

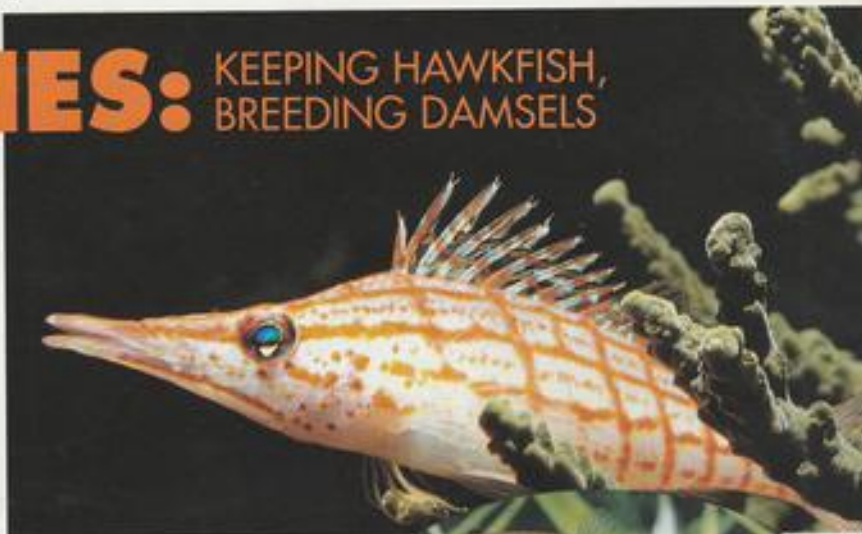
TROPICALS...KOI...COLDWATER...MARINES...REPTILES...

AQUARIST & PONDKEEPER

APRIL 1995

£2.00

MARINES: KEEPING HAWKFISH,
BREEDING DAMSELS



WILD
PLATIES FOR THE AQUARIUM

ILLEGAL SOUVENIRS
SUCCESS WITH SHELL-DWELLING CICHLIDS



FREE KOI SUPPLEMENT

PREPARATIONS FOR SPRING AND SUMMER

**£1,000 WORTH OF HOZELOCK
ULTRA-VIOLET PURIFIERS TO BE WON**



AMPHIBIANS EXPEDITIONS CONSERVATION COMPETITIONS

STOP PRESS! · STOP PRESS! · STOP PRESS!

NUTRAFIN STEALS LIMELIGHT AT MAJOR SHOWS IN '94!

YORKSHIRE AQUARIST FESTIVAL 1994

FISH OF FISHES
IAN ROWBOTTOM



Ian Rowbottom has won many major titles with his fish over the last 20 years and his personal recipe for success begins with a pinch of Nutrafin...

'To produce the perfect fish requires dedication, enthusiasm and patience. I've been feeding all my fish on Nutrafin for many years now because I get the results I want. Nutrafin is a high quality, balanced food which is quite simply - THE BEST!'

BRITISH AQUARISTS' FESTIVAL 1994

CHAMPION OF CHAMPIONS
TED DERRICK



A veteran aquarist and winner of 'Best in Show' no less than 38 times, Ted Derrick's latest achievement is just one more accolade to his dedication and experience in fishkeeping. Ted holds the FNAS Master Breeder Certificate and feeds his vast collection of fish exclusively on Nutrafin...

'I switched to Nutrafin in 1988 and since then I've never looked back. Nutrafin fits my requirements as the ideal diet for ALL my fish, including fry'

THE SUPREME FESTIVAL OF FISHKEEPING 1994

SUPREME CHAMPION
MARK IRVINE



A top aquarist on the show circuit, Mark Irvine has been keeping fish since childhood and winning prizes at top shows for the past 10 years...

'I won Supreme Champion with a catfish reared entirely on Nutrafin it provides the essentials I need for both my showfish and the youngsters I rear from my home breeding stock. I'd certainly recommend Nutrafin to anyone who keeps fish'

THE SUPREME FESTIVAL OF FISHKEEPING 1994

2ND PLACE
KEN LAWN



The trophies are stacked high at Ken Lawn's home, testament to his prize winning track record for keeping and rearing a wide variety of fish...

'When you're rearing fish for show quality the last thing you need is dietary problems. As far as I'm concerned Nutrafin is the number one food for my fish - every last bit is eaten so there's no waste and I know I'm feeding high quality nutrition for perfect, healthy results'



It's unanimous!
Today's Champions prefer

NUTRAFIN

HAGEN

BOLE C. HAGEN (UK) LTD, CALIFORNIA DRIVE, WITWOOD INDUSTRIAL ESTATE,
CASTLEFORD, W. YORKSHIRE WF10 5QH, TEL. 0477 506622

Contents

APRIL 1995
VOL. 60 NO. 1

EDITOR John Dawes

ART EDITOR Ian Hunt

ADVERTISEMENT
MANAGER John Young
Tel: 081 904 8890

ADVERTISEMENT
SALES
Rosemary Goodwin

ADVERTISEMENT
PRODUCTION
Pauline Philpott

PUBLISHED BY Day
World Publications,
9 Tufan Street, Ashford,
Kent TN23 1QW

TELEPHONE:
ADVERTISING AND
PRODUCTION
CLASSIFIEDS &
BUYERS GUIDE
01223 821877

FAX NUMBER
01223 840660

SUBSCRIPTIONS £22.50
per annum (incl. p&h).
Overseas rates on
application. All
subscriptions payable in
advance to: Aquarist &
Pondkeeper, 9 Tufan
Street, Ashford, Kent
TN23 1QW

Originator by Webpark
Ltd/Ashford Composition
Ltd. Printed by Headley
Brothers Ltd. The Insects
Press, all of Ashford, Kent

Distributed to the
Newtrade by:
Signpost International
Press Distributors Ltd,
Woburn House,
127/9 London Road,
Hatfield, London,
SN6 5JH

ISSN 0022-7222

features

- 5 KEEPING THE CLOWN LOACH:**
Tetra's Dr David Pool sets the record straight regarding this stunning, often misunderstood, bottom dweller



- 11 97 SPECIES AND COUNTING:**
Colin Grist's latest instalment looks at the challenges and excitement involved in Breeding Damsel-fishes

- 18 MAKING THE MOST OF YOUR POND:**
Useful, attractive ideas for pondkeepers from David Fletcher

- 27 KEEPING AND BREEDING FRESHWATER CRABS:**
Dave Barnson's story of almost-total success with these interesting and colourful tropical aquarium inverts.

- 39 SHELL-DWELLING SUCCESS:**
Marie-Paule and Christian Piednoir show you how to establish a long-running stable population of shell-dwelling African cichlids

KOI SUPPLEMENT: Preparations for Spring and Summer

See Page 43

- 75 WILD ABOUT PLATIES:**
In this month's instalment, Derek Lambert looks at three species that do very well in aquaria

- 78 MINI-FEATURE — MEGA-CHALLENGE:**
A&P editor John Dawes' story of trials and travels in the quest for a small water feature for his patio

- 84 KEEPING MARINE HAWKS:**
Svein Fosså turns his attention to the hardy and inquisitive Hawkfishes

- 88 FROGS AND FRIENDS:**
Julian Sims' farewell instalment

- 90 LIGHT-SENSITIVE SPAWNERS:**
It's not just the 'light of the silvery moon' that stimulates some fish to breed, as Dr David Tipping reports



- 93 BOUGA TOADS, PUFFERS . . . AND ZOMBIES**
The latest of Dr. Andrew Allen's revealing and intriguing looks into the depths of the aquatic world

- 94 COMPETITION RESULTS:**
All the winners of our 'Aquarian' 20th Anniversary competition

- 107 ANYTHING TO DECLARE?**
Susan Brewer offers some friendly and timely words of advice to aquarists and herpetologists planning to embark on foreign holidays

- 112 TYPICAL TOADS:**
Learn how to keep and breed them with a little expert help from Marc Staniszewski



Also in this issue

Tomorrow's Aquarist... 8, News... 14, White Back... 20, Coldwater Jottings... 22, Fascinating Fish Fact... 24, Koi Calendar... 30, Seaview... 36, Koi Talk (See Supplement), Traveller's Tales... 37, Trade Talk... 80, Water's Edge... 92, Question Time... 95, Shore Watch... 99, Society World... 109, Discussions... 110, Next Month and A&P Subscription Form... 115

editorial

'EXPLOSIVE' NEWS FROM CHINA

Fish, as we all know, are amazing creatures. It is even said that if something is biologically possible, then some fish, somewhere, will have stumbled across it in the course of evolution.

Few would, however, have come up with such an 'explosive' solution to species survival as a new Charax-like fish reported from the foothills of the Y'a Kid Ding (pronounced Y'a Kid Ding — i.e. with the emphasis on the second syllable) mountains in a remote corner of China. In fact, were it not for the impeccable credentials of the discoverer, Professor Insa Foeller, the whole matter would verge on the incredible.

Discovered on 1 April last year, this tiny shoaler (a subspecies, appropriately named *Aprolocheilichthys foellerensis explosiva*, is found in large shoals

which are heavily predated upon by all manner of larger fish, birds and even invertebrates.

When an attack is launched, the adrenalin rush experienced by the *Aprolocheilichthys* nearest to the predator is such, that its delicate constitution just can't handle it. So . . . it explodes!

This ultimate sacrifice is, of course, of no advantage whatsoever to the unfortunate individual involved, but, as far as the rest of the shoal is concerned, it gives them the few vital seconds they need to make their escape while the predator dines on the floating biological 'debris' left behind by the exploding victim.

Sadly, though, we are not likely to encounter *Aprolocheilichthys foellerensis explosiva* in aquaria, since a fish that has a tendency to explode every time a net is placed in a tank is, obviously, not only extremely difficult to catch in one piece, but even more difficult to pack and transport across the globe.

John Dawes

B.T. Foden

AQUARIST

Over 45 years as the North's leading Aquatic Centre

MARINE FISH — Over 30 tanks of top quality marines and inverts from Malaysia, Indonesia, Sri Lanka, Caribbean, etc.

TROPICAL FISH — Over 300 Varieties including South American Catfish, Tetras & Cichlids. Also fish from Africa, Indonesia, India, Singapore, Miami and Malaysia.

PLANTS — Thousands of aquatic plants — including many crypto's — kept in superb condition in our specially designed tanks.

EQUIPMENT — An Aladdin's cave of tanks, stands, hoods, furniture, filters, test kits, pumps, in fact everything for the novice and experienced hobbyist.

For quality and service second to none contact the professionals at:

93 Thornhill Road, Longwood, Huddersfield
Tel. 01484 655445 or 645324. Fax. 01484 648886

1 mile M62. Open 7 days.

Sole distributor for: Aquarium Air supply — Britain's
No 1 Air Blower & Dalecraft Aquarium Decorations

MARINER HEATER/THERMOSTAT

For accuracy and reliability use a

MARINER

Heater Thermostat in your aquarium



Available from your nearest aquatic retailer.

Manufactured by

Springfield Electrical Co Ltd.

Throxton Industrial Estate

Nr Andover, Hampshire SP11 8PW

The NEW Aquatic Centre in S.E. London

NOW OPEN

NOW OPEN



CASTLE AQUATICS



With 20 years combined experience in the Aquatic Trade, owners Steve and Richard offer the very best in expertise

- OVER 70 TANKS OF TROPICAL AND COLDWATER FISH
- FULL RANGE OF ACCESSORIES
- KOI CARP • POND EQUIPMENT

We stock everything you need

Tanks set up and maintenance contracts taken for restaurants waiting rooms, etc . . .



TOP BRAND NAMES

Eheim Interpet

Fluval Hagen

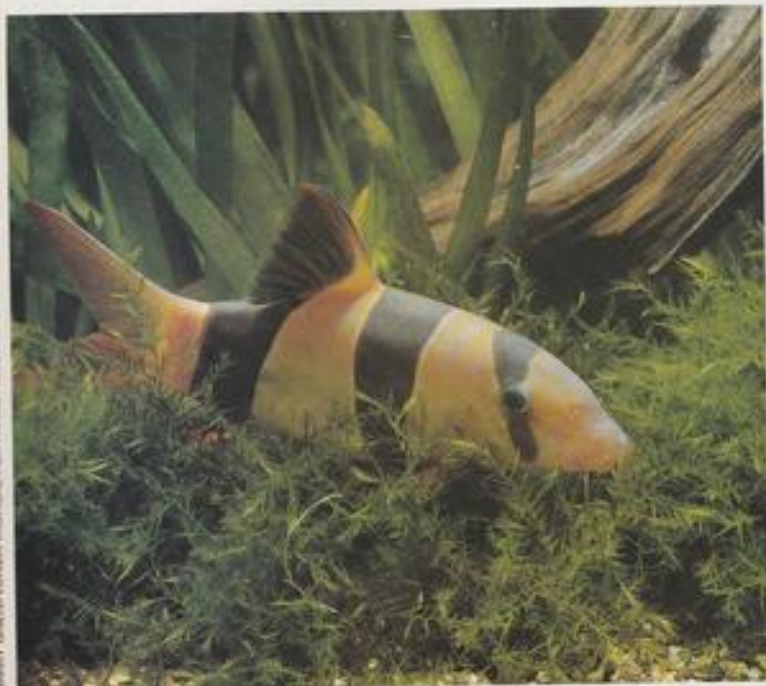
Tetra Aquaclear

Open seven days a week Mon-Sat 9.30am-6.00pm, Sun 10.00am-2.00pm
426 Well Hall Road — Eltham — London — SE9 (Near the Welcome Inn)
0181 856 0505

KEEPING:

THE CLOWN LOACH

As Dr David Pool of the Tetra Information Centre explains, these beautiful loaches are not hard to keep in peak condition, as long as a few basic rules are followed.



ABOVE - Portrait of a beautiful Clown Loach.



LEFT - Food tablets will make Clown Loaches rise from the bottom of the tank.

BELOW - No, there's nothing wrong with these fish. They are just resting on their backs (see text for details).



Its striking coloration, active nature and unusual characteristics, make the Clown Loach one of the more popular additions to many aquaria. Unfortunately, this beautiful fish has a reputation for being more difficult to keep, and be prone to White Spot - but, as you will see, this is due to the ignorance of the fishkeeper, rather than a fault of the fish.

What is it?

The Clown Loach, *Bonia macracantha*, is a member of the *Bonia* genus, a genus which includes the Tiger Loach (*Bonia heloder*), the Red-finned Loach (*Bonia lecontei*), the Reticulate Loach (*Bonia lobachata*) and the Dwarf Loach (*Bonia siddhimanthi*). This genus forms part of the Cobitidae family, which includes other loaches, such as the Weather and Kuhli loach. The Cobitidae, in turn, forms part of the suborder Cypriniformes - the carps and barbs.

In common with their distant carp-like relations, the Clown Loach has pharyngeal teeth in its throat to chew and crush food. These teeth are quite powerful, and can easily cope with the shells of any snails in the aquarium.

All of the *Bonia* loaches have tiny round scales, which are located deep down in the skin, giving them the appearance of being scaleless. They also have small, moveable spines located just below the eye. These spines can be erected and locked into position for protection or defence of a territory. Fortunately, they do not cause any harm to other fish, but they can pose problems, if these loaches become entangled in a net when the fish are moved.

Slow-flowing rivers in Indonesia, Sumatra and Borneo are the natural habitat of the Clown Loaches. They are usually found in areas with a sandy bottom, or where deposits of organic material have built up. These areas allow Clown Loaches to forage in the substrate looking for food.

The Clown Loach is very sought after in its natural environment, not as an aquarium specimen, but because of the excellent flavour of its flesh. Local fishermen catch large numbers, particularly around breeding time when the fish congregate.

Aquarium Care

Caring for the Clown Loach in an aquarium is relatively easy, providing its limited needs are met. The first of these is for good-quality water. The pH (acidity/alkalinity), hardness and temperature are not critical, as long as they do not change quickly. A temperature of 75-82°F (24-28°C), pH of 6.0-7.5 and hardness of 5-20°dH are all ideal.

Clown Loaches are intolerant of pollu-



M.P. & C. PEDDOR

Cobitid Loaches (these are Reticulated Loaches) are shoaling fish. Don't keep them singly or in pairs.



M.P. & C. PEDDOR

The Tiger Loach is widely available.

tants, making good filtration and regular partial water changes essential. Poor water conditions, or sudden changes, have a very obvious effect on these fish, with them becoming considerably paler and very agitated.

Stressing the Clown Loach through poor water quality, bad handling etc can quickly lead to White Spot. In fact, these fish are widely regarded as being particularly prone to this disease. Taking care when moving them and gradually introducing them to their new tank can avoid such problems – as will preventive treatment with a suitable White Spot remedy. Care has to be taken when selecting remedies for Clown Loaches, as some can have an adverse effect, rather than improving their health.

Numbers to keep

Clown Loaches are a shoaling species, found in groups of 10-1000 in the wild. In an aquarium, it is important that at least three specimens are kept together. If only one is kept, it can become very aggressive or remain hidden all of the time. If two are kept, one will be more dominant and the other submissive.

However, when three or more are kept together, they will swim as a shoal, and demonstrate their range of interesting behaviours. One such behaviour to note is

their resting pose, when all of the fish in the shoal will lie on their side on the tank bottom for a few minutes.

Feeding

In the wild, Clown Loaches feed on snails, worms and insect larvae from the bottom of the river. In an aquarium, they will usually feed on the bottom or in mid-water. Tablet or granular foods are ideal and will be eagerly consumed. Sticking tablets onto the glass is also a good way of feeding, and brings the fish to a position where they can be easily viewed.

Their feeding habits also make them an ideal and interesting solution in aquaria which are being overrun with snails. While the loaches cannot consume the larger snails, small ones are rapidly devoured.

When feeding, these active bottom dwellers demonstrate yet another of their unusual behaviours, that is, the production of a clicking noise. This is not a result of sloppy table manners, but a warning to other fish to keep clear. When several Clown Loaches are present, one fish clicking can prompt the others to join in, resulting in a pretty noisy meal!

Breeding

Distinguishing male and female Clown Loaches is difficult until they are mature.

At this stage, the males are thinner, and the caudal peduncle (the area of the body immediately in front of the tail) is thicker. Some reports suggest that the male's tail is more pointed, though this can be difficult to distinguish.

In the wild the Clown Loach spawns in the rainy season. Little is known about the actual breeding behaviour, although spawning is thought to occur in groups, in shallow water and among vegetation. Our knowledge has not been enhanced by aquarium observation, and this species has only rarely been bred in captivity. Most recorded spawnings have occurred by chance, with little information being noted.

