dealers' lists. It requires a small vivarium filled with gritty soil and leaves.

### Green Tree Python (*Chondropython viridis*)

This beautiful arboreal species bears a striking resemblance to the Emerald Tree Boa (*Coralia canina*) yet, in terms of temperament, it is far less aggressive. It is probably the most sought-after popular boid, and the most expensive, because captive-bred youngsters are in great demand worldwide.

It grows slightly larger than the Emerald Tree Boa at around 5½ft (168cm) and conditions in which it will breed need to be almost perfect in terms of humidity and temperature.

### Children's Python (*Liasis childreni*)

This is an Australian species which has a very pleasant nature but is seldom seen in British collections. It requires a fairly dry set-up with plenty of sturdy branches, flat

rocks and hiding places. It attains a size of around 4½-5ft (137-153cm).

### HOUSING

Specific instructions for accommodating small boids depends on their habits, whether they are burrowing, ground dwellers, arboreal or all three (such as *Candovia*). Most species only require basic accommodation which is easy to clean out when soiled.

For all species, except the burrowers, use a glass-fronted wooden vivarium which can easily be constructed at home and is less stressful than an open, all-glass aquarium. For a substrate where ground and arboreal species are concerned, newspaper, wood shavings (not sawdust), bark chippings or even prefabricated materials, such as rubber sponge or plastic grass, are ideal because they are either easy to replace or wash.

In all set-ups, a large water bowl in which the snakes can bathe, a hide of some description, a few rocks and some sturdy branches are really the only decorative items which need to be included.

### HEATING, LIGHTING & HUMIDITY

Few boids are natural baskers and so require no special lighting arrangements (although if live plants are grown in arboreal vivaria, then natural UV lighting is essential). On the other hand, photoperiod (hours

of daylight per 24 hour cycle) is important, and this, along with heating and humidity, can be manipulated to induce breeding.

Correct heating is essential for a proper metabolism, while too low a temperature can cause complications, such as pneumonia, stomach rot (through undigested food matter) and stress. For all the species mentioned above (except the Rubber Boa) aim to keep the temperature in the 78-88°F. (25.6-31.1°C.) range for most of the year, except when breeding is to be attempted. Use heater pads or non-lighting ceramics guarded with wire mesh and controlled by thermostats to give a constant temperature, or else situate the whole vivarium in a centrally heated room.

High humidity levels are needed for tropical boids, especially when young, but units can be quite expensive, so an alternative is to mist the vivarium thoroughly with a hand sprayer four or more times a day. A humidity indicator is quite a wise investment.

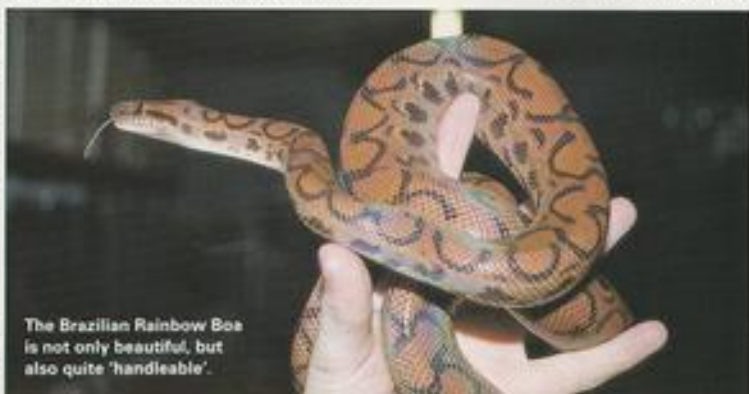
### FOODS & FEEDING

For most small boids, the main food is rodents, and these should, without exception, be offered dead to the snakes. It is unethical to feed live, warm-blooded vertebrate food such as rodents to snakes (or any other creature for that matter) in captivity because of several reasons:

- (a) they feel pain just like humans
- (b) the tables may be turned and the rodent could attack, maim or even kill the snake
- (c) it is unnecessary, because most boids, especially captive-bred types, will readily accept dead food, and even more cautious species will go for a dead rodent if it is wiggled about.

