

JULY 1993

# **AQUARIST & PONDKEEPER**

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## COVER STORY — Lemonpeel Butterflyfish

Photograph: Max Gibbs, The Goldfish Bowl, Oxford

The Lemonpeel, Addis or Golden Butterfly (*Chaetodon semilarvatus*) is undoubtedly one of the most elegant of all the members of its family, the Chaetodontidae. There are two sources of Lemonpeels: the Indian Ocean, from which most of the specimens circulating within the hobby come, and the Red Sea, which supplies only very limited numbers.

Although shoals of dinner-plate sized individuals are common in the wild, aquarium specimens (which don't normally attain the same size) can show a distinct intolerance for members of their own species and should therefore be kept singly. In fact, Lemonpeel Butterflies are sometimes intolerant of other species of butterfly as well, particularly in the close confines of an aquarium.

Among the reefs of its native waters, the Lemonpeel Butterfly feeds on both plant and animal matter. However, since the animal component of its diet includes coral and shellfish, this difficult but beautiful species cannot be considered suitable for invertebrate aquaria.



# Editorial

## FILAMENTS AND PEA SOUP

The problem with algae in ponds is . . . that no one seems to agree on what actually constitutes a problem in the first place.

We are now in high summer and, since early spring, letters, phone calls and queries at aquatic shows have been pouring in on this subject, so much so that, if we were to work out a list of Top Ten Pond Problems, the control of algae would be the outright chart-topper every single year without exception.

There is, of course, no doubt that algal infestations, both of the free-floating (green pea-soup water) and filamentous (Blanketweed) types can be so severe as to cause a genuine health hazard, no matter what definition of the term 'problem' you care to choose. If, for instance, conditions are such that the algal bloom is adversely affecting the health of the pond and its inhabitants, then there can be no argument: you've got a problem.

On occasion, Blanketweed growth can be so luxuriant that the fibrous strands can actually trap fish and amphibians. Equally, green water can be so pea-soupy and thick that algal cells can appear to become associated with small fragments of debris, such as broken down particles of fish faeces, to form granule-like 'globules' that are not only unsightly, but will also render anything swimming more than a couple of inches below the surface totally invisible.

Extreme conditions such as these often lead to marked day/night fluctuations in the pH (acidity/alkalinity) of the water and this does our fish no good whatsoever. Remedial action can and must, obviously, be taken when such situations develop, and there are numerous effective strategies and remedies which can be applied to rectify the imbalance.

However, if your pond — like most others — suffers only some greening of the water and/or some growth of Blanketweed early on in the season, does this really constitute a problem?

To me, it doesn't . . . and I must admit that I am more than a little concerned at the seemingly large number of people who feel that, unless their ponds are 100% algae-free, they've got a

problem which must be eradicated at all costs.

Does a growth of Blanketweed (I use the term here for all types of filamentous algae) about three or four inches long, encrusting the edges of a pond all year round constitute a problem? Again, to me, it doesn't, as I see this algal 'mini-forest' as a highly desirable source of food for my fish which love to graze, both on the algae themselves, and on the myriad micro-organisms they harbour.

It's our pond equivalent to the *Aufwuchs* that many species of African Rift Lake Cichlids feed on in the wild. Have you ever come across a Rift Lake Cichlid keeper who would look on *Aufwuchs* as a problem? Of course not.

Every body of water contains algal spores, so should we expend large amounts of energy fighting every last cell? Or should we accept some algal presence in the water and adopt a middle-of-the-road approach, taking preventive steps to keep things in check?

After all, waging all-out war of any kind usually causes more problems than it solves. What is your opinion (to quote one of our popular regulars)?



*John Dawes*  
John Dawes  
Editor

## News Desk

### Holiday Tips From OFI (UK)

OFI (UK) has prepared a factsheet to help fish-keepers protect their aquarium or pond while they are away on their summer holidays. However, they explain that the best tip is to ask their local OFI (UK) retailer for advice and a copy of the factsheet.

The organisation explains that, in order to maintain a healthy and well-balanced aquarium, tank preparation should start four weeks before your holiday. "Introduce NO new fish or plants during this time," remarked Keith

Davenport, chief executive of OFI (UK). "These could introduce disease which could be difficult to detect in time."

He added: "Three weeks before your holiday, change up to one-third of the water and add an approved preparation. Remove all debris from the tank and gravel. If you have undergravel filtration, put a siphon down the uplift pipe

and remove all debris from underneath the plates. If you have a box filter, rinse some of the debris in old aquarium water; and remember that new water should always be at the same temperature as the tank water".

Regarding feeding, Keith explained that this should cause no problems if care is taken: "Remember that fish naturally go for long periods without food, but you should work to a scientifically-proven regime."

"At the start of a four-week period before you go away, increase feeding levels to help

build up body fat reserves. During the final week, gradually reduce feeding levels to half or one-third to prepare the fish for the conditions while you are away.

"Upon your return, gradually increase feeding levels back to normal so that the fish can make the necessary adjustments to their digestive system."

He also added that feeding blocks are a very useful aid to feeding fish in your absence, and to consult your retailer about these. "A neighbour or friend can also help out, but remember to stress the dangers of overfeeding," continued Keith. "If you have any fry in the tank, you must arrange for regular feeding."





Lighting is also included within OFI (UK)'s holiday advice: "This can be enhanced with automatic timers, but if you do not have one, leave some light access from an appropriate window; automatic timers could also prove to be a useful security device."

"Pondkeepers are advised that they may need to make water changes in a Koi pool, but not in a well-planted natural pond," he continued. "It is unwise to add remedies or water treatments during the four-week period leading up to your holiday — especially those for the treatment of algae: fish can live quite happily off insects and algae for up to three weeks."

"If you have any doubts at all, ask your OFI (UK) retailer," concluded Keith.

### 'Grocklemania' Success

FBAS reports that Grocklemania '93 was a total success. "The weekend fishkeeping event, held on the Isle of Wight, was provided with fine weather — despite being 'bracketed' with rain — and as excellent entertainment throughout," reported Joe Netherell, chairman of the FBAS.

Inter-club team competitions resulted in the Thomas Crapper Trophy being won by the FBAS team; while the 'Aquarian'-sponsored Aquacub Competition was a triumph for the Southend, Leigh and DAS team over members of Strood AS.



LINDA LEWIS

Lectures at the event were provided by a selection of speakers, including a local zoo expert, Steve La Thangue from Kingfish, and Dr David Ford from 'Aquarian'.

The 'Best in Show' award was presented to Bob Lemmon, of Strood AS, with an *Anotomas ternetzi*, and Bob was also the winner of the FBAS Championship Trophy class.

A special award was also made to Newtown AS, whose members travelled from the northern outposts of the UK especially for the event.

Dr David Ford chairs the final round of the 'Aquarian' Aquacub competition at the Isle of Wight AS "Grocklemania '93" weekend event, with members of eventual winners, Southend, Leigh and DAS on left, Strood AS on right.

### London Zoo Close-ups

A series of 'close-up' visits has been organised by London Zoo to provide animal lovers with the opportunity to gain a new perspective on the activities of the establishment. (See also the *Out & About* feature on the Aquarium by Linda Lewis elsewhere in this issue.)

The events also contribute directly towards animal conservation projects at London Zoo. According to the organisers, funds raised last year by close-up visits were used to buy vital equipment for several of the zoo's animal sections.

Of particular interest to aquatic enthusiasts is a behind-the-scenes look at London Zoo Aquarium, on Thursday 19 August. The events are open to adults and

London Zoo aquarium resident: a Regal Tang. Close-up views of this and numerous other species are on offer.

children, are held in the evenings from 1 July, and start with a tour of the particular animal section. London Zoo inform us that this is usually followed by informal talks or an animal film, and food and refreshments are provided.

Spaces are limited, with booking preference given to members (Lifewatch Members, Animal Adopters, Associates and Fellows). Prices are as follows — Members; Adults £7.50; Children (4-11) £4.50, (12-15) £5.50. Non-members: Adults £10.50; Children (4-11) £6, (12-15) £7.

For further information, contact Gina Guarnieri, Lifewatch Executive, The Zoological Society of London, Regent's Park, London NW1 4RY. Tel: 071 586 4443.

### Turning Japanese

Discus expert and author Eberhard Schulze has contacted News Desk with news that his book *Discus Fish: The King of All Aquarium Fish* (ISBN 974-8754-9-8) — already a great success over here in the UK — is now available in Japanese.

The book, available to date in English and German, has been slightly revised, with additional photographs by Japanese Discus keeper/photographer H Shiraishi, and translated by Shinichiro Watabe (distributed by Midoro Shobo Co Ltd, Tokyo, Japan).





## Hampton Court Palace Flower Show

**A**quarist & Pondkeeper will be one of over a dozen aquatic stands at the 1993 Hampton Court Palace Flower Show (July 7-11).

The stands form part of the event's "Aquatic Village", a feature situated alongside Hampton Court's famous Long Water, and which has proven extremely popular in previous years of the show.

*A & P* will be distributing free copies of *The Water Gardener* magazine (which was a free supplement to the May issue of *A & P*). Among the aquatic companies exhibiting are A J Howells Water Gardens, Airport Aquaria, Anglo Aquarium, Aquatic Design Centre, Dorking Aquatic Nursery, FBAS, Interpet, Lowara (UK), Pantiles Aquatics and Tetra (UK) — see *Who's Who at Hampton '93* elsewhere in this issue.

An additional major attraction of the show this year is

the *Daily Mail* Garden Pavilion — plants and flowers of the world. Incorporated within a 300ft long marquee will be international exhibits and an English garden, showing plants from different regions of the world.

Hampton Court Palace Flower Show will open from 10 am to 7.30 pm (7-10 July) and from 10 am to 6.30 pm on Sunday 11 July. Admission is £14 for adults, with substantial discounts for RHS members who book in advance. A 10% discount is available to groups of ten people or more, and all non-RHS members who apply for tickets in advance will be eligible for a £2 voucher for rail travel to the show.

Tickets can be obtained in advance from the Ticketmaster, Hampton Court Palace Flower Show, PO Box 43, London WC2H 7LD. Tel: 071 344 4444; Fax: 071 915 0414.



Tetra's award-winning pond display (designed by Tony Howells) was voted the top exhibit in the Aquatic Village at last year's Hampton Court Palace Flower Show.



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Last year, Pantiles — exhibiting as Walton Koi — provided us with a superb Koi exhibit. This year they promise us another real treat. Come and see for yourself.



# Who's Who at Hampton '93

By John Dawes  
Photographs by Stephen Smith

It's Hampton time again! Between 7 and 11 of this month, The Royal Horticultural Society will be hosting this now-famous and hugely successful gardening extravaganza in the incomparably beautiful grounds of Hampton Court Palace.

As in previous years, the highlight for any water-loving visitor will be represented by the Aquatic Village. As a taster to what you can expect, here's a brief summary of the aquatic exhibits. Do come and see us — you'll be assured of a warm welcome.

If you would like further details, including how to get a £2 discount voucher from British Rail and a free RHS garden pass, ring 071 344 4444.

## Stand AQ1 C J Skilton Aquarist

As aquatic consultant to the show, Chris Skilton will provide an all-day advisory service each day. Different aquatic advisers will be covering specialist subjects at announced times.

It is hoped to stage a display of an amazing revolving granite kudel (an architectural water feature which incorporates a sphere that appears to be balanced on water).

## Stand AQ2 Heritage Stone

In 1992, Ian Lauriston created a stunning "Slate Water Garden". This year he plans an equally startling natural garden with a stream in a wild garden setting.

## Stand AQ3 Aquarist & Pondkeeper

We have teamed up with Gary Sharpe of Howe Green Garden Services to present a water garden featuring a fast-moving stream using superb Irish Limestone rock from

Border Stone of Welshpool. The stream will be made to disappear and reappear in the garden. What better place to learn more about water gardening?

Come to the *Aquarist & Pondkeeper* stand and receive your free copy of our introduc-



Having won one of the top awards last year with this unbelievable Slate Water Garden, Heritage Stone are out to make another spectacle of themselves!

tory issue of *The Water Gardener* with our compliments. You'll also be able to meet some of our invited guests and discuss your aquatic problems with them.

## Stand AQ4 The Aquatic Design Centre, London W1

This year's exhibit will employ a whole series of exotic planted aquaria incorporating a wide variety of substrata and rocks to create an ever-changing picture in the shape of a hexagon. With Aquatic Design Centre's expertise in lighting, their display will be sure to be a real crowd-puller.

## Stand AQ5 Anglo Aquarium Plant Company

A garden teeming with mature marginal, bog and moisture loving plants is guaranteed. Steven Day has the gifted knack of producing a water garden that looks as though it has been in existence for years.

Anglo's own-grown nursery plants will be available for any visitor to buy from the stand. Previously, TV companies have chosen Anglo's award-winning gardens to depict the show and hold interviews and previews on. This may well happen again, but there is no substitute for visiting it yourself.

## Stand AQ6 Federation of British Aquatic Societies (F.B.A.S.)

This year, a very professional package has been put together by Peter Furze, the F.B.A.S. show manager. Its emphasis is on 'portable' water gardening. A series of water features, all self-contained, that can adorn the smallest of patios to the largest stately home will be on show.

Such personalities as Dick Mills and 'Aquarian's' Dr David Ford will be on hand for advice and periodic lectures.

## Stand AQ6B Dorking Aquatic Nursery

Dorking's exhibit will consist of a Scottish Garden masterminded by Kate Harman, the nursery's principal. This follows the wild garden built in 1992, which had visitors transfixed, and suggests this year's garden will be another eyecatcher for visitors and judges alike.

Also on show will be aquariums depicting native fishes. The Surrey-based nursery will have its usual array of unusual and popular aquatic plants for sale.

## Stand AQ7 Tetra UK

Tetra have Tony Howells once again building and designing their garden. They will, no doubt, be trying to match their success of 1992. (The Royal Horticultural Society have now taken over the running of



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the show and they have decided to maintain the show's unique awards.)

Tetra will also be promoting the Tetra Club which is geared towards the young aquarist.

### Stand AQ8 Lowara UK Ltd

Lowara are celebrating their 10th anniversary, and the 25th of the parent Italian company. As well as supplying pumps for a display in the Longwater, all the show's exhibits are being sponsored for pumps by Lowara.

Their garden will stress the versatility of

their pumps by means of fountain displays.

Formal raised fountains combine with tall conifers, set in large stone-effect urns, a mosaic and Roman garden seating, to create the effect of the Italian walled garden.

The Roman tradition of throwing spare coins in a fountain will be put to good use on the Lowara stand, as any money thrown in the water display will be donated to Water-Aid, a charity dedicated to bringing water supplies to the needy in the Third World.

### Stand AQ9 Airport Aquaria and Interpet

Both companies will, once more, be join-

ing forces to show the versatility of an amazing series of fountain displays in a patio location.

### Stand AQ10 Pantiles Aquatics (formerly Walton Koi)

Pantiles are building a series of Koi pools representing the Tudor Rose motif. Continuing their precise designs of last year's Koi ponds, this year's garden will be a photographer's dream. Nishikigoi will predominate, consisting of just part of Pantiles' splendid collection located at their new premises.

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# HEALTH AND HAPLESSNESS

Alex Stephenson offers some personal thoughts on the complex and sometimes controversial matter of the acclimatisation (quarantine) of new fish.

*Illustration by the author*

The editorial in *A & P* in January 1993 (*Goodbye Quarantine?*) started me thinking about the various measures we take when we acquire new fish. Most aquarists are, of course, familiar with the word 'quarantine'. The books we read recommend it and other fishkeepers advise it.

The trouble is that quarantine means different things to different people. To some, it can be as little as 48 hours' observation, while others practise a long period of isolation, during which prophylactic (preventive) treatments are given 'just in case'. In severe cases, a fish may swallow enough chemicals to pickle it!

To quarantine effectively, I think you need to be specific about what you are quarantining for. Is it an external parasite with a relatively short life cycle? If so, an isolation period of adequate duration, together with good hygiene and, if you insist, an appropriate prophylactic, should suffice.

The same regime, however, is unlikely to prove successful with many internal parasites, the problem being that they are difficult to get at. The commercial world has developed, and made available to hobbyists, preparations to deal with some internal nasties. Despite this, unless you suspect their presence, you are not going to use these treatments.

Diseases which a fish may be carrying could be of the seasonal type, or they might be of a kind which is slow to develop, only showing themselves when all the damage is done. How do you quarantine against such things?

For the average hobbyist, the answer is you can't. Average aquarists like us have neither the knowledge nor the facilities to enable us to make an accurate diagnosis of anything but the simplest complaints. As for post-mortems, very few hobbyists are qualified to determine 'cause of death'.

I think I am right in saying that importers of fish have been known to take a sample specimen from the stock, destroy it, and do a proper examination, presumably treating the remainder for whatever is found.

This is bad news for the specimen in question, but good news for the vast majority. These professionals must be applauded for their efforts to supply healthy stocks.

Wild-caught fish, by their very origins, must arrive complete with naturally occur-

ring pathogens and pests. You may therefore think their farm-bred counterparts would be safer in this respect. Not always so, I'm afraid, so establishments vary in the sort of conditions they provide... or can provide.

Even if the fish you have chosen to purchase has been born and reared in the finest possible conditions (as I'm sure many have), what has happened to it on the way to your reputable and caring retailer is anybody's guess. I am told that transit facilities can vary from clinical to septic.

## Misdirected Flak

Retailers, it seems, get most of the 'flak' when it comes to apportioning blame for sick fish. There are bad ones, of course, but, mostly, retailers are even more concerned than we hobbyists about the health and condition of their stock.



*'Hang on a sec'. I think we've got a live one.*

Think about it: it is their livelihood. The sight of sick, poor and unsellable fish is the last thing your local supplier wants. Unfortunately, when s/he receives stocks, they can be in a very bad state, the rigours of travelling, and (probably) indifferent treatment at some point on the way, causing many of the problems that a supplier is going to have to deal with when the fish arrive. Dead fish do not make a profit, so rest assured that if your dealer is a good one, he or she cares.

From time to time, articles and letters appear in the press condemning the trade in general, and everybody in particular, for the quality and condition of imported fish. The

injured (quite naturally) retaliate and insults fly in all directions. I've seen the outlines of many sound arguments blurred by ruffled feathers. All such criticisms are born out of dissatisfaction with some of the fish currently offered to the hobby. Yet, I don't know anyone who says that things can't be improved (see, for example, the latest positive guidelines being offered by OFI [UK] in their *Code of Conduct*).

Perhaps it is simple economics. I have thought, rightly or wrongly, and for a very long time, that fish are too cheap. If more money was involved, would this help bring about a change in attitude towards their welfare? I have a strong suspicion that if fish were ten times the current price, they would get ten times the respect in some quarters.

## Improving the Odds

So how do people like you and I go about increasing our chances of obtaining healthy fish? Well, it's a good idea to set up a good rapport with your chosen supplier(s). If (s)he isn't really interested, find one who is. Pick a time when business is light so you get the opportunity to talk. Discuss your requirements; ask for advice. You don't have to take it, but you are almost sure to learn something from the discussions.

When you are ready to buy fish, find out how long they have been in the shop. What problems has the retailer had with them? What treatments have they received? What are they being fed? Are there any special requirements you don't know about? If you ask intelligent questions, you will, hopefully, get intelligent answers.

Having got your fish home, you now have to decide what measures are to be taken regarding quarantine, acclimatisation, observation, or whatever you want to call it.

Remember, fish have an immune system, so it is reasonable to assume they have some resistance to 'bugs' they have met before. Your existing fish, all being healthy, are probably immune to the 'bugs' in your tanks, but the newcomer may not be.

A few days out of isolation you might find this latest acquisition looking as sick as Monty Python's parrot! The temptation may be to blame the supplier. In reality, you have exposed this fish to strains of organisms it's never had to deal with before. The problem didn't come in with the fish; you've probably had it all along.

So this quarantine period is not only to safeguard your existing stock; it also allows you a period in which to prepare this latest fish for life in your colony.

There's nothing fanciful about this theory. Anyone who goes to 'foreign parts' knows the effects strange cuisine and conditions can have on their health. Robust and vigorous people can be virtually destroyed by the local Amoebae. I once fell victim to an unpleasant little germ in Watford...

Unless you have comprehensive facilities and an expert knowledge of fish diseases, the best you can ever hope to achieve is a clear conscience; a peace of mind which comes about when you genuinely know that you have done the best you can.





# Helping Hand

By Kevin Fox

## FAILED ATTEMPT

It's usually around spring that new projects and plans are drawn up and set into motion. This year was no exception for me, so I set up my plant-growing experiment then and have been running it ever since.

The 'experiment' consists of running a 24in tank using an internal power filter. The plants have all failed to thrive. You see? It's not only under-gravel filters which may stop plants growing! I, or rather, the filter system, couldn't handle the nitrate levels. Too much nitrate in the water has exactly the same consequences as not enough; the plants won't grow.

I've therefore decided that the experiment has failed, and so I plan to strip the tank down, wash and disinfect everything, then start all over again, but this time using undergravel filter plates driven by two small powerheads.

## MANPOWER NEEDED

So what's stopping me? Well, the same thing which stops us all: manpower.

I've boarded out my fish,

and have all of the new equipment ready. Using the superb **Tetra Self-Starting Siphon Kit**, I can empty the tank in a couple of minutes. But who's going to shift the buckets of waste water? The trouble with starting something major such as I'm (trying) doing, means that all my friends who usually do all of the donkey work, are all busy at home, DIYing, decorating, etc, and I come way down in their list of priorities.

So far, I've been waiting for three weeks, and the temptation to get stuck in and do it all myself is almost overwhelming. But I know that shifting just one bucket could put me back into bed for a month or so. Therefore, I must be patient. Huh!

## SHARING PROBLEMS AND TIPS

I wonder how you cope. How, or even who, mucks-in with you when it comes to new projects, routine maintenance, etc? I'd be really pleased to hear of your own problems and how you resolve them. Don't forget that **Helping Hand** is our forum; a place to discuss various disabled issues.

And, most importantly,

whatever problems you've had, and no matter how trivial, there is almost certainly someone else facing the same problem, but doesn't have the solution.

## NEED FOR UNITY

Some time ago, I mooted the idea of a national association for disabled aquarists, the idea being that we would have our own special organisation dealing exclusively with disabled issues. Further, individually we carry no clout at all with any aquatic manufacturers; but as a nationally organised association . . . ?

We would have tremendous clout, and be in a far stronger position to negotiate with the various companies for specially adapted aquatic equipment, such as talking thermometers for the visually handicapped (Yes! There are blind fishkeepers!), canister-type power filters with valves which people with arthritic fingers could not only get their fingers around, but also not need Superman's strength to turn them off and on!

Finally, such an association could build up a reference library of areas and able-bodied people in those areas who would be willing to give an hour or two of their own time once a month.

As I said at the time, there's no conceivable way that I can spare the considerable amount of time such an organisation would demand. However, I would be perfectly willing to help out with contacts, administration, etc. In the final analysis, whether such an organi-

sation ever comes into being or not is entirely in your hands. If you want it, then let me know. Since I first floated the idea, no one has had a single word to say about it either way.

If you want it, then let's do it, but let's do it properly. Write to me, care of the office, and let me have your views. Should enough people be interested, and I'm not just referring to disabled people, then we can make a start. Imagine: a whole organisation catering exclusively for US!

## DEAFENING SILENCE

Things have been ominously quiet on the manufacturer's side. So far, the only company that has asked me to review a piece of equipment which has special application for disabled people was **Tetra** — who sent me one of their superb self-starting siphon kits.

For any aquarist with breathing problems, bronchitis, asthma, etc, the Tetra siphon is worth its weight in gold bars.

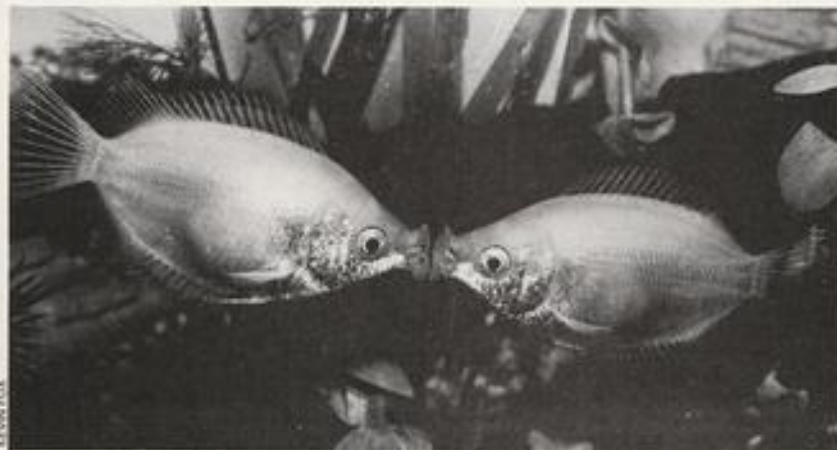
Does other manufacturers' silence indicate that disabled people do not figure at all in their plans for new aquatic equipment? Please prove me wrong. For once in my life, I sincerely want to be wrong!

## OUT AND ABOUT

Now that the sun is where it should be all of the year round, we're getting some really nice days here in the heart of Bandit Country (Sherwood Forest). After months and months of being stuck indoors, I've been out and about for a while now, blowing away the cobwebs, absorbing the greenery and the beautiful blossoms of various trees.

Incidentally, a lot of my friends are trees, and we often spend hours talking over our problems! Knowing that we won't breathe a word of our conversations to any other person (or tree), we can really pour out our hearts to each other. It gives me that lovely inner glow, the same feeling I get when coming out of church.

Why not arrange a visit to a public aquarium, even if they are now quite rare? By the way, I would like to put together a list of public (or even private) aquaria. You



Kissers in the act of kissing (see *And Finally . . .* on the next page).



send me details and I'll ensure that my readers know where you are, opening and closing times, facilities for the disabled, entry fees, etc.