Some of the difficulty in breeding Clown Loaches may be a result of the fish not becoming mature in captivity. Certainly, they do not reach the size of the wild fish. In an aquarium, they rarely reach 18cm (7 in) in length, while in the wild, they can exceed 30cm (12 in). It is perhaps more likely, however, that sufficient numbers are not kept together to allow shoal spawning.

The Clown Loach is an ideal fish for most aquaria, and will add considerable interest, as well as colour and movement. If you are successful and manage to get them to spawn, send a report to the magazine, because we'll all be very interested indeed.



M.P. & C. PEDDOR

The tiny Chain or Dwarf Loach is harder to find than many other species.

CLOWN LOACH FACT FILE

| | |
|--------------------------|---|
| Scientific name: | <i>Sotia macracantha</i> |
| Origins: | Indonesia, Sumatra, Borneo |
| Size: | In wild, 30cm (12in). In aquaria, 18cm (7in) |
| Food: | Tablet and granular food |
| Water conditions: | pH 6.0-7.5. GH 5-29 dH. Temp 75-82°F (24-28°C) No pollutants |
| Numbers to keep: | A shoaling fish – so keep at least three specimens together |
| Breeding: | Very difficult |

Tetra

Whisper



A team of eleven pumps to match any need.

A pump that's too big or too small for its aquarium can create a stressful environment for fish. So choosing the right size pump is essential. But with eleven sizes of Tetra Whisper Air Pump you can be sure there's one that's just perfect for your aquarium - whether it's home to tropical, coldwater or marine fish.

Whisper Pumps are brand leaders...

- Manufactured, assembled and tested to exacting quality control standards.



- Unique Silaflex valves give years of trouble-free life and Whisper-quiet operation.
- Designed to work without strain, giving exceptional reliability.
- Now with fitted sealed plug.

- Non-slip rubber bases further reduce noise and prevent 'walking'.
- Comprehensive range of accessories and spares includes check valves and air filters.
- Variable Flow Control and Multi-outlets on selected models.
- Now backed-up with Tetra's unrivalled experience and expertise.



So choose a pump from the team that really scores!

POST THE COUPON TODAY FOR YOUR FREE LEAFLET ON THE WHISPER & PLANTASTICS RANGE

Send to Tetra, Lambert Court, Chestnut Avenue, Eastleigh, Hants. SO53 3ZQ

NAME _____
 ADDRESS _____

 POST CODE _____



Tetra

Whisper

AQUARIUM AIR PUMPS

Tetra, Lambert Court, Chestnut Avenue, Eastleigh, Hants. SO53 3ZQ
 Tetra is a division of Parke Davis & Co. Ltd.

T43

AQUATIC FANATICS

42 HOCKERILL STREET Tel: 01279 504024
BISHOP'S STORTFORD Fax: (as above)
HERTS. CM23 2DW



JUST OPEN

A really great selection of:
**FRESHWATER TROPICAL
MARINE AND COLDWATER FISH**
Plus all Accessories
FREE ADVICE GIVEN BY QUALIFIED STAFF
Catering for Beginners to Dedicated Hobbyists
Pay & Display parking at rear

Mon, Tue, Fri & Sat:
9.30 am - 5.30 pm
Thurs: 9.30 am - 7.00 pm
Wed: Closed
Sun: 10.00 am - 4.00 pm

New
from *sera*

Now sera also offers granulated food
in renowned sera quality
The staple diet for fresh and saltwater fish



granumarin, the high quality staple diet for all saltwater fish.



granumix is the ideal food for all community fish.



premium diskus granulate is a food to feed best possible quality and to give fish a special treat at the same time.

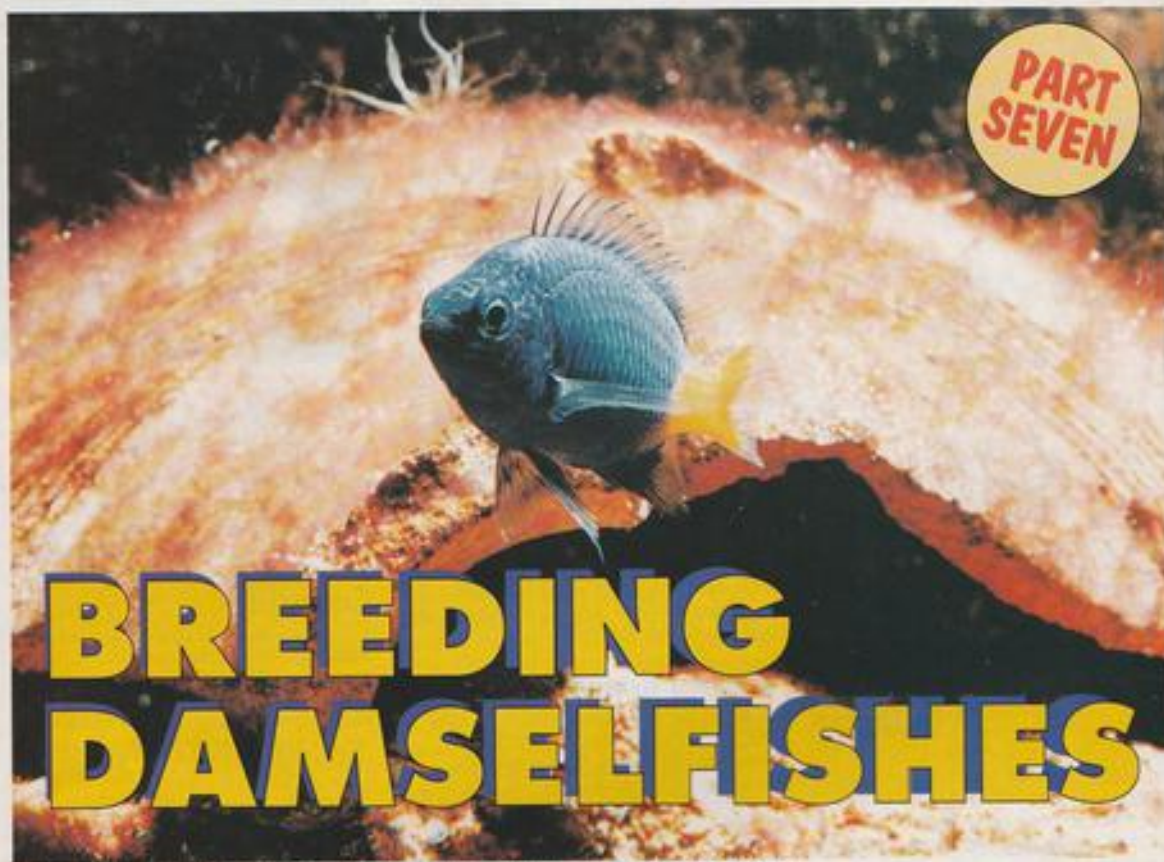
The new sera foods ideally extend the menu for your fish. They contain everything the different species need for a healthy diet in accordance with their nutritional requirements. This includes all important vitamins and trace elements, making it a food that is healthy and easy to digest.

The special structure of sera granulated food complies with the feeding habits of fish. The food floats and then begins to sink slowly. Thus the fish are able to feed according to their feeding habits, either at the surface, in the middle or at the bottom of the tank.

John Allan Aquariums Limited
Eastern Way Industrial Estate
Bury St. Edmunds,
Suffolk IP32 7AB
tel. 01284/755051
fax 01284/750960

sera
For a water world according to nature

PART SEVEN



BREEDING DAMSELFISHES

Male Azure Demoiselle, guarding a batch of eggs (tiny white dots in the background)

Colin Grist of the World of Water at Bristol Zoo Gardens, looks at damselfish in the wild and offers tips on how to breed them in captivity.

Photographs reproduced by kind courtesy of Red Sea Fish pHarm Ltd/Coral Reef Technology Ltd

Over the past instalments, this series has covered the techniques for culturing suitable foods for marine fish larvae and establishing a hatchery and rearing facilities. Now we come to the actual species of fishes and invertebrates which have already bred in captivity, or are worthy of serious attempts, starting off with the family Pomacentridae — the popular damselfishes. Although anemonefishes are included in this family, I have omitted them from the series, as their captive spawning and rearing is already well documented and it will not be too difficult for you to thumb through back issues of *A & P* to find a suitable article.

What I will try to do is offer accurate information on general ecology, natural feeding requirements, specific behaviour and sociability, with the hope that this will help you establish the most suitable aquarium environment to induce your fishes or invertebrates to reproduce.

Virtually everyone who ventures into

the marine aquarium hobby keeps damselfishes at one time or another. Many species are incredibly colourful; most are also hardy and not very big, therefore being suitable for smaller tanks. However, their hardiness has often been their downfall, because it has been common practice for suppliers of marine fishes to suggest that hobbyists should use damselfish to mature newly set-up tanks. Of course, this treatment subjects the fishes to severe cruelty, and the majority do not survive.

In addition, damselfish are often aggressively territorial, which makes it difficult to introduce new fishes into the aquarium. Many species are, without doubt, ideally suited to being kept in new, but properly established, aquaria, and so they are often kept by newcomers to the hobby as 'practice' fishes. Later on, these fishes can become troublesome and their owners tend to want to remove them, but as they are extremely fast swimmers, this usually means dismantling the tank in order to

stand a chance of catching them.

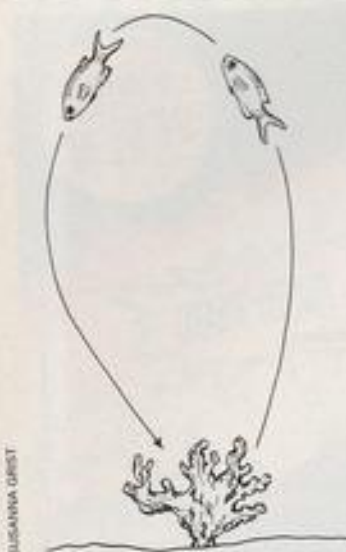
Nevertheless, should you have a serious interest in this family, or you can think ahead to what other species you may wish to combine with the damselfish, they can be very rewarding aquarium inhabitants — especially if you try to breed them.

Distribution

Damselfish are distributed throughout tropical and temperate seas, with the largest concentration of species occurring on Australian reefs. Larvae cannot settle to develop into adults unless a suitable area of habitat is located. Many species are not too particular about habitat requirements and are therefore distributed over large areas, some drifting with oceanic currents, eventually to occupy reefs throughout, for example, the Indian and Pacific Oceans.

Generally, damselfish are found among, or very close to, either living or dead corals and, sometimes, rock. Crevices, overhangs and multi-'fingered' corals, such as Staghorn, *Acropora* spp, are important areas of habitat. Several species, particularly those belonging to the genus *Chromis*, are found in large congregations above coral outcrops, the whole body of fishes darting for

BREEDING MARINES: 97 SPECIES AND COUNTING



Display used by male *Chromis* damsels to attract females from the water column (based on Sale, 1971).

cover in unison at the first hint of danger.

Others, such as *Pomacentrus* spp., are found in pits dug out of sand under corals, or in holes and crevices. Some species have associations with anemones, particularly the juvenile fishes, such as in the genus *Dascyllus*, although some adults will (as with some *Chromis*) seek protection from anemones during the night.

Most species occur at a water depth of less than 15 metres (c 50ft). Although *Chromis* generally prefer areas with strong currents at the outer reef, some species have been found at depths between 60-100 metres (c 200-330ft). In contrast, many *Chrysiptera* species are found in sandy areas of calm lagoons.

Behaviour

Generally speaking, damsels are territorial fishes, with some species being more aggressively so than others. Species within the popular genera *Chromis* and *Neopomacentrus* can be kept in groups, as can some 'Dominoes' (*Dascyllus*) and 'Sergeant Majors', (*Abudefduf*), although the Banded Sergeant Major, *A. septemfasciatus*, Black-spot Sergeant Major, *A. sordidus*, Night Sergeant Major *A. taurus*, Hawaiian Damsel, *D. albigella*, Strasburg's Damsel, *D. strasburgi* and the Domino Damsel, *D. trimaculatus* should not be risked and only kept in male-female pairs.

Most other damsel species are only suitable for keeping in pairs, or as singular individuals if you do not want to attempt breeding them.

As I have already hinted, damsels can be aggressive in defending their territory. However, while they are defending

quite fearless, to such an extent they will attack much larger fishes which may be attempting to gain a quick meal of damsel eggs. Even swimmers and divers have been known to be attacked by these small fishes.

Feeding

In the main, damselfishes are omnivorous in their feeding habits and, as such, will take a wide variety of animal and vegetable material. These non-specific food requirements mean they readily adapt to taking commercial aquarium foods.

Chromis species, on the other hand, are planktivores and therefore require the likes of tiny shrimps, for example *Myris*, both newly hatched and adult *Artemia* (brine shrimps) and even rotifers. Planktonic copepods are also important in the diet of *Chromis*, as are the copepods living on rocks and sand (benthic) to other species of damsels.

Other exceptions are those species belonging to the genus *Siganus*, which are herbivorous and feed on a wide variety of brown, blue-green and green algae, including *Caulerpa*, as well as filamentous red and calcareous types.

Sexing damsels

If you are very experienced in probing the urogenital papillae of damselfishes, then you will be able to determine the sexes easily. Otherwise, you will have to make some calculated guesses which may or may not be reliable.

If you are able to obtain ready-mated fishes, then you will have no problems. Or, if any fishes you already have start courtship behaviour, then it is usually easy to distinguish males from females. This is mainly because males develop more vivid colours when courting and during spawning. Both males and females in many species become lighter and, in contrast to their close relatives, the anemonefishes, mature male damselfishes are larger than the females. These are features to look out for, which should help you to sex your fishes.

It has been reported that mature males of the Neon Damsel, *Pomacentrus coelestis*, have blue edging to their tails, while the females' remain transparent. This is fairly unreliable, as this species is also seen with varying degrees of pale yellow on the tail. The two most reliable species for determining sexes are the Electric Blue Damsel, *Chrysiptera cyanea*, and the South Seas Blue Devil, *Chrysiptera taupou*.

Mature males of *C. taupou* have blue on the front part of their dorsal fins and yellow to the rear, while females just have yellow. In the case of *C. cyanea*, males develop a bright orange tail, except for those in Indonesian populations, while the females have a plain tail, but, unlike males, they do have a black spot at the



Young Azure Demoiselle. As an idea of scale, the *Siporax* cylinders in the foreground are just over 1 cm long.

rear dorsal fin rays. It is likely that mature males of *C. cyanea* in populations found from Indonesia have blue tails, particularly when courting and during spawning.

Courtship

Damselfishes display quite dramatic courtships, with males being the main performers. The males, sometimes pairs, will select the nest site before any serious courtship takes place. Species which are not permanently territorial do not always perform elaborate courtship, but will often extend their territory.

A male will entice a female to the nest by swimming directly at her and then rapidly turning to swim back in a leading fashion, occasionally quivering his body.

Another leading display is where the male suddenly dips while approaching the female. This dip is often accompanied by what is generally referred to as a 'chirping sound'. Males never make sounds on the return out of the dip. Lower frequency grunting sounds may be emitted while the pairs are swimming around their nest site.

A rapid, exaggerated up and down movement, which looks like a jump, can sometimes be observed. This is believed to be used to attract females further out in the water column. However, in the absence of any females, this action may be a signal to other males, or a means to synchronise mass spawning.

Once pairing is complete, both sexes will vigorously clean the nest site of algae and other materials.

Spawning

Usually, damselfishes can spawn all year round, with increased activity during early summer. Water temperature seems to influence the number of eggs produced; warmer temperatures result in larger numbers of eggs — to over 1,000 per spawning in some species. The lunar cycle also influences spawning activity, with the majority of encounters taking place dur-



Most Pomacentrids (damselfish and anemonefish) produce large batches of eggs.

ing either a new or full moon, depending on species and, sometimes, location.

Once a male has attracted a female, or, as in some cases, females, and the nest site has been cleaned, spawning can take place. This usually occurs early in the morning at first light. The male skims across the nest site and then 'stands aside' while the female does likewise to lay a row of eggs. The male will continually defend the female and nest site from predators, but will have to swim alongside, or just behind, the female to fertilise the eggs each time a row is laid. This process can be repeated for more than two hours, but rarely beyond sunrise.

Some species, like *Chromis*, which spend much time congregated in the water column, will spawn communally. The females in these cases tend to spawn for short periods only, before returning to the water column. In some species, the female will return to the spawning site to lay eggs which will be fertilised by a different male. As a result, males can become responsible for up to 200,000 eggs which have been produced by a variety of females on one site.

The eggs are sticky at one end and are easily attached to rock, or whatever substrate has been chosen. Some species will attach eggs to live coral heads or into algal turf, and there is evidence of *Chromis* spawning on sand.

Depending on species, egg sizes range from 0.6-4.5mm and, in most, they are coloured pink or red. However, the eggs

of *Chromis* are transparent, while some species of *Pomacentrus* produce white eggs, some *Abudefduf* have brown or green, *Dascyllus* have transparent or sandy coloured eggs and *Microspathodon* produce greyish green eggs.

Incubation

Again, depending on the species, the eggs can incubate for 2-4 days before hatching, with larger eggs taking the longest. Warmer temperatures can reduce the incubation period.

During incubation, the male continues to defend the nest and will even drive away the female, or females, he has spawned with. He will also care for the eggs by fanning them to prevent debris from settling on them. Any infertile, fagged or damaged eggs will be removed and, generally, eaten by the male.

The planktonic damselfish larvae hatch out at the end of the day, or during the night, and range from 2-4mm in length. These larvae are, basically, transparent and have quite obvious silvery eyes. Once they have absorbed their yolk sacs, which takes around three days, they have to start feeding on suitable microscopic zooplankton. This planktonic stage in their life history means they drift at the water surface, being transported by currents and tides.

The length of time spent drifting varies from species to species. Thresher, Colin and Bell (1989) found, by studying the microstructure of the larvae's tiny inner ear bones (known as otoliths), that they could determine the daily growth rate up to when the fry reach metamorphosis and, therefore, were able to calculate the length of time spent as planktonic larvae.