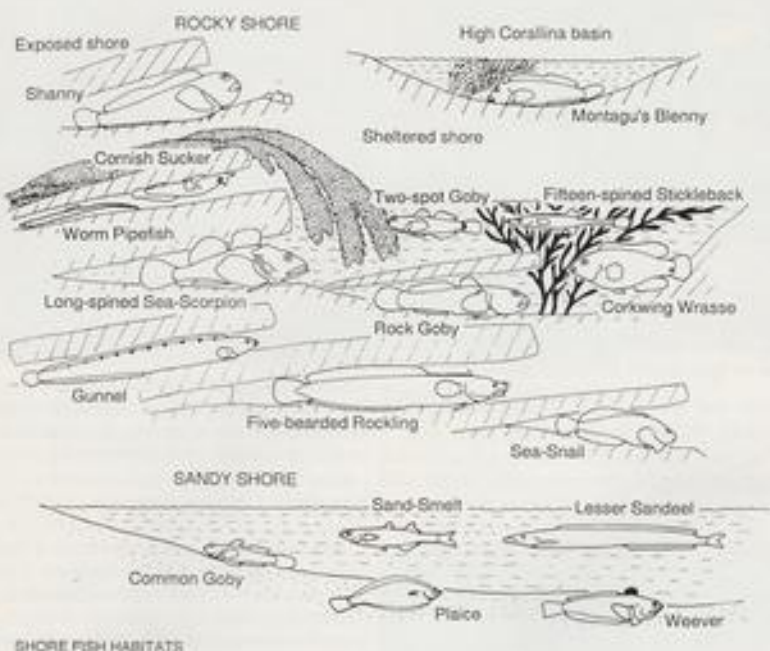
Today, most suppliers of snakes also supply frozen mice or rats as snake food at a reasonable price. If you breed your own, always kill the rodent before feeding to your snake by giving it a swift blow to the back of the head. Other frozen foods which are taken include chicks and small birds, such as quail for arboreal species, fish and laboratory-bred frogs for aquatic types, or any of these foods for species such as those belonging to the genera *Candovia* and *Liasis*. **AM**

(TO BE CONTINUED)



The Brazilian Rainbow Boa is not only beautiful, but also quite 'handleable'.





The rocky shore cross-section includes a crevice on an exposed rock face, and, under more sheltered conditions, a high rock basin with red alga *Corallina*, a midtide pool overhung by serrated wrack and containing the brown alga *Halidrys*, and crevices on the middle and lower shore. The sandy shore fishes are those in a large pool, some partly buried in the substrate.

**T**he edge of the sea has fascinated naturalists since the eighteenth century, when it became fashionable to seek the health-giving properties of seawater and ozone. Nowadays, these benefits are not quite so apparent but, for the aquarist, there is still the chance of finding some interesting and hardy fish, without the need to don an aqualung or hire a trawler. A puddle of water under a stone, or a shallow pool smaller than an aquarium, seems a difficult place for fishes to inhabit. How do they manage? What are their problems?

#### ENVIRONMENT

The basic factor is, of course, that, twice a day, year in and year out, tidal forces remove and replace most of the water. However, two other important aspects of the shore fish's environment are the ground on which it

lives and the extent to which the shore is open to wave action. The ground or substrate is essentially either rocky, with stable structural features, or sedimentary, composed of mud, sand or gravel, and potentially unstable. Too much wave action creates an unfriendly 'high energy' habitat, scouring rock surfaces and shifting pebbles and boulders.

In turn, both these features determine the variety of species in the local shore ecosystem of plants and invertebrates as well as fishes. 'Cover' is an important product of the interaction between substrate and protection from wave action. A broad sheltered rocky shore, with a good growth of seaweed over loose stones and other nooks and crannies, is a much better place where to seek food, escape predators and find residual water at low tide. Most species of intertidal fish around the British Isles live on such shores.

In contrast, sheltered sandy shores may develop some plant cover, but intertidal fishes are less diverse. However, if exposed to strong wave action, even rocky shores lose plant cover, with limpets and barnacles predominating in a greatly reduced fauna.

Exposed depositional shores may suffer widespread shifting of substrate which prevents most intertidal plants and animals from maintaining a foothold, although, in Japanese waters, some eel-like gobies (*Laciogobius*) can live among pebbles.

#### STATUS

The fishes found between the tidemarks are there as either permanent residents or as temporary dwellers. Resident species, living in the intertidal zone of rocky shores, include forms which may also inhabit inshore shallows, such as the Rock Goby (*Gobius pagannellus*) and the Long-Spined Sea-Scorpion (*Eunophrys bubalis*), as well as those found exclusively on the shore, like the Shanny (*Lipophrys pholis*), in more exposed, barnacled habitats, and the smaller, more colourful Montagu's Blenny (*Coryphoblennius galerita*) in high coralline pools.