## OSSIE

That reminds me, I've not been too well myself lately, another narcoleptic fit: another fall, and more broken bones. High time I went over to Matlock Aquarium in Derbyshire, and see how my old friend Ossie — the *Ophryotrocha goramy*, commonly called 'The Gourami'.

I think I've mentioned Ossie before. I bought him when he was half-an-inch long, grew him on to around thirteen inches, at which point he then became far too big for my tank. I moved him into a friend's five-foot square tank, and Ossie then shot up to fifteen inches long. Finally (in desperation, because he showed no signs of stopping growing!), we passed him onto Matlock Aquarium, who've taken great care of him ever since.

The last time I saw him was about a year ago. I took my

son, and on the journey explained all about Ossie. When we arrived, I was surprised because Matlock had increased their stock of *Ophryotrocha goramy* by six! "How can you tell which is Ossie, dad?", asked Number One son. "Easy, watch this."

I approached the first tank, pointed my right-hand little finger at the glass front. The fish ignored me. Four tanks later I again pointed my little digit at the tank, and immediately the fish swam straight to me. "Ossie," I said, "meet Ryan!"

My son was 'Gobsmacked!' as they say around here. You see, I used to feed Ossie spaghetti rings on the tip of my little finger. Even after all these years, he still recognised the pointing little finger, and reacted accordingly. Do fish have long-term memory? I know that they do.

## AND FINALLY . . .

Thanks very much indeed Steve Holmes ('astronomical' fishkeeper) for your letter. You will be receiving an audio cassette from me soon (I very

rarely write letters to my various 'Pen-Pals', around the world. The spoken word has that missing dimension which, somehow, becomes lost the minute your pen hits the paper).

I don't know how or why I seem to attract so many ex-policemen as friends. I already have two sisters-in-law (pardon the pun!) who are both policewomen, and three other pals who are ex-police; and very nice people they are too.

By the time you read this, Sparsholt College's Open Day will have been and gone. But worry not: your man-on-the-spot (as usual) will be there to report back to you. Sparsholt College, by the way, is the UK's ONLY college which runs a full-time aquatic management course.

Administered by Jane Lloyd — herself a wheelchair user — access around the college should be wide enough even for my extra-strong chair. (I've broken two doing wheelies and hand-break turns already). Joy riding? Certainly not!

Finally, finally . . . this month's photograph shows a

pair of Kissing Gouramis — *Helostoma temminckii* — in the act of 'kissing'. The actual touching of lips IS NOT a sign of deep affection for each other. It's a straight battle of strength.

Having established its own territory for feeding/breeding, etc., a Kissing Gourami will protect this area. If another fish of the same species invades the other's territory, both fish meet head-on, touch lips and the transgressor will try to push the *in-sinu* fish out of its territory. If it succeeds, then the invading fish wins, and the losing fish must find another area of the tank to live in. If, however, the *in-sinu* fish manages to push the invader out of its territory, then it wins and keeps its hard-fought area.

Until next time, Happy Fishkeeping. And don't forget to let me have your ideas on NADA — National Association (for) Disabled Aquarists.

Let me leave you with this thought: no matter how stupid the question, the 'asker' always has a perfectly logical reason for asking it. So please don't shoot them down.



# KOI



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  - (k) **TEST KITS** — Full Tetra range.
  - (l) **LANDSCAPING ACCESSORIES** — Japanese style lanterns, Bamboo poles, Rocks and Conifers.
  - (m) **BOOKS** — Extensive range of Koi related books. Large car park.
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6 DAYS, CLOSED ALL DAY WEDNESDAY.

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## FOODS WORTH THEIR SALT

It's not often that I bring you news of fish food in *Seaview*, but this month I can tell you about a brand new one which I have been testing in my own aquarium for some time — I never recommend anything I haven't tried myself.

You should have been seeing three different types of flake food by **Ocean Star International of America** in the shops for a little time now. Believe me, you would be well advised to try these foods. The three varieties are **Basic Marine Flake**, **Spirulina Flake** and **Shrimp Flake** — all of which have the same basic ingredients, but in different ratios to suit the various types of fish.

For regular, basic flake feeding, use the **Marine Flake**. The manufacturers claim that this

product will enhance the survival of delicate marine species, and I can well believe it. Its ingredients include a vegetable protein concentrate, rice products and a vitamin/mineral supplement, giving a flake that smells so good that I could eat it myself. The fish certainly seem to thrive on it — I'd swear that they have grown and become more colourful in the weeks that I've been using it!

It also makes sense to use the other two varieties now and then — just to fill out the diet of your fishes. Herbivorous fishes, like Tangs and Angels, will love **Spirulina Flake**. The main ingredient, as you might imagine, is the alga *Spirulina*, which has long been recognised as an important part of the diet of algae-eating species.

OSI say that this flake improves the natural colours of fishes, so perhaps it isn't my imagination after all.

The main ingredient in **Shrimp Flake** is — surprisingly enough — **Brine Shrimp**. Anyone who has kept seawater fishes for five minutes will tell you how much they all love **Brine Shrimp**, and feeding this stuff once or twice a week will really get them going!

If, by now, you think I'm enthusiastic about **Ocean Star**, then you're absolutely right! Regular readers will know of the value I place upon flake foods as the building blocks for a complete and rounded

diet but, in my opinion, this is about the best there is.

As I said earlier, **Ocean Star Flake** should be in the shops by now. However, I suspect that it will never become too widely available over here and, for this reason alone, will never seriously worry the other major brands of this world. It is well worth tracking down this food though! For further details see last month's report by **Dick Mills** in **Product Round-up**.

## TENTH ANNIVERSARY NITRATES

**Aquarium Systems**, the manufacturer of **Instant Ocean**, produces the freebie called **Seascope**. This publication is produced quarterly and is distributed through aquarium shops. It was created to present short articles to marine aquarists and, in my view, usually carries some good stuff.

The Winter '93 issue saw its tenth anniversary. Nothing gobsmacking about that, you might think, but all this drivel is preamble to the real point I wish to make. In this tenth anniversary issue was an article which really set me thinking and blew several holes in the view long-held by many — myself included — that nitrate in anything but small concentrations is debilitating, if not fatal.

As I said, I myself have been extolling the virtues of keeping nitrates down — by whatever method — purely because our fish and invertebrates don't experience it in the wild. At least, if they do, then it's only in concentrations so minute that they can be ignored.

The article was by **Thomas A Frakes**, a respected man in America (and elsewhere) and its main point was that, with the increasing number of articles recommending lower and lower safe levels, nitrate is being blamed (predictably) for mortalities which are, in reality, due to other causes.

It has to be said that Tom does cite some hefty 'evidence' to support his article. **Albert Thiel**, **John Tullock** and **John O'Malley** are all quoted as the

anti-nitrate lobby.

However, the other side is equally impressive. That marine aquarium God, **Stephen Spotte**, is quoted as recommending an upper limit at 50 ppm in fish-only tanks, as opposed to the 20 ppm he was recommending in 1979. Other icons from the world's public aquaria were also lined up on Tom's side, and he draws on his own experience as research manager at the former **Instant Ocean** hatcheries, where 120+ spawning pairs of Clowns were kept with anemones in water with concentrations of 40 ppm!

The article, though, ends by stating that, although nitrate is not as toxic as some of us believe, it is a good indicator of overall water quality. Very interesting stuff and a good article, but after keeping all sorts of delicate animals over a lot of years, I don't think I'd like to risk it.

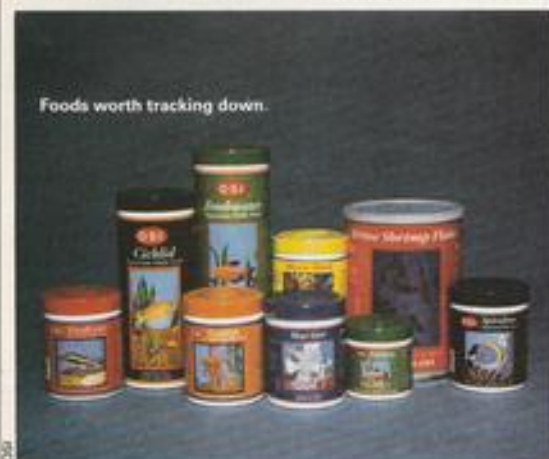
## FAROESE LEAFLET UPDATE

In a totally different vein, do you remember that I told you recently of the move by the big conservation bodies to promote a boycott of Faroese fish products? Well, the leaflets are out and, if you are interested enough, you could write to the **Whale and Dolphin Conservation Society** at **Alexander House, James St West, Bath BA1 2BT**. They would send you some leaflets to hand around.

Please do it. The slaughter really is — in every sense of the phrase — bloody horrific.

## NEW CONSERVATION SOCIETY

There is a new society on the scene — aimed at dealing with the issue of disappearing marine habitats. The **Society for the Protection of British Coastal Marine Flora and Fauna** (a bit of a mouthful, peeps), formed in September of last year, is concerned with the disappearance of marine habitats from our shores and is trying to address the problem of human interference caused by development, pollution and decay.



Foods worth tracking down.



We all know the devastating effect that these can have on salt marshes, mudflats, shingle beaches and similar habitats, and I believe that, rather than hamper initiatives by movements like the Marine Conservation Society, the new organisation will supplement their activities; the big boys paint on an international canvas after all.

According to the Society's chairman, Ray Stokes, the aim of the society is simple. It is to conserve and encourage new marine reserves. The issue of marine reserves is one which is very close to my heart and one which, I feel sure, none of our readers can disagree with.

For more details, contact Ray at:  
100 Viscount Walk,  
Bearwood,  
Poole,  
Dorset  
BH11 9TJ.  
Tel: 0202 594650.

#### AND FINALLY . . .

I've heard a whisper recently that Tetra are to introduce a new version of

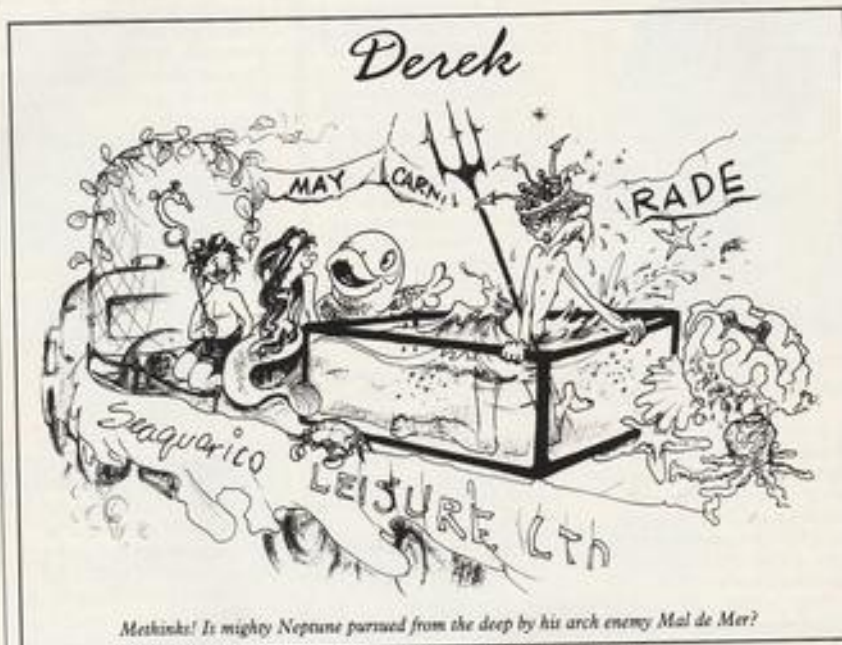
Tetra MarineOomed — the single-dose copper-based treatment for Oodinium and White Spot, etc, that you can use

when invertebrates are present.

It will be out very soon. In fact, it might well be in the

shops by the time you read this.

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



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HARRY GIBBS/FLORIDA TROPICAL FISH FARMERS' ASSOCIATION

*Ophthalmotilapia nasutus*:  
Old World Exotic's Best in Show winner.



HARRY GIBBS/FLORIDA TROPICAL FISH FARMERS' ASSOCIATION

How's this for an unblemished Chocolate Lyretail Molly?  
This fish — and its tankmates — won the Fancy  
Mollies trophy for Neighbourhood Fish Farm.

# FLORIDA: LIFE

Not even Hurricane Andrew could dampen the enthusiasm of Florida's fish farmers, as *A & P* editor **John Dawes** discovered when he judged at the 1993 FTFFA show.

It's no secret that, over time, I've developed a very healthy respect for the international community of breeders and farmers who, year in, year out, continue to provide us with the countless varieties of fish that we love... plus the few that we are not so keen about.

There's no way that you can ever hope to please everyone, of course, especially when it comes to so-called 'fancy' varieties of fish. Yet, whether you are a purist who only has time for wild-type 'unadulterated' fish, or a lover of the more fancy, elaborate ornamental types, you can't fail but admire the

creativity, skill and determination of those who regularly keep coming up with the goods — fancy or otherwise — time, after time, after time.

One of the major 'cradles' of creativity can be found across the Atlantic, in Florida. There, the Florida Tropical Fish Farms' Association members come together every year to show off the best that they've been able to produce over the preceding twelve-month period in an annual fish extravaganza that is quite awesome, in both quality and diversity.

## DEVASTATING ANDREW

All things being equal, we could be forgiven for expecting a crop of new varieties every time the show is held. However, things are not always equal.

Take the catastrophic events of 24 August 1992, for example. Florida was hit by one of the most violent hurricanes ever recorded there. Goodness knows why it was given the deceptively friendly-sounding human name of Andrew. Hurricane Andrew was many things, but it most certainly was NOT friendly!

As we know, it devastated vast tracts of (particularly) south Florida. In so doing, it hit a significant part of the state's ornamental fish farming industry. Pictures of the havoc caused, especially around the Homestead area, were beamed across the world via our TV screens in frighteningly graphic detail.

Everyone recoiled in horror at the unbelievable scenes of mayhem wreaked by Andrew's ferocity. Then, as the news reports



JOHN DAWES

Future champion in the making? A male Guppy Tail Balloon Molly entered in this year's show.





MARIE GREEN/TROPICAL TROPICAL FISH FARMER ASSOCIATION

A sure-fire winner: 5-D Tropical's top fish in the Danios and Minnows — the brand new Golden Giant Danio.



MARIE GREEN/TROPICAL TROPICAL FISH FARMER ASSOCIATION

Ekk Will's Hi Fin Rosy Barbs get even better every year

## AFTER ANDREW



JOHN NIKOZ

Possible future 'gold mine': a Golden Pearl Gourami just beginning to show some mottling in the head region. The two 'normal' specimens seen out of focus in the background, were once just as golden.



MARIE GREEN/TROPICAL TROPICAL FISH FARMER ASSOCIATION

A rarely seen gem — at least, of this quality: the award-winning *Paratilapia polleni* from New Life Exotic Fish, Inc.

became more infrequent, we all, not unnaturally, found the images receding in our everyday thoughts until we didn't really think about them in quite the same every-minute way we had done a mere few weeks earlier.

It may largely been a question of out-of-sight, out-of-mind, for the majority of those of us not directly affected by the hurricane, but for those two million people caught in the path of Andrew's unimaginable fury, life was irrevocably and rudely wrecked.

Nearly a year has now elapsed, but the after-effects still persist, and will continue to do so for a long time. Electricity supplies had been cut off by the storm; telephone lines

had been toppled; hatcheries had been razed to the ground; breeding and rearing ponds had been flooded or polluted; countless numbers of valuable broodstock and fish destined for sale had been lost. Now, you can't rebuild that in a week... or a month... or even a year.

The problems are compounded when you discover that the ornamental fish industry is classified as non-agricultural within certain sections of the official relief programmes and as agricultural by others. This is a very significant consideration because non-agricultural enterprises apparently don't qualify for Federal financial assistance, as a result of which, as Laif DeMason of Old

World Exotic Fish, Inc (one of the badly hit farms) points out, "the ornamental fish farmers have fallen through the bureaucratic cracks".

### THE SHOW GOES ON

Because of the regular stream of news that I had been receiving since the disaster, I half expected to find myself judging at a somewhat under-par FTEFA show this year. How wrong, and how delighted, I was when I discovered just how inaccurate my expectations had been.

Quite frankly, there was absolutely no detectable difference whatsoever in the



excellence of the best fish on show when compared to previous years. As to the number of entries, there were no fewer than 527, a figure that was just as high as at most recent Florida shows.

If I had to select a group of fish that was particularly impressive, it would have to be the livebearers — not because I am especially keen on livebearers (which I am), but because they were genuinely good. I have chosen a picture of an impeccable Chocolate Lyretail Molly from Neighbourhood Fish Farm to illustrate this article, but I could just as easily have selected the Marble Sword from Imperial Tropical Fish Farm (winner of both the Swordtail and Freshwater Livebearer Classes), or the Velvet Swords from Ed Parker Tropical Fish, Inc. or the Sunset Platies from 5-D Tropicals... or any one of half a dozen other superlative entries.

Another of my chosen pictures is of a *Paratilapia polleni* (no common name) from New Life Exotic Fish, Inc. the winner of the Any Other African Cichlid category. What a beautiful fish it is, and what stiff competition it had to beat to win the award.

Among the new varieties, I would need to single out the Golden Giant Danios entered by 5-D Tropicals. Here's an outstanding commercial prospect if ever I've seen one. The same would probably also need to be said of the outstanding Hi Fin Rosy Barbs from Ekk Will Waterlife Resources, which seem to get better every year.

And what about the winner of the Best in Show: Freshwater Egglayer? This exceptional specimen of an *Ophthalmolapia nanatur* (no common name) was produced by Old World Exotic Fish, Inc. — one of the hurricane-ravaged farms, which must have made success just that little bit sweeter for its proud owners.

#### OPTIMISTIC SIGNS

Before you swim away with the impression that every fish on show at this event is always absolutely perfect in every sense, it may be worth mentioning that some of the newer varieties, undoubted and considerable though their potential is, still have some way to go before their characteristics are firmly fixed.

I would single out two varieties in this

sense, both of which have, in my opinion, very rosy futures ahead of them.

The Guppy Tail Balloon Molly is one of those fancier varieties that will always find a ready market among enthusiastic aquarists who want something really new. Once consistency can be 'captured' with regard to finnage and coloration, this fish is certain to 'take off' in commercial terms.

So will the Golden Pearl (Leeri) Gourami, which is magnificent in its precious-metal livery, but which becomes mottled after a short time kept in indoor aquaria (as opposed to outdoor ponds), eventually ending up like any other normal Pearl.

Space dictates that I be highly selective in my choices — influenced, no doubt, by my subconscious preferences. I would therefore urge any reader who would like to obtain full details of all 131 trophy winners to contact the Florida Tropical Fish Farms' Association at:

P.O. Drawer 1519,  
Winter Haven,  
Florida 33880,  
U.S.A.  
Tel: 010 813 293 5710;  
Fax: 010 813 299 5154.



'Sting-in-the-Tail' storm damage experienced at Ekk Will's Gibsonton farm during this year's event. In total, the mini-hurricane caused some \$30,000-35,000 worth of damage here. Other farms were luckier; a few weren't so lucky... relatively speaking.

#### STING IN THE TAIL

The 1993 FTFFA show was, without doubt, a huge success, despite the best efforts of Hurricane Andrew to destroy the industry.

However, just as a timely reminder that Nature can never be taken for granted, a mini-hurricane (Son of Andrew?) hit Florida during this year's event. Damage varied, from slight to major... but nowhere was it as overwhelming as last time round.

Some stocks were lost and some buildings were damaged, but resilient as only they can be, Florida's fish farmers braced themselves, cursed the weather, and decided that they won't be beaten by it. I have absolutely no doubt that they are right, as next year's show will, once again, prove.

## FISH HEADS

By ANDY RYKIE





Elegant finnage, striking coloration and a hardy disposition: what more could anyone want from a catfish?



# Introducing: A CAT CALLED ZEBRA

German catfish specialist Wolfgang Mahr introduces a stunning species for the real enthusiast.

Photographs: Peter Lucas

**T**he importation of the first New Star Crown Sucker Catfish (one of the Vampire or Gold Nugget Plecos), *Leporacanthicus galaxias*, started a regular 'catfish boom', and not just in Germany. There followed a rapid succession of further extremely attractive armoured catfishes (family: Loricariidae), such as those known in the trade as the Orange-Bordered Catfish and the Magnum Orange-Bordered Catfish.

The discovery and capture of almost all these beauties is due to the efforts of Tropicarium Para, Brazil and the huge degree of commitment shown by Arthur Werner of Munich. Probably the most striking of these 'new' species is *Hypancistrus zebra* (L 46), the Zebra Catfish, or just Zebra for short.

## 'L' EXPLAINED

First of all, however, a word on the 'L' numbering system, which many aquarists may find difficult to understand. 'L' numbers (that of the Zebra Catfish is L 46) were devised in 1988 by Arthur Werner and the editorial team of *DATZ* (*DATZ* is the leading aquarium magazine in Germany). The 'L' stands for Loricariidae, and thus, L-fishes are always representatives of the so-called Armoured Catfishes.

It is true that the numbering system is less descriptive and more difficult to remember than is a common name, but it has the immeasurable advantage, as has been proven in practice, of being unequivocal and, above

all, standardised internationally. Thus, there is no danger of imaginative trade names, perhaps formatted like scientific ones, being mistaken for genuine valid scientific names and causing quite unnecessary confusion.

## STRIPED BEAUTY

But now let us turn to what, to me, is probably the most attractive of the Armoured Catfishes (while remembering that one must always be careful with superlatives, as who knows what the future may bring!): the catfish called Zebra.

This species was discovered as recently as 1987 in the Rio Xingu, a large southern tributary of the Amazonas in Brazil. The first few specimens were exported to the USA and Japan at (understandably) fantastically high prices. Zebras did not reach Germany, and subsequently Great Britain, until 1989.

A description is superfluous, as the photos say more than a thousand words. The unusual attraction of the Zebra Catfish lies in the striking contrast of its black and white patterning, which has a sharpness reminiscent of coral fishes, but rarely seen in their freshwater cousins.

It is natural to speculate on the biological purpose of this striking coloration — as Mother Nature does nothing without reason. It may be that — as in the 'true' zebras of the African savannahs — the clear-cut coloration has a role to play.

A predator invariably needs to pick out an individual creature as prey. This is more difficult, or even impossible, if it is looking at a whole herd or shoal. As soon as it tries to focus on a single individual, the contours of the latter blur into the general confusion of black and white stripes and bars. In fact, it has been found in practice in captivity that Zebra Catfishes prefer to live in large groups, rather than holding solitary territories.

## TROUBLE-FREE MAINTENANCE

Two further milestones in the short aquarium history of the Zebra Catfish should be mentioned.

① In 1991, it was scientifically described as *Hypancistrus zebra* by the Dutch catfish specialists Isaac Isbrücker and Han Nijssen.

② In 1992, the first successful breeding was reported from Japan (*Fish Magazine* No 320, 1992 [11]: 68-69).

I obtained my first specimens shortly after the introduction of the species to Germany, and naturally — and in view of the price at that time — they were treated as the apples of my eye. But it was soon discovered that the maintenance of the Zebras is completely free of problems, as long as a few minor points are taken into consideration.

Although this spectacular fish originates from extremely soft and decidedly acid water, they remained in, if not A1, at least very close to A1, condition in my local





Despite obvious similarities, no two Zebra Catfish are the same. Compare this specimen with the one illustrated in full-body profile.



Face-on, the attractive features of this Suckermouth Cat can be seen to include the cheek spines responsible for the 'ancistrus' part of its scientific name.

tapwater which, with a total hardness of around 20 German degrees and a pH of about 8, is classed as very hard and alkaline.

Water chemistry is far less important than numerous small, but regular, water changes to keep the water quality consistently good. Zebra Catfishes originate from fast-flowing waters and, thus, react badly to not only nitrite, but also nitrate, and any other types of metabolic product and/or by-product.

L 46 has a relatively high degree of temperature tolerance. My specimens were kept at 24-27°C (75-80.6°F), while those of a friend were maintained in the company of Discus at about 30°C (86°F). This correlates with observations in the natural biotope, where Stawikowski (1989a) recorded temperatures of 30°C during the dry season — even in fast-flowing water. During the rainy season, however, the temperature is probably significantly lower.

#### AQUARIUM CARE

The main problem in aquarium maintenance is choice of tankmates, and this derives from the feeding habits of the Zebras. Anyone who automatically assumes that any catfish with a sucker mouth is an algae eater like the Bristle-nose Catfishes, *Ancistrus* spp and will virtually fend for itself in the aquarium, will soon come unstuck. Zebras eat as good as no algae and need to be deliberately fed.

And, as they are slow and peaceful eaters, they should never be kept with fishes which will clear up all the food as soon as it is put into the aquarium. Thus, Malawi Cichlids, for example, are quite inappropriate tankmates for Zebras, while small characins, etc are, in general, eminently suitable.

On the other hand, Zebra Catfishes do not have any special dietary requirements. *TabiMin*, mosquito larvae, lobster eggs, *Artemia* (brine shrimp), dried food tablets (Tetra *TabiMin*) are all enjoyed. In addition, various vegetable foods should be offered from time to time.

In setting up the aquarium, I use a fine sand/gravel mix. Large stones and, above all, bogwood or mangrove roots, complete the decor. Bogwood is one of the basics for all Loricariidae in the aquarium, as many, if not all, species enjoy scraping it. They probably require the cellulose as roughage. This requirement is not as critical in Zebras as in the Royal Plecostomus, *Panaque nigrofasciatus*, but even so there should be at least one piece in their aquarium.

The aquarium may be planted according to the tastes of its owner; Zebras will not attack underwater greenery.

If the aquarium capacity is sufficient, then one should always have a group of, at least, 4-5 individuals. But it is not until one keeps about 20 together with a shoal of Cardinals, *Paracheirodon axelrodi*, in a 120-cm/300-litre aquarium (4ft/66 gal) that one learns their true nature.