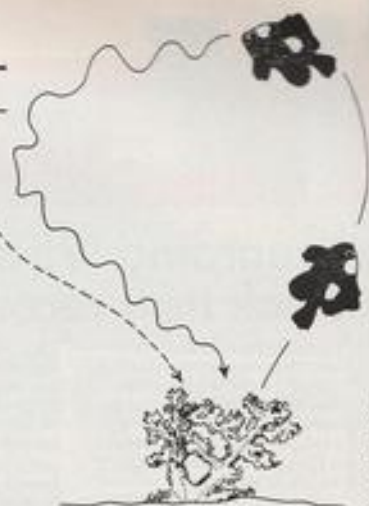
Chromis and *Dascyllus* were found to spend 17-47 days in this larval stage, with an average of 20-30 days, while *Abudefduf*, *Chrysiptera*, *Pomacentrus* and several other genera ranged from 13-42 days. Periods of over 31 days were found to be normal for the species *Plectroglaphidodon jordanianus*, *Stegastes nigricans* and *Stegastes fasciatus*.

Once the larvae locate a suitable habitat to settle, they begin to develop the colours and patterns of their species.

Aquarium spawning

To make any breeding attempt, you will need to house your parent stock in an aquarium of at least 30 gallons (c 135 litres) capacity. The larger species will require larger tanks.

As damselfish larvae hatch out straight into the planktonic stage and are offered no further parental care, you will have to be present at the time to collect the fry before they are eaten. To do this, the aquarium and room where it is situated must remain dark. You can shine a torch onto the water from above and the larvae will congregate in its beam, making it eas-



Domino males go through an elaborate 'dance' in their attempts at attracting a female to the spawning site. The female's movement is indicated by the dotted line (based on Sale, 1971).

ier to scoop them out with a cup, small ice cream container or something similar. Do not use nets.

Alternatively, you can transfer the eggs after spawning to another aquarium with identical water conditions, but containing no other livestock. Obviously, you will have to move the eggs while still attached to the rock they were laid on and use a flow of air bubbles or water to simulate the male's fanning activity which prevents debris settling on them.

Rearing challenge

Historically, the rearing of larval damselfishes has, on occasion, proved problematic in getting them beyond two weeks old. The reasons for this are still unclear. However, several species have been spawned and reared through to metamorphosis.

Martin Moe and Forrest Young gave an account (1981) of their successful attempt at rearing large numbers of the Yellow Damsel, *Microspathodon chrysurus*. The Red Sea Fish pHarm hatchery in Eilat, Israel are now commercially rearing the Azure Demoiselle, *Chrysiptera hemicyanae*. In addition, it is with great regularity that species of *Pomacentrus* and, in particular, *Dascyllus* spawn in aquaria.

One species worthy of attention is the Spiny Chromis, *Acanthochromis polycaetus*, because, unlike other damselfish species, it continues to protect its fry after they have hatched, in a very similar way to freshwater cichlids. This could make things a lot easier for the culturist wishing to attempt breeding this species.

It is interesting to note that, due to the similarities in courtship and spawning between damselfishes, and the often equally colourful cichlids, many cichlids were once taxonomically described as belonging to the genus *Chromis*.

NEWSDESK

Aquarama '95 set to break new records

In excess of 40 countries are expected to be represented at this year's **Aquarama**, the biennial exhibition and conference for ornamental fish breeders, traders, and enthusiasts, held at the World Trade Centre, Singapore (25-28 May).

Aquarama is the only specialist event of its kind in the world and the biennial series has developed an ever-increasing reputation since its inception in 1989. Based upon bookings made and responses received so far, organisers **Expoconsult Pte Ltd** anticipate that this year's attendances will far exceed the record-breaking figures of the previous event, in 1993, of 3,170 trade visitors and a staggering 30,549 visitors to the one-and-a-half days that the event was open to the public.

The organisers told **Newsdesk** that exhibition space was almost fully-booked at the start of the year, with exhibitors from 19 countries, including national pavilions representing Sri Lanka and Indonesia. On show will be the latest innovations in water treatment, new fish species, healthier and more convenient fish foods and an exciting and efficient range of aquarium accessories (including tank-cleaning systems and aquatic plants).

A trade conference, held concurrently with the exhibition, has the theme, **The Ornamental Aquatic Industry: Keeping**

Pace with Change and will provide delegates with insight into new dimensions in the business of fish keeping. Helping to organise the conference, along with the fish competition, as consultant to Aquarama '95 is **John Dawes** (editor of **A&P**). The conference will comprise 21 papers presented by well-known authorities in the world of aquatics. **Dr Herbert Axelrod**, collector, publisher and author, will present the keynote address, during which he will discuss the future of the aquarium fish and aquatic plant industries in relation to the impact of current and forthcoming trade regulations and the growth of prospects of fishkeeping as a hobby.

A major highlight of Aquarama '95 is the fish competition, which has drawn large numbers of entries throughout the years. Presided over by an international panel of judges, including Discus 'gurus' **Jack Wattley** and **Manfred Gobel**, this year's competition (Discus, Goldfish, Guppy, Tetras, Cichlids and New Species/Varieties) will be 30% larger than in 1993. In addition, there will be a special Koi show organised by the **Singapore Koi Club**.

Delegates to the exhibition/conference can also gain an insight into Singapore's success as a major world breeder and exporter of ornamental fish. Technical visits have been organised to production and

breeding centres and farms and these will be guided by knowledgeable professionals who will explain the techniques and methods used and the problems faced, as well as their solutions.

Finally, there will be a series of public seminars featuring the Dragon Fish (Asian Arowana) and Discus, with contributions from, among others, **A&P** editor **John Dawes** and **Jack Wattley**.

20 years' service from 'Aquarian'

A lecture tour of SeaLife Centres and Zoo Aquariums throughout the UK to selected top aquarists forms just one of the highlights of the celebrations by the **'Aquarian' Advisory Service** in its 20th anniversary year. Invited fishkeepers will be given free entry to the relevant centre or zoo, as well as a behind-the-scenes tour and will each receive a special edition commemorative pen.

"These top aquarists are the many people who have helped 'Aquarian' over the years," explained **Dr David Ford**, senior consultant. "They have appeared in 'Top aquarists recommend' advertisements, have tested new foods, or have helped with problems sent to the company's **Advisory Service**."

He continued: "The 'Aquarian' Advisory Service was launched in May 1975, just after the launch of the 'Aquarian' range. This was the very first free advice centre for fishkeepers and was run by me from the Waltham Centre for Pet Care and Nutrition. Twenty years on, I am still running it and, in that time, I must have answered over 100,000 queries by post, as well as writing hundreds of articles for aquatic magazines in several countries."

A special display about the fun of fishkeeping has been mounted at Blackpool Tower Aquarium, and a 1995 calendar with the '20th Anniversary' logo has been dispatched to over 100 aquarist societies for use in their club room. In addition, the company will be holding **'20 Years' Celebration'** displays at national fish shows, such as Grocklemania on the Isle of Wight, BAF in Manchester, and the Supreme Fishkeeping Weekend at Weston-super-Mare. **David** added that there will also be a special edition of the 'Aquarian' sponsored **AquaClub** and



Dr David Ford of the 'Aquarian' Advisory Service, at work answering some of the 5,000 letters he receives every year.

Aquachamp annual competitions. **Aquarian Advisory Service**, PO Box 57, Elland, W. Yorks HX5 0S.J. The service is assisted by **Dr David Sands**, who also mans an emergency 'Aquarian' Helpline on 01722 30869.

The 'Wow' aquarium

Designer and aquatic hobbyist **Ian Parker Bell** wanted to 'create an aquarium design which would shock and give a 'Wow' effect to whoever confronted it.' The result: the fabulous triangular aquarium design illustrated, which is produced in cast aluminium, glass and wood.

Ian produced the design as part of his final year BA (Hons) degree course in three-dimensional design at the University of Northumbria. "Having a great interest in, yet little knowledge of aquaria, I initially researched the history and the art of fishkeeping," **Ian** explained. "Having understood the theory, only then was I able to concentrate on the visual aspects of the aquarium. With the introduction of a mythical theme in the design and the chosen materials, I opted for a triangular, all-glass aquarium with a clear glass lid."

He also explained that the aquarium is designed to be free-standing on three polished cast-aluminium legs resembling abstract bone-type structures left on the sea bed. Because of the clear viewing lid, alternative lighting positioning has been acquired in the corners of the aquarium, the lights being hidden by similarly polished cast-aluminium heads of Neptune.

Ian added that the aluminium never comes into contact with the aquarium water, so there is no danger of corrosion of the metal, nor toxicity from it: "Feeding and maintenance is achieved by removing the heads, thereby



Discus will feature prominently at Aquarama '95. This was the Grand Champion, entered by **Gan Discus** of Singapore, at the last event.

STEWART MACKAY

IT'S EASY TO TELL WHAT THIS FISH HAS GOT...



Glowing health thanks to Interpet Aquarium Treatments

Our comprehensive range of treatments solves all major aquarium problems, keeping your fish healthy and happy.

- Effective advanced formulae • Easy to select • Easy to use • Safe for all fish • Do not colour the water (except No 10)
- Single dose (except No 9) • Do not adversely affect biological filters or plants (except No 10)

Write or phone for free information pack quoting magazine issue.

INTERPET

THE BEST CARE FOR YOUR AQUARIUM

INTERPET LTD, DORKING, SURREY RH4 3YX, TEL 01306 881000, FAX 01306 885008

THE WATFORD AQUARIUM

338 ST ALBANS ROAD, WATFORD, HERTS

01923 - 220823



The Axelrod Reef has made an instant impact on the marine market and Watford Aquarium are proud to be a distributor.

- NEW DIOCLIDE TRICKLE FILTER
- DRIP FEED NITRATE FILTER
- POWER PROTEIN SKIMMER
- FINE PRE FILTER
- TWIN SPIRAL FILTER
- SURFACE AND MIDWATER FLOW
- BOTTOM WATER CIRCULATION INLETS

£100 OF LIVING ROCK FREE WITH EVERY AXELROD REEF ONLY FROM WATFORD AQUARIUM

Please phone for info pack and finance details (if required). Axelrod Reef and Watford Aquarium recommend the use of "Living Rock" within any reef tank. We therefore as an extra special offer will, with any Axelrod Reef tank purchased from ourselves give free of charge 30lbs of our high grade living rock.

WHY NOT VISIT US TO SEE OUR AXELROD DISPLAY TANK.

LIVE ROCK

"Live" or "Bio-Rock" is recommended by the top authorities on marines as an excellent method of treating a natural bio-system in a new aquarium or adding to an existing reef system. Our live rock is supplied in a 44lb box and is of the highest grade available in the country. Full instructions are supplied with every box.

ONLY £145

PER BOX INC CARBAGE

Orders welcomed by cheque, postal orders, Access and Visa. Cheques made payable to "Aquatek".

Please note this price is for 44lbs in weight box of rock not 35lbs as supplied by others, when comparing price (£3.29 per lb) do of course compare quality if possible!

If you think mail order companies are cheap then compare our prices to those of the leading mail order companies advertising at the moment. We undertake to beat those prices advertised on any product.

| | |
|---|---------|
| Instant Ocean 26 Gall | £9.25 |
| Instant Ocean 132 Gall | £35.00 |
| AH400 Protein Skimmer | £125.00 |
| WaveMaster with 3 "4" Powerheads | £225.00 |
| Reverse osmosis unit with chrome tap and pressurised storage tank | £250.00 |
| Arcadia 250 watt metal halide lamps | £179.99 |

Please phone for a price before placing your order elsewhere. We promise we will not be beaten, under any condition.

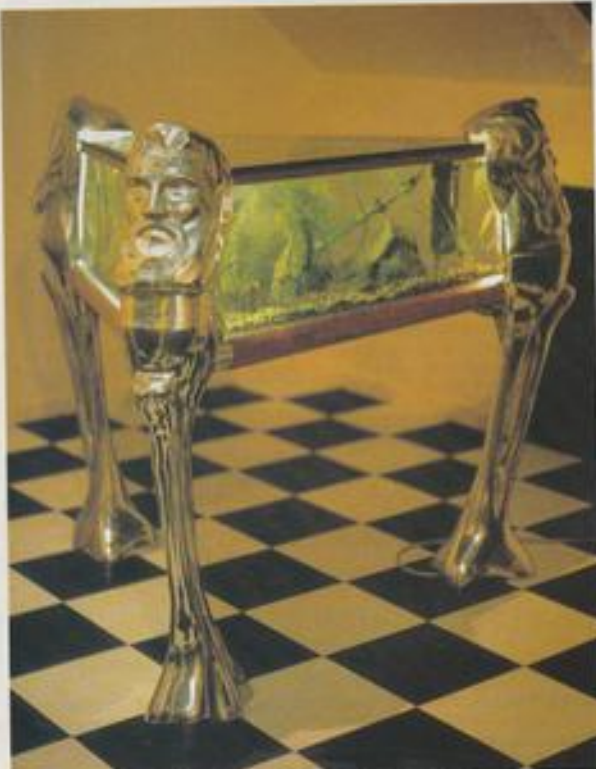
01923 220823 — Ask for Mail Order Dept.



**LARGE RANGE OF MARINE FISH AND INVERTS
RARE AND UNUSUAL FRESHWATER FISH, 'PHONE FOR DETAILS
DUTCH GROWN PLANTS SUPPLIED**

OPENING HOURS 9.00 am - 6.00 pm Mon-Sun — Late Opening Fridays

NEWSDESK



Ian Parker Bell's innovative triangular aquarium.

revealing gaps in the lid, or else the lid can be removed. The system is powered by an internal filter linked to a control unit and the mains by means of cable through one of the legs.

The design illustrated is a one-off and, according to Ian, would retail at around £2,700. However, he hopes to produce these for hotels, banks and offices, and to produce smaller versions for hobbyists.

For details contact: Ian Parker Bell, 21 Mill Grove, Tynemouth, Tyne and Wear NE30 2JP. Tel: 0191 2582077.

Siporax in space

Newts and Goldfish in experiments aboard the space shuttle Columbia have benefited from the use of Siporax as water filter medium. "Siporax was chosen by space project scientists from many different types of filter medium to ensure optimum water quality during experiments relating to the effects of weightlessness on newts and Goldfish," explained Stephen Lally, managing director of Lotus, whose Biological Pond Filter range incorporates Siporax.

He added that the aquaria

inhabitants remained unaffected by the experiments, despite the fact that astronauts on the shuttle sometimes experienced curvature on the spine as a result of weightlessness in space.

Siporax helps to produce clean, clear water by maximising colonisation of bacteria which feed on pond pollutants; the medium has an enormous surface area compared with overall volume, which offers an ideal environment in which beneficial bacteria can breed.

Lotus Water Garden
Procuts, PO Box 36, Junction Street, Burnley, Lancs. BB12 1NA. Tel: 01282 420771; Fax: 01282 412719.

Reef-Tec makes news

Marine aquarium technology specialist Reef-Tec has launched a newsletter for marine fishkeepers. Called Reef News, the newsletter is produced monthly and includes information about keeping marines, plus advertisements for personal sales, as well as from manufacturers, and prize competitions.

Proprietor Russell Thorpe

explained that he specialises solely in marines, and believes he is the only marine retailer to produce a newsletter. "The marine hobby in the UK is ever-growing so, perhaps, we will see it develop like it has done in the USA".

For information, contact
Russell Thorpe, Reef Tec, 40
Aikman Avenue, Leicester LE3
9JA. Tel: 0116 2873998.

'In our hands' at Bolton

A series of talks and seminars on conservation is being held at Bolton Metro Museum and Art Gallery next month (20 May). The programme is being organised by Tim Henshaw, aquarium technician at the venue, and commences with a tour of the aquarium, followed by talks.

Dr Gordon Reid will be presenting a talk entitled Zoo Quest in Gashaka Gumti, while Mexican fish and how we can help endangered species will be presented by A&P contributor Derek Lambert. Other talks are also being planned, but full details were not available at the time we went to press.

Tim Henshaw may be contacted at Bolton Metro Museum and Art Gallery, Le Mans Crescent, Bolton BL1 1SE. Tel: 01204 522311; Fax: 01204 391352.

Hozelock's special deal

A major promotion for the company's range of pond pumps has been launched by water gardening specialists Hozelock.

The promotion provides discounts on the purchase of any pump in Hozelock's Cascade and Super Cascade ranges; a free waterproof cable connector is also available to every purchaser of a Hozelock Cascade or Super Cascade pump upon presentation of a voucher incorporated within press advertising.

Mike Pugh, divisional manager of Hozelock, explained: "The promotion is supported by a major advertising campaign which has been targeted at around 10 million potential customers. We believe that this is the largest-ever consumer advertising campaign for the aquatics market, with full-page advertisements in the national press supplemented by national radio advertising."

Tetra Club celebrates three-up

The Tetra Club starts its fourth year having enrolled over 15,000

members since its inception. "The club was formed to help everyone who wants to keep fish, whether they are a tropical fishkeeper, a pondkeeper, or even a youngster who has just won their first fish at the fair," explained Dr David Pool.

"Tetra provides authoritative advice on all aspects of fishkeeping through the club. Its regular glossy magazine Tetra Club News contains news and features, competitions, special offers and hints and tips to ensure that fish fans enjoy their hobby to the full," added David, who is pleased with the continuous interest in the club, and who is determined to keep up the high standard of advice and information the magazine provides.

"Each issue contains articles on pond, tropical and coldwater subjects, but there is now far more scope to include information on other areas of pondkeeping and product news."



Roger Foggitt, the latest fishkeeping expert to join the Tetra team.

In addition to the magazine, Tetra Club members receive a useful gift on joining, together with samples of Tetra products — food and treatments — sent throughout the year.

For information about the Tetra Club, contact Tetra Information Centre, Lambert Court, Chestnut Avenue, Eastleigh, Hants. SO5 3ZQ.

Don't forget the 'one'

From 16 April, all telephone STD codes will begin with 01. So, if you live say, in Birmingham, the STD changes from 021 to 0121. However Leeds, Sheffield, Nottingham, Leicester and Bristol have completely new STD codes, while mobile and Freephone numbers stay as they were. For full details, contact British Telecom.

**You have the choice between
clean water and dirty water...**
...so why don't your fish or plants have the same choice?



Remember, tap water that we can drink is not aquarium water. What a purification plant does to make water drinkable for human beings, sera water conditioners will do to turn tap water into aquarium water, where fish and plants will really feel at home (like in their natural habitat). Ask your retailer for our adviser "Natural Aquarium Maintenance and Water Filtration" or write directly to

John Allan Aquariums Ltd.
Eastern Way Industrial Estate
Bury St. Edmunds
Suffolk IP32 7AB
Tel: 01284/75 50 91



Yes, please send me your adviser "Natural Aquarium Maintenance and Water Filtration" 19 pence for return postage are enclosed in form of stamps. Don't forget your address!