Temporary species may enter the intertidal zone only during the breeding season (such as the Lump-sucker, *Cyclopterus lumpus*, and the famous Grunion of Pacific beaches), or as juveniles, like the small flatfish (Plaice, Sole) in sandy pools. In pools, among weed beds, small Corkwing, *Crenilabrus melops*, are not uncommon, and nests of this wrasse may

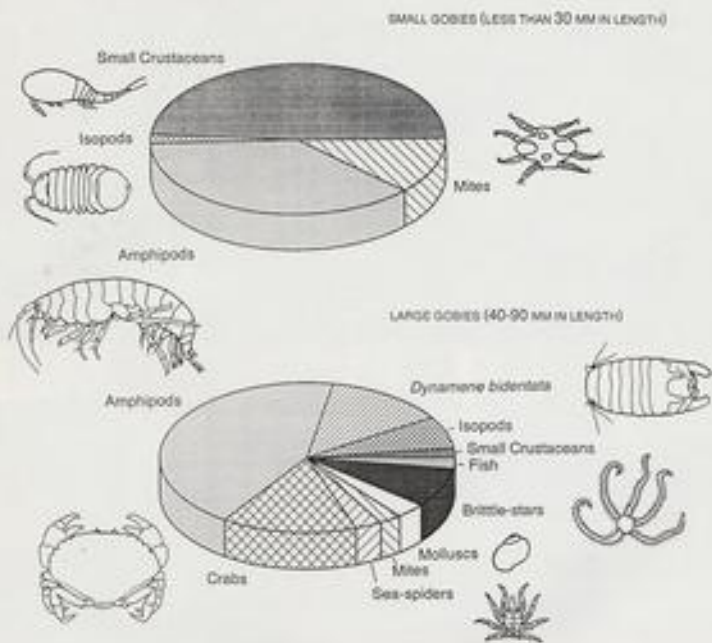


# FISHES OF THE

## Part 1 Staying Alive



THE FOOD OF THE ROCK GOBY



Each slice of the pie is proportional to the percentage of the named food item in the diet (assessed by volume).

be found in crevices on the lower shore. Sometimes, larger species, even sharks, are stranded as very temporary and reluctant inhabitants of shore pools.

**ADAPTATIONS**

The fish species which live permanently under intertidal conditions share specialisations in anatomy, physiology and behaviour for life in this rather extreme habitat.

Firstly, small size is an obvious requirement, because of the usually limited volume of pools or the constricted space under rocks or in crevices. Here, a flattened or elongate body shape, as in the Gunnel or Butterfish, *Pholis gunnellus* or Worm Pipefish, *Nerophis lumbiciformis*, is also appropriate. Relatively large, but narrow, fishes can live intertidally, although transferring the occasional Conger Eel, *Conger conger*, to your aquarium will require brute force!

The concealing coloration of our native species is probably related to small size and the risk of predation by larger fish, birds or even rats. Bullheads and Sticklebacks have some defensive armour, but only the Lesser Weever *Echiichthys vipera*, in sandy shallows, has venomous spines in the black first dorsal fin and on the gill cover. The poison can cause unpleasant symptoms in humans.

As will be noticeable in a tank, shore resident fishes, mostly bottom-living, need negative buoyancy, not the neutral buoyancy of a midwater fish, so the swimbladder is reduced or absent. On the bottom, shore fish are intermittent swimmers, darting rather than cruising, and this is helped by their



RELATIVE EGG SIZE IN VARIOUS SHORE FISHES

Vertical scale 2 mm; all eggs are demersal except the floating planktonic eggs of the rocklings and the weever.

# BRITISH SHORE

Dr Peter Miller of Bristol University begins an illustrated two-part guide to the shallow-water fishes found along the British coast.  
*Illustrations by the author*





Exposed intertidal rocks and pool at Rockcliffe, Solway Firth.



Sandy bottom habitat in upper Nicholson Pill, Oxwich Saltmarsh, near Swansea.



A Gunnel in residual water beneath a stone at low tide on the Bay of Ireland, Orkney.

frequently large pectoral fins. The pelvic (ventral) fins are often modified for life on the substrate, serving as props (Shanny) or fused into a sucker (gobies, sea-snails and clingfish). This is simplest and least powerful in gobies, rounded and more robust in sea-snails and Lump sucker, but most compli-

cated and very effective in clingfish.

Life on an abrasive substrate is also helped by a reduction in size of scales (as in the Rock Goby, *Gobius paganelius*) or complete loss (in blennies and sea-snails).

The shore is also a much brighter environment than the adjoining sea, and the eyes of

intertidal fish are suitably modified. In exotic forms, the eyes may be prominent, as in mudskippers, or greatly reduced as in the Californian Blind Goby, *Typhlogobius californiensis*. However, 'normal' eyes have more subtle specialisation in which an iridescent cornea acts like sunglasses.