Invariably, they will be found in groups of 6-10 individuals under an overhanging piece of bogwood, or in the lee of a large stone. Only rarely will a single fish be seen by itself. While the species is probably not a true shoaling fish, it is certainly one which appreciates and requires the presence of conspecifics.

It is quite normal for these fishes to remain almost motionless next to one another, sometimes even on top of one another. They come to life only if food is dropped into the aquarium — including

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during the daytime — when they excitedly start to seek out the clusters of lobster eggs, *TabiMin* tablets, mosquito larvae, or *Artemia*.

The Zebra Catfish, L 46, *Hypancistrus zebra*, is therefore an easy-to-maintain and very rewarding aquarium fish, and one which, now that the price has descended to more sensible levels, can be recommended to every serious, though perhaps still-hesitant, catfish enthusiast.

#### BREEDING

As already mentioned, the species has already been bred, though it appears that this was a chance occurrence. If breeding is intended, there should be a large number of individuals, and the natural seasonal variation between rainy and dry periods must be simulated in the aquarium.

Males and females are easily differentiated when adult, i.e. about 8-10cm (3.2-4in) long. Males have bristle-like spines on the pectoral fins ('odontodes') on the first pectoral spine, as well as obviously stouter and longer interopercular spines (interopercular odontodes) between the gill plates.

One final point: at first glance, the striking markings give the impression that all individuals are quite identical. But, upon closer and more painstaking examination, it can be seen that no two Zebra Catfishes are exactly the same. Each individual can be recognised by slight differences in how and where the various elements of the pattern join together, or simply by the presence or absence of a spot, for example in the caudal fin. This makes observing them even more fun. You will, like me, soon be giving your Zebras names of their own.



# Tomorrow's Aquarist

By Gina Sandford

Summer's here and, like the rest of you, I'm daydreaming of holidays. When I go away, I have to make arrangements for someone to look after and feed the rabbits and check the fish. You will note that I only put 'check' and not 'feed' against the fish. I think I've had more trouble caused through over-zealous, well-meaning friends who thought I'd not left enough food for the creatures and over-did it with the flakes, than by leaving the fish unfed for two weeks.

It is vital that you get someone to check on the fish on a daily basis because, should there be a power cut, a tank crack, heater blow, etc, it needs to be sorted out if your fish are to survive.

Before you leave, carry out your regular tank maintenance: water change, clean the filter and also service the equipment. Make sure the lighting is working and, if necessary, put it on a time switch for the duration of your holiday — you need to keep the plants growing, otherwise they will start to die and decay, thus placing an unnecessary strain on the filtration system. Check the diaphragms on air pumps and either change them if they are looking suspect, or leave spares.

Above all, if your fish minder is not an aquarist, make sure that you leave a contact number for someone who is capable of dealing with a major crisis and is willing to do so.

## TO JOIN A CLUB OR NOT . . . ?

At Ilford's recent Convention, I was wandering about the halls looking for anything that might take my fancy, and came across all manner of things — spiders — big hairy ones — the sort that they use in horror movies. Then there were the bugs — crickets, etc, all manner of live foods, newts, tadpoles and, of course, fish.

But the thing that came over most, was the fact that many of the stands were run by clubs other than Ilford. They were offering fish their members



A shoal of Sticklebacks. If you look closely, you will see that they don't have normal scales. They do, however, have a line of 'scutes', or plates, running down the length of the body. In one of the top fish — the one facing away from the camera — the protective projecting scutes near the base of the tail can be clearly seen.

of the South American catfishes.

## 'Armour' plates

The Callichthyidae (appropriately known as Armoured Catfishes) have a double row of plates on each side of the body, each plate corresponding to a muscle segment or vertebra (back bone). This arrangement is known as *metameric*.

## 'Whip' plates

The Loricariidae (Whip-tails) have three series of plates protecting the sides of their body, again in a *metameric* arrangement, but they go a little further and some have their bellies covered in much smaller so-called platelets. The plates on their sides may also have small spines formed from a substance called dentine on them and these are similar to the dermal denticles (skin 'teeth') found on sharks.

## 'Talking' plates

The Doradids (Talking Catfishes) on the other hand, have a single series of scutes along the midline on their flanks, each scute being armed with a backward-projecting spine. Similar structures occur on the Sturgeons, where they are known as *bucklers*.

## 'Stickler' plates

Even the Common Stickleback is devoid of scales but does have a series of bony plates along each side.

In the British Stickleback, the number of plates seems to vary with salinity, fish in freshwater having fewer plates than their marine counterparts.

had bred, plants they had grown, and as much information about them as they could give you. All you had to do was ask.

## Don't be afraid to ask

So why then, are people afraid to ask? Is it because we are afraid in case we are asking the obvious and everyone will think we're silly? When I give lectures, invariably very few people will stand up and ask questions, but I bet you they corner me afterwards to ask a few, and they probably start with the words, "I know this sounds silly but . . .", or "It may be obvious but . . .".

Well, it's usually the obvious we all overlook. Many's the time I've discussed a problem over tea, or whatever at one of these events and someone has said, "But it's obvious. You do this and this!" and I shake my head, thinking, "Why didn't I see that?"

For me, this is what fishkeeping is about; an exchange of ideas. It's knowing that if something goes wrong in the middle of the night, I can phone a friend and get help and, finally, it's about the fish and plants that makes them tick. If we can understand that, we can breed,

propagate and conserve our fish and plants.

## Join a society

Fishkeeping is a process of continual learning. None of us will ever admit to being experts, but most of us will admit to making ghastly mistakes in our time. However, the thing is, did we learn from them?

In order to learn we have to communicate with like-minded people, and where better than at your local club? Some advertise their meetings in this magazine, others use the local newspapers. Most have junior membership available. If you can't find anything, then contact one of the Federations and they will be more than happy to put you in touch with the secretary of your nearest society. Try it, you might just enjoy yourself!

## PLATES AND SCUTES, NOT SCALES

Over the last three months, I've looked at the different types of scales found on fishes. There are, however, some fishes which have forgone scales and have sacrificed manoeuvrability for a heavy armour that offers protection from predation and desiccation. Among these are some



# OUT AND ABOUT

## LONDON ZOO AQUARIUM: THE FUTURE

By Linda Lewis

Photographs by the author



Children are always fascinated by the exhibits at London Zoo Aquarium.



A ray presses against the front glass of its large aquarium in the Seawater Hall.



If funds can be raised, the Aquarium's Hawksbill Turtles will be returned to the wild.

My memories of school trips to London Zoo are not of elephants or tigers, but of the Aquarium. It was there that I discovered that there was more to fishkeeping than goldfish in bowls.

When the news first broke that London Zoo might close, my heart sank. Now, at last, there is a future. £21 million is to be spent over a period of eight years to turn London

Zoo into a haven for endangered species. Plans for the Aquarium are still being discussed.

There has been an Aquarium at the Zoo since 1853 and it has been housed in the present building since 1924. The latest plans involve redeveloping the existing site to make the Aquarium more 'visitor friendly'. It is hoped, for example, that the public

areas will be refurbished and decorated and, eventually, catering and toilet facilities provided, along with an informative video display.

New circular display tanks may also be built in the middle of each of the three halls (currently called Freshwater, Seawater and Tropical), giving an all-round view. One may be a touch pool, and may hold creatures found in British rockpools, such as starfish and anemones. If funds allow, staff or volunteers will be on hand to answer visitors' questions.

Some smaller tanks will be replaced by larger ones so that they can better imitate habitats found in nature. One example could be a display reproducing conditions found in a fast-flowing tropical stream, and in which cyprinids and loaches live together. Such communities in which a variety of creatures occupy different levels and niches, are always full of interest.

Fish, because of their movement, and great variety of shapes and colours, provide a living spectacle which never repeats itself. Perhaps this explains why the Aquarium is so popular; a recent survey of visitors placed the Aquarium second only to the gorillas and chimpanzees.

A 20,000 gallon shark tank was on the cards at the time of my visit, to help the Aquarium retain its high ranking. Though not of the tunnel walk-through type, which is becoming increasingly popular, it would provide good viewing facilities, along with optimum conditions for the inhabitants.

Putting the animals' interests first helps to explain why breeding successes are common at the Aquarium. As of 1992, for example, around 250 different species of fish lived at the Aquarium and of these, 39 bred. Among these are *Haplochromis ishmaeli* and

*H. pyrocephalus*, two Lake Victoria cichlids which are thought to be extinct in the wild. Obviously, if the time and trouble were not taken to encourage them to breed at the Zoo, the species would quickly die out completely.

It is not widely known that the Zoo does so well with some kinds of fish (from Guppies to cichlids) that they are able to pass them on to wholesale outlets in return for supplies. This helps reduce demand for wild-caught specimens which has to be a good thing, and also helps to reduce the Aquarium's running costs.

Once refurbishment is complete, visitors should be able to see, through a window, part of the area used for breeding. This should help attract the attention and funding which such schemes need in order to flourish. A new Piranha tank (always a popular choice) and an area dedicated to amphibians should also help to attract visitors to the Aquarium.

Much work needs to be done and it will be some time before improvements can be seen or plans implemented. Meanwhile, the Aquarium is seeking help, via sponsorship, from anyone who can offer it, from individuals to large corporations.

If you belong to a fishkeeping society, or work for a company involved in the sale or manufacture of aquarium-related articles, please consider sponsoring. Whether you can afford to help with one small tank or a vast display, all support will be gratefully received and acknowledged.

For details, write to **Brian Harris, Head Keeper, London Zoo Aquarium, Regent's Park, London NW1 4RY**. Alternatively, why not organise a visit? I guarantee you will enjoy it.

The Zoo is open every day from 10 am-4 pm. Adults: £6, children aged 4-14: £3.70.



# Your questions

# Answers

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

### BASKING FACILITIES

*I have two Red-eared Sliders and have read that they must be provided with a basking area. Why is this?*

*I would also like to know how best to go about providing such a feature.*

A basking area is essential to allow the turtles to climb out of the water and dry their shells.

The shell is composed of an upper half called the carapace and the lower plastron. Drying the carapace allows the outermost layers of the shields, called scutes, to loosen gradually at the edges and eventually completely peel off. As

Red-eared Sliders require proper basking facilities for healthy shell growth.



new shell material has previously formed underneath, continual loss of the upper, outer layers is essential for even growth.

Freshwater turtles which are denied basking facilities often have a stunted, deformed carapace because thick layers of old material have built up over each shield. These thick layers

act as a 'corset', restricting even growth.

The basking area might be a single rock which forms an island in the centre of the tank. Alternatively, a basking area can be constructed at one end of the tank by placing two layers of old, well weathered, bricks or paving slabs in the water. If either of these two

methods is used, the Sliders can swim up to the dry area and crawl out directly.

Two points of caution about the construction of the basking area:

- ① The bricks or rocks in the water must be securely arranged so that the turtles cannot dislodge them and send them crashing through the glass of the tank.
- ② The basking area must be so arranged that it cannot be used as an escape route by the turtles. Turtles dropping out of the tank onto the floor will undoubtedly injure themselves.

## MARINE

### RAGGED URCHIN

*I recently bought a tropical sea urchin and introduced it into my 48in (120cm) invertebrate aquarium.*

*After four hours it was beginning to look a bit ragged. After five hours it had lost all its colour and many of its spines.*

*My nitrates are 0, and nitrates 20 parts per million. The temperature is 24°C (75°F) and there are plenty of algae for the urchin to graze on.*

*What do you think has caused the problem? Will the urchin recover?*

I'm afraid that it is impossible to pinpoint the cause of your problem. Anything could have had the effect which you



Unfavourable water conditions can result in loss of colour and spines in sea urchins.

describe. However, I can offer some educated conjecture and a little advice. I outline below a few things that might have caused your urchin to lose its colour and drop some spines.

- ① There could have been

traces of ammonia in your aquarium, or your nitrates are, in fact, higher than you think (i.e. your test kit may be inaccurate).

- ② Your water quality parameters may be different to

those of your dealer to such an extent that the urchin was 'shocked' when introduced to your aquarium.

And now the advice:

- ① Always make sure that your filter — of whatever type — is clean and working at optimum level, i.e. that there are no blockages and that the pump(s) is/are working properly.
- ② Buy only healthy animals. With invertebrates, this means, usually, that all parts are intact.
- ③ Take time to introduce new animals slowly in order to get them acclimatised properly. Sudden changes in things like pH, salinity or temperature can be deadly.



## KOI

### MEDIUM QUERY

I have a 4,000-gallon pond with a four-bay filter section containing about 1,000 gallons of water, although its surface area is quite small.

I plan to use filter brushes on their own in the first section, suspended filter brushes with some medium underneath in the second, followed by Canterbury Spar in the third. However, I am concerned about the weight and am therefore toying with the idea of using either Flocor or Siporax.

The fourth section of the filter is quite small, so I was planning to fill it with one or other of the above media.

I would welcome your comments.

As your proposed filter is quite small in surface area, I suggest that it would be advantageous for you to fill all your bays with brushes, as opposed to mixed media of any kind.

Brushes are very effective and can be easily cleaned as often as required.

Spar seems to be falling from favour owing to its weight disadvantage. I feel that the final bay would not require cleaning more than perhaps once a year, provided the flow rate was not excessive.

When removing heavy layers of 'crud' from the brushes, you should use 'dirty' water for cleaning, rather than fresh, so as to minimise bacteria loss from the filter. Minimum cleaning action should be used, as it is not necessary or indeed desirable to leave the brushes spotless.

With regard to an alternative medium, the main disadvantage of Flocor (which is, otherwise, very good) is the actual bulk which therefore requires considerable space. Siporax, on the other hand, is an excellent medium in this

respect, but is expensive in the quantities you desire.

It's a case of you pays your money and takes your choice!

### UNFINISHED KOI

What is an 'unfinished' Koi? Does this relate to their pattern or their colour? I know that some varieties are late bloomers with respect to their 'Sumi' (black) and 'Hi' (red).

Please enlighten me. With regard to 'unfinished'

Koi — known as Tategoy — you are correct in your assumption that this relates to the fact that both pattern and colour are still improving. This is a continuous process throughout the life of every Koi which, of course, can result in disappointment just as much as triumph. Both 'Hi' and 'Sumi' can undergo dramatic changes, irrespective of sex, as a fish grows and approaches maturity, so it is all a bit of a lottery.

Healthy young Koi. Both their colours and patterns will change as they grow.



## PLANTS

### PLANTS FOR BUBBLE NESTERS

I would like to set up a tank for Siamese Fighters, Gouramis and related species.

Would you please recommend suitable floating and rooted plants for such a set-up?

Suitable plants for a 'bubble nester' aquarium would be:

- 1 Bottom (rooted) plants:**
  - Cryptocoryne spp (all species)
  - Aponogeton spp
  - Nymphaea spp (small tropical water lily species)
  - Limnophylla (Giant Ambulia)
  - Hygrophila (Indian Water Star and Water Wisteria)
  - Nomophylla (Giant Hygrophila)
  - Microsorum (Java Fern)
  - Venicularia (Java Moss)
  - Vallisneria (Tape Grass)

- 2 Floating plants with a long root system:**
  - Ceratopteris (Floating Indian Fern)
  - Ceratophyllum (Hornwort — the best)
  - Pistia (Water Lettuce)



All Cryptocorynes are suitable for a tank that will accommodate bubble-nesting species of fish.

### GETTING RID OF ALGAE

How can I get rid of green algae?

There are numerous species and genera of algae, all of which have their own special requirements. This means that most tanks have one form of alga or other. Certain species are, however, particularly obnoxious.

Algae need nitrate and phosphate to survive, so adding a phosphate remover may well do the trick. Adding floating plants, such as *Salvinia* or *Ceratophyllum*, will also be effective.

You could also use a good algicide. Some are pretty effective, containing copper as the active algal-destroying agent.

In conclusion, using phosphate remover, floating plants and algicide together should solve your problem.



## TROPICAL

### COMMUNITY SELECTION

*I would like to set up a tropical freshwater community tank and would be very grateful if you could recommend a selection of fish that will live happily together. I would also like to know which species to avoid.*

There are thousands of fish suitable for the home aquarium, so it is impossible to list them all, except in a manual of fishkeeping. The following are the top ten most popular tropicals, which is a useful guide:

Neon Tetra, *Paracheirodon innesi*, Cardinal Tetra, *Paracheirodon axelrodi*, Angelfish, *Pterophyllum scalare* (note that older Angels can turn nasty, but remain very popular — sometimes the top seller), Guppy, *Poecilia reticulata*, Molly, *Poecilia* spp (but not necessarily the Black Molly which is really a brackish-water fish), Platy, *Xiphophorus maculatus*, Swordtail, *Xiph-*

Swordtails are among the most popular of all community species.



HARRY GRIER/FLORIDA

NATIONAL FISH FARM ASSOCIATION

*ophorus helleri*, Zebra Danio, *Brachydanio rerio*, Dwarf Gourami, *Colisa lalia*, Cory Catfish, *Corydoras* spp.

Most aquatic shops list suitable fish as 'community' fishes, which, by definition, means they are compatible. Some good stores use a traffic light system, with a red dot on the display for fish that are dangerous or require special conditions, amber for fish where special knowledge is needed before buying, or green for easy-to-keep, compatible species.

Do not add coldwater species to your tropical collection. Sometimes, you can see Fancy Goldfish in the tropical aquarium. These fish can (just) tolerate the higher temperatures, but have no resistance to the tropical diseases and eventually fall ill.

### USING STREAM WATER

*We have several streams running through our town. Would it be safe to draw water from these*

*for our freshwater tropical aquaria?*

One of the problems with stream or river water is that you have no control over its quality. If wild fishes are present, they will certainly be carrying parasites, which you may introduce into the confines of your aquarium, with disastrous results.

If no fish are present, it may be because of pollution!

Why not use collected rainwater instead? To avoid 'acid rain', use a polythene sheet pegged out on the lawn with a central hole under which is a collecting bucket. Throw the first collection from 5 or 10 minutes of steady rain away. Thereafter, the heavens will have been washed ...!

Tapwater remains your best alternative, however. It is guaranteed free of parasites and bacteria and treatments are available to remove the chlorine and buffer the pH, if needed.

## COLDWATER

### GOLDFISH HEALTH TIPS

*I have recently acquired a Common Goldfish from my local pet shop.*

*I am keeping it in a roomy tank with gravel on the bottom. Is this OK? How do I keep my fish healthy?*

The most important point to remember when keeping fish is that the water in which they live must always be in the best possible condition. They cannot remain healthy if their water is not suitable.

Therefore, you must make quite sure that the temperature does not fluctuate too rapidly. If your tank is positioned near a radiator or window where sunlight will heat the water, or if it is near a door, and so, in a draught, then the water temperature will rise and fall too quickly and will have a bad effect on the health of your fish.

Water must be changed frequently, two or three times per week in small tanks, but change only about 1/3 of the

volume with water of approximately the same temperature.

Make sure that your fish has a varied diet, but do not feed too much at each feed so that much of it is left to spoil the water. Use a gravel cleaner when changing some of the tank water. This useful gadget siphons out the bits of food left between the gravel.

A few real plants will help create a better, natural environment and provide vegetable matter supplement for the diet.

Even without a filter, the tank should be given aeration, so you will need a small pump. Instead of just an airstone, why not connect the airline to a small sponge filter? This will keep the water clear, though as I have already explained, changing water will keep it clean.

### HERON CLEAN-OUT

*Our local heron has virtually cleaned out our pond of fish. From about 200, we are down to about 10 — just in a few weeks.*

*We are thinking of covering our pond with a net, but it's so unsightly. Do you have any other ideas?*

The theft of fish from a pond by predators of whichever kind, is most distressing. Unfortunately, herons are common culprits with good memories. They therefore tend to revisit waters where they have previously had some successful fishing.

I appreciate how unsightly a cover net is, but it's far better than the expense of continual restocking.

Alternatively, why not try a different approach using a Pondguard Heron/Cat Scarer? It's easy to install, not unsightly and is effective without harming herons or cats in any way. In fact, it is approved by the Royal Society for the Protection of Birds (RSPB).



JOHN DAVIES

Pondguard: safe visual/sound protection against herons and cats.



# Coldwater jottings

By Stephen J. Smith

## SCOTTISH SOCIETY EXPANDS

The Goldfish keeping hobby really seems to have taken off in the northern reaches of the British Isles, if the continued expansion of the West of Scotland Goldfish Society is any indication.

Following their innovative Open Day held in March, the society has reported several new members recruited to their ever-expanding membership. They are also currently busy with last-minute preparations for the first Open Show, to be held next month (Saturday 7 August).

PR officer Fergie Brown is hoping to make it "the biggest Goldfish event in the UK", and will be welcoming Goldfish keepers from all the major specialist societies in the country, as well as a number of trade stands and a host of family attractions.

Yours truly has been invited to the event to meet exhibitors and visitors and to make the presentation of trophies, so I am also looking forward to seeing you there on the day.

The show is being held at PYCA — Pollok Young People's Club, 35 Muir Shield Crescent, Priesthill, Glasgow G53 7AD, and further information about the show is available from Fergie Brown, at 6 Invershiel Road, Summerston, Glasgow G23 5JG (Tel: 041 946 8019); or from the society's newly-appointed secretary Sandra Lang, 50 Luganswell Road, Glasgow G46 8AX (Tel: 041 638 8980), who will also be pleased to help you with membership information.

## HOLIDAY FISH FEEDING

With the summer holidays now well and truly upon us, thoughts begin to turn to the prospect of a week or two 'away from it all' to recharge the batteries. But what to do with the fish...? Shall we get the neighbours to feed them,

or shall we enrol a 'fish-sister'?

Both of these are among the dozens of questions I receive throughout the year regarding the care of fish during the owners' absence on holiday. My reply: do nothing!

It isn't quite as simple as that, but my own feeling is that fish — whether in the pond or the aquarium — can suffer from a little-known ailment: that of *insufficient neglect*. In other words, it will probably do your fish far more good than harm if they are left to their own devices for a week, or two at the most.

I have never experienced a fish dying through lack of food, but I am aware of many which owe their demise, quite

simply, to *too much* care and attention. So, some days before you depart for your break, ensure that you have undertaken the regular tasks of partial water changes and checking equipment and, if your fish are kept in a pond, that the 'spring clean' has been done and a partial water change carried out.

It is also a useful expedient to place netting over the pond to deter predators (such as the neighbours' cats) and, perhaps, some shading against the possibility of direct sunlight (isn't the weather always better at home when we go away for a holiday...?).

Then, rest assured, you can enjoy your holiday in peace,

with the knowledge that, unless you have an earthquake in your district (a good time to be away on holiday...!) your fish will be safe and sound, themselves basking in the indulgence of a couple of weeks of simply being left alone.

## FOUR-BUBBLE SPECTACULAR

By the time you read this, I will have returned from my second visit to Singapore, where I have had the honour of being invited to judge the Goldfish Section of the Fish Competition at *Aquarama '93*.

More details, hopefully, in the next issue of *A & P*, but one of the highlights of the trip to the world's leading conference and exhibition of the fishkeeping hobby is to see the first Four-bubble Goldfish.

'Normal' Bubble-eye. Watch this space for news of the Four-Bubble.



These are being introduced to the hobby at *Aquarama*, by Qian Yang Aquarium of China, for the first time outside China, and promise to be an exciting development in the Goldfish scene.

Now, I have never been a big fan of some of the more 'gruesome' Goldfish varieties which have been introduced to the hobby over the last decade or so. Thankfully, none of these have been perpetuated, which is testimony to the discerning fishkeeping public in the UK.

I do have a penchant for the Bubble-eye, however — considered by many to be 'gruesome' itself, but a fascinating variety nevertheless. I under-

stand that the bubbles of the Four-bubble Goldfish are smaller than those of a conventional Bubble-eye (see photo). The upper pair are the usual exaggerated sacs of fluid immediately below the eye and I believe that the second pair is situated under the chin (I write this prior to my departure to Singapore).

And this turns my thoughts to an unexpected feature of a spawning of Blue Orandas a few years ago, some of which, themselves, had bubbles under the chin. I allowed this half-dozen or so 'freaks' to develop into reasonably-sized fish, rather than cull them out, but the characteristic was fascinating, though not really to my own taste.

The bubbles appeared to be a deformity of the floor of the mouth and, when the fish took food in, particles could be seen swirling within the bubbles themselves!

Happily, I have not seen this characteristic since in any of my spawnings of Blue Orandas, or any other variety, but I would be interested to hear of other hobbyists' experience of similar, or other, 'deformities'.

We have, on these pages, encountered a twin-dorsal Shubunkin — a characteristic which, in my opinion, was quite acceptable and which could have provided a whole new dimension to the hobby, had further generations been produced — and I have heard of a Jikin-coloured Common Goldfish, of which I would like to learn more.

I understand that progress is also being made by one hobbyist in particular, in developing a calico Wakin. Again, an update would be welcome. But, these apart, very few 'new' varieties have been produced in the UK.

The only truly acceptable 'new' variety to have been developed on these isles is the Bristol Shubunkin (some 30 years ago) and, while I am certainly not advocating any 'gruesome' varieties, it will be interesting to see just what the British hobbyist is doing to advance the selective breeding of Fancy Goldfish.

In the meantime, I am looking forward to seeing and reporting upon the Four-bubble Goldfish in a future *Coldwater Jottings*. Watch this space.



# Koi Calendar



By David Twigg

## JOBS FOR THE MONTH

Summer is now with us and water temperature is at or near to its maximum. At temperatures above 20°C (70°F) our Koi will be at the peak of health and any bumps or bruises they may suffer, while spawning, for instance, should be disappearing within a couple of days of seeing them without recourse to the medicine chest.

It would be wise, nevertheless, to keep a watchful eye on these wounds just in case they become infected by bacteria or fungal spores, which are also increasing in numbers with the increasing water temperature. In most instances of infection at a time when temperature is high, Koi will have sufficient antibodies to fight off the invasion without the use of drugs. If, however, you consider help from a human necessary, then please try to minimise stress during the whole procedure.