Sera

For a water world according to nature

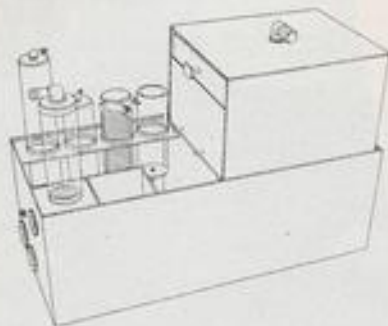
The ultimate aquarium filtration system . . .

The Platinum series of trickle filters are just part of the superb range of aquarium filtration products manufactured by Bio-Zone.

Originally designed by Albert Thiel the family of three standard filters handle system sizes up to 1125 litres and a bespoke service is available for larger sizes and special configurations. Designed as they are by a marine biologist, they have many features that may not be understood by plastic manufacturing companies attempting to copy Thiel's original ideas.

The Platinum series includes within the basic specification:

- Venturi skimmer with BioZone venturi valve
- Carbon Chamber
- Coil De-Nitrator
- Molecular Absorption Reactor
- Chemical Reactor
- Removable Drip Tray!
- Mechanical Filtration Draw



- Removable Biological Chamber
- Air Injection to the Biological Chamber
- Automatic Top Up Valve
- Probe Bracket
- Float Switch Bracket
- Material selection to protect Photophobic Bacteria

Also available are additional reactors for Carbon Dioxide, Oxygen, Ozone and Alkalinity Reserve which all offer the same modular concept as well as a salinity cup and skimmer cup.

Other products include a family of protein skimmers, the Berliner filter and the H0200 pressurised filter.

.....from **Biozone**



Distributed in the United Kingdom by

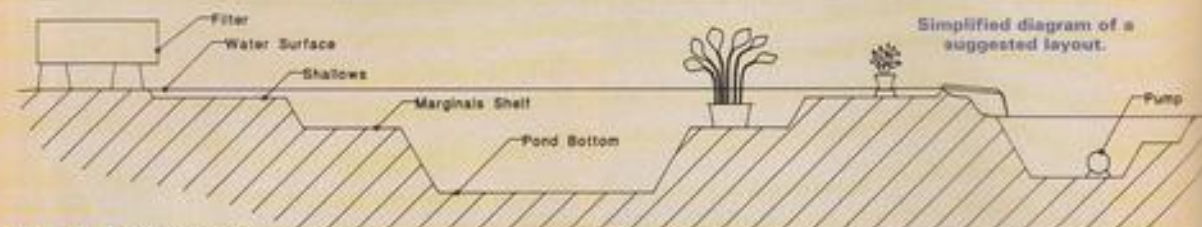
CORAL REEF TECHNOLOGY LTD

High Road, Byfleet, Surrey
Tel: 01932 355121
Fax: 01932 349718

*SUPERIOR PRODUCTS FOR
THE DISCERNING AQUARIST*

Making the most of your pond

GENERAL PRINCIPLES



When giving first thought to having a garden pond, many people may think of it only as somewhere to keep ornamental fish. This can result in an under-utilisation of all the effort which is always put into such projects. Many more things can be done with a water garden, so long as plenty of thought is given to exactly what is wanted before starting to dig.

There are as many designs of ponds as people who keep them. In my own case, I think of a new pond as a great opportunity, for example, to keep plants that may be difficult or impossible to grow by other means. Other benefits are that wildlife can be attracted to the garden, while the sound of running water is always enjoyable.

The complexity of a system is entirely up to the builder. For example, given sufficient space, it could consist of a whole series of ponds linked by streams and waterfalls. My system, however, is fairly simple, and has two ponds linked by a waterfall, with an ornamental pond at the top and a small wildlife pond at the bottom. I like to think of my wildlife pond as giving something back to nature in return for all she gives to us.

My water garden requires little maintenance and is cheap to run. Due to the relatively simple filtration employed, however, I keep the stocking level lower than with other, more complex systems.

In this, and subsequent articles, I will present some ideas which I have used in the construction of my system. Hopefully, they will provide some food for thought when you are at the design stage.

Basic ingredients

Here are what I believe to be the essential ingredients to achieve maximum utilisation and enjoyment out of a water garden.

① The water garden should have at least two individual ponds, with the water running from one to the other. If the system includes a wildlife pond, this can be quite small and serve to keep tadpoles and other small creatures away from predatory ornamental fish.

② Size, as always, is important. For stability of the system, the best rule is, "the bigger and deeper, the better". I would



TOP — My two-pond system under construction.

ABOVE — Part of the ornamental half of my system.

RIGHT — Pondfish are forever testing items that they come across to see if they are edible or not.



PART ONE

With a little 'aquatic' creativity, there's no end to what can be achieved even within a modest-sized garden.

David Fletcher offers some constructive suggestions.

Illustrations — unless otherwise indicated — by the author



Frog spawn and tadpoles stand little or no chance of surviving in an ornamental pond. An additional wildlife pond provides the ideal solution.



Pond skaters will appear as if by magic on any new pond.



The Great Diving Beetle is an excellent predator of both wildlife and ornamental ponds.

suggest a minimum capacity of around 300 gallons (c 1,400 litres) with a part of the main pond being at least two feet deep for the ornamental fish. It should be possible to achieve this in most medium size gardens.

③ Use a pump to move the water around. The flow does not need to be a torrent; it needs to be strong enough to make a splash from a small waterfall, which will help to get oxygen into the water. Remember that the faster water is pumped, the more powerful the pump needs to be. Consequently, a fast water flow will lead to larger electricity consumption, so keep it sensible.

④ A biological filter, to help maintain water quality, should be an essential component. With a little improvisation, this filter can be made at home (if expense is an important criterion). Whether bought or built, a filter can become a garden feature which enhances the rest of the system.

⑤ An ultra-violet steriliser should be considered a must. Many pondkeepers have suffered from pea soup water from time to time, but with these little marvels, it is no longer a problem. A pond needs to have a good growth of plants to maintain its natural balance of nitrates, oxygen, etc. But if the water is dark green with algae, the sunlight cannot get into the water and the plants simply will not grow.

⑥ There should also be a mechanism which automatically keeps the water level topped up. If the lower pond is much smaller than the higher one, a fall in water level due to evaporation will be multiplied by the ratio of the surface areas. So, in hot weather, the lower pond might be dry in as little as a couple of days.

Two better than one

The first thing to understand is that ornamental fish and wildlife should not be mixed. This is the reason for having two separate ponds in my system.

This principle was well demonstrated by one of my neighbours last season. Discussing our fish ponds over a couple of pints one evening, he told me that he had put some spawn and tadpoles into the pond, hoping to raise some frogs. Not one tadpole survived. However, I put some spawn into the small wildlife pond and had hundreds of little frogs hopping all over the garden.

This is because fish are predatory. If an item will fit into their mouth they will try to eat it. Watch a fish patrolling the water surface, and it will sample everything it comes across, such as pieces of floating plant debris blown into the pond by the wind. If it does not taste good, it will be jettisoned. Otherwise, down the hatch it goes.

I have even seen my Orfe trying to catch flies on the wall above the water! Any small creatures, such as tadpoles or pond skaters, would not stand much chance of surviving in an environment shared by creatures with such superior speed, agility, eyesight and large mouths.

Having the wildlife pond can provide

another benefit if the pondkeeper has an interest in breeding fish. My Goldfish were busy spawning last summer, and, presumably, some of the eggs were washed down the waterfall into the small pond at the bottom. I now have some small Goldfish there, safe from the mouths of their parents, but benefiting from the same filtration system. The wildlife pond is, of course, inhabited by other predators, with which they have to take their chances. (More about them in Part 3).

General design

Dealing with the general layout first, I suggest that the larger ornamental pond be placed higher than the smaller wildlife part. Arrange for the ornamental pond to have the biological filter emptying into one end, with a waterfall running off into the wildlife section from the other end.

Place the pump in the bottom of the wildlife pond, so that the water is circulated through the UV steriliser, the filter and both ponds. The ornamental pond should be designed, if possible, with an elongated shape, rather than square. The water then flows through, rather than across it, and there are no corners left stagnant.

As well as the usual marginal planting shelf with a water depth of, say, nine inches, provide a very shallow area, only 1½-2½ inches deep. This is where moisture-loving plants can be grown; the fish also seem to enjoy basking there. Perhaps it's because the shallow water warms up more quickly than the rest of the pond.

Setting up a waterfall running off from one end of the pond might be a problem, as I do not recall seeing any prefabricated ponds with the facility built in. My present pond is built from concrete, and the run-off channel was made from a short length of plastic rainwater guttering.

While the concrete was still wet, the guttering was pressed down into it at the desired angle and left until everything set. Then the plastic was lifted out and sealed down properly with silicone mastic, with one of the stones in the wall placed on top to keep it firmly in place.

It might be possible to re-form the edge of a prefabricated plastic pond liner. If sufficient heat is applied, thermoplastic materials are softened, so that their shape can be altered. I have not tried this with a pond liner, but it might be possible to use a heat source, such as an electric paint stripper, and form the desired channel.

Be very cautious with the heat, though. Apply just enough to soften the plastic so that it can be moved to a different shape, then keep it in position until it cools. Do not try to do this with a glass fibre (GRP) liner. It will not soften, and may even burn.

(TO BE CONTINUED)

Next time I will discuss some ideas on filtration and maintaining the water level in a two-pond system.

WRITEBACK

BIOPLAST LETTER OF THE MONTH

Conflicting advice

Breeding for Diversity (A&P, Dec '94) highlights some of the problems faced by the fish breeder who aims to maintain the genetic diversity of captive stock of a particular species. I think some of Colin's advice is conflicting. In one section he states that males and females should always be selected at random, but further on he advises the breeder to avoid deformed or weak fish, arguing that these would not normally survive in nature.

The question is: What is the aim of the exercise? If it is to preserve the gene pool of a collection of individual fish that have been taken from the wild, then perhaps the efforts should be directed towards finding ways to keep stocks of eggs and sperm which can be revitalised at some further date.

Cryogenic storage in liquid nitrogen or freeze-drying are possible solutions using current technologies. Assuming that all the gametes were equally viable after their period of 'suspended animation', this method would ensure the preservation of the gene pool in an unaltered state.

If, however, the aim is to maintain a healthy captive population, the fish breeder must accept that the genetic diversity will change from generation to generation. This is especially

true of small breeding populations.

The reasons for this gradual change are the very same reasons that led to the development of the diversity of life that populates our planet. That is, that within any population, there is variation between the individuals and that in the 'struggle for existence', those individuals showing variations best adapted to their environment have a reproductive advantage and produce more offspring than their less well-adapted companions.

Over many generations, the genes that produce successful individuals will become more frequent in the gene pool and those genes that are less beneficial will be lost.

The struggle for existence is no less severe in our aquaria than it is in the wild, but the selective pressures are different. No matter how good the aquarium, it can never perfectly mimic the natural conditions in which the species normally lives: the water chemistry, turbulence and predation pressures will not be the same. It follows that, over many generations, the gene pool of the captive population will diverge from that of the wild population.

That captive populations are usually small by comparison to natural populations exacerbates the problem. In a small population, each individual represents

a large proportion of the genetic diversity, thus the loss of a single individual (as might happen if a thermostat sticks on) represents the loss of a significant amount of the genetic diversity from the gene pool. The population that develops from the remaining fish would then be atypical of the original wild population.

Fishkeepers should not delude themselves in thinking that their collections will ensure the survival of species in the wild. The very act of maintaining a captive breeding population is sufficient to cause its gene pool to diverge from that of the wild population. How these 'domesticated' fish would survive if re-introduced to their natural environments is debatable.

I am not saying that captive breeding programmes have no place in the conservation of biodiversity, but they must be viewed very much as a last resort. The real way to maintain biodiversity is by maintaining the natural environment of our planet. This means practising sustainable harvesting of fishery resources, whether that harvest is for food, sport or even stocking our aquaria, and not treating the waters of our planet as a giant chemical waste tip.

Fish breeders do have a part to play in this process, by establishing breeding techniques that can provide the fishkeeping public with the fish they want without plundering wild populations. The real battle is to increase public awareness of environmental issues.

R Cannon,
Newtown,
Powys.

Interesting! Mr Cannon's comments earn him the Bioplast Letter of the Month award. £30 worth of products will shortly be on their way to him c/o our sponsor Bioplast (UK) Ltd. Tel: 01535 630230.

Captive-bred populations, even of widely available species like Clowns, cannot maintain the genetic diversity found in the wild.

THELOR MACKENZIE



Dwindling society membership

In November's issue (Editorial), you talked about people who never buy glossy mags because they reckon to have nothing left to learn. I wondered if this might be a source of the problem that my club, the **North Bucks Aquarist Society**, is having, and if other clubs are having similar problems.

Apart from one of our members (Mark Irvine) winning the Supreme Championship last year, we have had a very 'quiet' year, with membership dwindling to the point where it is a struggle to keep the club alive. We have tried advertising on home-grown posters and leaflets (can't afford the local press); we have reduced the membership fee to £5 a year (or 25p per month for those who can't afford a fiver);

we have used interesting speakers (Dr Ford and Dick Mills to name but two); we try to tempt with a new members' prize draw each month; we have an Open Show each year, with sideshows and games for all the family, etc. and we hold different kinds of social events and interesting 'fishpeditions'. Despite all this, we do not seem to be attracting new members as in the past, and as people move or leave the club,

there is nobody to replace them.

Why can this be? The hobby seems to be growing in spite of the famed recession. Aquatic stores are always busy at weekends, and at least some people seem to be able to afford to buy glossy magazines like A&P (club membership fees are low by comparison). Are people less sociable than they were — or less enthusiastic about fish? Perhaps it is that fishkeepers know so much these days that they no longer feel the need to swap tips and advice? Or is it maybe that the upsurge of aquatic technology wizardry means that problems, and the need to talk about them, are fewer?

What we are experiencing in NBAS is a downward spiral, i.e. the fewer members we have, the less money we make in subs and raffles, the less we can afford to advertise or put on interesting activities and so the fewer members we can attract. The smaller the membership becomes, by definition, the less interesting the club, since there are fewer experiences to swap.

It seems such a shame that this aspect of the hobby, which encourages, advises and helps hobbyists to maintain standards of husbandry — particularly those who are new to it — looks like dying away; certainly in Milton Keynes the home of our club. We reason that keen amateurs must be out there somewhere, but where are they? What more can we do? Do other clubs have any suggestions?

Jo Field,
N.B.A.S.,
Bucks.

North Bucks AS meets at 8 pm on the first Tuesday of every month, at Stacey Bushes Meeting Place, Briar Hill, Milton Keynes. Queries to Club Sec: Leslie, on 01908 372850.

Safe pond heaters

I read with interest Bernice Brewster and David Pool's article on heating ponds (published in your February Supplement: **Aquaria and Pond Equipment**).

I would like to point out that use of regular aquarium heaters in ponds is definitely not recommended, even with an RCD. The only heaters which should be used in ponds are those specifically designed for the purpose.

Anon.

(Name and address submitted).

Fiery questions

I am a 15-year-old student and my friend and I are writing to you with regard to your article of some months ago on Fireheads, where Martin Chandler and Terry



Synspilums — can they, or can't they, be kept with other species?

Molloy of the British Cichlid Association, said, and I quote: "Synspilum should never be kept with its sibling species *Paratheraps* 'C', melanurum as hybridisation is likely, or with other species such as 'C', bifasciatum.

I then read through a few old editions and in the January 1994 edition, I found another article on the very closely related 'C', bifasciatum and zonatum where the same two experts say you can keep them within a community aquarium. There is also a picture in the same article showing Zonatum and, behind them, there is a female Finehead (Synspilum).

These writers are supposed to be experts, but they tell you one thing and then another. Please would you check this out?

Chris Bright
and Andrew Machin,
Leyburn,
N. Yorks.

Martin Chandler comments

With reference to the points raised by Chris Bright following publication of the article on "Dichasoma" (*Theraps*) synspilum, firstly, the name *Paratheraps* is yet to be universally accepted and is not (yet) the correct name for the fish. Neither Terry nor myself have ever termed ourselves "experts"; this is done by the magazine, but what we do have is over 30 years combined fish-keeping experience. I, myself, have kept nine species from the *Theraps* group and have bred most of these.

The point raised is whether 'C' Synspilum should be kept with other *Theraps*, especially those closely related. In our article, we said "never". Then, in a second article, we published pictures of Synspilum together with 'C' as zonatum; perhaps on the

face of things a contradiction.

It is very difficult in articles of two to three pages to cover every tiny detail, so most contributors go on the side of caution. As a general rule, Synspilum should certainly not be kept with closely related species. Let's remember that the average aquarist is likely to be keeping these fish in small tanks of four feet or under, and it is quite likely there will be only one specimen of each species. This is a recipe for cross breeding, which is very undesirable within the hobby.

These fish need large quarters, and if kept in communities, they need to be crowded. The picture to which Chris refers was of Terry's 72 x 24 x 24in aquarium. The Synspilum in the back of the shot was, in fact, a very large male, some 14in, with a poorly developed nuchal hump. It never showed any inclination to breed with a variety of other specimens of Synspilum, let alone cross breed. This may be because it was wild-caught and never got over the move from Central America. So this is why you find this individual together with the Zonatum, to which it never paid any attention. Cichlids all have their own personalities and it is very difficult in an article to account for this.

As a final point, cichlids are known to use several factors with regard to mate recognition. These are colour, pattern, shape and behaviour. The Zonatum does not have many similarities with the Synspilum on these factors, but it does to 'C', bifasciatum. Bifasciatum also has similarities with the Synspilum on these factors, hence they should not be kept together. These factors are considered by all serious cichlid keepers when setting up their communities, be they for Americans or Africans.

Martin Chandler,
BCA Species Controller.



PO BOX 122 • HEREFORD • HR2 0YF
☎ 01432 279268 (day),
01981 550051 (eve)

DUE TO EXPANSION, WE HAVE MOVED TO
NEW PREMISES AS FROM FEBRUARY 14TH

Please call us on 01432 279268 (day), 01981 550051 (eve)

24" COLLECTION 42 PLANTS 12 VARIETIES £6.95 Code p24

BACKGROUND: 3 Edmondsonia Tenella,
3 Four Leaf Clover,
4 Papyrus Chain Swords
HIGHLIGHT: 2 x Hemiphysalis Cherry Leaf, 3 Cyst
Cardus, 4 Red Ludwigia, 3 x Baccopa Coriandrina
BACKGROUND: 3 x Amazon Swords,
4 x Java Fern (feature plant), 4 x Green Marphyllum
3 x Hygrophilis (plant)
Floating Plant 1 x Salvinia Natans

30" COLLECTION 52 PLANTS £8.95 Code p30

(As above but including)
BACKGROUND: 4 Cyst-Heads
3 portions of Java Moss
HIGHLIGHT: 4 Baccopa Mariner,
3 Baccopa Coriandrina
BACKGROUND: 4 Vallis Terns,
4 Vallis Colocasia (large),
4 Red Hygrophilis (plant)

48" COLLECTION 85 PLANTS £15.95 Code p48

(As above but including)
BACKGROUND: 5 x Cyst-Heads
4 Cyst-Cards
HIGHLIGHT: 4 x Sagittaria Subulata
BACKGROUND: 3 x Red Marphyllum
3 Indian Fern, 3 x Creeping Juncus

Please note: Due to seasonal changes,
some varieties may not be available,
substitutions may be made.

POTTED PLANT COLLECTION

9 Potted £11.95 Code p9
15 Potted £17.95 Code p15
23 Potted £26.95 Code p23

DISCUS PLANT COLLECTION

33 plants £16.45 Code p33
61 plants £13.95 Code p61
75 plants £18.95 Code p75

ECONOMY COLLECTION

65 plants on choice £ 7.50 Code e65
85 plants on choice £ 9.45 Code e85
125 Plants on choice £13.75 Code e125

FISH HOUSE COLLECTION

143 Plants £21.95 Code f143

Full list of pick and mix plants
available on request

CRYPTOCORYNE COLLECTIONS

Code
15 Mixed Cryptocorynes £ 4.75 C15
30 Mixed Cryptocorynes £ 8.75 C30
45 Mixed Cryptocorynes £13.75 C45

BULB COLLECTIONS

10 Mixed Bulbs £ 9.75 Code B10
22 Mixed Bulbs £18.75 Code B22

FLOATING COLLECTIONS

15 Floating Plants £ 3.75 Code F15
30 Floating Plants £ 4.45 Code F30

SPECIAL OFFER Free planting guide and lead weighting with each collection
5 free plants with each collection ordered from this advert

6 DAYS A WEEK. After hours answer phone service
Closed Sundays

TEL: 01432 279268 (10am - 5pm); 01981 550051 (6pm - 10pm)

Cut out this order form today and post to:
Aquaflora, PO Box 122,
Hereford HR2 0YF

| Code | Description | Qty | Price |
|-----------------------|-------------|-----|-------|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| Sub Total | | | |
| Please add £1.95 p.p. | | | |
| TOTAL | | | |

Please enclose payment

01981 550051

COLDWATER

JOTTINGS

BY
STEPHEN J. SMITH



Why not be different? Try Sunfish, for instance. This is the Blackbanded Sunfish.

Coldwater challenge

With a little luck and a following wind, we should have seen the last of the frosts by now and, for the coldwater fishkeeper, the season begins in earnest. Maybe you will start (or finish!) that ornamental pond you have been hankering after for so long. Perhaps you will, this year, breed that spe-

cial strain of Fancy Goldfish, or you may even treat yourself to the 'ultimate' Koi to join your prized collection, not forgetting, of course, taking on new challenges presented by some of the lesser-known coldwater species.

So here's my 'new-season' resolution for all of us (me included!). How about finding something a little unusual, away from the tried-and-tested Goldfish,

Orfe or Koi? Obtain a shoal of Bitterling, a Sunfish, or even a spawning of eggs from a species of coarse fish, such as Roach or Dace (never take home fish caught from the wild — apart from being illegal, you could be taking home parasites and bacteria which will devastate your existing collection).

Find out as much as you can about your chosen 'challenge',

while at the same time ensuring that you record as much as you can about how you keep the fish: their conditions, size, growth, feeding and even the problems which you encounter.

The result will be that you will have discovered a whole new facet of this pleasurable pursuit of fishkeeping, as well as providing new information for other hobbyists. Do let me know how you progress.

Success with Daphnia

For many Goldfish keepers, the new season really gets going with the first spawnings of the year. By now, some enthusiasts will be rearing the first fry of the season, while others will be conditioning their parent fish in preparation for the 'big day'. I tend to use the first day of May as my 'threshold' for the breeding season — having spent as much time as I can during March and April ensuring that tanks and nets have been disinfected, equipment is running properly and that my ponds are looking spick and span.

Hold it! Spick and span...? Now, I know that 'cleanliness is next to Godliness' but, for the breeder of Daphnia, the golden rule has to be bent a little. So, one or two of my rearing ponds are cleaned a little less thoroughly than the others, so that a smear of muck remains on the pond liner — because I have found that it is the perfect Daphnia fertiliser.

Yes, I have tried using banana skins, yoghurt, dried cow manure



Fish live longer with
King British

OPEN WOUND
TREATMENT
FOR POND FISH



For FREE Treatment Guide for Fish Tanks or Ponds send S.A.E. to King British, Bradford BD5 9ET or Phone 01274 573551

NEW

NEW

NISHIKOI

ANNOUNCE THE TOP NEW STICK ON THE POND

A NEW LOW DENSITY FLOATING POND STICK EVERY FISH WILL ENJOY



BRITISH AND BEST
with 300mg stabilised Vitamin C per kilo



Give Your Fish and Your Pocket a Treat
Check out The Price

NISHIPOND FLOATING STICK

available in 140, 300 and 510gm jars.



VISIT YOUR LOCAL STOCKIST

SOAPBOX



Timely reminder of nightmare

On the very morning that I sat at my trusty word-processor to compile this month's Jottings, I received my subscription renewal for this year from Ornamental Fish Industry (UK). Now, it must be four years since I first gave mention of this organisation within these columns, and they have come a long way since; as has the coldwater hobby. Indeed, it is a timely reminder to all aquarists that, without the good work of OFI (UK) — in conjunction with other organisations, such as Ornamental Fish International — we would not have a coldwater hobby — at all.

Imagine this nightmare scenario: imports of Goldfish BANNED; imports of Koi BANNED. Without notice. No three-minute warning. And no more coldwater fish. I joke not — it is not the storyline of an Alan B'Stard in Brussels TV sitcom. It almost happened only a few short months ago.

Keith Davenport, chief executive of OFI (UK) explains: "We came to within 48 hours of measures being introduced which could have potentially brought about an immediate two-year ban on the import of coldwater species. We estimate that this would have cost the industry as much as £30m, both this year and next. This represents a return to the industry of around £300 for each £1 paid in levy and subscriptions".

I was surprised to learn that there are still some importers who have joined neither OFI (UK), nor its levy scheme, nor Ornamental Fish International — yet the very livelihoods of these companies (and our hobby) depends upon these people. It is the levy to the former and subscriptions to both these organisations which help ensure that imports may continue in a reasonable fashion and thus safeguard the interests of us all.

And let's remind ourselves that the matter of legislation surrounding the import of coldwater fish is not yet at an end. So, I shall have no hesitation in renewing my OFI (UK) subscription.

And my plea to all manufacturers and importers who are not members of either organisation is this: make sure that you join. You very nearly had no business at all!

wet cow manure, chicken manure (wet and dry) and a myriad other 'experiments' which, after all, have worked for other fishkeepers. Unfortunately, not for me. By far the best medium for producing

good, healthy Daphnia for me has been our very own fish manure — and it is produced in greater quantities than I can cope with in my humble establishment!

Indeed, I have even received phone calls from one eminent

correspondent requesting a breeding pair of Daphnia because I am the only Daphnia farmer he knows . . . !

And the reason for all this fuss? Simple: Daphnia (or water fleas, as they are popularly known) are God's gift to fishkeepers. And, if you can produce them in sufficient quantities yourself, it will save you a lot of money and/or a lot of tramping across fields to collect it. So, again, give it a try. There's nothing to beat feeding your fry with as much as they can consume.

Treat for Goldfish

Anyone who is keen on cross-words will know that the word 'treat' is indeed an anagram of 'tetra'. So it is no surprise that Tetra should come up with a treat — for Goldfish! In fact, there's not just one, but three treats available for your fish (when you're not feeding with home-grown Daphnia, that is).

The company's 'Gold Medal' range has been formulated especially for Goldfish and is a floating pellet which softens in seconds and floats just beneath the water surface. "This has the effect of reducing the air intake by the fish and, coupled with its recipe and the fast-softening characteristics, helps to minimise swim-bladder problems," explained Dr David Pool, of Tetra, who added that the new foods are easily digestible and contain a high proportion of roughage, which is essential to avoid digestive disorders.

The treats come in a choice of three foods and allow Fancy Goldfish keepers to tailor the diet to the needs of their fish: the 'Luxury Food' can be fed all the time; the 'Colour Enhancer' to improve colour (for example, as

part of the conditioning process leading up to a show), while the 'Growth Food' conditions fish for breeding and can be used to raise fry. Each food is available in a 20ml tub, priced at £3.25.

Know your onions

Coldwater friend and co-contributor Alex Stephenson has brought to my attention that fishkeepers in the south of England have been experiencing problems with their pond fish over recent months; with the onset of spring, it looks likely that these may become even more apparent.

The situation is particularly prevalent in Kent (from where Alex originates) where, apparently, Goldfish, Koi and other pond species have been behaving rather strangely. Despite the cooler weather, the fish have appeared to be ravenously hungry and, consequently, filter systems have been less able to cope with the increased output, while plants have developed lush growth and lilies have even been said to bloom months before they should.

Water samples taken from ponds around the region have revealed a strong smell of onion and garlic, which is believed to be affecting the chemical balance of the water. Co-incidentally, the problems seem to have developed since last autumn, when the Channel Tunnel was opened . . .

And finally . . .

I'm look forward to meeting 'fishy' friends and colleagues at Yorkshire Aquarists' Festival Fish Fayre '95 (Doncaster Racecourse, 1-2 April), where I shall be dusting down the slides for a talk on **Pondkeeping Made Simple** on the second day (Sunday) of the show.

FASCINATING FISH FACTS



Right twisted Livebearer

Xenodexia stenocephala (no common name) is a pretty fascinating and rarely seen livebearer.

Unlike other members of its family (the Poeciliidae — which includes Guppies, etc.), the males possess a mating organ — the gonopodium — which is tube-like, lacking all the claws, hooks and other 'adornments' found in other species.

An added unusual characteristic is that this gonopodium exhibits dorsal (right-handed) asymmetry. As if this wasn't enough, males also possess a most intriguing right pectoral (chest) fin.

The left one is perfectly normal, but the right one contains an accessory structure called a clasper, which is believed to help the males direct the gonopodium accurately when they swing it forward during mating.

Not surprisingly, *Xenodexia* is proving one of the more challenging livebearers to breed in captivity.

Adult pair of *Xenodexia*. The male is the fish with the slightly kinked spine. Note the 'swelling' at the base of its right pectoral fin. This is the clasper.



International Aquatic Centre



126-128 WEST BAR, SHEFFIELD, S3 8PN

TEL: 0114-275 0147

FAX: 0114-275 6767

SUPER SPRING SPECIALS

EARLY OUTDOOR POND FISH

GOLDEN ORFE (ALL SIZES), GREEN & GOLD TENCH
5" BLUE ORFE, ONLY £4.95 each

BEST BUY: SARASA COMETS, SHUBUNKINS
MIRROR & GHOST KOI

AQUALAST POND LINER

20 Year Guarantee

All sizes, off the roll

ONLY 29p per sq foot

JMC POND STICKS

Unbeatable Value

500g £1.95

1400g £4.95

LOTUS DIAMOND POND PUMPS

2 YEAR GUARANTEE

FULL RANGE AT MAIL ORDER PRICES

PLUS: BIOFLOC FILTERS COMPLETE WITH MEDIA;
UVAC UV STERILISERS AND A FULL RANGE OF
WATER GARDENING ACCESSORIES

WATER TESTING SERVICE AVAILABLE

OPENING TIMES:

MON-SAT 9.30am-5.00pm

SUNDAY: 10.00am-5.00pm

AMPLE CAR PARKING



**MAJOR
'SEABRAY'
STOCKIST
OVER 100
AQUARIUMS &
CABINETS**

**FOR EVERY £50
YOU SPEND ON
A SEABRAY
AQUARIUM IN
APRIL ...**

Example prices for
Aquariums with Cabinets

| | |
|--------------|--------|
| 24 x 18 x 12 | 119.75 |
| 24 x 22 x 12 | 130.59 |
| 30 x 18 x 12 | 134.75 |
| 30 x 22 x 15 | 162.75 |
| 36 x 22 x 12 | 171.25 |
| 39 x 18 x 12 | 170.75 |
| 39 x 22 x 15 | 198.50 |
| 42 x 22 x 12 | 194.75 |
| 42 x 22 x 15 | 210.00 |
| 48 x 22 x 12 | 212.00 |
| 48 x 22 x 15 | 238.75 |

This unit 30 x 22 x 15
aquarium and cabinet
LIST PRICE £162.75
£30.00 FREE GOODS

Send see for full list
of Seabray aquariums and cabinets



DENNERLE

We are one of the largest stockists of Dennerle products in the U.K. If you are interested in growing aquarium plants and keeping healthy fish we recommend the Dennerle book entitled "System for a Problem Free Aquarium", 128 pages of indispensable information only £9.50 post free.

MONEY-BACK OFFER
Buy the above book from us and get a full refund when you spend £75 on Dennerle goods.



New customers, present this advertisement to claim your first two Premier Customer* stamps and Collection Card FREE and save up to 50% on future purchases.

*Certain discounted items are excluded from this scheme.



**...WE
WILL GIVE YOU
£10 IN GOODS
OR FISH OF
YOUR CHOICE
FREE!**



**THE
water
ZOO**



439 LINCOLN ROAD PETERBOROUGH PE1 2PE
Telephone: Peterborough 312142 Fax: 897935

The WaterZoo is a fishkeeper's paradise... not part of a garden centre! It is a 4000 square feet 'High Street' store displaying over 300 tanks of marine, tropical and coldwater fish.

PLUS

... one of the largest all glass marine display aquariums in any retail establishment in the UK.



New fish arriving twice weekly - phone for details

POND

PUMPS

- AMPHIBIOUS ● OASE
- HOSELOCK ● LOTUS ● PRIMA
- Amphibious 180 R.R.P. £87.81
April price **£69.50**
- Amphibious 300 R.R.P. £93.57
April price **£74.85**
- Amphibious 450 R.R.P. £106.85
April price **£84.50**
- Amphibious 620 R.R.P. £117.21
April price **£93.75**
- Amphibious 770 R.R.P. £141.79
April price **£113.50**
- Amphibious 1400 R.R.P. £185.34
April price **£148.50**
- Amphibious 1800 R.R.P. £232.22
April price **£185.75**

**SPECIAL OFFER
(Limited Stock)**

T.M.C. POND U/V 15 watt £45.99
CYPRIO JVC 6000 £59.99

Living World
Tropiquarium
only

**£80⁹⁵ WITH
FREE
£10⁰⁰ GIFT
VOUCHER**



Stockists of **Axelrods Reef**
complete system marine aquariums

The WaterZoo is a
licensed credit broker

Easy to find - only 3/4 mile
from Queensgate Centre
Parking right outside.
Make it easier, send
see for street map.
Present the map on
arrival and we will deduct twice
the postage from your first purchase.



KEEPING AND BREEDING:

FRESHWATER CRABS

Dave Barnson describes his almost-total success in keeping these colourful hardy creatures . . . and his partial success at breeding them.



M. P. & C. PHELAGOS



LINDA LEWIS

TOP — A heavily armored male Red-clawed Crab (*Geothelphusa depressus*).

ABOVE — The female doesn't carry quite as robust claws (this one has her right claw missing).

Tropical freshwater crabs belong to the Potamonidae, the collective name for all freshwater species. As members of this family, they can, and will, leave the water for lengthy periods. Coupled with great climbing skills, this ability must be taken seriously, unless you want little crabs running all over the house! I have found, to my cost, that they can run at a fair pace, and aren't easy to catch once they get loose. Therefore, a tightly fitting aquarium cover is essential.

Areas above the water line can be provided by using cork bark; it's cheap to buy, easily cut to the required shape, and is virtually unsinkable.

By attaching heater grips to the rear of the cork bark it can be anchored to the wall of the tank. A depth of about five inches below the top edge of the tank seems to work best, but keep in mind the access areas for cables and filter pipes, as the crabs can climb these and will use them as escape routes.

Aggressive tendencies

Aggression is a very serious problem with freshwater crabs, especially the males, who are intolerant of each other and only slightly more tolerant of other animals. Plenty of rocks and artificial wood offer shelter and territories, and if enough cover is added, it can create a honeycomb of escape passages for harassed individuals. If insufficient cover is provided, small specimens are usually killed, or at best, badly mutilated, by the larger and more aggressive male crabs.

Missing limbs are common, but are more akin to torn or damaged fins in fishes, so given care, they will grow back. I have seen crabs with more legs missing than remaining, eventually regenerating a complete set of legs and looking as if they had never been injured. Even so, don't be tempted to place two crabs together to see this in practice. While it is amazing to watch new limb growth, it would, of course, be cruel intentionally to cause crabs to fight.

Voracious feeders

Feeding freshwater crabs offers no problems; they eat all of the normal aquarium foods, including frozen, flake and fresh. Make sure, though, that the food sinks to the bottom, and that it is well distributed over the whole area of the tank; some smaller crabs would rather starve than risk entering another's territory.

As these crabs are scavengers by nature, they will attempt to eat just about anything, so care is therefore needed when adding fertilisers, or tablet-form remedies to the water. Even if they are broken up, the crabs will eat them, sometimes with fatal results.

Soft-stemmed aquatic plants are also

eaten. I have had crabs strip entire sections of aquaria of plant life, so if vegetation is not available to them, it would perhaps be advisable to supplement their diet with fresh greens. A rather serious problem occurred in a heavily planted aquarium of mine when the crabs died from asphyxiation overnight due to insufficient aeration. The lesson learned was that they need a high dissolved oxygen content in the water.

Tankmates

Fishes can mix with these little crabs, but deciding on the suitability of fishy tankmates is difficult. A simple equation is: too large to be eaten by a crab, and it may eat the crab; small enough to be caught, and the crabs will eat it!

Well-fed crabs produce an astounding volume and density of waste, dark brown, very fine and heavy; heavy enough not to be collected by powerful filters. The only remedy for this huge waste problem is to vacuum it off each day. If the aquarium isn't a show piece, then a bare glass bottom makes this task easier.

Hard is best

Hard water seems to suit freshwater crabs more than soft. Considering the fact that they are crustaceans and that they need calcium to keep their shell hard, water of pH 7.0-7.5 would appear to be sensible. In this respect, heavily aerated water helps to keep the pH up, and it also seems to invigorate the crabs.