## Catching Koi

Catching Koi in a pan net to enable treatment to take place is a stressful time for both Koi and owners alike. Netting Koi is an art that can be learned, given a little of that virtue, patience.

First of all, it is necessary to ensure that the correct net is used. The diameter of the pan and the length of the handle are most important, as is the need to control the speed of the net through the water.

Much damage can be inflicted on Koi, other than the one you wish to catch, by their inability to dodge the moving net.

My own *modus operandi* is as follows:

① I place and leave the net in the pond for a few minutes to allow the Koi to get used to it. Have you ever noticed how inquisitive Koi are?

② I move the net slowly towards the Koi to be treated, with the aim of separating it from the shoal. Invariably, every fish bar the one you want, will either swim by or into the net during this procedure, but with the aforementioned virtue, it won't be long before you have perfected this technique.

③ Having separated the Koi, it is now a matter of getting it to swim into the net. This is achieved by carefully and slowly bringing the net closer to, and up under, the Koi without causing it to panic.

④ Having entrapped the Koi in the pan net, it is then guided into the floating bowl or basket in readiness for further action as required for successful treatment.

A Koi should never be lifted out of the water by a pan, or indeed any other net. Much damage to scales can be done, and, certainly, the mucus layer can be breached. Having said that, there is on the market a net designed for handling Koi. It is a 9 x 36in (c 22 x 90cm) tube made of very fine mesh netting mounted upon a small rim and has a short handle.

⑤ Having got the Koi into bowl or basket, it is a simple matter to get it to swim into this tubular net.

⑥ Once safely in the centre of this dark tube, the Koi can be moved by taking hold of each end of the tube and lifting it out of the water.

Remember, if the fish you need to catch does, at any time during the netting process, shoot away or jump over the net, please don't go chasing after it, but start the procedure all over again.

## JULY SHOWS

This month brings four shows to pick from, covering the length of the United King-



dom; Scotland to the South Coast.

4 — **Wothing & District BKKS.** Open Show.

11 — **Lower Thames-side Section BKKS.** Open Show. Eastwood Junior School, Rayleigh Road, Eastwood. Contact Valerie Radley on 0702 529675. **Scottish Section BKKS.** Closed Show. Cronberry, Near Cumnock, Ayrshire. Contact Archie Dick on 0786 832073.

25 — **Essex Section BKKS.** English Style Open Show. Aveley Sports Ground, Aveley. On A13, 2 minutes from Dartford Tunnel.

## WHAT'S ON IN JULY

1 — **Middlesex & Surrey Borders Section BKKS.** CIU Norbiton Club, Kingston-upon-Thames. Contact Marie Martin on 0372 272462.

**North Wales Koi Club.** 7.45 pm, David Bryant Bowling Centre, Frith Beach, Prestatyn. Contact Eileen Price on 0745 591730.

**The Potteries & District Koi Keepers Society.** Social evening. The Thistleberry Hotel, Newcastle-under-Lyme. Contact Ivan Rwatchew on 0782 45864.

4 — **Lower Thames-side Section BKKS.** Monthly meeting. Contact Val Radley on 0702 529675.

**Central Section BKKS.** Members' pond visit. Contact Sue Finney on 021 747 2733.

**Wothing & District Section BKKS.** Preston Scout Hall, Bognor Regis, Sussex. Contact Steve Willard on 0243 267893.

5 — **Kennet Valley Section BKKS.** 8 pm at Newbury Rugby Club, Pinchington Lane, Newbury, Berks. Contact Bob Thompson on 0734 713640.

**Northern Koi Club.** Beginners' Seminar in Simister, Prestwich. Contact Tony McCann on 061 794 1958. **North Lincs Koi Society.** Talk on *Pond and Filter Construction* by Dave Thorley of *Thorley International Koi*. 8

pm, Brackenborough Arms Hotel, Fotherby, Nr Louth. Contact Anne Mawer on 0472 826605.

6 — **Yorkshire Section BKKS.** The Holme Lees Inn, Ouse, Nr Wakefield. Contact Fred Harston on 0226 722578.

7 — **Leicestershire Koi Society.** Old Aylestone Constitutional Club, Leicester. Contact Ian Oliver on 0533 839707.

**Plymouth & District Section BKKS.** 7.30 pm, The Lynham Inn, Plympton, Plymouth. Contact Trevor Ridley on 0752 690087.

**Suffolk & North Essex Section BKKS.** Coach trip to visit ponds in Peterborough area. Contact Dennis Prou on 0371 856450.

8 — **East Pennine Section BKKS.** Monthly meeting, 8 pm at The Phoenix, Platts Common, Burnley. Contact John Timmis on 0226 289507.

10 — **Heart of England Koi Society.** Warwick. Contact me on 0926 495213. **Crouch Valley Section BKKS.** Laindon, Basildon. Beginners' class. Contact Alan Ward on 0268 543600.

11 — **Merseyside Section BKKS.** *entertain East Pennine Section BKKS.* Contact Robbie on 051 549 2001.

**Mid-Somerset Section BKKS.** *visit South Hants Section BKKS ponds.* Contact Alan Purnell on 0458 72132. **Northern Koi Club.** St James Hall, Pendleton. Contact Tony McCann on 061 794 1958.

**Nottingham Section BKKS.** *visit Aton Section ponds.* Contact Shirley Hind on 0602 810923.

12 — **Northants Section BKKS.** Monthly meeting in Northampton. Contact John Byles on 0604 718648.

13 — **Chiltern Section BKKS.** Contact Ann Howard on 0462 679315 or Mike Reed on 0525 375418.

14 — **Merseyside Section BKKS.** Speaker is Paul Stacey of *Skirley Aquatics*. Millbrook Manor Restaurant, Knowsley Village. Contact Robbie on 051 549 2001.



- 15 - **Witral & District Section BKKS.** Lever Sports & Social Club, 8 pm. Contact Cilla Hardisty on 051 645 7832.
- 18 - **Lower Thames-side Section BKKS** entertain members from *Middlesex & Surrey Borders*. Contact Val Radley on 0702 529675.  
**Northants Section BKKS** entertain visitors from *Lea Valley & Harlow Section BKKS*. Contact John Byles on 0604 718648.  
**Central Section BKKS.** Visit *Esperanza Park Fisheries* and *Japanese Water Gardens*. Contact Sue Finney on 021 747 2733.  
**South Hants Section BKKS.** Visit by *South East Section BKKS*. Contact George Rooney on 0420 473169.  
**Lea Valley and Harlow Section BKKS.** Members visit *Northants Section BKKS* ponds. Contact Bary Ford on 0279 419101.  
**East Riding Section BKKS.** Barbere, Contact Tim Goodyear on 0964 542762.  
**Yorkshire Koi Society.** Monthly meeting, Wetherby, 2.30 pm. Contact Graham Baines on 0423 864297.  
**Scottish Section BKKS.** Linlithgow. Contact Archie Dick on 0786 832073.  
**Northern Section BKKS.** Monthly meeting. Contact Phil Adamson on 051 220 2970.  
**Northern Koi Club.** Two speakers tonight! Bernice Brewster on *Fish Parasites* and Harry Green on *Breeding Koi*. Meeting in Salford. Contact Liz Donlan on 061 643 9107.
- 19 - **Border Koi Club.** Lanes Library, Carlisle. Contact Amy Fisher on 0228 513623.
- 21 - **Mid-Staffs Section BKKS.** RNA Club, Elmoe Green Road, Bromwich. 8 pm. Contact Don Dye on 0543 425178.  
**Crouch Valley Section BKKS.** Laindon, Basildon. Speaker is Peter Oakes on *Sponax & Filter media*. Contact Alan Ward on 0268 543600.
- 25 - **Northants Section BKKS.** Seminar on *Fish Diseases and Treatment*. Contact John Byles on 0604 718648.  
**Essex Section BKKS.** North Stifford Village Hall. Contact Bobbie Barton on 0702 611750 or Margaret Bishop on 0702 522388.  
**South East of England Section BKKS.** Monthly meeting. 2.30 pm, Community Centre, Chelsfield, Kent. Contact Mick Wright on 0634 718943.  
**East Riding Section BKKS.** Visit *East Pennine Section Ponds*. Contact Tim Goodyear on 0964 542762.

- 27 - **East Riding Section BKKS.** 7.30 pm, Grovehill PH, Holme Church Lane, Beverley. Contact Tim Goodyear on 0964 542762.  
**Mid-Lincs Section BKKS.** West Ashby, Nr Horncastle. Contact Brenda Goodwin on 0522 688631.
- 28 - **London Section BKKS.** Ruskin House, Coombe Road, Croydon, 8 pm. Contact Keith Nind on 081 673 3574.

### COMING IN AUGUST

- 1 - **Lower Thames-side Section BKKS.** Monthly meeting. Contact Val Radley on 0702 529675.  
**Mid-Somerset Section BKKS** visit *Kennet Valley ponds*. Contact Alan Parnell on 0458 72132.  
**Worthing & District Section BKKS.** Preston Scout Hall, Bognor Regis, Sussex. Contact Steve Willard on 0243 267893.  
**Northants Section BKKS.** Seminar on *Pond Construction*. Contact John Byles on 0604 718648.
- 2 - **Kennet Valley Section BKKS.** 8 pm at Newbury Rugby Club, Pinchingon Lane, Newbury, Berks. Contact Bob Thompson on 0734 713640.  
**North Lincs Koi Society.** 8 pm, Brackenborough Arms Hotel, Fotherby, Nr Louth. Contact Anne Mawer on 0472 826605.
- 3 - **Yorkshire Section BKKS.** The Holme Leas Inn, Ossett, Nr Wakefield. Contact Fred Harston on 0226 722578.
- 4 - **Suffolk & North Essex Section BKKS.** 7.45 pm, Prince of Wales PH, London Road, Marks Tey, Colchester, Essex. Contact Dennis Preou on 0371 856450.  
**Leicestershire Koi Society.** Old Aylestone Constitutional Club, Leicester. Contact Ian Oliver on 0533 839707.  
**Plymouth & District Section BKKS.** 7.30 pm, Lynham Inn, Plymouth, Plymouth. Contact Trevor Ridley on 0752 690087.
- 5 - **Middlesex & Surrey Borders Section BKKS.** CIU Norbiton Club, Kingston-upon-Thames. Contact Marie Martin on 0372 272462.  
**North Wales Koi Club.** 7.45 pm, David Bryant Bowling Centre, Frith Beach, Prestatyn. Contact Eileen Price on 0745 591730.  
**The Potteries & District Koi Keepers Society.** Guest speaker: Bill McGurk. The Thistleberry Hotel, Newcastle-under-Lyme. Contact Ivan Rwtachew on 0782 45864.

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# Focus on: WATER LILIES



*Nymphaea x pygmaea* 'Alba', the finest of the pygmies.



Two attractive pygmy varieties: the popular yellow-flowered 'Helvola' and the much rarer, and more expensive 'Rubra'.

## SMALL IS BEAUTIFUL

Water lily specialist Philip Swindells focuses in on the many attractions of the pygmy and dwarf varieties of lilies suitable for tubs and other water features.

*Photographs — unless otherwise indicated — by Reg Henley.*

**A**mong the myriad hardy water lilies are a range of dwarf and pygmy kinds, beautiful little aquatics which are much neglected. The reason is a little hard to understand for, with gardens becoming ever smaller, one would think that tiny water lilies would become quite fashionable.

With the true pygmy kinds, this is happening in the United States, as during the last few years, tub or barrel gardening has become very popular. Indeed, I know of two nurserymen in North America who make their living solely from the supply of aquatic plants for tub gardens.

It is this kind of culture which is eminently suited to miniature water lilies, since they require shallow water, and yet will not spread extensively. They are very well proportioned and complete miniature replicas of their larger counterparts. It is not just the blossoms that are smaller.

### PYGMY HYBRIDS

The tiniest is *Nymphaea x pygmaea* 'Alba', a plant considered now of doubtful origin and possibly just a form of the widely distributed white-flowered *N. tetragona*. Whatever the botanists decide, for the water gardener it is the finest little white-flowered water lily, sporting delicate blossoms no more than the size of the new penny, each with a central boss of bright golden stamens. Unlike all other water lilies, this little gem reproduces only from seed.



'Aurora' — a particularly attractive pygmy variety which changes colour as it ages.





*N. x p. 'Alba'* is propagated from seeds. In this photograph the fruits have been wrapped in polybags to collect the seeds when the ripe seed heads explode.



'Alba' seeds.

The beautiful yellow-flowered *N. x pygmaea* 'Helvola' grows freely from 'eyes' or divisions, and rarely sets seed. If it did, its progeny would be of questionable likeness, and, in all probability, inferior. *Nymphaea x pygmaea* 'Helvola' is a wonderful free-flowering water lily with bright starry canary-yellow flowers among dark olive green leaves that are splashed and stained with maroon. It has a long flowering period, the first blossoms appearing in June, the last fading with the early October frosts.

The red-flowered *N. x pygmaea* 'Rubra' is a much less colourful character. Its dark wine blossoms are only scarcely produced and emerge from among dark green foliage. A slow plant to propagate, it is usually very expensive and, really, only a plant for the enthusiast.

The pink-flowered *N. x pygmaea* 'Joahann Pring' is equally scarce and expensive, although, in future, it is likely to become very popular. Of American origin, it is now being propagated in Britain and should be widely available in a year or two. This variety is a lovely complement to *N. x p. 'Helvola'*.

The foregoing are all pygmy hybrids, but one should not neglect the opportunities presented by one of the main parents of these little jewels, the white-flowered *N. tetragona*. An easy-going character, it is very hardy and resilient, in the wild occurring as far north as Alaska, but with a distribution which spans much of Asia as well. Different geographical forms exist, all with white flowers, but differing in behaviour and foliage colour and shape, a number producing leaves that are pleasingly marked.

#### YEAR-ROUND PYGMY CULTIVATION

It is interesting to observe where these plants grow in the wild, for this gives a clue to possibilities with cultivation. Natives of areas where there is a periodic presence of water, it follows that it may not be necessary for the plants to spend their entire lives submerged. In nature, they often inhabit pools created by a tropical monsoon, or sometimes snow-melt above permafrost in tundra regions.

When the *N. tetragona* complex and their varieties are cultivated, it is quite possible to dry them off for a period, a considerable advantage for tub culture. Few gardeners want tubs of water standing on the patio all winter, so, in the autumn, when your pygmy

water lilies fade, tip out the water and put the tubs in the garage. Unless they become bone dry, it is unlikely that the water lilies will perish.

In the spring, take out the plants, replace the aquatic planting compost, return them and fill the container with water. Cultivation is as simple as that. It is useful to add a small goldfish to each tub during the summer in order to control mosquito larvae and other aquatic insect life, but, otherwise, care consists of little more than replacing the water lost to evaporation.

#### DWARF TYPES AND THEIR CULTIVATION

The dwarf water lilies are slightly different. They require deeper water and have a leaf spread that would swamp a tub or half barrel. These water lilies are well suited to the smaller garden pool and the shallower parts of more extensive water features. Few enjoy a water depth of much over 15in (38cm), but will grow in as little as 9in (23cm) if necessary.

The most important group is that known as the *N. x laydekeri* hybrids. These occur in most colours except yellow and have a discernible fragrance.

The brightest and most popular is *N. x laydekeri* 'Fulgens', a vivid red water lily of outstanding merit, better in every respect than the pink-flowered *N. x l. 'Rosea'* and its parent, *N. x l. 'Lilacea'*. The pure-white *N. x l. 'Alba'* is of exceptional merit, with crisp white blossoms which have a fragrance of a freshly opened packet of tea.

#### THE FUTURE

Reg Henley, one of our most important water lily breeders, claims that this is really the old variety *N. 'Gracellima Alba'* in another guise. He is probably right, for he has made a close study of the smaller kinds in order to develop a breeding programme.

On his Hampshire nursery, Reg is hybridising endless varieties and is growing on several thousand seedlings in his quest for improved dwarf and miniature sorts. It is his progeny and those of American breeders Pery Slocum and Kirk Strawn that are likely to be the lilies of the future.

The day of the dwarf and miniature varieties has come. With improved knowledge of their cultivation and the exciting prospects for new varieties, dwarf and pygmy water lily culture should become the leading water gardening fashion of tomorrow. **ADP**



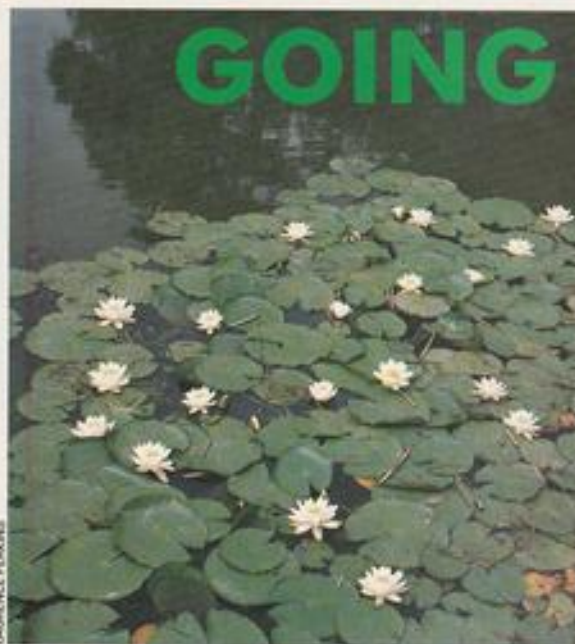
The most popular — and one of the most striking — dwarf: *N. x l. 'Fulgens'*.



# Focus on: WATER LILIES

## GOING NATIVE

Peter Muggeridge, of Westcountry Water Garden Centre, introduces our three native species of lily.



A well established expanse of the White Water Lily.

**W**ater lilies are poorly represented in our native flora. The genus *Nymphaea* — the true lily — has one member: *N. alba* (the White Water Lily) while the other genus — *Nuphar* — fares a little better with two: *N. lutea* (the Brandy Bottle or Yellow Pond Lily) and *N. pumila* (the Dwarf Pond Lily).

What these native lilies lack in variety they make up for in resilience. *N. alba* is found throughout most of Europe, as far north as 65°N on an island in the White Sea, while *N. lutea* is even hardier, being more abundant in Scandinavia than the British Isles and spreading into northern Siberia within the Arctic Circle. Therefore, our native water lilies will survive in even the most severe of our British winters.

### LONG HISTORY

In Norfolk, between Mundesley and Sheringham are outcrops of well preserved plant remains (primarily seed and pollen) known as the Cromer Forest Beds. Although we may all appreciate that seeds of every plant are different, not everyone would appreciate that, when pollen is examined under high magnification, the pollen grains of each individual species are also very distinct. The presence of a plant during an era can therefore be traced by identifying these fossilised pollen grains and seeds.

The pollen of both the White and the Yellow Water Lilies have been found in the Cromer Forest Beds indicating they were both part of the East Anglia flora before the

Ice Age. Whether they survived through this freezing era is open to question, since it is possible that they may have recolonised our waters from populations elsewhere after the Ice Age ended. Pollen from two other species of water lilies have also been identified at Cromer, but these, native to Britain before the Ice Age, became extinct during the great freeze.

### THE WHITE WATER LILY

*N. alba* is the most vigorous of our native species of lily, growing in water up to 3 metres (c 10ft) deep. The rootstock is a creeping rhizome, often as thick as a man's wrist. These large fleshy 'roots' (they are really stems) criss-cross on a pond bottom to form large mats, tethered into the mud with fibrous true roots that gather nutrients from the substrate.

The rhizome is a food store for the plant. Food produced by the leaves in summer is stored as starch, providing reserves for overwintering and growth the following season. This richness in starch has led man to recognise these rhizomes as a valuable food source, particularly in Northern Europe, where they are eaten whole or dried and ground into a flour.

Other substances are also stored, including several alkaloids and tannins, leading herbalists to use the rhizomes as a heart tonic and for stimulating the functions of the spleen and liver.

In spring the first leaves begin to rise to the surface. The leaf, green on top and red beneath, and almost circular, with a deep

narrow notch, floats on the surface attached to the rhizome by a long slender leaf stalk. This flexible anchor, up to 3 metres long, allows the leaf to stay on the surface, irrespective of changes in the water level.

The waxy surface of the leaf repels water, ensuring that it always stays right on the surface. Water falling on the surface quickly forms globules and runs off, preventing the leaf from becoming waterlogged.

Each leaf, up to 30cm (12in) across, has a relatively short life of only two weeks. When the leaves die, the stalk breaks from the rhizome, leaving a crescent-shaped scar that makes the lily root easily identifiable.

*N. alba* has the largest flower of all indigenous plants in Britain, measuring up to 20cm (8in) across. This spectacular white flower is composed of rows of white pointed petals surrounded by a row of sepals, green on the outside and white on the inside. The stamens and stigma in the centre are yellow. Rising from the rhizome on a long flexible stalk, the flower buds are sent up in a continuous series from June to September.

Lasting for only three or four days, the blooms are rapidly pollinated by beetles and other insects attracted by the fragrant scent and in search of nectar. If pollination is successful, the seeds develop in the ovary.

During autumn, the spherical seed capsule splits underwater, releasing the black ovoid seeds, some 3mm (0.1in) long, which float away on currents before settling and possibly germinating to produce another colony of this beautiful water plant.

### THE BRANDY BOTTLE

*Nuphar lutea*, also known as the Spatterdeck, is very similar in character to *Nymphaea alba*. The root system is, again, a creeping rhizome.

Two types of leaves exist, however, on the same plant. The typical lily leaf, oval in shape, leathery and green on both surfaces, floats on the water and has all the water-repelling properties of other lilies. The second form is roughly circular, heavily crinkled, green, soft and almost transparent and remains totally submerged.

The flowers are most distinctive with the 5-6 yellow sepals arching over the smaller petals, while the central stigma is the most prominent feature. Round in shape, the flower measures 4-6cm (1.6-2.4in) across and is held vertically above the surface. The



flower is nowhere as flamboyant as in the White Water Lily, but the fragrance is most distinctive. Smelling of alcohol, the plant has earned the common name of Brandy Bottle.

The seed capsule is also flask-shaped, broad at the base with a narrow neck and flared mouth. Unlike *N. alba*, the seed pod leaves the plant intact, dispersing the pale yellow seeds *en masse* to a new site.

#### THE DWARF POND LILY

Our smallest native water lily, *Nephar pumila*, is very isolated in its distribution, restricted to some Scottish and Welsh lakes. It is very similar in habit to *N. lutea*. Its appearance is also similar, but everything is smaller, with the flowers measuring only 2.5cm (c lin) in diameter.

#### CULTIVATION

Before 1880 *N. alba* was the only lily to be planted in the garden pond, as the numerous varieties available today had not been bred. This species was to become the ancestor of many of the beautiful varieties now available. For example, in Southern France, a Frenchman, Joseph Marliac, began experimenting with water lilies. He embarked upon a breeding programme involving our native *N. alba*, *N. odorata* 'rosea' and *N. mexicana* from America and a red sport of *N. alba* discovered in Sweden.

In their wild state, *N. alba* and *N. lutea*

both grow in lakes and slow-moving rivers up to 3 metres deep, where a good layer of silt exists. Our man-made canals also provide an ideal habitat and colonisation has been widespread. The Brandy Bottle does particularly well in slow-moving rivers, the submerged lime green 'cabbage' leaves waving



The delicate submerged leaves of the Spatterdock or Yellow Water Lily.

gently in the current, while the floating leaves weave across the surface.

The vigorous nature of our natives make them unsuitable for the majority of garden ponds. In a small wildlife pond, if a lily is required, a little cheating will be needed and one of the less vigorous white hybrids planted.

*N. lutea* can also be planted in a wildlife pond, but it should be planted in a large container that can be lifted at regular intervals for judicious pruning, otherwise heavy invasion will result.

#### Lake Culture

In lakes and ponds where our native lilies will be happy, special arrangements will have to be made for planting. Although they will grow in up to 3m of water, to drop a young plant into this depth would almost certainly be fatal. It is far wiser to plant the rhizome in a container, filling it with a good heavy loam and mixing in a small amount of bonemeal or slow-release fertiliser.

Plant the rhizome firmly in the centre, taking care not to bury the crown. Place the container in the water up to 60cm (24in) deep, and as the plant grows, move it to deeper water. Left to its own, the rhizomes will creep to their maximum depths.

Our native lilies, attractive as they are, do not really belong in an ornamental pond, but growing wild in large expanses of water where contentment is rewarded by great rafts of leaves, punctuated by blooms. **ADP**

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# Focus on: WATER LILIES

## THE LILY AND THE MOTH

As John Clegg explains, if you go down to your pond today, you could be in for a 'winged' surprise.

Photographs by the author



A badly damaged water lily leaf.

**H**ave you taken a good look at your water lily leaves lately? If not, do so. You may be surprised to find curious oval holes in them about an inch or so long. Turn the leaf over and you will discover the missing piece quite firmly attached to the underside of the leaf.

### CHINA MARK LIFE CYCLE

This is the work of a China Mark Moth, one of a few species of British moths that can live underwater in the caterpillar and pupal stages. The female moth lays her eggs in little clusters on the underside of floating leaves, of water lilies, floating pondweed and similar plants in June and July and, in about two weeks, the caterpillars hatch.

At first, they move about on the plant and seem happy to remain wet. Later, though, they cut out the neat ovals to suit their size and fasten them to the underside of the leaf with silk threads, leaving a small hole to allow their heads to emerge and then bite off and chew the leaf.

After a few moults, the body becomes covered with fine hairs and, if a case is opened, the caterpillar will be found to be quite dry, so presumably it is breathing atmospheric air trapped in the case. The aperture where the head extends is so small, and the hairs so close, that no water penetrates the case.

Pupation takes place the next year, so when vegetation dies down in the winter

months, the caterpillars remain dormant in whatever shelter they can find, either below or above the water level. Round about April, the adult stage of the moth emerges from the pupal cocoon and the life cycle restarts. The adult moths can be seen flying around ponds from June to August.

### SPECIES

The commonest species of the five found in Britain is the Brown China Mark, *Elophila (Nymphula) nymphaeata*.

A smaller species is the Small China Mark,

*Cataglyphis lemnae*, which is found where Duckweed, *Lemna minor*, covers the surface water. Both its larval case and pupal case are made from this plant.

It is worth studying the life history of these interesting insects, so don't just destroy them as pests. Bring in some leaves on which there are the oval cases and rear them in shallow dishes, replacing the leaves when they go brown with new ones.

Brown China Mark Moth.



Larval case of Brown China Mark caterpillar.





# Focus on: WATER LILIES



BARRY JAMES

'Odorata alba' is a great white lily with — as its name indicates — fragrant blooms.

where they are not containerised, they will, in time, occupy an area of several square yards.

The 'Tuberosa' and 'Odorata' groups have extended tubers which grow to a length of a yard (90cm) or more. These sorts should never be planted in a natural pool, unless the aim is to cover the surface as quickly as possible.

Water lilies have extensive rootstocks which reach 18in (45cm) or so. These fleshy roots occupy the detrital layer derived, partly from the clay base, and partly from the organic deposition formed as a result of the natural degradation of dead leaves, etc.

## Growing Tips

By Barry R James



both hardy and tropical water lilies have undergone extensive hybridisation at the hands of such notables as the late Monsieur Latour Marliac of France and Dr George H Pring of the USA. In the world of horticulture, it is unusual for just two men to have had such influence in the development of an entire genus of plants. The results of their endeavours have provided

numerous hybrids to satisfy virtually any requirement.

### ROOTSTOCK TYPES

There are two types of rootstock. The 'Marliac' group have compact tubers, often conical in shape, which produce offsets but which stay close to the parent plant. This type of lily therefore produces clumps of tubers. However,

### TAILORED REQUIREMENTS

The average water gardener planting a pool for the first time does not realise that he or she should tailor the requirement for a water lily to the depth and surface area of the pool.

Vigorous growers will produce leaves as big as a dinner plate, grow in up to 48in (120cm) of water and have a spread of up to 4ft (120cm) in diameter. These hybrids can

Attraction is a good red lily that can grow in water up to 1 metre in depth.



Water lilies of the genus *Nymphaea* are an ancient and primitive group of angiosperms ('higher' flowering plants). Fossil remains of these plants are abundant in Europe, and relics of tropical species which flourished before the ice age are common in certain rock strata.

Water lilies have many structural features in common with Cycads (tree ferns), Magnolias and Buttercups, all of which are very ancient groups dating back tens of millions of years. Close relatives of water lilies include such aquatic plants as Nuphars (Spatterdocks), Nelumbos (Sacred Lotus), and Cabomba, of all things!

From the original species,



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used only in the largest of ponds and lakes.

Medium growers have leaves around 4in (10cm) in diameter, grow in 12-18in (30-45cm) of water and have a spread of leaves 2ft (60cm) in diameter.

Of course, the figures given for the surface area occupied applies to just one plant, and does not take into account subsequent spread of the tuberous rootstock. There are also a few miniature varieties, but these are dealt with elsewhere in this issue of *A & P*.

In their natural environment, water lilies grow in clay-based depressions, such as ponds and lakes. They dislike, and are seldom found in, flowing water. They are shallow-water plants and even the largest species will not generally be found in areas where the water is more than 4ft in depth.

#### PLANTING LILIES

Potting soil for water lilies should therefore consist of heavy, clay-derived loam. On no account should peat be incorporated, as this will be

very detrimental to growth.

Water lilies are vigorous plants and need to be housed in the largest containers available. The latest purpose-built designs are in durable plastic, with numerous small perforations which, while allowing the unfettered egress of fine roots, does not allow the

compost to escape — a common problem with earlier designs.

The growing point, or crown, of a water lily tuber must never be covered when planting, or rotting can take place. To prevent the surface of the soil being disturbed by the rooting activities of the

fish, a ½in (c 1.3cm) covering of coarse gravel should overlay the compost.

Regular applications of slow-release fertiliser tablets should be added to the basket, as water lilies are gross feeders and will fail to bloom if starved.

#### WATER LILY SELECTION GUIDE HARDY VARIETIES

Name	Colour	Planting Depth cm	Spread in sq metres	Description
Alba	White	30-100	1.50-2.00	A native white lily; blooms 10-15cm in diameter.
Attraction	Red	30-100	1.50-2.00	Large pink-red blooms 15-20cm across.
Comanche	Orange	30-60	0.75-1.00	Flowers change from orange to bronze.
Escarboucle	Scarlet	80-120	1.00-1.75	Large scarlet flowers, yellow centres.
Froebeli	Scarlet	30-60	0.50-0.75	The best red for smaller pools.
Moorei	Yellow	30-50	0.75-1.00	Fine yellow blooms. Purple blotched foliage.
Mrs Richmond	Pink	30-100	1.00-1.25	Large deep-pink globular flowers. Bright green leaves.
Odorata alba	White	30-50	0.75-1.00	Medium-sized fragrant flowers. Tuberous rootstock.
Pygmaea	Yellow	10-25	0.25-0.40	Prolific star-shaped soft yellow flowers, only 3.8cm across.
helvola	Yellow	10-25	0.25-0.40	Prolific star-shaped soft yellow flowers, only 3.8cm across.
Rose Arey	Pink	30-50	0.50-0.75	Large stellate rose-pink flowers held erect.



# Focus on: WATER LILIES



Some insects can cause serious and unsightly damage to water lilies.

Close-up of a Water Lily Beetle 'at work'.



## Anti-Insect Lily Protection

John Timson takes a look at insect-inflicted water lily damage and comes up with some interesting findings and advice.

Photographs: John Dawes.

**T**he large floating leaves of water lilies are often eaten by insect pests, both adults and larvae. A really heavy infestation can reduce a leaf to little more than a half-submerged rotting skeleton. Not only does such a leaf spoil the look of a pond, but it also means that the leaf cannot carry out photosynthesis, and so the amount of food resources being stored in the rhizome for next year's growth is reduced. In extreme cases, the water lily could be lost, of course.

Although insecticides can be used to control the insect pests quite effectively, there is always the danger that they may harm the fish in the pond. However, some research by J Kouki of Helsinki University recently published in *Functional Ecology* (Vol 7 p 21, 1993) suggests that there may be a better way to deal with the insects which eat water lily leaves.

Kouki studied the effects of the Water Lily Beetle, *Galerucella sympharctae*, on the Yellow Water Lily, *Nuphar lutea*, growing wild in Lake Ridasjärvi in southern Finland. Both adults and larvae of this beetle eat the upper surfaces of the floating leaves of the water lily, exposing the leaf interior to attack by bacteria which cause it to decay rapidly.

### PLANT RESPONSE

The response of the plant to being eaten by the beetle is to divert some of its resources from floating leaves to submerged ones. Although the total number of leaves produced is unchanged, within a month of being attacked by the beetle, the water lily is producing mostly submerged leaves, while plants not being eaten by the beetle continue to produce more floating leaves.

The number of flowers produced by the

water lily is not affected by the beetle's attack. However, the submerged leaves, while safe from the insect, are not as efficient in carrying out photosynthesis, and hence food production, as the floating leaves, so that the water lily may well be less vigorous next year and produce fewer flowers then. A water lily attacked year after year is likely to succumb eventually, since the submerged leaves only partly compensate for the lost floating leaves.

The most surprising result of Kouki's research, however, is that artificial damage to the floating leaves in the form of removal by clipping them does not result in the switch of resources from floating to submerged leaves caused by insect damage. It appears that the water lily reacts to being eaten by the beetle, and, perhaps, to the effects of the bacteria, and not simply to the loss of leaves.

Differences in the ratio of submerged to floating leaves in aquatic plants have previously been assumed to be due to differences in the environment, such as water depth or light quality.

These may well affect the relative numbers of the different types of leaf, but Kouki's work has shown for the first time that, in the case of the Yellow Water Lily at least, an aquatic plant can also respond to being attacked by an insect by changing the kind of leaves it grows.

### CONTROL TIPS

Since removal of leaves by cutting does not cause the water lily to produce more submerged leaves, it seems that pondkeepers might protect their water lilies from insect pests by prompt removal of infested leaves, rather than by using insecticides. This would certainly be safer for the fish.

It should be remembered that the larvae in removed leaves could still develop into adults so it is best to destroy the leaves completely, preferably by burning them.

Destruction of the insect-infested leaves should result in fewer insects in future years. In addition, since the leaves removed will be largely replaced by floating leaves, rather than submerged ones, the plant should be able to lay down more reserves for the next growing season.

This is particularly important, as it is known that, in a related species, *Nuphar japonicum*, floating leaves are 20 times more efficient at carrying out photosynthesis than the submerged ones.

While it is clear that the Yellow Water Lily reacts differently to insect damage and cutting, it is not certain that other water lilies would react in the same way, although it seems likely that they would do so. Pondkeepers trying leaf removal as a means of controlling insects' damage on other water lilies would therefore need to keep this in mind and check that they are getting the desired results.



# OUT AND ABOUT

## UK DEALERS' SHOW

by John Dawes



Eric Sida's Sadazo Sanke, the Grand Champion in the hobby section.

After a few years' absence, the UK Koi Dealers' Show made a welcome return on 8-9 May at a new venue, the Telford Exhibition Centre.

Easy access via the M54 meant that the event attracted Koi enthusiasts from all over the country, and few can have been disappointed at what they found. With the exception of first thing on Saturday morning, the stands were pretty busy all the time, particularly during the Sunday, with dealers reporting very encouraging results, some even experiencing better sales than at bigger shows.

We certainly had our fair share of visitors at the A & P stand. Most were, quite naturally, keen Koi keepers or potential Koi keepers, but quite a few were also very interested in more general aspects of both outdoor and indoor aquatics, dispelling the myth promulgated by some that, if you 'seriously' keep Koi, you can only be interested in Koi.

The fish themselves, both on the trade stands and in the dealers' and hobbyists' competitions, were generally of a high standard, some being quite exceptional. In the end, the most exceptional of the exceptionals — the Grand

Champions — were:

1. **Hobby Section:** Sadazo Sanke owned by Eric Sida.
2. **Dealers' Section:** Kin Hi Utsuri owned by Joe Wilmington/Infiltration.

Have a look at the accompanying pictures and judge for yourself. Whichever way you look at these fish, they are tremendous, aren't they?

Brilliant though the competition fish were, what impressed me most of all was the diligent care taken over their welfare throughout the show by a team set up specifically for this purpose.

Oxygen, temperature, pH and ammonia were constantly and continuously tested, with the result that the water quality, and consequently the fish, were maintained in tip top condition over the weekend. Full marks, therefore, to the organisers and their team for having the good sense to handle this side of the show as it should be handled, and as the fish deserve.



The Dealers' Grand Champion: Joe Wilmington's/Infiltration's Kin Hi Utsuri.

If I was disappointed about something, it was the number of unoccupied competition vats. Perhaps the fee of £25 per

vat had something to do with this. Perhaps the fact that some of the country's top fish had already been exhibited only a few weeks earlier at Aqualife '93 was also an important factor, the owners not wishing to disturb their prize specimens again after such a short time.



Sue Finney carries out one of the numerous water quality tests that ensured the wellbeing of all the fish throughout the weekend.

Dealers — ProKoi in this case — were kept busy from mid-morning on Saturday, right through to the end of the show.



Whatever the case, the fish that were entered, more than made up in quality for the lower-than-expected quantity. There's always next year, of course.

I was also very pleased to see how the close co-operation between the dealers who organised the show (DJ's Koi and Clear Water Koi Direct) and members of the Central Section of the BKKS and the Midland Koi Association resulted in an extremely well run competition, particularly with regard to the benching and debenching of fish.

Judging, which is never easy, was perhaps not helped by the quality of the lighting, which was not particularly effective in showing off some of the colours to their best advantage. However, since all the fish were exhibited under the same conditions, this didn't affect the overall results. Besides, an excellent fish is an excellent fish, no matter how you look at it.

The 1993 UK Dealers' Show seems to have had all the main basics on which to build for a successful future. Let's hope that this will indeed occur and that this attractive event becomes a permanent fixture in the Koi keeping calendar.



would like a pond for every time I have heard someone say, "We are rebuilding our Koi pond and we want to get it right this time". Sadly, it is all too often the case that ill-conceived plans manifest themselves into disastrous pond construction projects. The problems may be of a financial, aesthetic, safety, water quality or even matrimonial nature. When one suddenly decides to build a Koi pond, the magnitude of the project should never be underestimated, otherwise disaster is being courted.

If this first paragraph has made some readers reach for the whisky, then I apologise, but I cannot stress too strongly the necessity for careful planning before proceeding with a Koi pond construction project. In the case of fairly large or elaborate ponds, the work involved and the design complexity, to say nothing of the cost, may be similar to the construction of a large detached double garage, or even a small house.

#### 'HORSE-AND-CART' CONSIDERATION

For many, the two most important considerations when formulating a plan are finance and space. Unfortunately, all too often, the conception of a design is evolved cart-before-the-horse; in other words, the first thought is about the location and dimensions of the pond, and then the question is asked whether or not the construction cost can be afforded and, after that, will any resources be left to build a filtration system?

As any experienced Koi keeper will tell you, the heart of a good Koi pond is the filtration system; without it, the pond may never be a success.

#### LINERS

There is a vast difference in the cost of the various construction techniques, and so, if a restricted budget is a major consideration, then, of course, it would be prudent to choose one of the cheaper methods.

The most simple means of pond construction involves the use of a liner. The hole can be dug and some form of cushioning material should be laid on the earth so that when the liner is installed, it will not be damaged by sharp objects. Once the liner is in place, the pond can be filled, the landscaping can be done and a filtration system can be added.

The advantage of this method is simplicity of construction and low cost, but the aesthetic appeal and the durability of the pond may suffer unless due care is taken.

#### CONCRETE

The main alternative to a lined pond is concrete or concrete and block construction. On the plus side, this sort of pond can be built any shape you choose, without getting unsightly wrinkles, as is common with flat sheet lined ponds. Extra care, however, must be taken with this construction technique to ensure that the design and material choices



# PLANNING YOUR KOI POND — PONDER A WHILE FIRST!

Think you before you dig! Peter Skinner of Koi Kraft outlines all the major factors that need to be considered if you intend to install a Koi pool in your garden.

*Illustrations by the author*





Concrete and block construction provides a very sturdy pond structure.

Spot the filters! Strategic use of timber and plants can disguise the most visually obtrusive filtration system.



Timber-effect G.R.P. lids are ideal for covering filters.



The installation of a bottom drain is very important for an efficient Koi pond filtration system.

depth will not be adequate. Some manufacturers are now beginning to produce much larger models in their range to appeal to Koi keepers but, at the moment, most of these are fairly expensive.

### BOTTOM DRAINS

Whichever construction method you choose, if you intend to keep Koi in the pond, it is most important that you install a bottom drain. This, of course, should be done while the pond is being constructed.

Even if a small box filter is to be used initially, it is still a good idea to incorporate a bottom drain because, should you wish to introduce a much larger, gravity-fed filter later, it is a simple job to connect to the pipe where it emerges from the edge of the pond and run the water to the settlement chamber.

In the meantime, the bottom drain can be used in the discharge box method. That is, it can be opened for a few seconds every day, or every few days, to allow a few gallons of water and (hopefully) most of the waste to run to waste. This is not as good as feeding a settlement chamber but, at least, the base of the pond will be kept reasonably clean.

### STOCKING DENSITY

Before planning the construction of any pond, it must be decided whether or not the occupants of the pond will be Koi only, or predominantly Goldfish varieties and Orfe, Tench, etc, with some Koi added later on.

The maximum stocking level should also be fixed at this stage. This is important because such information will determine what type and size of filtration system will be required. Koi have a much larger appetite than the other mentioned varieties and are also likely to grow much larger. You could say that if the Goldfish is a Shetland Pony, then the Koi is a Shire Horse!

If your pond is to be heavily stocked with plants and you intend to keep only a small number of Goldfish, then you may not need a filter at all. If the stocking density is a little greater, a simple box filter, such as those available at most garden centres, should maintain healthier conditions and clearer water.

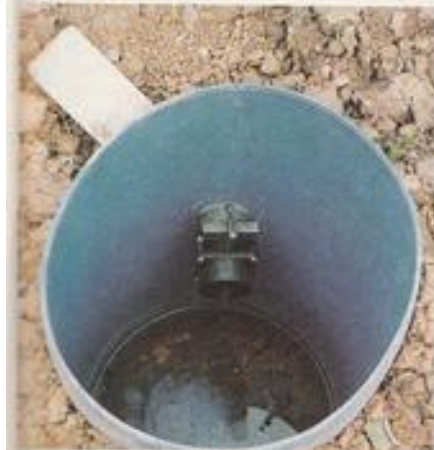
If, however, you intend to keep a medium to large collection of Koi, then this type of pump-fed filter is really not suitable. In this

are made with structural integrity in mind. Concrete construction is more expensive than using a liner, and there is a lot more work involved, so it is vital that the job is done properly. If the walls are too thin, or the footings inadequate, and the pond cracks, the extra money and effort will have been wasted, not to mention the headache of rectifying the situation.

### PREFABS

For a very small Koi pond, the simplest and quickest method of construction is to use pre-formed G.R.P. (Glass-Reinforced-Plastic) or plastic pond. These are very easy to install, since all you need to do is locate the moulding on a flat sand base and backfill around the perimeter with sand and then fill the pond with water.

Unfortunately, this type of pond is usually not suitable for Koi because its size and



A slave tank.



situation, it is really worth seriously considering using a gravity-fed filter which will draw water from one or more bottom drains in the pond.

There is a significant advantage in feeding the filter by gravity, rather than by pump, because it gives you the opportunity to employ a settlement and brush chamber, which will allow most of the suspended solid matter to settle out at a point where it can be drained from the system. This is better than it being jettied into the top of a biological filter where it will accumulate and eventually cause the efficiency of the filter to decline as the filter medium becomes progressively clogged.

One extra advantage of employing a gravity-fed system is that the pump will be located in the filter itself, rather than in a more conspicuous position in the pond. In addition, the pump will always be pumping clean water and, consequently, will not become clogged by weed and debris, as will any pump situated in the pond.

If the filter is gravity-fed, the water level in the settlement chamber has to be at the same height as that in the pond. The biological chambers, however, can either be fed directly by gravity for the outlet port from the settlement chamber, or they can be situated at a higher level so that they can be fed by a pump which will draw from the 'clean' end of the settlement chamber.

## SPACE

There is really nothing to choose between the above two methods as regards efficiency. Space availability will be the main factor that will dictate which is the more suitable system.

If there is plenty of room beside the pond for a large multi-chamber filter to be sunk in the ground, then this may be neater and more convenient, but if space is short, then a split-level filter may be preferable.

## DRAINAGE

Every filter requires cleaning at some time and for this, it will be necessary for the filter to be drained completely. If you are fortunate, the drainage system in your garden will be deep enough to allow your waste water to flow away by gravity as soon as you open the sump valve, but if your drains are too high, a different strategy is called for.

In this case, you can use a pump to expel the water directly from the filter, but a much less laborious method is to have a slave tank. This is simply a tank located beside or near the filter, but which will be a little deeper than the filter itself. The outlet pipes from the base of the filter will discharge directly into the slave tank when the valves are opened. There will then be a pump situated in the slave tank which will send the water to its destination anywhere in the garden.

It is best for this pump to be automatic, which means that, as soon as the water level in the slave tank rises to certain point, the pump will switch on and will continue running until the water has dropped below another pre-set level. With this system you

have all the benefits of direct drainage, except that it may operate a little more slowly.

Whichever filter system is chosen, a common problem exists in trying to incorporate such a large item within the garden design without it looking like an eyesore or an after-thought. This problem is compounded by the fact that you will need to gain frequent access to the filter for maintenance purposes, so it is not practical to grow creeping plants over the filter or to cover it with rocks.

## DISGUIISING YOUR FILTER

Sometimes, it is possible to hide the filters behind a wall or hedge, but on many sites, this is not possible. In these cases, the art of making the filter look as if it belongs, is to try to make a feature of it, rather than hide it.

For instance, if the filter is put in the ground where you normally stand to feed the fish, then you can cover it with removable timber decking and, perhaps, put a wooden handrail where the decking meets the edge of the pond. This will look as if you have purposely made a viewing area, which may add to the attractiveness of the pond.

Another way of 'losing' a filter is to make it the same width as a path which connects to one end and continues at the other.

Covering filters can cause a headache, because most materials that look good and are strong enough to take pedestrian traffic will be too heavy to lift for access to the filter, or they will not last. Timber is the most commonly employed material, but most types of timber will absorb moisture if not treated, and so will get heavy and may rot. It is possible to treat the timber with preser-

vative, but care must be taken when choosing a treatment, because many well-known brands would contaminate the pond if allowed to be washed into the pond by rain. There are a few safe products but, really, you need to read the instructions on the cans to see which are suitable for this purpose.

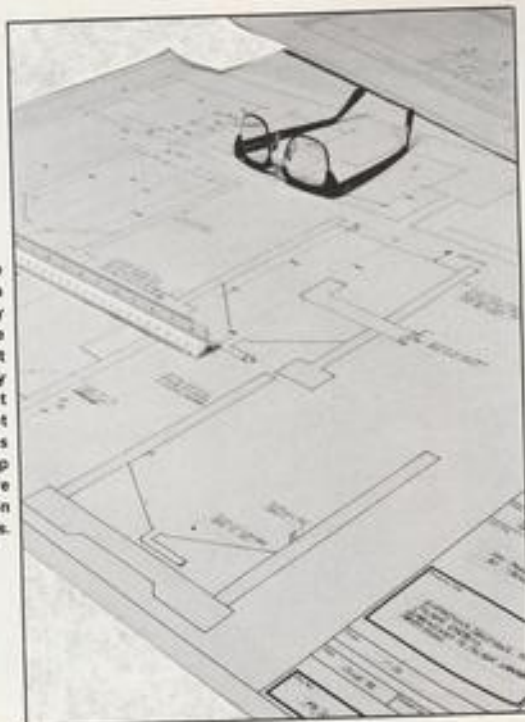
Unfortunately, I have not yet found one which specifically says that it is safe near fish ponds. It is therefore best to be on the safe side and telephone the manufacturer's technical department for advice.

## OTHER COVERS

Other materials suitable for covering a filter are plastic and G.R.P. Plastic is light, inert and durable, but usually looks too sterile to be used in a garden. G.R.P. lids seem to be the best answer for covering filters, because they are strong, durable and light. They come in a variety of colours, and textured surfaces are available which make them look like timber or stone. However, the high cost of these lids means that many people will choose to make do with one of the less hi-tech methods.

If you are planning a small Goldfish pond and you get on well with your neighbours, then you may as well reach for your spade now, but if your plans are far more elaborate and your neighbours are Mr and Mrs Nosey-Parker on one side, and Mr and Mrs Envious on the other, it may well be worth checking with your local planning officer to see whether or not planning consent is required. It is extremely rare for average-sized Koi ponds to attract bureaucratic involvement, but one does hear of the occasional elaborate sand-pit!

If you are planning a fairly elaborate Koi pond, it is very important that you get proper plans drawn up before construction begins.





# THE CULTURED BIN

My 'cultured bin' in situ in a shady spot.



Daphnia: the bin has provided a ready supply of this live food in an incredibly short time.



Live food fan Dr Iggy Tavares sets about creating his own regular supply for the summer months. Photographs by the author

**W**hy should we feed fish any live food? The commercial brands of fish foods on the market are supposed to provide all the requirements in a variety of shapes, sizes and colours, and ranges from flake to pellets, and from freeze-dried to frozen, to suit almost every type of tropical fish.

Most of the fish foods are prepared from the highest quality ingredients and contain all the nutrients and vitamins that fish require. Most species of fish will lead healthy lives on these commercial diets. A good many may also spawn, and the resulting fry can also be fed commercial fry food.

However, one has only to watch the ensuing feeding frenzy whenever any kind of live food is fed, to realise that fish are particularly fond of this type of diet. Moreover, I have no doubt that feeding some live food does bring fish into condition very quickly and induces them to spawn more readily.

## DIET DRAWBACK

The drawback of feeding live food is that one might accidentally introduce infection into the aquarium. The infections that are most likely to affect fish are usually introduced when feeding aquatic live food, particularly *Tubifex*, while *Daphnia* and Red Worm are probably safer.

In order to reduce the risk of introducing pathogens into my aquaria, I therefore decided to culture *Daphnia* in my own back garden, since, by doing this, I could actually monitor the water quality of the aquaculture.

Last spring (end of March), a large plastic dustbin, which had been purchased several years previously but never been used for its intended purpose, was placed in a secluded,



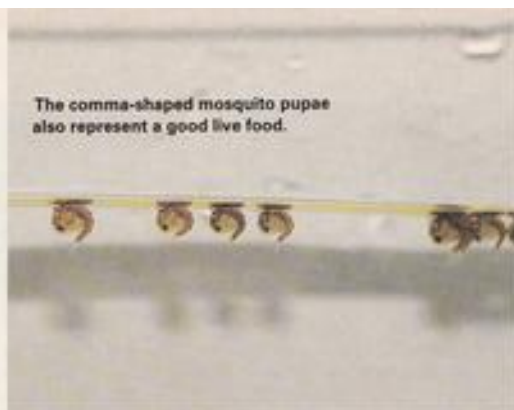
The most delightful find so far — a Common Frog







Mosquito larvae are voraciously devoured by all types of fish.



The comma-shaped mosquito pupae also represent a good live food.



This shrimp, surprisingly, turned out to be a marine species: *Crangon crangon*.