Being invertebrates, crabs have to cast off their old exoskeleton in order to grow. This is a time of extreme vulnerability for them, as their new shell is very soft and easily penetrated.

The act of casting seems to carry a high mortality rate, but the hard water and increased oxygen levels appear to lessen the risk of death. Again, the importance of retreats is paramount here, offering shelter to the growing crab until its shell hardens.

Breeding

Breeding is an integral part of casting, since only a newly moulted male can fertilise a female. The sex differences are subtle: a male is broader across the carapace than a female, the body depth is less, it will have larger claws and underneath the body, there will be a V-shape, rather than a U-shape as in the female.

Once a pair have successfully spawned, the female carries the eggs under her body, in the ventral region. There are two distinct clusters of eggs either side of the ventral flap. She uses this flap to fan water over the eggs.

Each cluster seems to consist of about one hundred light brown eggs, which, after a few days, turn berry-red. The female becomes very nervous while carrying eggs, and rarely appears in the open. She will often be the last to break cover for food, and will position herself so that



DAVE LAMSON



DAVE LAMSON



DAVE LAMSON

TOP — This is the subtly coloured blue *Potamonautus orbitospinus* (no common name).

CENTRE — A pair of *Uca* Fiddler Crabs. Note the over-sized left claw of the male.

ABOVE — Freshwater crabs may be kept with fish . . . but the choice of tankmates is not straightforward.

her rear is against some solid object; this prevents attack from behind and, thus, protects the eggs.

One major difficulty that I encountered was that of feeding the females. Their reluctance to come out in the open meant that food was scarce, while too much food offered meant that the water quality was in danger of deteriorating, and a hungry, or nervous female will eat her brood.

I have no idea as to how long the incubation period actually lasts, since all of my female crabs have turned up at some point with no eggs, sometimes after carrying them for several weeks. Whether the females themselves ate them, or they hatched and were then eaten is not known.

Brood-caring females also leave the water and occasionally dip their rear into the water to keep the eggs wet. A balanced spectrum light tube seems to bring more crabs to the surface to bask. Might this have something to do with the light spectrum offering enhanced vitamin production?

All in all, keeping a large aquarium full of freshwater tropical crabs has been a delight, a welcome change from the usual fishes available, and a great chance to witness some remarkable behaviour. One day I'll go back to keeping them, and hopefully, raise a batch of freshwater crab larvae.

DAVE

The

The Axelrod's Reef has made an instant impact on the marine market. What's more the best is even better! Now with the Axelrod's Reef deluxe you can combine the best systemised marine tank with the finest furniture available to the aquatic industry.

Axelrod's

reef



Our unique hand-crafted cabinets are made by EMCEE cabinets using top quality materials in mahogany, oak, teak, black ash and white plus a modern rag rolled effect.

The cabinets are hand stained, lacquered, sealed and then polished to give a lasting finish. Available with a traditional lid as shown or a metal halide option. These aquariums are simple to operate, easy to maintain and give superb results.

The following features combine to ensure perfect conditions at all times. New biocube trickle filter, dried feed nitrate filter, power protein skimmer with double collection cup, fine pre-filter, twin spiral filters, surface and midwater flow, surface skimmer, bottom water circulation inlets and chemical chamber.

Why wait? Talk to us about one of our flexible finance packages. Not only can you have no deposit finance, we offer a 3 months deferred payment plan. What's more you can add any additional equipment, eg. Living Rock, Metal Halides etc to the finance.

To cope with the unprecedented demand for the Axelrod's Reef we are setting up a dealership network throughout the U.K. We are pleased to appoint The Waterzoo, Reef World, Shirley Aquatics, Watford Aquarium and Emcee Cabinets as distributors.



REEF WORLD

SHIRLEY
AQUATICS



Tel: (01733) 312142 (Peterborough) Tel: (01737) 370777 (Surrey) Tel: 0121-745-9387 (Birmingham) Tel: 01923-220823 (Watford) Tel: 01482 581666 (Hull)

WATCH THIS SPACE FOR A QUALITY DEALER IN YOUR AREA

| EXAMPLE | PRICE | DEPOSIT | TOTAL CREDIT | 36 MONTHLY PAYMENTS | TOTAL | APR |
|------------------------------|---------|---------|--------------|---------------------|-----------|-------|
| 48"x18"x25" Deluxe trim | £792.50 | NIL | £792.50 | £33.82 | £1,217.52 | 30.6% |
| 48"x18" Deluxe cabinet | £330.46 | NIL | £330.46 | £14.10 | £507.60 | 30.6% |
| 48"x18"x25" Standard trim | £575.00 | NIL | £575.00 | £24.54 | £883.44 | 30.6% |
| 48"x18" Standard cabinet | £282.00 | NIL | £282.00 | £12.04 | 433.44 | 30.6% |

FIGURES ABOVE ARE FOR BUY NOW, 1ST PAYMENT 3 MONTHS AFTER DELIVERY



AXELROD AQUATICS



24 Church Street, Stapleford, Nottingham NG9 8DA. Tel/Fax 01602 391701

Licensed Credit Brokers

Finance subject to status

Written quotations on request



DAVID TWIGG'S

KOI CALENDAR

Jobs for the month

April showers are the things to dodge this month when trying to catch up on all the things which haven't been done over the winter period. Water temperature of the unheated pond will be approaching feeding level (10°C — 50°F) now, if it has not already got there, and our Koi will be eagerly awaiting our visits to the pond side.

Please continue to keep a watchful eye on water quality during this time, as the bacterial bed in the filter does take its time to re-establish again after the cold winter spell and water quality can suffer as a consequence. If your test kit tells you that either ammonia or nitrite levels are rising above the acceptable level, then cut back on the feeding to allow the filter to catch up.

If water has not been heated during the winter, then your Koi will almost certainly have spent a lot of time lying on the bottom of the pond. This may have led to soreness on the underbelly of the fish which, in turn, if not spotted and treated early enough, could lead to death. Careful observation of your fish, particularly when feeding, may pay dividends at this time of year.

Avenue update

The last time I visited Avenue Fisheries was just after they had moved from their Sandy home into the much larger premises at Wyboston, in Bedfordshire. I was therefore pleased to hear that they are now opening up over four acres that were previously not accessible to visitors. This area has been landscaped and contains six mud ponds and has two more under construction. It is proposed to make these ponds available to customers for growing on their personally selected high-grade Koi in natural conditions similar to those in Japan.

A new face is joining the Avenue team this summer; Andrew Wheeler has 17 years

To think that part of this magnificent interior Koi paradise was once a toilet!

of Koi keeping, breeding and showing experience to add to the depth of knowledge already available.

Services on offer are an all-year-round pond construction service (with graphic designer to allow visualisation of proposed schemes), a pond maintenance and accessory installation facility and a health service option available at all times.

Apart from an ever-increasing range of show-grade Koi, Avenue Fisheries are stocking a range of reasonably priced Bonsai trees to complement and enhance your Koi surrounds. Avenue Fisheries are at 46 Rookery Road, Wyboston, Beds and can be contacted on 01480 215408.



LAURIE JOHNSON

to complete and the surrounds, as the photo shows, have been decorated by Laurie with Japanese scenes. I am glad that you, your wife and Koi are now enjoying the benefits of an indoor pond, Laurie... and that you are speaking to each other again!

Insuring your Koi

A couple of years ago I mentioned insurance for Koi, and this has, once again, been brought to my attention. A comprehensive Livestock Insurance has been designed to give the Koi keeping hobbyist cover against 'All Risks of Mortality' and 'Loss of Koi' up to a limit of £25,000 per individual fish, or £250,000 for any one collection.

The insurance, arranged by the Lloyds Broking firm Roberts Morris Bray (Insurance Brokers) Ltd. — one of the leading firms specialising in insurance of commercial fish farming risks worldwide — has been devised for Koi keepers in conjunction with Farmer & Clark (Bristol) Limited. It has the formal approval of the British

Transformation

A letter received recently from reader Laurie Johnson of Chard, Somerset tells how a comment from his wife about the time he spent in the garden with his Koi, set him thinking about an indoor Koi pond. Laurie tells of how he transformed a second toilet-cum-shed 'outhouse' into a 12 x 6ft 6in x 4ft 6in deep pond containing 2,000 gallons of water.

The pond is block-built and fibreglassed and the 4in bottom drain feeds into a settlement chamber before entering a Green Machine 3500 filter. Return to the pond is by a Dab 1800 pushing the water through a spray bar. This conversion took 9 months



One of Avenue Fisheries' newly constructed ponds.

WHAT'S ON IN APRIL

- 2 — Eastend Section BKKS. Meeting, 7pm, Wellstead Community Centre, Vicarage Lane, East Ham, London. Contact Phil Davis, 01279 443754.
- Merseyside Section BKKS. Coach trip to Shirley Aquadoc. Contact Robbie, 0151 549 2001.
- 5 — Border Koi Club. Meet in Carlisle. Contact Mrs Amy Fisher, 01228 513623.
- Leicestershire Koi Society. Monthly meeting, B.S.C. Social Club, Scudamor Road, Leicester. Contact Pip Ostell, 01533 609707 or Kevin Luckman, 01455 250413.
- Yorkshire Section BKKS.

- Monthly meeting. Contact Phil Swallow, 01422 343674.
- 6 — Suffolk & North Essex Section BKKS. Monthly meeting. Stanway Rovers Football Club. Contact Alan Carter, 01206 866011.
- Middlesex and Surrey Borders Section BKKS. Speaking on Koi Health is Kevin Kenny, 8pm, Norbiton C.I.U. Club, Kingston. Contact Peter Saul, 0181 979 9117.
- 9 — Mid-Somerset Section BKKS. Paul Jarrett talks on Pond construction, 2pm, West Monkton Village Hall. Contact Alan Purnell, 01458 272132.
- Lee Valley & Harlow Section

- BKKS. Speaker is Gary Pritchard (Chairman BKKS) on Buying and Appreciating Koi. Contact Mick Fahey, 0181 508 5155 or Alan Burnall, 01279 814638.
- Northern Koi Club. A slide show of UK and USA ponds by Tony McCann. Contact Tony, 0161 794 1958.
- 10 — Northampton Section BKKS. AGM. Contact Brian Calcutt, 01604 784954.
- 11 — Nottingham & District Section BKKS. Monthly meeting. The Western Club, Nottingham, 8pm. Contact Shirley Hind, 0115 981 0923.
- 12 — South Hants Section BKKS.

- Meet at 8pm, Danmead Church Hall. Guest speaker is Gary Pritchard (Koi Appreciation). Contact George Rooney, 01420 473169.
- 13 — East Pennine Section BKKS. AGM & Pie & Piss Supper. Contact John Timmis, 01226 289500.
- 14 — Heart of England Koi Society. AGM in Warwick. Contact me, 01926 495213.
- Merseyside Section BKKS. Lawrence Craven speaks on Bonsai. Kneesley Village Hall. Contact Robbie, 0151 549 2001.
- Peterborough & Cambridgeshire Section BKKS. Coach trip to Clearwater Koi. Conta



Koi Keepers' Society and a special discount is offered to its members and those of other approved Koi societies.

Not being a great lover of insurance 'legalese', I found the "Your Questions Answered" leaflet that comes with the Prospectus to be an extremely clear and readable explanation of how the insurance works. If you would like to find out more, you should write to **Farmer & Clark (Bristol) Limited, Britannia House, High Street, Bream, Lydney, Glos. GL15 6JS.** Alternatively, they can be contacted on **01594 564444 (Tel)** or **01594 564084 (Fax).**

New Shirley service

A new service is being offered to aquatic hobbyists by **Shirley Aquatics**. Their new Mail Order operation aims to give a 'no fuss' service from special telephone 'hotlines'. All products in the Shirley Aquatics range carry a 1-year warranty; if an item supplied does not work as it should, it will be replaced.

The new Mail Order catalogue contains over 20,000 aquatic lines and can be obtained direct from the Shirley Superstore or by phoning the information line below. Telephone orders can be placed on **01564 770020** and taxes to **01564 776085**. An additional bonus is the free delivery to UK mainland destinations on orders over £10. For more information call **Shirley Aquatics** on **0121 744 1300**.

Gary Found, 01733 573178 or Alan Peppercom, 01733 349472.

18 — Peterborough & Cambridgeshire Section BKKS. 4024, Brecks Snooker Club, Peterborough. Contact Gary Found, 01733 573178 or Alan Peppercom, 01733 349472.

22 — Peterborough & Cambridgeshire Section BKKS. Koi Auction, at The Tuff House Hotel, Nr. Stantrod, Nr. Soham. Viewing from 11.30 am. Auction starts 1.00pm. Further details and map from Gary Found, 01733 573178 or Alan Peppercom, 01733 349472.

— Heart of England Koi Society.

Show Calendar

APRIL
29/30 International Koi Show, Telford Exhibition Centre.

MAY
6/7 Belgian Open Koi Show, Huyzingen (20km from Brussels)
28/29 Merseyside Section BKKS Open Show. Contact Robbie, 051 549 2001.

South Hants Section BKKS Open Show. Contact: George Rooney, 01420 473169
29 Avon Section BKKS Open Show, Part of The North Somerset Show, Ashton Court, Bristol. Contact Dave Knowles, 01454 774676.

JUNE
3/4 Yorkshire Section BKKS Open Show. Contact Phil Swallow, 01422 345674

4 Middlesex and Surrey Borders Section BKKS. Contact Peter Saul, 0181 979 9117.

18 Crouch Valley Section BKKS Open Show. Contact Ron Parfou, 01277 840863.

24/25 East Pennine Section BKKS Open Show, Wentworth, South Yorkshire. Contact John Timmis, 01226 269307
25 Suffolk & North Essex Section Closed Show Langham Community Centre. Contact Alan Carter, 01206 866011.

JULY
9 Lower Thames-Side Section BKKS Open Show. Contact Barry Hales, 01268 565700
23 Essex Section BKKS Open Show, Aveyley Sports Ground.

AUGUST
12/13 BKKS Koi '95. Billing Aquadrome, Northampton.

19/20 Lea Valley & Harlow Section BKKS Closed Show, Harlow Garden Centre. Contact Mick Fahy, 0181 508 5155 or Alan Burnall, 01279 814638.

Trip to dealers in the South East. Contact me, 01926 495213.

26 — London Section BKKS. Speaker is D. Brown (Chairman S.E. Section), Ruskin House, Croydon. Contact Keith Nind, 0181 673 3574.

27 — Middlesex and Surrey Borders Section BKKS. Beginners' Class 3. 8pm. Norbiton CUI Club, Kingston. Contact Peter Saul, 0181 979 9117.

30 — Merseyside Section BKKS. Coach trips to the International Koi Show at Telford. Contact Robbie, 0151 549 2001.

— Mid-Somerset Section BKKS. Contact Alan Purnell, 01458 272132.

More New Products & Offers from Animal House
see our separate 'Aquarium & Pond Buyers Guide'



23rd issue **FREE** listing over 2,000 bargain items!!!

For Your Free copy phone **01924 479946** or post the coupon & we'll send one immediately.

Please rush me your free Aquarium & Pond Buyers Guide

NAME _____

ADDRESS _____

POSTCODE _____

ANIMAL HOUSE (U.K.) LTD., Q.B.M. Business Park, Gelderd Road, Birstall, Batley. WF17 9QD. Tel: 01924 479946

JOIN THE



The more you know about keeping fish, the more satisfaction you will receive from it. That's why you'll want to join the Tetra Club.

It's a unique Club offering exclusive benefits to fishkeeping enthusiasts like yourself. Being a member gives you free access to unlimited expert advice and information. We assist you with queries before they become problems!

The Club also keeps you up to date with the trends and the news. And helps you advance in the hobby, making it very rewarding. All this, plus many other special benefits! Whatever kind of fish you keep – the Tetra Club is for you.

A CHOICE OF FREE WELCOME PACKS

When you join the Tetra Club, you receive a Welcome Pack, tailored to your fishkeeping needs. If you keep tropical fish, your pack will contain a tub of TetraMin, the world's favourite tropical fish food. Plus, a bottle of Tetra AquaSafe – to condition tap water and keep your fish safe and sound.



Or, if you're a pond fishkeeper, you will receive a Welcome Pack containing a 500ml tub of TetraPond Flaked Food, the famous, high quality diet for all pond fish. Also, a bottle of Tetra AquaFin – the water conditioner that neutralises chlorine in tap water, removes poisonous metals and protects your fish against harmful bacteria.



EXCLUSIVE BENEFITS FOR ALL MEMBERS

For a start, you'll get a Membership Card with your name and membership number printed on it.

Plus 3 times a year you will also receive an exclusive full colour magazine – Tetra Club News. It's packed full of interesting facts, tips and features. You'll find articles covering pond, tropical and coldwater fishkeeping, along with news of developments and new products, plus com-



petitions and readers' letters. Tetra Club News will keep you informed, and you'll gain in knowledge about all aspects of the fascinating hobby of fishkeeping.

MEMBERS' FREE ADVICE SERVICE AND HOTLINE

The Tetra Club Information Service is there to help you whenever you need it.

No matter how simple or obscure the queries, you receive expert advice to all your questions.

And there's no charge. Simply write to Tetra Club Advice Service, Lambert Court, Chestnut Avenue, Eastleigh, Hants, SO53 3ZQ. Your letter will receive the personal attention of one of our experts and a reply sent promptly. Alternatively, the Tetra Club Hotline gets you a rapid answer to any urgent problem. Phone between



10.00am and 12.00 noon, Monday to Friday. Have your membership card to hand when you call, since this service is only available to Tetra Club members.

THE BEST WAY TO GET THE MOST OUT OF FISHKEEPING

FREE ADVICE FROM OUR TEAM OF EXPERTS

There's not just one, or two, but three Tetra experts available to give advice to Club members! They have a uniquely broad and in-depth knowledge of all kinds of fishkeeping. And this expertise is freely available to every Club member.



Roger Foggitt has recently joined our team of experts. He has a degree in Marine Biology from Liverpool University and was previously a lecturer in aquatics. In addition to a deep understanding of marine species,

his knowledge covers the full range of tropical and coldwater fishkeeping, and will be hosting most of our Talking Fish seminars.



Bernice Brewster is our pond specialist. She graduated in



Biological Science at London University, and has worked at the Natural History Museum for ten years, studying all aspects of fish care. Her specialist knowledge centres around Koi. But she is just as keen to answer questions about the humble goldfish, and all pond fish and plants.