Bloodworms have made an appearance, but not in large numbers.



shaded part of the back garden. This was filled with tapwater and then allowed to stand for a few days, to allow all the chlorine to escape.

Coldwater aquatic plants were introduced into the bin, together with a range of snails. A water lily was also planted, and this has thrown up a few leaves but never any flowers, possibly because the site is too shaded.

Several large lettuce leaves were crushed and thrown into the bin every week to feed the snails. Every two weeks, a half teaspoon of flour was mixed with half a pint of water and also added. Some books suggested adding dried liver, blood or sheep manure to feed the *Daphnia*. However, since I wanted to try to retain good water quality and also maintain friendly relationships with my neighbours, I stuck with crushed lettuce and was still very successful!

The combination of crushed lettuce leaves, flour and snail droppings produced large numbers of infusoria. Infusoria comprises a whole range of microscopic aquatic animals, some of which are called Amoebae, Ciliates, Vorticellids and Rotifers.

### 'SEEDING'

The bin was now ready for seeding, which was done by releasing a bag of live *Daphnia* purchased from the fish shop. *Daphnia* are small crustaceans (animals having an external skeleton) which are sometimes called Water Fleas because they appear to hop around in the water.

*Daphnia* feed on infusoria and, if the temperature is warm enough, they can multiply at a tremendous rate. Their reproduction is fascinating, since during the summer months, most specimens are female and give birth to live young which are produced asexually (without fertilisation by a male). Only as the weather starts getting colder do males and females mate, followed by the female producing eggs which are capable of over-wintering.

### PROGRESS REPORT

By the middle of May, the bin was teeming with *Daphnia*, and they kept multiplying at a quicker rate as it got warmer. Once a week, about a third were harvested using a fish net. The *Daphnia* collected provided a sufficiently large feed for all the fish in a three-foot tank and was equivalent to three to five bags that one would buy at the fish store. By mid-November, the number of *Daphnia* in the bin will have started falling off and harvesting will be suspended.

Towards the end of May, I observed a new addition to the aquatic life in the bin. Under closer examination I recognised them as mosquito larvae. Mosquitoes lay batches of 20 to 30 eggs which float as rafts on the water surface. These hatch out into very tiny black larvae which feed on infusoria and decaying vegetable matter.

They grow at a tremendous rate and can reach about a third of an inch in under two weeks, depending on the water temperature. The larvae then change into pupae, followed by further metamorphosis into adult mos-



quitoes a few days later. Both larvae and pupae hang on the water surface, but wriggle to the bottom when disturbed.

The mosquito larvae and pupae are eagerly taken by the fish, making a welcome addition to their diet. The larvae have increased as summer has progressed, during which time they have been as abundant as the *Daphnia*, but their numbers will start falling off rapidly by the end of September.

During the past couple of months, larger larvae and pupae have been collected with a fish net at the same time as the *Daphnia*. During this time, I have also caught the occasional bloodworm. These are not worms at all, but the pupae of a gnat. However, the number I've caught have been too few for them to get a big mention here.

### SHRIMPS

Last month, I came across some freshwater shrimp in the fish shop. I decided to investigate whether these could be cultured, and introduced a dozen into the bin. These have been fed occasionally on small pieces of cod.

These shrimp are quite difficult to catch, not only because they are almost transparent when in the water, but also because they are very adept at diving out of the way of the approaching net. Any shrimp caught has always been returned to the bin as I argue that their population has not reached a large enough number to harvest.

Recent further investigation into the

identity of the shrimp has revealed that it is not a freshwater shrimp at all, but the Common Saltwater Shrimp, *Gammarus crangon*. This shrimp is not only found in the coastal areas, but also in river estuaries where seawater mixes with freshwater. It can obviously tolerate a wide range of salinity and temperature conditions and, both in aquatic shops and in my bin, it has been kept in freshwater.

The so-called Common Freshwater Shrimp, *Gammarus pulex*, which lives in streams, is not a true shrimp at all, but an amphipod.

Since the shrimp is a saltwater species, I suppose it is a little surprising that it should breed in the freshwater bin. However, as the summer has progressed, I have caught some shrimp which have grown to 4cm (1.6in), while others are only 1cm (0.4in) long. I suppose that there is a possibility that some of the introduced shrimp have not grown at all in the three months, while others have.

### SURPRISING FIND

One morning last month, I found a surprising addition to the inhabitants of the bin. Its arrival was signalled by a splash early one morning when I approached the bin. The splash was too big to be caused by a shrimp and I later discovered that it had been caused by a medium sized frog!

Where it came from I do not know; perhaps one of the neighbours has a pond. It had probably hopped onto an adjoining

### REFERENCES

*Encyclopedia of Tropical Fishes*, H R Axelrod and W Vorderwinkler, 1974, T.F.H. Publications, Inc.

*Atlas of Freshwater Aquarium Fishes, Mini-Edition*, H R Axelrod, W E Burgess, C W Emmens, N Pronck, J W Walls and R Hunziker, 1987, T.F.H. Publications, Inc.

empty rabbit hutch and then into the bin.

During the day, the frog lies half submerged among the weeds in the water with only its head showing. In the evenings, it will clamber onto the weeds or water lily leaves which are strong enough to support its weight. Here it will hunt for insects, probably mosquitoes coming to lay their eggs. I often supplement its diet with woodlice which are eagerly taken.

The frog has made an interesting and welcome summer visitor to the bin. By the beginning of November it will have left, though, probably to hibernate.

In nature, live food forms an important part of a tropical fish's diet and, hence, it is not surprising that fish are keen to eat this particular kind of food. I enjoy watching the fish eat their live food supplements, and moreover, none of them has suffered from a single infection so far this summer. The 'cultured bin' will therefore provide a cheap, convenient and abundant source of safe live food for my fish, for a good six months of the year. ASP



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# Books

## NEW BOOK NEWS

### 1 A Field Guide to the Shallow-Water Echinoderms of the British Isles.

By: B Picton.  
23 x 15cm, 96pp, 62 colour photographs, index. Softback. £16.95 post free UK.

A unique field guide and practical reference book to all the Echinoderms (i.e. starfish, brittlestars, sea-feathers, sea-urchins and sea-cucumbers) likely to be encountered between the tides, and in the coastal waters around the British Isles. High-quality underwater photographs of live animals illustrate an informative text based on the author's own extensive field research.

### 2 A Field Guide to the Shallow-Water Nudibranchs of the British Isles.

By: B Picton & C Morrow.  
23 x 15cm, 128pp, 115 colour photographs, index. Softback. £16.95 post free UK.

A comprehensive and useful guide recommended for naturalists, divers, underwater photographers, aquarists and anyone interested in the vast array of animal life found around the coasts of the British Isles. The authors have drawn on their considerable field experience in this field to produce a book that is both authoritative and accessible to the non-specialist. It is the first guide to represent most of the British nudibranchs with striking photographs of living individuals.

Both titles are available from: Steven Simpson, Natural History Books, PO Box 853, Brighton BN1 5DY. Tel: 0273 727328; Fax: 0273 203754. Prices are subject to change. Catalogue of ichthyological and herpetological books is available on request. Please write stating interests.

## The Biotope Aquarium

By: Rainer Stawikowski  
Published by: TFH Publications  
ISBN: 086622-519-6  
Price: £12.95

A new perspective on aquarium fishkeeping which has increased in popularity over recent years is the keeping of fish and plants in conditions which mirror, as far as possible, their native ecology.

Have you ever tried spawning Gouramis and wondered why they wouldn't, only to



realise that the aeration in your aquarium is disturbing the water surface where they would otherwise be able to build their nest? Or have you wondered why your Cardinal Tetras appear pale and surprisingly unable to spawn, while oblivious to the fact that vegetation in your aquarium is sparse for the fish to hide?

If so, then *The Biotope Aquarium* may well provide some interesting answers which will, quite literally, open up a new world of fishkeeping.

As the introduction describes, factors such as altitude, subsoil characteristics, vegetation, and climate, can all give a single body of water, such as a river, innumerable different aspects as it travels from its source to its mouth. Each of these habitats is characterised by its own fish fauna, some of which are quite specialised to one habitat and others which can adapt to a variety of other, quite different, biotopes.

"Some of these habitats," explains author Rainer Stawikowski (editor of the German aquarium magazine *DATZ*), "have absolutely nothing in common with the arrangement of an aquarium. It would be crazy to represent a biotope of muddy, turbid puddles in an aquarium and try to keep fish in it... On the other hand, there are biotopes which, because of their specific characteristics (clear water, vegetation, stones, woody roots, etc) do challenge aquarists to regard them as models for an aquarium set-up."

The following 200 or so pages then take the reader on an explicitly detailed world tour of aquatic biotopes, lavishly illustrated with spectacular colour photographs of places, plants and fish to make this a book which can only be a pleasure to read.

And this brings me nicely to the treatment of the photographs. Once again, TFH has led the field in specialist publications with the introduction of lamination on the

colour photographs. This really does have the effect of making the photographs 'come alive', as the publishers describe. But even the glossiest lamination will do nothing to revive a bad photograph and, as ever with TFH, the standard of photography is superb.

Chapter by chapter, *The Biotope Aquarium* investigates the clear-water rivers of the Central American landbridge; Belly-sliders and Bottom Hoppers — fish from river rapids; river banks with fallen foliage; an aquarium for 'Antenna' or Tentacled Catfish; overgrown bank; rocky shore or beach zone — careful fish among large stones; rubble or scree zone in Lake Tanganyika; underwater deserts — life in the sand. An index, though only of the scientific names of fish species, concludes the presentation, and I would have welcomed a reference to geographical locations.

The book is translated from German, with additional material added to the original literal translation, as well as the addition of a number of photographs. Naturally, there is a distinct American flavour to the text, but this in no way detracts from its presentation.

As for technical accuracy, the information appears to be sound, with no glaring errors, and is accompanied by a conservative use of the occasional diagram (a criticism of some previous TFH publications is that there are often too many 'juvenile' diagrams).

This is a book for 'grown-ups' — those aquarists who are looking for a challenge beyond the community tank in the corner of the living room. The sign of a good aquatic reference book is that, upon reading it, it makes you want to try your hand at the subject; for me, this book achieved just that. Watch out for imitations of the ecology of Lake Tanganyika, River Amazon and other parts of the world in my own fish establishment...!

Stephen Smith



# Keeping and Breeding:

# THE RED PIRANHA

## Part 1 From Buying to Spawning

Lee Batley shares his hard-earned experiences with this challenging Amazonian predator.

Photographs — unless otherwise indicated — by Bill Jeffries.



Adult Red-bellied Piranha. The red coloration virtually disappears during courtship and mating.



One of my females during latter stages of nest building, once she had been allowed to approach by the male.

I have a 70-gallon (320-litre) community tank at one end of the living room, and recently had a specially made 40-gallon (180-litre) aquarium measuring 30 x 24 x 18in (75 x 60 x 45cm) set up at the opposite end. I furnished this new aquarium with slate, made into a cave for the Piranhas which I had decided to keep, to hide in. I left the tank for a week to settle, then purchased four, 4-5in (10-13cm) *Serrasalmus natereri* (Red-bellied Piranha) and then introduced them to the new aquarium.

### FEEDING

At the same time as introducing the Piranhas, I bought some live food in the form of Brine Shrimp. The Piranha liked these very much, but they are lazy fish and hunting the shrimps seemed to be hard work for them, so I then started feeding them on 'feeder' Goldfish, measuring 3-4in (7.5-10cm).

The Piranha were quicker feeding on Goldfish and a chain reaction started. As one Piranha attacked, the other three would soon follow. This would sometimes result in damage, such as nipped fins, or tails bitten, purely accidentally; I never had a Piranha more seriously injured than that.

My Piranha have an outstanding appetite, usually eating one Goldfish a day each. They have their off days, but only very rarely.

### pH LEVELS

I was curious to know what the pH levels of the tanks were, and after testing both, I had a pH value of 9.3 in the 40-gal tank, and 7.3 in the 70-gal tank.

These values have not changed since then.

### FILTRATION

The filtration systems that I use in both aquaria are Fluval 103 external power filters.

These are possibly not the highest rated filters (in terms of turnover) for the tanks in question, but they keep the tanks spotless and are easy to clean once a month in a half-filled bucket of siphoned tank water.

### TEMPERATURE

The temperature of the 40-gal tank was set at 80°F (c 26.5°C) for the first three months, while I had the Piranhas in there. I also set the 70-gal tank at 80°F; neither temperature has changed.

### LIGHTING

Lighting consisted of one 20W 24in (60cm) Gro-Lux. This type and intensity of light created a shady, dull aquarium. It was reasonable light for growing easy plants like Cabomba, etc, but, more importantly, it seemed to make the Piranha more paranoid



of everything; a sudden movement would send them darting into the corner of the tank or cave. They would also stay at a reasonable distance from each other trying to find a spot in the tank where no other Piranha could get behind them.

In this dull light, the Piranhas' colour was very dark, almost black, the red bellies being a dark red, except at feeding time, when they would change to a silvery/white, with pale red bellies.

### AERATION

I was using a twin air pump in this tank to allow extra oxygen into the water, but this, I found, was not liked at all by the plants. My way around this obstacle was to install two power heads (one at the top front, right hand corner, and one at the top back, left hand corner) facing in sequence to create a circular flow of current on the surface.



I found that this oxygenated the water enough for the fish without affecting the plants.

### DEVELOPMENTS Moving the Fish

I had the four Piranha in the 40-gal tank for five months, during which time I changed nothing at all. The feeding regime was still one Goldfish per fish per day.

On one particular occasion it was suggested to me by a good friend that the Piranha were getting bigger very quickly and that I should transfer them to the 70-gal tank, putting the other tropical fish into the 40-gal tank.

As I see the Piranha every day, their growth had not registered with me, so upon this suggestion, I undertook the long and tedious task of transferring the fish.

Eventually, I had managed to move the Piranha, despite one of them biting through my net; the rest, I transported using a colander with a book over the top.

Upon being tipped straight into the 70-gal tank, the Piranha went to the bottom and settled on their side to adjust to the water. They stayed in this state for about 15 minutes.

I turned the lights off for half an hour. Although in most literature I have read, it says that light makes no difference to the fish seemed to be far less paranoid in bright light.

This may be because a dull, lit aquarium may give the fish the impression that something nasty could be hiding behind a shady slate or rock. This, however, seems to account for their behaviour in dull light only. My Piranha seem to be more than well when the light is completely off.

Half an hour after introducing the fish, I switched the lights on, whereupon the Piranha started chasing each other up and down the tank in a certainly playful manner; I believe I could clearly see the happiness of the fish.

### Diet Change

The local aquarium shop where I usually purchased the feeder Goldfish suddenly stopped stocking the 3-4in Comets due to them being a seasonal sale. I was faced with a small problem, or so I thought.

Pair resting after spawning. At this stage, they kept very close to each other. Later, the female was driven away.

Accepted practice is that, in order to change the diet of Piranha, you have to wean them off one particular food gradually on to another; this I also found to be untrue.

It was suggested to me that I try feeding them on chicks. I therefore dropped a defrosted chick into the tank; it took about 2-3 hours before the Piranha had the courage to attack it, but as soon as one went in, they all followed. From then on, their meals consisted of one chick every three days.

### EARLY COURTSHIP

It was on the third day on the chick diet that things began to happen. The Piranha had chewed up 65% of the plants and, as I watched, they were biting leaves off the remaining plant, spitting them at the gravel and then trying to put stones on them before the current washed them away. Two Piranha started building nests, were picking stones up in their mouths and placing them in roughly a 5in (c 13cm) circle, forming a pit in the gravel.

I have a large piece of bogwood in the centre of the tank, and this created a divider for both nests.

The plant that had been removed was mainly all round the nests. Plants more than

10in (25cm) away had just been stripped of some leaves, nothing serious.

It was then that I realised the colour of the fish had started to change to dark grey and their bellies to a dark red. This, plus the clear visibility of nest building, made me read up on Piranha breeding in *Piranha in the Aquarium* by Wolfgang Schulte, published by T.F.H. Publications, Inc.

A Japanese Piranha hobbyist had photographs in the book of a nest made from coconut fibres. This, along with a detailed description of the courting ritual, made me conclude that my fish were actually courting and, perhaps, about to spawn. And at such short notice; they had only been in the 70-gal tank for nine days!

### LATER COURTSHIP

The time was 6 pm when I first saw the two Piranha chewing up the plants and start on the nests. By about 8 pm, both fish were happy with their building, and the other two were now being allowed closer to the nest, without being chased off.

When I read that the males make nests, I was able to distinguish the sex and identity of each fish. It was amazing to see that the four Piranha I had bought at random, had resulted in two mating pairs.

By roughly 8.30 pm, both females had gained entry to their respective breeding grounds and a rubbing and flickering movement of both male and female in each nest was in action. This almost-vibrating movement is, I believe, to stimulate both male and female to lay the eggs and fertilise them.

This particular stage of courtship was not entirely placid, the females soon engaging in biting the males on their sides, each time removing scales. The males nipped back at the females' fins and the tail was bitten quite badly on one female. At 10.30 pm, the same courting actions were still taking place.

### MISSED SPAWNING

I had to drop a friend home. When I returned an hour later, the eggs had already been laid and the males had already fertilised them.

The book says, "fertilised eggs are an orange/yellow colour and unfertilised eggs are an opaque/white". To my relief, all the eggs laid that night were orange.

The extraordinary thing was that the males had expelled the females from the nests and were viciously guarding the eggs.

Upon touching the glass in front of a nest, one particular male would dart the 10in (25cm) gap from the nest to the glass in a split second and head-butt the place of my fingertip with quite a force. I was surprised, on one occasion, that he didn't come through the glass!

The day of the spawning I will refer to as Day 1.

In Part 2 I will be explaining the hatching of the eggs, the rearing of the fry and some unusual occurrences following the courtship of my Red-bellied Piranha pairs.

(TO BE CONTINUED)

ASP



# PRODUCT ROUND-UP

BY DICK MILLS

## PETINDEX '93 NEWS



As you might expect, many manufacturers launched their newest products at the **Petindex '93** exhibition at the NEC. Limited space within these pages means that only brief 'headlines' can be featured about those we noticed. If we missed a few, we hope their makers will be in touch.



### Best Aquatic Award for North of the Border

Starting off with the top story, **LAHAINA AQUARIUM SYSTEMS** took **BEST NEW AQUATIC PRODUCT** with the **PINPOINT pH METER**. This device, similar in design and application to the **PINPOINT ORP METER**, is meant to be a permanent feature in the aquarium, relaying out constant information about pH (the other meter displays Redox Potential) collected by its remote probe to an LCD display panel. Both units are extremely accurate, each with a narrow tolerance range. Always coming up with something out of the ordinary, how about a **REMOTE PROBE CHILLER**? Just the thing for those marine tanks which are always overheating in our summer climate

— a factor that affects both tropical and native marines. This automatic device will keep the temperature constant in the aquarium, no matter which way the temperature goes, so really it's a heat exchanger, either adding or taking away heat as required.

Obviously, Lahaina thinks de-nitrification is easy as ABC, for that's what they've called their new de-nitrifying system; un-abbreviating it reveals its true name — the **ANAEROBIC BATCH CYCLIC DENITRIFICATION SYSTEM**.

This operates on a separate feed system from a Remote Trickle Filter Reservoir via a system of timers, pumps and special dosing of ABC Food for the bacteria colonies. This 'state of the art' new product has been developed to provide zero nitrates in marine and freshwater aquariums.

On a slightly (dare I say it?) less complicated level, the re-designed **ADF NITRATE**

**FILTER** operates on a cycle/mix principle which means, unlike the ABC De-nitrifier, it does not empty completely during operation.

Full details of these exciting new products from: **LAHAINA AQUARIUM SYSTEMS LTD**, Kellas, Elgin, Morayshire, Scotland IV30 3TW. Tel: 0343 89 209; Fax: 0343 89 296.

they are there permanently by furnishing their aquarium with the **CLASSIC** range of fantastic new aquarium ornaments from **CALDEX**. Sleeping Beauty's Castle has got nothing on this!

Details from: **CALDEX LTD**, Shay Lane, Holmfild, Halifax, West Yorkshire HX2 9AB. Tel: 0422 240084; Fax: 0422 240865.

### Over and Under the Waves

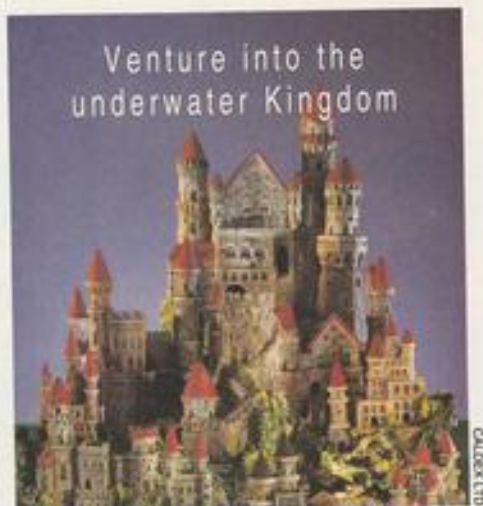
New for this exhibition from **RED SEA FISH PHARM** was a full range of **AQUARIUM ELECTRONICS**, featuring a **WAVE-MAKER**, two maintenance-

### Have your Fishes been to Euro-Disney?

No, of course they haven't, but you can do the next best thing and make them feel that



Lahaina's Chick Holland receives his award for Best New Aquatic Product from A & P editor John Dawes.





free OZONISERS and a REDOX CONTROLLER with a built-in OZONISER.

Details from: CORAL REEF TECHNOLOGY LTD, 62 High Street, Byfleet, Surrey KT14 7QL. Tel: 0932 355121; Fax: 0932 349718.

## Shedding Light on Invertebrates

Appreciating the need of invertebrates (especially those that naturally act as hosts to algae) for direct high-power light, JERRARD BROS were showing off their new SUN-SPOT LOW-VOLTAGE SPOTLIGHT. Add in some water surface movement, and the overall effect of 'sunlight' beaming down through the rippling waves is most realistic. Details from: JERRARD BROS plc, New Cairo Road, Croydon, Surrey CR0 1XP. Tel: 081 688 8222; Fax: 081 681 3119.

## Tahiti Tanks Have Landed!

I know it's a long way to come to the NEC from Tahiti (it's a long way to Tipperary too, so they say!) but it's not that far from Tahiti! TAHITI AQUARIUMS have launched the new FIJI, the feature-packed HAWAII and a premier range of AQUARIUM STARTER KITS. They'll be in your local dealers' by now.

Details from: TAHITI AQUARIUMS, Aquarius Centre, Queens Road, Hurst Cross, Ashton-under-Lyne OL6 8EW. Tel: 061 339 3131; Fax: 061 343 4439.

## Is There a Doctor in the Aquarium?

TECHNICAL AQUATIC PRODUCTS, the specialist manufacturers of medicines, test kits, water treatments, filter media, fish foods, marine salt and other items for marine and freshwater aquariums, have announced a new range of treatments entitled AQUARIUM DOCTOR.

Details from: TECHNICAL AQUATIC PRODUCTS, 64/65 Anthea Road, Fishponds Trading Estate, Fishponds, Bristol BS5 7EX. Tel: 0272 585588; Fax: 0272 585577.

# OTHER PRODUCT NEWS

## Plants by Post Plus

You can often tell the time of year by what drops through your letter-box; if it's not seed catalogues just before Christmas, it's holiday brochures just after.

You also know it's the real start of the coldwater season when AQUATIC PLANT CATALOGUES arrive, and the latest from AIRPORT AQUARIA is both bigger and better than before. Although following last year's format of describing the general groups of aquatic plants available (marginals, floating plants, oxygenators, lilies, etc), numbers required per square foot of pond water surface area, cultivation instructions and a full list of species, sizes, suitable water depths, flowering period and price, the catalogue now includes a 10-page Pond Equipment section, too.

Here can be found information on pumps (including at-a-glance comparable performance figures, guarantee periods, cable lengths, waterfall attachments or not, head achieved, maximum flow, flow at 3ft head, power consumption, mains or low voltage and price), fountain jets, pond and garden lighting, pond foods, pond planting baskets and basket liners, UV Sterilisers/Clarifiers, pond filters, treatments and test kits, books, electrical accessories and pond liners.

Now you can make your decisions in advance, and buy

from the comfort of your own armchair, although it would be a pity if you didn't pay Airport Aquaria a personal visit if at all possible — there's so much to see, and all that sitting around in the armchair means you're probably not getting enough exercise anyway!

AIRPORT AQUARIA, Heathrow Garden Centre, Sipson Road, West Drayton, Middlesex UB7 0HR. Tel/Fax: 081 897 21563.

## Flower Power

Now, I want you to read that heading again, pronouncing the first word "flow-er", because what we're talking about here is water-flow... and plenty of it!

I bet the majority of visitors to last year's Hampton Court Flower Show went home appreciative of most things on display, but quite ignorant of some vital, yet mostly invisible, equipment which provided them with stunning displays. A typical example of this will have been the motive force behind the fountain displays in the Long Water and other eye-catching water movements around the Aquatic Village.

When the same company get invited year after year to supply the necessary equipment, then you can rest assured that the equipment will do the job more than just capably.

LOWARA (UK) of Axminster have that privilege, and are celebrating ten years of business in this country while, at the same time, the



Italian parent company, Lowara SpA, are just passing their 25-year milestone.

The range of DOC submersible pumps used in previous shows not only provided impressive visual evidence of their performance, but they also had the added hidden bonus (not always shared by competitors' pumps) of being able to handle 'dirty' water — in the case of the DOC7VX model, that containing solids of up to 20mm particle size.

Although most pond owners like to think their fountains/waterfalls are only shifting clean water, there is the satisfaction (and peace of mind) of knowing that the occasional lump of gravel can be catered for without reducing the impeller to shreds, or the whole thing literally grinding to a standstill!

New for this year is the DOMO 'DIRTY WATER' PUMP. Like its predecessors, it is fabricated in stainless steel, but also has a silicon carbide mechanical seal, able to withstand all but the most abrasive materials.

Its powerful performance (20m<sup>3</sup>/hour — around 4,400 gph — up to 10.5m — c 34.5ft — head and able to pass solids of up to 35mm), means that it's destined for the larger end of the aquatic/water feature market.

The SC goes even better, for this close-coupled borehole pump is ideal for fountains, throwing jets up to 70m (230ft) high in capacities up to 120 litres/minute (26 gpm).

Again, being silicon-carbide protected against solids damage, and compact in size too,



Pond plants being grown for collection or mailing out.



means that it will out-perform other pumps whose physical size preclude their use, or where submersibles have been considered unsuitable.

Remember then, as you meander through the flowers and water gardens, that there is a number of high-quality submersible pumps quietly going about their business, bringing just the same excitement of water movement to Hampton Court as they can to your own garden pond.

**LOWARA (UK) LTD.**  
Millwey Rise Industrial Estate, Axminster, Devon EX13 5HU. Tel: 0297 33374; Fax: 0297 35238.

### Rock Fans Read On!

Once upon a time, rock cooled down from the magma and lava forms and was termed igneous (from the fire) by geologists. Such rocks are consequently honeycombed with capillary-like passageways, making them an ideal biological filter medium; the water seeps in and, depending on the physical restrictions to

water flow, such passageways become colonised by either aerobic or anaerobic bacteria.

Marketed as **BIOTIC ROCK** by **CRYSTAL CLEAR**, the material is available in coarse, medium and fine sizes, in 2kg and 25kg bags (except for the fine, which has a smaller bag size of 1kg, rather than 2kg).

Biotic Rock is best used in trickle, or slow-running filters (for maximum effect) and is also best situated in the water flow chain after a good mechanical and chemical filtration section, such as **CRYSTAL CLEAR ACTIVATED CARBON** sandwiched between **CRYSTAL CLEAR POND PADS** or **FILTER MAT**. Biotic Rock is suitable for both marine and freshwater systems.

The efficiency of the biological filter can be further enhanced by adding a **CRYSTAL CLEAR TURBULATOR AERATOR** to ensure good oxygen supply to aerobic bacteria and to expel any build-up of toxic gases.

**BIO-PLUS** is a biological filtration medium made for aerobic bacteria. Looking like a pastry-cutter, it can

be stacked, layer on layer, to form a massive surface area, with baffles and passageways, with excellent void space, but also breaking up waterflow so that every corner gets a supply of water. It can be used in down-flow or reverse-flow systems, and is available in large, medium and small sizes.

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# Letters

## HIGHER PRICES

### 1 A Manufacturer's View

I read your April editorial on the subject of currency movements with some interest. From Interpet's point of view, I can completely concur with your findings that many aquatic dry goods products have been dramatically affected by currency movements.

At Interpet we are particularly at the mercy of both the US \$ and the Japanese Yen. The Yen has, in fact, been the biggest problem, and it continues to strengthen against all world currencies. Many judges perceive appreciation of the Japanese currency as the way that the Japanese government would prefer their balance of payments to be held in check, rather than risk the imposition of export quotas by Japan's trading partners.

To date, Interpet has absorbed all the currency movements without passing anything on to our customers and, consequently, the final consumer. Obviously, we are hoping that the currency movements will reverse and we can continue with our policy of offering the best possible prices for our quality goods to the consumer. As you so perceptively note, this cannot continue forever, and we may be forced into significant price increases induced by cur-

rency movement.

Once again, our congratulations on your perceptive editorial.

**Mark Senior,  
Managing Director,  
Interpet.**

### 2 The Wider Issues

I read with interest what you had to say in April's Editorial and agree with it wholeheartedly. On top of the valid points raised, it should also be added that our hobby will once again be assaulted within two years with the imposition on household bills of 17.5% VAT, particularly on gas and electricity.

It should be pointed out here that whatever the effects it has on our hobby pales in comparison to the effects that this tax levy will have on the elderly, disabled and needy.

The excuse given for this tax increase is that it is a "Green" issue and commitment to the Rio Convention. Yet, this country is still the world's largest importer of Brazilian mahogany taken from many areas illegally. The "Green" excuse sounds even more hollow when you think how our environment will be savaged, particularly small ponds and lakes, over the next few years with the building and widening of motorways in the cause of the horseless carriage.

In the April Supplement, you published an article *Cold-water Tropicals*, by Dr David Ford which states that, in a centrally heated room, many semi-tropical species can be kept without additional in-tank heating. The consequences of the aforementioned tax will, however, be that, for a lot of people, central heating will be impossible because all the fuel bills will have to be carefully monitored.

A lot of the elderly and disabled are unable to keep cats and dogs for various reasons and instead have a small tank of tropical fish as companions (my aunts being in this group). They will now have to think seriously about the necessity of these because of costs, however minimal.

There are numerous ways the tax will hit our hobby, but the bottom line is that a lot of people who enjoy aquatics will either have to halt it altogether, or restrict their involvement.

**Michael Robson,  
Snaresbrook,  
London.**

### Wanted: Aquatic Society Details

For many years I have been collecting aquarium literature and collecting data concerning aquarium societies around the world. My notes concerning such societies in the British Isles now fill to

overflowing three five-inch wide notebooks.

I recently had reason to type a listing of the clubs that I know to have existed in England, Wales, Scotland and Ireland. There were some 1,645 club names dating from the 1890s to today!

Over the past century there have been many changes in the hobby and in its clubs, and many of these changes have been reflected in the pages of your magazine.

Being a collector of aquarium-related literature I have also included in this listing the names of club publications if they were known to me: some 222 clubs are publishing, or did in the past publish, some type of periodicals. I believe this type of information and these publications should be in some way preserved or, at least, recorded.

Of the 1,600-plus British organisations that I list, I believe that some 341 still exist and are functioning. I must admit, however, that my collection of British publications is only complete through the late 1980s, so perhaps some of these clubs have disbanded and a few new ones may have appeared in recent years.

Clubs often advertise their formation date, but only rarely do they announce the date of their dissolving. Thus, the disbanding dates I list are only approximate.

I am most keen to hear from any society that might be able

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# W.S.3.

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to assist me in my search and would therefore be very grateful if you would publish my letter in *A & P*.

**Jare Sausaman,  
Philadelphia,  
Pennsylvania,  
USA.**

[We would be pleased to hear from any *A & P* readers who may be able to help Jare in his venture. Please drop us a line and we'll forward your letter to him with pleasure. Ed]

## Environmental Success

I thought you might be interested in an update with regard to our labelling system, especially in relation to the interest shown around the world following articles published in *A & P*.

Over the past few months, it has never ceased to amaze us how far the *A & P/Daves* influence has spread. Initially, we received enquiries for more details from all over this

country, which one would expect. However, the last few months have seen enquiries from, literally, all over the world: Spain, France, Belgium, Norway, Switzerland, Italy, Holland, Germany, New Zealand, Australia, Canada, America and the Jewel in the Crown, Papua New Guinea!

We are, obviously, extremely pleased that our system seems to have captured people's imagination in so many countries, and we can now boast installations in many of the above-mentioned. We are currently addressing an influx of enquiries from the United States of America, which have been as a direct result of the *A & P* articles and a review of our system in an American pet publication.

We will keep you informed of any further developments as and when they occur. Please pass on our thanks to all the staff at *A & P*.

**Nigel Cruickshank  
and Colin Grist,  
Environ,  
Paulton,  
Avon.**



# New Books

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## Jason Endfield



# Amy's Bleeding Guppies

Jason Endfield renews his relationship with his favourite seven-year-old's devastatingly simple truths . . . and her 'tank-bled' Guppies.

**R**emember my young friend Amy Lyre? She's seven years old now and is maturing fast. Her wisdom particularly impresses me these days, and although still largely in poetical form (regrettably), it sometimes astounds me how truthful her simplicity is — or to put it another way, how simple her truth is.

Not long ago, I paid a visit to her home to see her new aquarium set-up. She has "gone tropical", as she puts it, with a bit of help from her mum and dad who "don't help with the fish, but do help with the money for the fish."

Amy now has a two-foot tank on a stand which was supposed to be in her bedroom but which ended up staying downstairs in the living room and looks very nice indeed next to the settee. Alas, it is in front of a

cupboard which can't be opened any more due to a lack of forward planning.

Amy wrote to me inviting me to see her new tank. As usual, her letter contained a poem, which I reproduce here by kind permission:

*Dear Jason, now I write to you  
to ask you please to come  
to see my new aquarium  
which I got from my mum.*

*I have now gone tropical,  
so do please come and see  
my Guppies and my Sucking Loach  
which mummy bought for me.*

How could I resist? So, along I went to the Lyre household to see Amy's tank. It took me back to my early fishkeeping days, except that, as always, Amy had avoided any typical beginner's mistakes by carefully reading all

she could before setting up the tank and before choosing her fish.

Amy explained to me that none of the books she had read said anything about checking that the tank was not placed in front of a frequently used cupboard, and she has since written to several publishers suggesting that this important point should be made in future revised editions of fishkeeping guides! Amy is not entirely new to fishkeeping either — she has successfully maintained two Goldfish for over a year and her father had his own tropical tank for several years too.

After a tour of her tank, I was introduced to each individual fish and we sat down to a rather splendid tea laid on by Amy's mum. As I spooned raspberry jelly into my mouth (and down my sweater), Amy began one of her philosophical discussions.

"Why is it . . ." she began, "that my lady Guppies are not as colourful as the men ones?"

"Oh, well, lots of reasons I expect," I replied determined not to get into a discussion that I couldn't get out of.

"You see," said Amy, "I like the bright tails of the men Guppies and I wanted only bright colourful men Guppies in my tank, but Daddy said that if I wanted my guppies to bleed — that means have babies (she added helpfully) — then I needed some lady Guppies too."

I nodded. "Yes, Daddy is right, because you need men and lady Guppies if you want them to bleed . . . I mean breed," I said. Amy looked thoughtful and finished her jelly. She told me that Mummy thought that one of the Guppies was "expecting" (though Amy didn't quite know what the fish was expecting, but she thought it was probably expecting something quite important), and then went on to tell me about her plan to sell Guppy babies, or "fry Guppies", as she put it, to her local pet shop. I said I would buy some off her too for my own tank.

I continued with my jelly as Amy asked me her original question again: "But why do men Guppies have bright tails?"

"Well," I said, "they like to look nice and colourful because it cheers the lady Guppies up." I was quite satisfied with my answer, though Amy evidently wasn't.

"Well I think," she said, "I think it's something to do with sex."

I dropped the rest of my jelly down my sweater. It seemed that Amy had done even more reading about Guppies than I had at first thought — and good for her. I suspect she knows the whole story of Guppy reproduction and she just wondered if I did too.

Well, as usual, shortly after my visit, I received a poetical letter from Amy:

*To thank you lots for coming round  
I thought I'd write this little letter  
I hope you got back safely home  
and got the jelly off your sweater.*

*Since you came I'm pleased to say  
that ten fry Guppies I have bred  
I don't know if they're men or ladies,  
nine are living, one is dead.*

Well, you know what they say: from small beginnings . . .



# CUSHION STAR EXPERIENCE

Marine biologist, Fellow of the Linnean Society . . . and London taxicab driver, Terry Stephenson, describes the challenging experience of spawning and raising Cushion Starfish in aquaria.

*Photographs by the author*



Adult Cushion Star.

**F**or me, the collection of native marine animals is not so much for the pursuit of pleasure, as it is for the pursuit of knowledge. Here is an account of my experiences with the native Cushion Star *Asterina gibbosa*.

I collected two of these individuals at low water from a rocky coast near Torquay. Measured from the tip of the arm to the centre of the disc, the smaller male was 2cm (0.8in) and the female 3cm (1.2in).

When collecting starfish, my experience is that they survive better if not allowed to come into contact with air at any time, and

are not pulled from their rock, when they invariably leave some of their tube feet behind. I therefore transferred my catch into a container while still on their rocks, and underwater. When the temperatures were equilibrated they were put into the aquarium and allowed to crawl out on their own.

## AQUARIUM CARE

The aquarium was a 24 x 12 x 12in (60 x 30 x 30cm) all-glass affair. The filter, an all-over undergravel, was powered by two air lifts, with a one-inch (2.5cm) covering of

broken cockle and oyster shell. This maintained a pH of 7.8. The water temperature was uncontrolled and fluctuated between 14-16°C (57-61°F) and there was no overhead artificial light, only incident light from an adjacent window.

The water was natural seawater collected a few months earlier and passed through a fine net prior to its introduction. The water was filtered continually, both before, and after the introduction of the starfish.

The starfish were fed irregularly on small pieces of white fish and mussel 3-6mm (0.1-0.2in) long.

I always found it best to put the food either directly under the animal or lay it next to an arm, allowing the starfish to move over it to feed. In this way very little, if any, of the food was wasted. Unlike browsing herbivores that feed almost continually, carnivores are intermittent feeders and go for long periods with no food. I do believe that carnivorous invertebrates with a comparatively low energy demand, such as these starfish, will not thrive if overfed, although they will feed.

## UNUSUAL REPRODUCTION

*Asterina* are unusual among starfish, being hermaphrodite. However, to avoid self-fertilisation, the same animal changes from male when young and small, to female as it becomes older and larger. One evening, I noticed the larger, female on the front of the glass by the water surface shedding eggs into the water. Here, they were being fertilised by the male that was pressed closely against it.

The eggs were small and spherical, about 0.5mm (0.02in) diameter and, being negatively buoyant, they sank to the aquarium bottom and adhered to the rocks, stones and glass sides. This is not typical of starfish; most release their eggs into the water and then become part of the plankton.

Not having the necessary equipment available at the time to monitor the eggs' development, I had no choice but to sit and wait.

Starfish development, including my own, is indirect and involves various larval stages, the last of which eventually settles on a suitable substrate and metamorphoses into a miniature starfish, the only obvious difference being size and reduced number of tube feet.

## REARING THE LARVAE

The development of my eggs progressed and, two weeks later, hundreds of small starfish about 1mm (0.04in) across were crawling around. As it was totally impractical



cal to attempt feeding them individually, I sprinkled some finely mashed white fish into the water. Within five days, about 75% of the baby starfish had disappeared.

Three days later, only four babies remained. These I attempted to feed individually. The next day only two remained but, by this time, they had increased their size by about 50%. The remaining three days saw only one surviving, but, having doubled its original size, this one was somewhat easier to feed.

#### MYSTERIOUS LOSSES

Fourteen days after their metamorphosis, not one starfish was seen to be alive. What could have happened? Normally, the development of starfish from egg to metamorphosis can take anything from four weeks upwards, depending on species and environmental factors. These took only two weeks — almost certainly as a result of the increased temperatures being experienced by these individuals.

The temperatures of coastal waters in late spring—early summer would be around 12°C (53-57°F), reaching a maximum in September of 15° (59°F). Therefore the temperature range at which these animals would normally be breeding during early summer would be around 12°C (53-57°F). This is 2-4 Centigrade degrees (3-6-7-2°F) lower than my aquarium.

The larval stages have specific food requirements during development, consist-

ing mainly of diatoms. Without the high light intensities required to grow sufficient diatom numbers, which my aquarium did not have, they may not have had sufficient energy reserves for successful metamorphosis, to be followed by a period of food-searching activity.



One-week-old Cushion Stars look extremely delicate and beautiful.

The possibility exists that the young starfish did metamorphose successfully with enough energy reserves to carry them on to their first food supply, but, like many juven-

iles of a species, their requirements were different to those of the adults, minimising intra-specific competition. These requirements could be either benthic (bottom-dwelling) diatoms, flagellates or other protozoans, and my decision to feed them on the same food as the adults was wrong, although they were definitely taking white fish after a week.

Those few individuals that did begin to grow after settlement could have exploited an isolated colony of suitable food already present in the aquarium.

Of course, the reasons for the demise of these baby starfish could be many, not the least of which might include water quality. I have not dwelt on water quality, however, because the successful maintenance and spawning of the adults and the successful development of the young validates the water quality.

I have not yet attempted to repeat my breeding 'experiment', but I do believe that, with good water quality control and a better feeding regime, the spawning and raising of *Asterina gibbosa* will be a real possibility. It may, actually, already have been achieved by some aquarist, somewhere.

It is not always easy to distinguish between those successes that are achieved by mere chance, and those achieved by objective management techniques — and one would not expect such successes to be hailed as a lifeline for endangered species, but they could, at least, be regarded as justification for their captivity. ALP

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# Trade Talk

## OFI (UK) News

OFI (UK) is providing members and non-members with the opportunity to have their say on a variety of issues and to become informed about what is happening within the trade, with a series of regional meetings throughout the country.

Following the first meeting, held in Doncaster, OFI (UK) chief executive Keith Davenport remarked that there had been a great deal of useful dialogue. "Once the busy season is over, we intend to hold others in all regions of the UK," said Keith.

### Traders Under Fire?

According to OFI (UK), irresponsible traders in ornamental fish are coming under increasing fire for dealing in diseased stock.



A spokesman said that members have been "on the receiving end of furious customers who have purchased 'cheap fish' in good faith from irresponsible traders, only to find that they are diseased and probably wipe out their entire stock". Hobbyists are being sent away empty-handed when they complain and are turning to the organisation's members for help.

According to OFI (UK), member retailers have remarked that disgruntled customers see the organisation's Code of Conduct in their shops and demand to know what they are going to do about irresponsible traders. "We have to explain that if the

fish are not purchased from us, there is little we can do," one retailer has remarked.

The organisation explains that a massive publicity campaign is a major reason for the increased awareness by the general public of OFI (UK)'s uncompromisingly high standards.

"As our membership continues to climb, the screams from hobbyists over irresponsible trading will begin to die away, because our members must abide by the Code," explained Keith Davenport.

He concluded: "If members of the public are unfortunate enough to get caught by an irresponsible trader, they have the right to complain to their local environmental health officer, who will deal with the matter".

### Lift-off For Membership Drive

Retailers from around the UK have joined OFI (UK) over recent months, bringing the total membership to in excess of 400. And, according to the organisation, traders from around the world have also been finding out more about the Code of Conduct. Enquiries have been received from traders in the USA, Australia, New Zealand and the Netherlands, who have been keen to learn about the organisation's Code and to use it as a basis for their own 'self-policing' project.

### Import Charges

OFI (UK) is currently engaged in negotiations with the Ministry of Agriculture, Fisheries and Food (MAFF) and the Department of the Environment (DoE), over a range of issues triggered by EC directives since the inception of the single market.

The main issue is a proposal to impose import charges, which according to OFI (UK) "could be virtually prohibitive" for fish importers.

"MAFF has been told of OFI (UK)'s concerns that 'all businesses should be on an equal footing' throughout Europe," explained Keith Davenport. "In some countries, regulations, directives and duties are being applied inconsistently, which results in UK traders having to contend with an 'uneven playing field'."

Keith further explained that, when the directive is fully implemented, it requires that all countries exporting to the UK appear on an approved list prepared by the Standing Veterinary Committee, and that this committee will have powers to specify:

- Which countries or designated areas of countries exports may come from;
- The species and development stage of imports;
- Pre-export treatment which must be applied;
- The use to which animals are put following export;
- Post-import measures, including treatments and disinfection.

At the moment, checks are being carried out at no cost to traders, but if charges used for meat products were used for live fish, it would cost the industry a staggering £500,000-plus a year.

OFI (UK) members are being kept in close touch with developments as the trade organisation continues its crucial negotiations with two government departments, and "lone" traders with no official voice are seen to be clearly disadvantaged over getting information about ongoing developments.

### Banker's Guide To Selling Tropical Fish

Small businesses and branch managers of Midland Bank have been issued with a business information guide to help them better understand the needs of people wishing to become tropical fish retailers.

The guide, available to all Midland Bank customers, provides information on the market, its customers, competition, advertising, start-up costs, qualifications and train-

ing, legal requirements, further reading and useful addresses.

The tropical fish profile, along with profiles on over 250 businesses, has been prepared for Midland by Project North East, a local enterprise agency based in Newcastle-upon-Tyne.

Also included within the guide are factsheets on general business subjects, including choosing premises and location, writing a business plan, duties of the company secretary, and financing a business.

For further details contact Anne Morton on 071 260 8478.

### Check Your Notes

Members of the Pet Trade and Industry Association (PTIA) are being urged to check bank notes, credit cards and cheques, and are offering a special discount to members for an optical checking device to help them identify forgeries.



The Check-a-Note is available at a discount to PTIA members, and provides a reliable means of helping retailers to identify forged bank notes, credit cards or cheques.

The device, called Check-a-Note, provides an immediate warning of forged bank notes, credit cards or cheques when the item is passed under the device.

Normally retailing at £43 (including VAT), the Check-a-Note is available to PTIA members at £34.40 (including VAT) and is manufactured in mild steel. One and a half metres of cable are also supplied, with a fused mains plug fitted.

For further details, contact PTIA, Bedford Business Centre, 170 Mile Road, Bedford MK42 9TW. Tel: 0234 273933; Fax: 0234 273550.



# What's your opinion?

By Billy Whiteside,  
BA, ACP

## BANGOR SHOW WINNER

On a sunny Sunday afternoon earlier this year, I set off to drive to Bangor, in County Down, to visit the Bangor Aquarists' and Breeders' Society Show. The drive took me about 45 minutes and I was armed with my camera to capture on film some of the good fish that I expected to see.

I felt somewhat confused after arriving in Bangor and visiting three different halls without finding the show. I felt a complete fool when I subsequently discovered that I had arrived a day late! My apologies go to Robert Quinn and colleagues whose show was a big success, despite my absence. A week later, a large L.R.A. bomb blew up Bangor town centre.

I made up for my error in date by tracking down the main award winner at the Bangor Show and paying him a visit. Michael Dingwell lives in East Belfast and his fish-house is like a garden of Eden. Michael's Bangor awards included 1st in cold-water class with a Tanago, 1st with a Cichlid (*Geophagus*), 1st Catfish (*Corydoras julii*), 1st Tetra (Silvertip), 1st with Tan-

*ichthys linni* (close relative of the White Cloud Mountain Minnow), 1st with a Flying Fox, 1st Breeders (Harlequin), 2nd Breeders (*T. linni*), 3rd Breeders (*Corydoras sterbai*); and 2nd with a beautiful, big, red catfish — a *Pseudacanthicus* species.

Michael's fish-house contains a wide variety of splendid fish, many of them breeding. I especially like his two species of Arowana and two species of Rays — which are about the size of a dinner plate.

I left clutching a polythene bag containing a dozen *T. linni* — which look like fancy White Cloud Mountain Minnows. Michael's large, red *Pseudacanthicus* Catfish is an absolutely marvellous fish, as you can see from the accompanying photograph.

## CANADIAN HEDGEHOG LOVER

Some months ago, I made a passing mention of hedgehogs in my garden and it brought a letter from Garfield Monteith, of 10 County Road 45, St Thomas, Ontario, Canada N5R5T5.

Garfield is an aquarist with a love for all other animals and he would like some informa-

tion about hedgehogs, e.g. where could he obtain a pair, and where can be obtain information about hedgehogs? Please drop him a few lines if you can help.

## BREEDING ANGELS

Mrs Jean Dodswell lives at 34 Bunrags Lane, Bunrags, Manchester, and she wrote to me some time ago about her Angels breeding. She said: "My Angels don't appear to be worried by the tank lights or, in fact, by anything I do in or around the tank, maybe because the fish have it to themselves."

"They allow me to carry out all my regular tank maintenance, including the internal power filters, even when they are looking after eggs or fry, although, admittedly, both parents have 'bitten' me on occasions. I spend quite a lot of time watching them with their young. Could it be that the parents recognise me and trust me?"

"I was about to go on holiday and I had left the third batch of babies with the parents for longer than normal, removing the fry a few at a time each day, up to going away, in the hope that it would delay another spawning. It worked, because when I returned there was a small batch of eggs on the usual slate. The fry have been free-swimming for about nine days and the brine shrimp hatchlings are running well."

"The oldest babies are now three months old. I have put three of them into my tank with my existing Angels and they have settled very well. There were only another four survivors and they are indistinguishable from the next batch, with whom they live. They are 11 weeks old. I have another tank containing the third batch, at seven weeks old, and am rapidly running out of space in which to bring them on."

"One of my sons has a Saturday job in a local aquatic store. They are importers and will be happy to take home-bred Angels into stock, as I understand there have been a few problems with some of the

Angels coming from Singapore. I just need to grow them a little longer — easier said than done with limited tank space!

"The parents seem keen to spawn again, but I will leave the current babies with them a little longer, at least until they have had powdered food for a few days. There are only about 16 of them, so perhaps the parents aren't really bothered about them and want to start again. Please look me up if you are in Manchester."

Thank you for the interesting letter and the kind invitation, Jean. I have not yet been to Manchester. There's a hefty air fare from Belfast to other UK cities, which is why I have not yet visited any of the large shows in England, Scotland or Wales. I'd also need to double-check the dates and times before setting out!

If any of your fish have been breeding recently, please drop me a few lines giving me your opinion on how breeding fish and their babies should be managed.

## DOUBLE STANDARDS

The two Weather Loaches in my Goldfish tank are delightful fish — unlike two small, black catfish that I added recently. They seem to be taking the odd chew on the Goldfishes' tails and fins. I rather think they'll have to go.

The last similar catfish I faced was much larger and was served Cajun-fried style in New Orleans. It tasted delicious! (I wonder what our Editor will think of me after his recent Editorial about food fishes!)

I was photographing two large Oscars today and to liven them up, the owner tossed in a small Goldfish as food. The Oscars had been fed earlier, apparently, and ignored the Goldfish. My heart went out to the Goldfish.

Yesterday I ate some salmon sandwiches. I certainly have double standards when it comes to giving my own fish tender loving care, and quite happily eating bigger ones when someone else kills, guts and cooks them. What is your opinion?