Dr David Pool has been with Tetra for many years and is very well known and respected for his all-round knowledge. Years of training and experience are at your disposal, to provide solutions to any kind of fishkeeping problem.

EVEN MORE BENEFITS!...

Tetra Club News frequently contains details of special offers, exclusive to members, on various desirable items associated with fishkeeping. Within the Club magazine are discount vouchers for admission to Zoos, Wildlife Parks, Seminars etc. which save you over £20!



As a Tetra Club member, you are entitled to free entry to any of the 'Talking Fish' seminars which Tetra organise, at venues all around the country. Details are in the magazine. What's more, Club members are given opportunities to sample new Tetra products. Tetra regularly improves its range with new foods, remedies and equipment.



TO GET ALL THE BENEFITS OF THE UNIQUE TETRA CLUB, SIMPLY PHONE US ON 01703 628863

between 9am - 5pm Mon - Thurs quoting your credit card details, or just complete this coupon.

Send to: Tetra Club, FREEPOST S04835, Eastleigh, SO53 3JW.

Name

Address

Postcode

Please enrol me in the Tetra Club as a Tropical / Pond Member.

Methods of Payment to cover the first year's annual membership fee and once only joining fee.

I wish to pay by cheque/postal orders/MasterCard/Eurocard/Access/Visa*
*Debit as applicable.

I enclose £

I authorise you to debit my account with the amount of £

Cardholder's address

My Card Number is

Name Expiry Date

(as appears on Card)

Signature Date

Please allow 28 days for delivery of your pack. Club

£1,000 WORTH OF PRIZES FROM **HOZELOCK** TEN HOZELOCK U/V PONDWATER PURIFIERS TO BE WON



— durable black moulded casing, incorporating lighting and controls — all you need to do is to hook the unit up to your power supply (in conjunction with a Residual Current Device — RCD) and your pond pump to maintain a continuous circulation of water from your pond. (Full installation instructions are enclosed with each unit.)

Hozelock is one of the UK's largest manufacturers of garden accessories and pondkeeping equipment. The company's range of Pondwater Purifiers has met with enormous success since its launch last year. To kick off the 1995 pondkeeping season, Hozelock is providing readers of *Aquarist & Pondkeeper* with the opportunity to win one of TEN 'Hozelock 7000' Ultra-violet Pondwater Purifiers in a prize competition worth £1,000.

The unique design of Hozelock's U/V Pondwater Purifiers incorporates an innovative turbulator, which ensures that the maximum possible volume of water actually makes contact with the surface of the U/V sleeve, thus ensuring maximum efficiency in eradicating unwanted organisms in the pondwater.

Each Hozelock U/V Pondwater Purifier is completely self-contained in a compact and

THE COMPETITION

All you have to do to enter is to answer the following three questions about pondkeeping. Write your answers on a postcard or a stuck-down envelope, together with your full name and address, and send it to reach us no later than 30 April 1995. The first ten correct entries drawn after the closing date will each win a 'Hozelock 7000' U/V Pondwater Purifier.

- ① What does the abbreviation 'UV' stand for?
- ② Which vegetable organism does Hozelock U/V Water Purifiers help to eradicate?
- ③ What unique feature of the Hozelock range of pondwater purifiers ensures maximum efficiency?



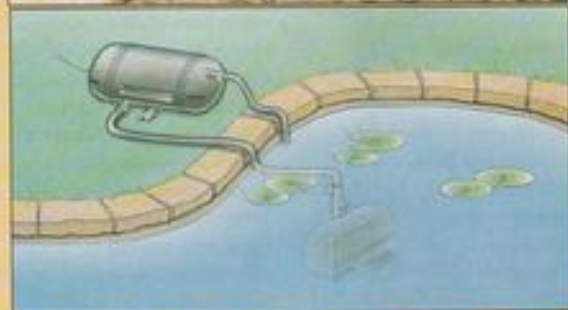
WHY USE A U/V PURIFIER?

In nature, a clear and healthy pond arises as a result of a balance, mainly between plant life and animal life. In the garden pond, however, this balance is not easy to achieve, and pondkeepers are faced with conditions such as green water and a build-up of toxic wastes. Therefore, filtration of some sort is recommended.

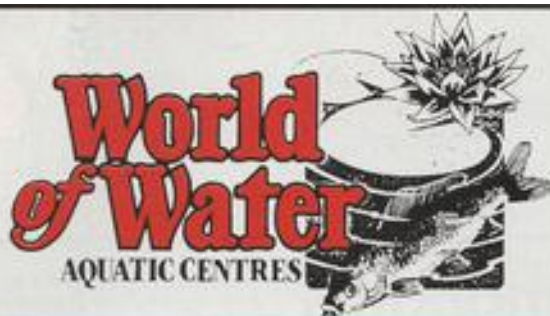
A U/V Pondwater Purifier provides a highly effective means of reducing harmful organisms, as well as the single-celled algae which cause green water. While it is advisable to use a mechanical/biological filter to maintain the quality of water in your pond, the use of a U/V Pondwater Purifier will help to give you clear and reasonably healthy pondwater.

THE RULES

1. Write your answers to the competition questions on a postcard or stuck-down envelope.
2. Write your FULL name, i.e. including full first name and address, in BLOCK CAPITALS on your entry.
3. Send your completed entry to:
HOZELOCK U-V PURIFIER COMPETITION,
Aquarist & Pondkeeper,
Dog World Ltd,
9 Telford Street,
Ashford,
Kent TN23 1QN.
4. Closing date: entries must be received by 30 April 1995, at the latest.
5. Only ONE entry per household will be accepted.
6. Entrants must be over 18 years of age.
7. No correspondence will be entered into regarding the competition.
8. The judges' decision will be final.
9. No responsibility is accepted for entries lost, delayed or damaged in the post, and proof of posting will not be accepted as proof of delivery.
10. The 10 prizes will be awarded in order to the first 10 correct entries drawn at the end of the competition.
11. No cash alternatives will be given.
12. The winners' names will be announced in the July 1995 issue of *Aquarist & Pondkeeper*.
13. This competition is open to all residents of the UK, excluding employees and families of *Aquarist & Pondkeeper*, Dog World Ltd, Pet Business World, Hozelock and their agencies.



**OPENING SOON
AT EAST
BIRMINGHAM**



**WORLD OF WATER
SWINDON**
½ mile South of Junction
16 off the M4
HAY LANE, SWINDON SN4 9QT
TEL: 01793 853097

BRITAIN'S LEADING AQUATIC SUPERSTORES

**WITH PROBABLY THE
LARGEST RANGE OF
TROPICAL AND
COLDWATER GOODS ON
DISPLAY IN THE U.K. AT
UNBELIEVABLE PRICES**

WORLD OF WATER WORLD OF WATER

READING, BERKS
166 HYDE END ROAD
SHINFIELD
READING, BERKS RG2 9ER
TEL: 01734 885492

ROMSEY, HANTS
STOCKBRIDGE ROAD
ROMSEY
HANTS SO51 0HB
TEL: 01794 515923

WORLD OF WATER WORLD OF WATER

BICESTER, OXON
OXFORD ROAD
BICESTER
OX6 8MY
TEL: 01869 322489

ROLVENDEN, KENT
HASTINGS ROAD (A28)
ROLVENDEN
KENT TN17 4PL
TEL: 01580 241771

**YOU CAN WANDER
THROUGH OUR SHOW
GARDENS FULL OF
WATERFALLS AND
FOUNTAINS IN GARDEN
SETTINGS AND LET OUR
IDEAS INSPIRE YOU**

**OUR CENTRES RANGE
IN SIZE UPTO 8 ACRES,
PLEASE PHONE YOUR
NEAREST CENTRE FOR
FULL DETAILS**

WORLD OF WATER WORLD OF WATER

**HAILSHAM,
EAST SUSSEX**
ERSHAM ROAD, HAILSHAM
EAST SUSSEX BN27 2RH
TEL: 01323 442400

WORTH, CRAWLEY
TURNERS HILL ROAD
WORTH, CRAWLEY
WEST SUSSEX RH10 4DS
TEL: 01293 883237

WORLD OF WATER WORLD OF WATER

**KENNEDY'S GARDEN
CENTRE, CROYDON**
WADDON WAY
CROYDON
CR0 4HY TEL: 0181 681 3132

**CHERTSEY
SURREY**
HOLLOWAY HILL
SURREY, KT16 0AR
TEL: 01932 569690

**FOR PROFESSIONAL
EXPERTISE AND
ADVICE COME AND
VISIT A 'WORLD OF
WATER'
SUPERSTORE**

**WE ARE STARTING
THE '1995' SEASON
WITH MASSIVE
DISCOUNTS. MANY
LEADING BRANDS
PRICED LOWER THAN
LAST YEAR**

WORLD OF WATER WORLD OF WATER

**COGGESHALL
ESSEX**
WEST STREET
ESSEX TEL: 01376 563836
CO6 1NT

**COUNTRY GARDENS,
CODICOTE**
HIGH STREET
CODICOTE
SG4 8XA TEL: 01438 820770



The Atlantis submarine sets sail off the coast of Hawaii.

THE UV WORLD OF CORAL FISHES

Dr David Ford of the Aquarian Advisory Service goes underwater in Hawaii and discovers a surprisingly grey world, green lips . . . and red teeth!

Photographs by the author

MAIN PICTURE — The violet scene of the natural reef — a photo taken through the porthole window of Atlantis.

BELOW — Inside the Atlantis submarine as it dives.

Coral fish lit by a camera flash show the colours visible to our eyes.

Coral fish are not really the brilliant colours we see; honestly! Marlinists are mainly attracted by the beautiful colours of the coral fishes they can keep in the home aquarium. The deep hues of the Powder Blue or Yellow Tang or Strawberry Grammas are famous, not only in marine tanks, but on TV, in nature or travel programmes.

How much better it must be to visit the fish and see them in all their colourful glory in the deep-coral reef. However, when you arrive . . . by scuba, glass-bottomed boat or submarine, you are in for a disappointment.

Those brilliant blues, yellows and red of the home seawater tank (or even TV screen) are camouflaging greys, blacks and browns!

The reason is that the deeper you go in water, the more the long wavelengths of natural light are absorbed, leaving only the violet and ultraviolet at 100 feet or so. On TV, the fish look as brilliant as they do in our world only because the video cameras take lighting with them. In the home aquarium, fluorescent tubes, or even metal halides, are used to highlight their beauty for our eyes.

Dive, dive, dive!

Most tropical islands that cater for tourists now have submarines to take visitors to see coral fish in their natural home. Many of these submarines have the same name . . . Atlantis (or Nautilus if there are two!). From Bermuda to Queensland, you will find such submarines making hourly dives for camera-laden tourists.

The deepest dive is made by a submarine called Atlantis (of course) off the coast of Honolulu in Oahu, Hawaii. This is a full-



sized submarine that can dive below 100 feet, carrying some 50 tourists on board to view the underwater world through the sub's thick glass portholes. At that depth, the internal lights are turned off for a better external view, so the inside of the vessel is diffused with the natural ultraviolet of the sea.

This means that your lips turn green (haemoglobin is this colour under UV) and your teeth turn red (fluoride fluoresces red under UV). All the tourists look at each other and announce, "Are you all right? You look awful!" The pilot explains what is happening and, reassured, they all turn to the windows and are disappointed to see a uniformly violet-coloured scene with hardly visible fish and corals.

Then the external lights are switched on and the corals and fish are revealed in all their glory — the reds, oranges, yellows, greens and blues of the flora and fauna of the tropical seas. But only because we take the lights of our world into their world . . .



Fish Fayre 95

TWENTY-FIRST
ANNIVERSARY
21

The once a year chance to see the very best displays of tropical and coldwater fish.

PLUS don't miss the opportunity to buy the finest fish for your own tank from the largest choice available anywhere in the U.K.

**FREE EXPERT
ADVICE**

**FREE CAR
PARKING**

EXCITING DISPLAYS

See the world's finest fish
lecturers in action

ADMISSION

£2.50 Adults, £1.25 OAP's & Children



ON
SALE
EVERYTHING FOR THE
FISH HOBBYIST

DONCASTER RACECOURSE

SAT 1ST APRIL & SUN 2ND APRIL



OPENING TIMES
10am - 5.00pm

1995

shell-dwelling **SUCCESS**



French aquarists **Marie-Paule** and **Christian Piednoir** pass on their secrets for long-term success with a delightful dwarf cichlid from Lake Tanganyika

Photographs by the authors

So what is wrong with keeping a single species of cichlid for several years — in a 70-litre (15.4-gal) tank? This was what we said after three years of doing just that, when the fifth generation of our *Neolamprologus multifasciatus* (referred to in some books as the Multi-banded Dwarf Lamprologus) hatched. We have been fishkeeping enthusiasts for a dozen or so years, and have "travelled the world over" in the variety of fishes we have kept, but our suitcases have finally come to rest in front of our Tanganyikan cube.

The set-up

The tank stands in our fish room, slightly apart from the other tanks, as it is intended to be viewed from any one of three sides. Its dimensions are 42 x 42 x 48cm (16.5 x 16.5 x 19cm), with an actual water depth of 42cm — i.e. a cube. We made the tank ourselves using 6mm glass, without any reinforcement. The rear 20% of its volume is partitioned off to accom-

modate an integral gravity-fed filtration system.

The stand is composed of uncemented breeze blocks topped by a piece of 19mm thick marine chipboard and a 20mm sheet of styrofoam. It is not very aesthetic, but it is solid — and it does the job.

The cover consists of two sheets of glass, on top of which rests a home-made box made from marine plywood, housing a fluorescent control unit and a 45cm (18in) Grolux tube, the latter positioned diagonally. The lighting is controlled by a timeswitch and is on for 12.5 hours each day. When the fluorescent goes off, a 15-watt blue lamp, sited 2.5 metres (c 8ft) from the tank, takes over, producing a gentle 'moonlight'.

The decor couldn't be simpler. In nature, these cichlids have a specialised habitat — they live exclusively in the empty shells of aquatic snails (*Neothauma*) — so the decor should consist solely of shells. Unfortunately, *Neothauma* are rare in the French countryside (!), but the shells of the large

TOP LEFT — One of our two-year-old males.

BOTTOM LEFT — As can be gauged by the size of the shell, the females are very small.

TOP RIGHT — Female guarding two four-week-old fry.

ABOVE — The tank during its plant-less phase.

'Burgundy' snail are an acceptable substitute.

A few small pebbles, scattered on a shallow sandy substrate, serve to wedge the shells in place. 'Multifasciatus' need sand so that they can adjust the position of their 'home' to their liking. Therefore, if the shell is moved, they will labour to return it to its original position!

This type of decor is a bit short on colour, so we have added vegetation in the form of some *Anubias barteri*, held in place by pebbles.

The filter, as already mentioned, occupies 20% of the tank's volume. This may seem a lot, but the beneficial effect can be seen in the biological equilibrium of the aquarium and the purity of its water. Water is drawn in through two 20mm (0.8in) diameter holes fitted with grilles to

keep the adults out; any juveniles which are sucked in are easily rescued from the first chamber of the filter.

The latter is filled with perlite, followed by a block of blue open-celled foam measuring 10 x 10 x 15cm (4 x 4 x 6in). The second chamber contains an identical piece of foam followed by 'Zolux' activated carbon. The filtered water is returned by a Hydor submersible pump with an effective turnover rate of 100 litres/hour (22 gal). Heating is by means of a Rena 50-watt combined heater/stat next to the pump.



The same tank planted with *Anubias barteri*.



The pair at home guarding some fry (one can be seen just inside the shell).

MULTIFASCIATUS PROFILE

by Mary Bailey

Neolamprologus multifasciatus is endemic to Lake Tanganyika, where its distribution is apparently restricted to the southern part of the lake, and to areas of coastal sandy substrate littered with the empty *Neothauma tanganyicense* shells it uses for shelter. Along with several other Tanganyikan shell-dwellers and a few South American Apistogrammas, it is a leading contender for the title of 'World's Smallest Cichlid': a full grown male measures a massive 4cm — 1.6in (including the tail), while females attain all of 2.5cm (1in). Adults can easily be sexed on this basis.

The species is colonial by nature, with pairs holding small territories centred on 'his and hers' shells positioned very close together. The distance between pairs averages a mere 10cm (4in). Juveniles which have 'left home' are tolerated by the adults of the colony, and live not in, but under, the shells.

They are able to do so because the adults dig away all the sand from around and under the shells, so that the colony is effectively situated in a depression in the substrate. This behaviour can be observed in captivity, where a single pair can transform an orderly tank into a 'moonscape' within hours. The species' digging ability is prodigious, and quite remarkable in relation to its size. Usually, the only thing to stop them is the bottom of the tank!

Konings (1988)* has suggested that the motivation behind this digging is used to create a rampart at the edge of the depression. This has the effect of diverting the flow of the water column downwards, bringing the plankton on which 'Multifasciatus' feed into the vicinity of the shells. This would not, however, be necessary if they hadn't previously lowered the shells out of the water column. So, we must assume there is some primary advantage to be derived from shell lowering.

Although a number of ostracophil (shell-dwelling) species are known from Lake Tanganyika, their size, appearance and habits are extremely variable; in consequence, it is thought they are, in general, not closely related.

It appears that multiple cichlid lineages have discovered the advantages of shell-dwelling independently, rather than a single one doing so and subsequently evolving into several species. Nevertheless, there is a species which closely resembles *N. multifasciatus*, but has a larger eye and lives among small stones, rather than in shells. It is probably a close relative, but whether it represents an ancestor (the species from which 'Multifasciatus' evolved) or an offshoot (a species evolved from 'Multifasciatus') is unknown.

* Konings, A (1988) *Tanganyikan Cichlids*. Verduijn Cichlids & Lake Fish Movies, Holland & Germany.

★ Maintenance is simple. The first filter chamber is cleaned once a month, and its filter media changed every three months. The second block of foam has been cleaned five times in five years — it acts as a bacterial reservoir. The carbon is rinsed every month, and replaced twice-yearly.

★ The water, which is heated to 25°C (77°F) is what comes out of our taps. The pH averages 7.8, and total hardness is 25 — conditions approximating to those in Lake Tanganyika. 20% is changed every 10 days or so.

The fish

In March 1988, we obtained four specimens of *Neolamprologus multifasciatus* at a meeting of the Association France Cichlid (French Cichlid Association). Unfortunately, they were four males. Three months later, a female joined the quartet. Today there must be about 60 of them!

The population appears to regulate itself automatically as a function of the size of the tank and the number of shells available. From time to time, friends 'gamble' on selecting a pair — one needs only to dabble one's hand in the water for a pair to dive into their shell.