Michael Dingwell's winning *Pseudacanthicus* catfish.



Dinner-plate-sized ray (see Bangor Show Winner item).



# Herpetology matters

By Julian Sims

## TORTOISE TWINS

Usually, only a single embryo develops within the shell of a fertile reptilian egg. However, twins can sometimes develop in the eggs of crocodilians, lizards, snakes and especially those of Chelonia — tortoises and freshwater and marine turtles.

The development of twins might be hazardous to one or both embryos. For example, the 'yolk stalks' and the bodies of the embryos can become entangled inside the protective shell. The developing embryos can also become compressed and deformed in this confined space.

However, the most serious hazard in the development of twins is when the two bodies remain joined together, resulting in the formation of so-called Siamese Twins. This phenomenon is called 'pagus' from the Greek for 'fixed'. I reported several examples of pagus resulting in bicephalism — the possession of two heads — among different species of North American rattlesnake and freshwater turtles in the October '89 edition of *Herpetology Matters*.

The reasons for this occurring are not fully understood, but Andrew Allen stated that one cause was very high fluctuations in temperature (up to 40-45°C or 104-113°F) during the incubation of eggs. Andrew gave a detailed account of bicephalism in Grass Snakes (*Natrix natrix*) in his article *Two-headed Snakes* on page 20 of the August '90 edition of *Aquarist & Pondkeeper*.

Twinning has also been reported in certain nesting populations of at least three different species of marine turtle, the Leatherback or Luth (*Dermochelys coriacea*), the Loggerhead (*Caretta caretta*) and the Green Turtle (*Chelonia mydas*).

A four-year study conducted with the population of Leatherbacks which nest on the Sandy Point National Wildlife

Refuge, St Croix in the Virgin Islands revealed that ten females laid eggs which contained twins. Interestingly, two of these turtles produced two or more pairs of twins in consecutive breeding seasons.

Statistically, this occurrence is 17 times greater than would be predicted by chance. Therefore, the production of twins is either promoted by a factor or factors in the environment, or is due to a characteristic of particular female reptiles.

Twins have also been found in unhatched Green Turtle eggs laid at the nesting sites of Tortuguero in Costa Rica, and — to the south of the Sebastian Inlet in Indian River County, Florida. A two-headed embryonic turtle near to hatching size has also been found in an egg laid at Costa Rica, and twin Green Turtle hatchlings joined at the abdomen have been reported from Sri Lanka in the Indian Ocean.

## Captive Twinnings

During a period of four years, I have found two examples of twinning in eggs laid by female Hermann's Tortoises (*Testudo hermanni*). In both cases, only one of the two embryos developed into a completely formed live and viable hatchling. The other embryo developed as a deformed runt, which was not only much smaller in size, but also lacked a properly formed head and limbs.

In each egg, there was insufficient space for the live reptile to move freely and escape without human help by the time the fully formed tortoise was ready to hatch. This



JULIAN SIMS

Twin Hermann's Tortoises during hatching.



After hatching, the difference in sizes between the twins — seen here with the umbilical cord still attached — can be fully appreciated.

lack of space could have been one reason why the other embryo did not complete its development. Another reason is related to uneven circulation of blood, resulting in one tortoise receiving insufficient nourishment and becoming stunted — a biological condition known as *maufusion syndrome*.

After the twins had been removed from their egg, the cord which joined them in the abdominal region was allowed to dry for a period of 36 hours. The live hatchling was then cut free from its non-living and incompletely formed runt twin. On both occasions, the live hatchling was noticeably smaller than other hatchlings from the rest of the clutch which did not have to share the nourishing yolk of their egg with a twin.

Recently, an example of healthy twin Habus (*Trimernura flavoviridis*) — a species of Asian Pit Viper — has been reported as hatching from the longest and heaviest egg in a clutch of seven. This species of snake inhabits the Okinawa Islands of Japan.

However, this appears to be an exception. Embryonic twin reptiles are often deformed and usually do not complete their development because of lack of space inside the egg shell.

Even when one twin does manage to complete its development it is much smaller in size compared with a normal hatchling and, therefore, its chances of long-term survival are greatly reduced. Thus, the

majority of evidence indicates that the development of twins in reptile eggs has no value whatsoever in the survival and evolutionary success of these animals.

## CHINESE CHELONIA

A new book which provides a photographic record of the land tortoises and freshwater and marine turtles which inhabit the People's Republic of China has been published recently. The book is entitled *Chinese Chelonians Illustrated* by Z Jiufa and Z Ting. It is only 98 pages in length, but contains 100 colour and 4 black and white photographs and illustrations, a colour map, checklist and keys.

This guide is a useful extension to previous publications which seldom give much detail about the Chelonia from this part of the world. Information regarding description, history, biology and distribution is provided for each of the 31 species described to date, including three new species discovered between 1988 and 1990.

Although much of the book is written in both English and Chinese, the final chapters are in Chinese only. These pages provide a very different perspective on herpetology — the economic value and use of Chelonia for food and as medicinal items, their importance as raw materials for industrial use, and the history and reputation of Chelonia in China.

This hardback publication, which measures 26 x 27cm, is available at £38 (post free within the UK) from:

Steven Simpson, Natural History Books, PO Box 853, Brighton, East Sussex BN1 5DY. Tel: 0273 727328 Fax: 0273 203754

A comprehensive catalogue containing details of ichthyological and other herpetological books which Steven Simpson can supply is available from the same address.



# MALAYSIA

## Sipadan: Turtle Capital of the World

If it sounds like paradise, it's because it very nearly is paradise . . . at least, at the moment.

Jack Jackson reports.

Photographs by the author

**M**any of the Pacific Ocean's coral reefs are a sad story of destructive fishing methods, but there are a few reefs that are now protected and stand out for their beauty and species diversity. The tiny island of Pulau Sipadan is one such destination that is fast growing in popularity. Presently, most visitors are local or expatriates from Brunei, Malaysia or Singapore, but American, British and Japanese divers are now finding their way there.

Malaysia's only deepwater oceanic island, Sipadan, lies five degrees north of the equator in the Sulawesi Sea, just off Semporna, on Borneo's north-east coast. The island was declared a bird sanctuary in 1933, to protect the rare Nicobar Pigeon, but the reef was not explored by divers until the late 1970s, when both Jacques Cousteau and the WWF gave it glowing reports.

Disputes over ownership between Malaysia and Indonesia, and to a lesser extent the Philippines, together with poor anchorage, regular pirate activity and blast fishing as late as 1985, kept visitors down. The few that did venture here used small self-contained boats or camped on the beach.

### UNTOUCHED ART

In the late 1980s, small-scale resort operations were set up with traditional wooden huts, and Mike Wong began his many visits, which culminated in his evocative book *Sipadan - Borneo's Underwater Paradise*. There are now three resort operators on the island, situated next to each other where the drop-off is close to the beach.

Basic diving and snorkelling equipment is available for hire, including an interesting Far East invention that combines water wings with a glass viewing screen, which allows children to view safely the colourful world below.

All boat dives, using several fibre-glass speedboats, are presently drift dives, so there isn't any coral damage from anchors.

"I have seen other places like Sipadan . . . 45 years ago. Now we have found again an untouched piece of art." Thus said Jacques

Yves Cousteau the underwater explorer.

"No other spot on the surface of this planet has more marine life than this island." Thus said the then World Wildlife Fund.

### NOT-SO-UNTOUCHED ART

Sadly, today, Sipadan is not quite so glorious as when these statements were made. There is a noticeable lack of pelagic fish, sea snakes and shells, very few sharks, and there are areas that have been damaged by earlier blast fishing.

While diving, one is regularly bombarded by explosions from blast fishing on other islands a few miles away. These explosions are so big that you feel the shock waves. I was told that a consignment of World War II bombs had been found and that these were being used for fishing, sometimes with disastrous consequences to the fishermen. Careful monitoring will be required to keep this island as a paradise.

While I was there, several prominent British marine biologists were surveying the marine environment for the WWF and the Malaysian Government, with a view to future conservation. Some of them had been part of the original survey, so they were well qualified to make a comparison.

At present, washing water comes from the island's only spring, and drinking water comes in daily from the mainland. By the time this article is published, all operators will have to use water desalination plants.

### TEEMING WATERS

The waters around Sipadan really are teeming with reef fish, most of them inquisitive enough to approach divers. We were regularly buzzed by large shoals of Fusiliers, Batfish, Sweetlips, Caranx, Goatfish and a huge shoal of Bumphead Parrotfish approaching 100 in number (the largest shoal of Bumpheads that I have ever seen).

There are at least nine different varieties of Clownfish and some unusually coloured anemones. The coral gardens area is very rich and includes some very large Table Corals and true Giant Clams.



The rare Zebra Lionfish (*Dendrochirus zebra*) photographed at night.





Pulau Sipadan  
Island — the  
almost-perfect  
paradise.



Green Turtle  
laying eggs  
at night on  
Sipadan.



Bumphead  
Parrotfish  
photographed  
sleeping at  
night.



Giant Robber  
Crabs are also  
known as  
Coconut Crabs  
because of  
their coconut  
tree-climbing  
activities.



Black Corals (*Antipathes* sp.)  
are abundant in deeper water.



Feather Stars, mixed  
corals and an Orange-  
stripe Triggerfish in  
crystal-clear water.





The reef top is, mostly, in one to two metres of water that is normally flat calm, so snorkellers can enjoy most of the marine life by snorkelling from the speedboats, just as the divers dive from them. There are many colourful varieties of Angelfish, Surgeon fish, Unicornfish, Trumpetfish and Triggerfish.

In deeper water, on the steep walls, there are large gorgonians, some hiding tiny Longnose Hawkfish, and plenty of Black Corals. Particularly prolific are many colourful Feather Stars which, in common with most Pacific coral reefs, are out and about in daylight.

There is also a large shoal of Barracuda, but it refused to appear for me, though I did photograph some large individuals.

Shore and night dives or snorkelling are from the beach in front of the huts, where a swim of ten to twenty metres, depending on the height of the tide, brings you to the drop-off.

The reef top towards the small jetty has plenty of small fish, some starfish and turtles. The drop-off here is well stocked with small fish, colourful nudibranchs and anemones, small shoals of juvenile Batfish, Sweetlips, Grunts, Sweepers, Butterflyfish, Bannerfish, Coral Rabbitfish, a very large shoal of Caranx, the rare Map Pufferfish, and two tiny Leaf Fish, as well as having the now-famous, turtle cavern.

At night, the many caves on this drop-off contain sleeping Parrotfish, Bumphead Parrotfish, Pufferfish and turtles, Moray Eels, starfish, shrimps and crabs. The rare Zebra Lionfish and the rare Snowflake Moray Eel, are also out and about.

### SIPADAN SPECIALITY

What makes Sipadan really stand out are the turtles. Massive 300-pound Green Turtles and smaller Hawksbill Turtles are everywhere. I often saw 20-30 on one dive, and many of these would continue with the serious business of eating, sleeping or scratching parasites off their backs on the coral, while totally ignoring my close presence.

Ironically, just one year previously, I had been diving just north of Sipadan on Philippines' Tubbataha reefs, where the turtles were equally abundant, but very timid due to hunting and blast fishing.

Green Turtles lay clutches of 100 or more eggs several times each breeding season, which is every two or three years or so. They prefer undisturbed beaches with overhanging branches, such as on Sipadan.

On most nights of the year, reaching a peak from August through October, turtles can be found laying eggs in the undergrowth at the top of the beach; sometimes right in front of the huts. Occasionally, they get their timing wrong and can be found exhausted, still laying their eggs after dawn; they also often get trapped among the tree roots, requiring human assistance to get back to the sea.

You can walk round the island in 20 minutes, so the turtles are easy to find; but they should never be disturbed before they



A spectacular Nudibranch or Sea Slug (*Chromodoris bullocki*): just one of numerous species that inhabit Sipadan waters.



The rare Map Pufferfish (*Arothron mappa*) can be found along the drop-off area of the reef.

start laying, or they will give up and return to the sea.

Turtle eggs can still be collected on the island by official egg collectors, so the resorts have set up a sponsorship system so that visitors can pay to sponsor turtle nests against 'unofficial' egg collectors.

On land, as well as rare fowl, there are Monitor Lizards and huge Robber Crabs, often called Coconut Crabs from their habit of climbing coconut palms to feed on the fruit. Like turtles, Robber Crabs are now rare elsewhere. Fruit Bats can be noisy at night.

### MODERN-DAY PRESSURES

This island paradise cannot survive under the visitor pressures currently imposed upon it. The difficult decision for the Malaysian government and its advisers, the WWF, is whether to close it completely, which would be a sad loss for those of us who truly appreciate the marine environment and treat it responsibly, or to limit the numbers of visitors allowed at any one time and, perhaps, charge a small visitor's tax to help pay for conservation.

As I write this article, I hear that a 'live-aboard' boat has been bought specifically for this area. With blast fishing going on around all the other islands nearby, and silt run-off from logging affecting all areas near to the coast, this boat is likely to spend most of its time around Sipadan, so fixed anchors will have to be set up to minimise coral damage.

Sipadan is not easy to get to: a long flight via Singapore or Kuala Lumpur to Kota Kinabalu in Borneo, followed by a 45-minute internal flight to Tawau, another hour by road to Semporna and then a bumpy 45-minute speedboat ride to the island. Accommodation is in traditional wooden huts, some with the sea lapping at their door; but there is 24-hour electricity, ceiling fans, showers, communal toilets and a bar. The driest season is May, through to October.

If you are on business in the Far East or visiting the aquarist shows in Singapore, it is well worth going on to Sipadan, where you can relax and dive or snorkel among larger versions of the fish you like to see in your aquarium. Children I met there were particularly excited at seeing turtles laying eggs: "Just like on television!"

If Sipadan appeals to you, get there soon, before it is too late!

### FURTHER READING

*Sipadan - Borneo's Underwater Paradise*

By: Michael Patrick Wong  
ISBN: 981-2821-0

Odyssey Publishing  
27 Foch Road,  
#05-01 Hoa Nam Building,  
Singapore 0820.

Also available from the author at:  
123 Hoe Street,  
London E17 4RX.



# OUT AND ABOUT

## HERTFORDSHIRE FISHERIES

by John Dawes

**M**editerranean Sea Daffodils and a water garden centre in Hertfordshire may, at first sight, have little in common with each other. Throw in a charity lecture, and the association might seem even more remote.

There are links, however, two of them being: me (I was giving the lecture and had started it off with a slide of the said Sea Daffodils) and a gentleman called Frank Jurado (the Senior Sales Assistant — Tropical Department — at Hertfordshire Fisheries, who is the first-ever member of an audience able to recognise a Sea Daffodil when I've projected it on the screen).

It turns out that, like me, Frank is extremely interested in all Mediterranean flowers. He has also, like me, attempted to grow Sea Daffodils, with only qualified success. And his family come from La Línea de la Concepción, the Spanish town next door to Gibraltar where I was born. We therefore had a great deal in common and spent a lot of time talking about plants of all sorts, fish of all sorts, natural history in general . . . and Spanish food.

The reason I mention this incident is that Frank is, in many ways, typical of the staff at Hertfordshire Fisheries: enthusiastic, competent and impressively well informed on a very diverse range of subjects.

The accumulated benefits of such a collection of talent runs through the whole staff, from Director Carole Goodchild, through General Manager Paul Kiddle, Tropical Department Manager Steve Desombee, Assistant Manager (Coldwater) Rachel Setchfield, to Senior Sales Assistant Will Mansfield. This has resulted in a deserved and unbroken run of success for Hertfordshire Fisheries since its opening just a few years ago.

Further, the ability to apply



One of the well planted fully kitted out pond systems.



The selection of pond and bog plants (this is *Primula denticulata*) is particularly impressive.



Golden Sucking Loach — one of numerous rarely-seen species and varieties of freshwater tropicals regularly available at Hertfordshire Fisheries.

this knowledge on a practical scale means that sound advice is readily available on any-

thing from a Red-bellied Dace (a great coldwater species from the States), to Giant Rhubarb

for large water garden set-ups.

The feeling one gets as you watch the Hertfordshire Fisheries staff go about their business, carrying out water tests for a customer one minute, and advising on the best size of pump or filter medium the next, is that you can buy with confidence, and that you'll receive courteous, well-informed service when you buy at this very attractively laid out aquatic centre.

By the time we go to press, the large outdoor area at Hertfordshire Fisheries will be a blaze of colour, with its range of fully fitted and planted water garden designs probably at their best, and with the bog garden section which had been planted just prior to our visit, already having achieved an 'established' feel about it.

Indoors, in the large, airy glasshouse which constitutes the main building, you'll be able to find virtually anything you care to name, such is the comprehensive nature of the dry goods department.

As far as aquarium fish are concerned, you can't go wrong either, particularly on the freshwater coldwater and tropical side. You will, of course, find all the common species and varieties, but if you want something out of the ordinary, like the afore-mentioned Red-bellied Dace, or a Chinese Sailfin Sucker, you are likely to find a good assortment of these too.

Hertfordshire Fisheries is very easy to find. It's just off Junction 21A of the M25, next door to Burston Tyler Garden Centre on the North Orbital Road, St Albans, Hertfordshire.

### Opening times:

Summer — 9 am to 6 pm, seven days a week.

Winter — 9 am to 5 pm, seven days a week.

For further details, contact any member of staff at the above address or ring 0727 833960; Fax: 0727 843657.



The locations of the known *Coregonus* lakes of the UK. The Lake District contains the whitefish lakes of Bassenthwaite Lake, Brotherswater, Derwentwater, Haweswater, Red Tarn and Ullswater.



DR IAN WINFIELD

# Desperately Seeking Schelly

Regular 'Paper Rounder' Dr Ian Winfield reports on the precarious state of three of our rarest native freshwater fish.

**T**here exists a species of vertebrate in the United Kingdom that few people know about and even fewer have ever seen. Surprisingly, it is not to be found in some remote, barren area of our country, but in a location

that teems with many thousands of holidaymakers during the summer months. The species is the Vendace (*Coregonus albula*) and the area is the English Lake District. Together with the slightly more widely distributed Schelly (or Gwyniad or Powan

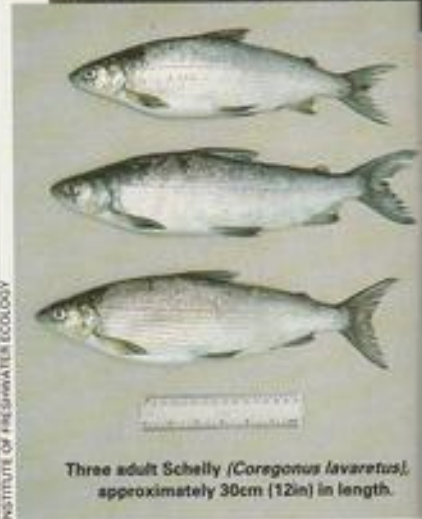
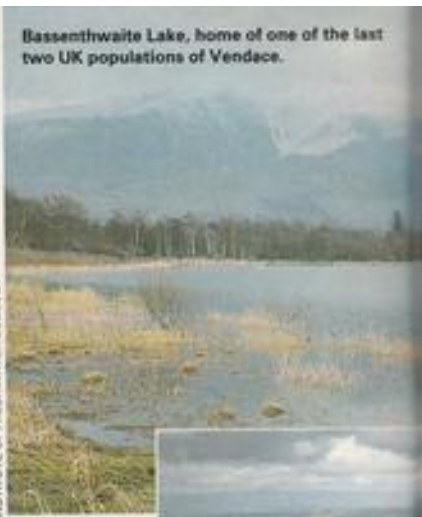
Bassenthwaite Lake, home of one of the last two UK populations of Vendace.

INSTITUTE OF FRESHWATER ECOLOGY

The Schelly lakes of Red Tarn (foreground) and Ullswater (distant left background) as seen from the summit of Helvellyn.

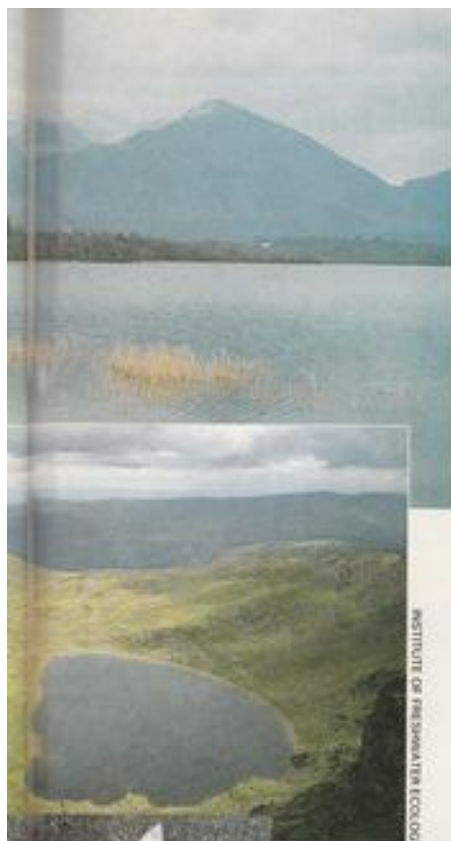
INSTITUTE OF FRESHWATER ECOLOGY

INSTITUTE OF FRESHWATER ECOLOGY



Three adult Schelly (*Coregonus lavaretus*), approximately 30cm (12in) in length.





MUSEUM OF FRESHWATER ECOLOGY



An adult Vendace (*Coregonus albula*), approximately 22cm (8.7in) in length.

Two adult Pollan (*Coregonus autumnalis*), approximately 30cm (12in) in length.



MUSEUM OF FRESHWATER ECOLOGY

— more of this below) *Coregonus lavaretus*, and Pollan, *Coregonus autumnalis*, the Vendace is among the rarest of our freshwater fishes.

The members of the genus *Coregonus* are known collectively as the whitefishes and elsewhere in Europe are of major importance in commercial fisheries, particularly in more northern latitudes. The British Isles lie towards the southern limits of the distribution of this genus and offer only a few sites capable of meeting their requirements for relatively cool and oxygen-rich water.

Consequently, the Vendace (*C. albula*) is found in just two locations, the Cumbrian lakes of Bassenthwaite and Derwentwater. Two populations formerly present in southern Scotland are now believed to be extinct.

*Coregonus lavaretus* is slightly more widespread, occurring in Lochs Lomond and Eck in Scotland, where it is known as the Powan, Llyn Tegid or Bala Lake in Wales, where it is known as the Gwyniad, and in Brotherswater, Haweswater, Red Tarn and Ullswater in Cumbria, where it is known as the Schelly (or Skelly).

The Pollan is found in Loughs Neagh and Erne in Northern Ireland and in the Shannon Lakes of the Republic of Ireland.

#### MAINLAND WHITEFISH

The remainder of this article will concentrate on the two whitefish species of the UK mainland: the Vendace (*C. albula*) and *C. lavaretus*. For the sake of brevity, and at the risk of offending the inhabitants of Scotland and Wales, I will refer to *C. lavaretus* as the Schelly, although many of the points that I will make apply equally well to the Powan and Gwyniad. The subtle differences between the various *C. lavaretus* populations remain a subject of active research.

#### Vendace/Schelly compared

Both the Vendace and Schelly are silver, streamlined fish, possessing a small but distinct adipose fin between the dorsal fin and the tail. These features separate them at a glance from the other lake fishes of England, Scotland and Wales. The Schelly has a heavier build than the Vendace and typically lives to a greater age, for example up to 12 or 13 years, while Vendace rarely survive beyond six or seven years of age.

As might be expected, the Schelly also grows to a greater maximum size, up to around 35cm (14in) in contrast to 25cm (10in) for the Vendace. The young of both species grow very quickly during their first year of life, such that they may be more than 10cm (4in) in length by the onset of their first winter.

The Vendace is a fish of the open water, where it is to be found exclusively at all times of the year, except the spawning season. During the day, it remains relatively inactive at depths generally in excess of 10m (33ft), but at night, it rises higher in the water to feed.

In contrast, the Schelly is more of a bottom dweller and, at least in some lakes, it



MUSEUM OF FRESHWATER ECOLOGY

Clockwise from top left: Eggs of Vendace (showing the embryos' eyes), Schelly and, for comparison, Brown Trout (*Salmo trutta*) and Arctic Charr (*Salvelinus alpinus*). The Schelly egg is approximately 2mm (0.08in) in diameter.

can be found in relatively shallow inshore areas less than 4m (13ft) deep throughout the year.

As might be expected, these differences in preferred habitats lead to differences in feeding ecology because, while both species begin life feeding on zooplankton, such as *Daphnia*, the Schelly subsequently progresses to feeding on larger invertebrates of the lake bottom.

Reproduction is more similar, with both species laying many small (less than 2mm — 0.08in — in diameter) eggs in silt-free inshore areas of gravel or stones during the early and mid-winter for Vendace and Schelly respectively. Each female may lay several thousand eggs which then enter a very long incubation period of over 50 days at the low (4-6°C — 39-43°F) water temperatures of the UK winter, during which they lie exposed and susceptible to predation.

The eggs thus hatch, largely, during March and April, when the newly-hatched larvae of approximately 10mm (0.4in) in length start to feed on plankton. While this early reliance on plankton has hindered captive breeding and aquaculture of whitefish in the past, the recent development of suitable artificial foods by Terra-Werke and other companies has largely solved this problem.

#### 'OVER-ENRICHED' THREATS

Without a doubt, the major threat facing whitefish in many parts of Europe is eutrophication, i.e. the over-enrichment of lakes by the unintentional addition of nutrients leading to algal blooms which, in turn, die, decompose and deplete the water of oxygen. This same problem also confronts at least some of the whitefish populations in the UK and is believed to have been responsible for the loss of, at least, one of the Scottish Vendace populations.

At present, eutrophication is giving particular cause for concern over the Vendace in Bassenthwaite Lake. In addition to the direct threat posed to adult Vendace by the potential deoxygenation of their deep water