The shells, and thus their occupants, are changed from time to time, and this quite often results in spawnings which remain undetected until a week later, when the fry emerge. So far, eight generations have first seen the light of day in this cube.

'Multifasciatus' is one of a group of conchicole (shell-dwelling) species from Lake Tanganyika which also includes *Brevi* (*N. brevis*) and *Ocellated Dwarf Lamprologus* (*Lamprologus ocellatus*).

We could have housed this species with other Tanganyikans, but deliberately chose to keep just 'Multifasciatus'.

Before the cube became their home, they lived in a 450-litre (c 100 gals) Tanganyikan community in the company of, among others, two male *Compressiceps* (*Abolamprologus compressiceps*) of the black Zairean form. The size difference was considerable: 2cm (0.8in) on the one hand, 10cm (4in) on the other. And from the viewpoint of the 'Multis', scuttling into their shells to escape the charging *compressiceps*, the latter must have appeared gigantic! There were never any fry.

Our fish are normally fed twice every day. The diet is extremely varied: flake or granules (Tetra Prima) are given, but in the main we feed frozen foods (shrimp, mussel) and live *Daphnia*. We have the good fortune to live near a very productive duck pond.

The aquarium has never received a single drop of medication of any kind. It is problem-free, nice to look at — and there is plenty of activity. Not only that, but it is a real pleasure to catch out some fishes when necessary — you just put in a hand and take out a shell! As aquaria go, a winner whichever way you look at it. **MB**

Jurassic Fishes

(Selection — Care — Behavior)

By: Haruto Kodera et al
Published by: T.F.H.

Publications Inc
ISBN: 0-7938-0086-2
Price: £14.95

Predictability is something no one could accuse T.F.H. of. If you were foolish enough to do this, then before you knew it, there'd be a book to prove you wrong. *Jurassic Fishes* is just such a book.

It is a truly gorgeous volume dealing with a subject — the so-called "primitive" fishes — that no other book I know of has ever dared to take on in such a wholehearted way. Arowana, Dragon Fish, Arapaima, Lungfish, Birchirs, Mormyrids, Knife Fishes, Gars and other equally interesting groups are given the sort of coverage that lovers of these fish have long craved for, but have never found.

What really makes the book for me, despite the relative paucity of spawning photographs, is not the outstanding quality, interest and rarity of many of these that are featured, but the inclusion of some excellent text detailing advice on the upkeep, aquarium design and breeding of the species concerned. There

Japanese authors and ichthyologists led by Haruto Kodera of the Dental College of Tsurugami University, this impressive tome is a mine of priceless information... and at the unbelievably give-away price of £14.95.

So what are the minuses? For me, one important minus is embodied in the very title itself. The Jurassic Period is the middle period of the Mesozoic era, the other two being the Triassic (older) and the Cretaceous (more recent). The title implies,

however, that the fishes discussed evolved (or made their first appearance) during the Jurassic, but this isn't so at all. The Lungfishes, for example, were 'well under way' by the Jurassic (they are known from the Devonian), while the earliest Birchir fossils come from the Cretaceous. The bony tongue (Cateuloglossiformes), including the Arapaima, Dragon Fish and Arowanas, appear to have arrived towards the end of the Cretaceous as well. It

therefore seems to me that, in coming up with the title, *Jurassic Fishes*, a certain degree of accuracy has been sacrificed in the name of topicality.

I also feel that the few pages grouped under the title: *The Basics of Raising Tropical Fishes*, with its meagre text and numerous product shots, is, largely, a filler that appears to have been added on at a stage in production subsequent to the writing of the main body of text.

My third quibble revolves around the unquestioning approach taken throughout with regard to the feeding of live fish. Why should a 'feeder' Goldfish be less important as a living organism than, say, a Saratoga? The fact is that, at the very least, the majority of the species which form the core subject matter of the book will take dead fish and numerous other alternatives. If live fishes are to be fed to other fishes then, the very minimum they deserve, is a humane consideration of the ethics involved.

Despite its few shortcomings, *Jurassic Fishes* is a wonderful book that fills a huge gap in a spectacular and eminently useful manner.

John Dawes



HARUTO KODERA
Tsukushi Igawa
Nobuhiko Kawano
Hiroschi Maeda
Shiroe Akashi
Fumihiko Mori
Keichi Yamamoto

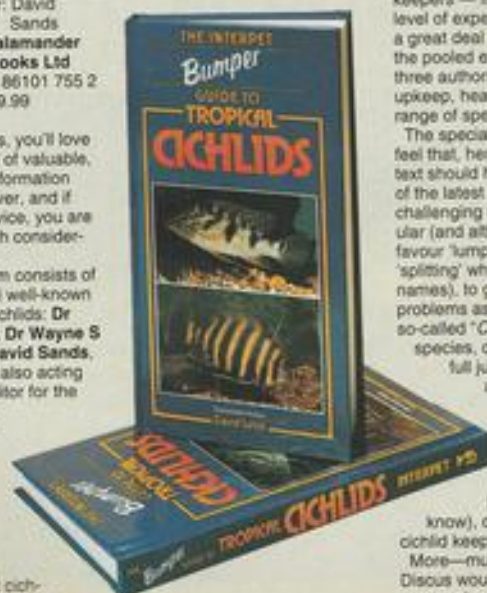
The Interpet Bumper Guide to Tropical Cichlids

Consultant Editor: David Sands
Published by: Salamander Books Ltd
ISBN: 0 86101 755 2
Price: £9.99

If you like cichlids, you'll love this book. It's full of valuable, easy-to-digest information from cover to cover, and if you follow its advice, you are likely to meet with considerable success.

The writing team consists of three authors, all well-known in the world of cichlids: Dr Paul V Loiselle, Dr Wayne S Leibel and Dr David Sands, the last of these also acting as consultant editor for the project.

For the beginner, this book is (perhaps) more useful than for the out-and-out specialist who already knows quite a bit about cichlids. Certainly, all cichlid



keepers — irrespective of level of expertise — will derive a great deal of benefit from the pooled experience of the three authors regarding upkeep, health, breeding and range of species.

The specialist may, however, feel that, here and there, the text should have tackled some of the latest thinking in a more challenging manner. In particular (and although I generally favour 'lumping' instead of 'splitting' when it comes to fish names), to gloss over the problems associated with the so-called "Cichlasoma" species, does not, I feel, do full justice, either to the author concerned (who undoubtedly knows much more about this subject than I'm ever likely to know), or to the informed cichlid keeper.

More — much more — on Discus would also have been most welcome. It's great to

see someone (at last!) questioning the validity of the various subspecies in a book, as opposed to an article, but a standard-sized entry on these fish is far from adequate.

Other quibbles include the inclusion of a great picture of *Pseudocrenilabrus philander* (unlabelled) in the General Introduction, but the omission of this wonderful species from the entry on the genus. Also, including a photograph (page 72) of a fish referred to as *Geophagus hondae* and then being told (page 204) that this is a junior synonym of *G. steindachneri* and is therefore "incorrectly used", hints at a little inconsistency.

This said, and other reservations notwithstanding, *The Interpet Bumper Guide to Tropical Cichlids* is an excellent value-for-money buy and an absolute 'must' for anyone interested in these wide-spread fascinating fish.

Now, how about a similar book on catfish...?

John Dawes



LYNWOOD FISH HOUSE

315/321 HOOK RISE SOUTH, TOLWORTH, SURBITON, SURREY



We have been one of Europe's most professional shops for ten years, not two, and totally endorse Tropic Marin Salt

Why start at the bottom of the fishkeeping ladder when you could start at the top with LYNWOODS

More species of fish under one roof than most public aquaria.

Telephone: **081 - 391 2613**
MARINES MARINES MARINES
NOW ONE OF THE MOST COMPETITIVELY PRICED OUTLETS FOR MARINES IN THE COUNTRY

Opening Hours: Mon-Sun 10 a.m.-6 p.m.

We wish to make it known that our aquariums are made to safety standards as laid down by guidelines.

Competitive prices given over the telephone on all glass tanks

We keep the whole Mayfair range of cabinets in stock

One of the best quality cabinets produced

It is not always possible for the cabinet craftsmen to be in the shop at the same time you visit us. If you wish to speak to one of them, please phone for an appointment as our workshops are in Portsmouth

Now in stock — over 50 Cabinets and Aquariums in our purpose-built showrooms

Nitraghost — removes nitrates and phosphates — A special Offer for this month — please phone for price

**NEW WORKSHOP NOW OPEN
ADJACENT TO OUR PREMISES IN TOLWORTH —**

THIS NEW FACILITY WILL ENABLE US TO OFFER LOWER, COMPETITIVE PRICES

★ ALL TANKS ARE AT TRADE PRICES UNTIL FURTHER NOTICE ★

ie:—

| | | | |
|-----------------|---------------|-----------------|---------------|
| 24" x 15" x 12" | £ 11.86 + VAT | 36" x 15" x 12" | £ 16.24 + VAT |
| 48" x 15" x 12" | £ 20.61 + VAT | 5' x 2' x 2' | £116.00 + VAT |
| | | 6' x 2' x 2' | £140.00 + VAT |



We can build Tanks and Cabinets to your own specifications by our own staff

PROBABLY ONE OF THE LARGEST SELECTIONS OF MARINE FISH AND INVERTEBRATES IN THE SOUTH

These problems harm fish. Our solutions don't.



Green Water Algae



Blanket Weed



Green Water Algae and Blanket Weed are not only unsightly, they can also kill your fish. Green Away and Pond Balance are safe, effective solutions that won't harm fish, plants or filters. Green Away clumps together green water algae, whilst Pond Balance rebalances the pond's nutrients so that blanketweed starves. The result - a clear pond that's safe for all your fish.

Write or phone for free information pack quoting magazine 1596.



INTERPET

THE BEST CARE FOR YOUR POND


INTERPET LTD, DORKING, SURREY RH4 2YX TEL 01306 881035 FAX 01306 885009

PREPARATIONS FOR SPRING & SUMMER

*Filter maintenance - correct feeding
pool heating - conditioning new fish
controlling viruses, bacteria
and parasites*



an Aquarist and Pondkeeper supplement



Everybody's target: a healthy Koi (Kohaku) ready for the season ahead.

Welcome to spring. This is the most difficult time of year for Koi keepers, particularly those who do not heat their ponds during the long British winter. For the last few months, our Koi will have been fed little, if at all, and have almost certainly been subjected to swings of water temperature that will have fooled them into thinking that spring had arrived several times.

This is, of course, very stressful at a time when our Koi are at their weakest. We are now at the point when we must coax them out of the almost comatose state into which they may have slipped for anything up to seven months, according to the area of the UK in which they are kept.

Confusing weather

The British weather is notoriously unpredictable; a near heatwave can be experienced in March and very cold and frosty nights can be experienced well into May. This sort of changing weather system is definitely not to the liking of our poikilothermic (cold-blooded) Koi.

As their metabolic rate increases with rising water temperature, they start to feed, but when the air temperature falls, thus dragging the water temperature down with it, Koi sense this change and their metabolic rate slows down again; maybe even shutting down completely in the worst



THOUGHTS THAT SPRING TO MIND

Lyn (my wife) gazing into a dealer's pond at new stock getting ready for warmer spring temperatures.

As David Twigg explains, sensible precautionary steps taken at this time of year will enhance our chances of success (and our Koi's, of course) for the whole of the season

illustrations by the author

cases. When this occurs, any food that has been consumed will take far longer to travel through the gut. Indeed, if the temperature falls too far, then this food may lie in the gut for a long time and may even rot there. When this experience is repeated several times in the space of a few weeks, then it would not be unrealistic for us to say that Koi become confused!

This stressful situation for Koi, and the resulting problems, can be minimised by careful management of the total pond environment. Probably the most important

part of that environment is the water in which the Koi live and breathe. If the water quality, and that includes temperature, can be improved, then the fish will be much less stressed and therefore less prone to medical problems.

Filter watch

It is generally accepted that, in an unheated Koi pond, to prevent greater than necessary cooling of the pond water during the winter months, the flow rate



IF YOU ARE LOOKING FOR KOI LIKE THIS FINE 45cms GOSHIKI, THEN PUT SKS ON YOUR "MUST VISIT SOON" LIST AND COME AND SEE FOR YOURSELF WHY SKS IS THE FASTEST GROWING KOI COMPANY IN THE UK.



SELECTIVE KOI SALES

Beech Croft, Waterloo Road, Hainford, Norwich NR10 3AX.

Telephone/Fax: 0603 897 453 · Mobile 0836 763315





A pondside gathering: an important part of spring/summer Koi keeping.



Spring treatment for equipment: a dip in potassium permanganate.

should be reduced in the autumn. Now, as spring progresses, it is important to increase the flow rate again.

This is to ensure that, as Koi activity and feeding increases, so does the ability of the biological filter to cope with the extra demand. An increased feeding rate will, of course, mean an increased load on the filter, so water quality must be monitored closely during this time to prevent an unexpected disaster.

Allowing, say, ammonia to rise to too high a level can cause irreparable damage to the gills and will even cause death in the worst cases. A wide range of test kits are available on the market to help prevent such an incident occurring and, apart from the usual pH, ammonia and nitrite tests, it would probably be wise to monitor oxygen and nitrate as well.

Filter maintenance must also be increased; the need for more regular back flushing is greater due, not only to increased feeding, but also to the onset of

the Koi keeper's nightmare: blanketweed. This will find its way into settlement or Vortex chambers and will putrefy if left unattended.

Temperature control

As mentioned earlier, the water temperature really needs to be stabilised at this time of year to prevent stress setting in, so if it is at all possible, some form of heating should be considered. The minimum arrangement would be to prevent, or at least minimise, the fall-back of water temperature to a point where feeding would need to be stopped.

The smaller your pond installation, the greater the swings of water temperature are likely to be. Under these circumstances, it could be prudent to place a couple of thermostatically controlled aquarium heaters in the filter system to help prevent temperature dropping below, say, 50°F (10°C). This would have the beneficial effect of

helping to build a good bacterial bed in the filter... one that would not be dying off each time the temperature fell.

If a winter pond cover is in use, then maybe it would be a good idea not to take it off too early. It can be very tempting to dismantle a cover on an early sunny weekend in March, but, really, it will only mean that water temperature will fall again. March winds certainly do blow and do succeed in chilling the water surface quite considerably. My own records show that my cover has always been removed during the period of the last week of April-first week of May.

Digestible feeding

In order to build up the biological filter beds, as well as to ease Koi into spring-feeding with easily digestible foods is most important. Although I have a heating system, I still give my Koi a winter by allowing the water temperature to drop naturally. When bringing them out of the low temperature, I start to feed at about 7°C (45°F).

Wheat, barley and rice, purchased from the local supermarket, are boiled up and fed as an easily digestible sinking food. As the temperature comes up higher, so I introduce the wheatgerm, low-protein type of pellets into the diet.

The quantity given of any of these foods must be carefully controlled, as must be the rate of increase according to the water temperature and the water quality, as given by the water test kit.

If any parameter slips too far out of control, then large water changes may become necessary. These can be very stressful to Koi, because the water used to top up will not be mature and may well be colder as well, thus again reducing water temperature at this critical time.

Koi are natural bottom feeders and, therefore, the type of food mentioned above, which sinks to the bottom of the pond, is ideal. A gradual build-up of the quantity fed is probably wisest, and certainly morning is the best feeding time. The rising heat of the day will aid digestion as the metabolic rate increases. Evening feeding could bring problems, particularly on those evenings that are followed by a very sharp frost.

As can be seen then, this is really the time of year when some form of heating comes into its own. To even out the swings of temperature can only be regarded as a good thing for Koi. They will be happy to know that when their sensors tell them that spring has arrived, it really has.

Health measures

This is also the time of year when parasites and bacteria, that have lain dormant over the winter months, start to increase in numbers. It is a continuous battle for the Koi keeper to ensure that these enemies are kept under manageable control, so as to reduce the chance of them attacking the Koi in their weakened state.

Although generally used for keeping ▶

PONDKEEPING MADE SIMPLE

CYPRIO

The Experts in Pond Management
All you need for a Clear, Healthy Garden Pond



CYPRIO LIMITED
Hards Road, Froggall
Peterborough U.K.
PE6 8RR
Telephone
01778 344502
Facsimile
01778 348093



Valley

AQUATICS

- We are the largest stockholders of JAPANESE KOI in the country
- Everything for the water garden, liners, pumps, filtration systems, plants, etc.
- Tropical and Coldwater fish
- All accessories for indoor and outdoor tanks and ponds
- Helpful advice freely given

flocor plastic biofiltration media specifically developed and patented by ICI is used successfully by tankkeepers and others throughout the world.

flocor Biological Filtration and Aeration Systems for Tanks, Ponds, and Lagoons

Open 5 days
a week
CLOSED TUESDAY
& WEDNESDAY

BARRY AND LINDA PRICE
Plantation House (Carrs Ind Estate), Flip Road
Haslingden, Lancashire BB4 5EJ
Telephone: Rossendale (01706) 228960/224370

HARROW KOI COMPANY

269 Watford Road, Harrow, Middlesex HA1 3TS
Telephone: 0181-423 0208

THE HARROW POND-E-VAC

The Pond-E-Vac is the most efficient pond vacuum cleaner available to date. This is made possible by the unique strainer chamber feature that in effect makes it an impossibility for any solids to enter and damage the pump impeller.

The Pond-E-Vac will remove gravel, sand, soil, fish waste and algae, including blanket and silk weeds effortlessly. Should you wish only to strain solids and return the water back to the pond this is possible, and if you intend to remove harmful nitrifying bottom water along with fish waste, it is advisable to flush this to drains or, alternatively, give your plants and lawn a treat!

The Pond-E-Vac Kit comprises of:-

- 1 x Jet-Vac Pump
- 1 x Strainer Chamber and Basket
- 2 x Multi Clips
- 1 x 1/2" Hose Tail Fitting
- 1 x 1 1/2" Hose Tail Fitting
- 2m Swimming Pool Flexi Hose
- 2m Reinforced PVC Hose
- 1 x 1.75m Telescopic Hand Set and Vacuum Nozzle



- ★ Guaranteed for 12 months
 - ★ Supplied ready for use including 3 pin electric plug
 - ★ Patent pending
 - ★ Specifications may alter at manufacturers discretion
- £195.00 + CARRIAGE — SOLE UK DISTRIBUTOR**
Over 5000 units now in use
Sell one of the largest selection of high grade Koi in the U.K.



Opening hours 7 days a week 9.30 am - 5.30 pm

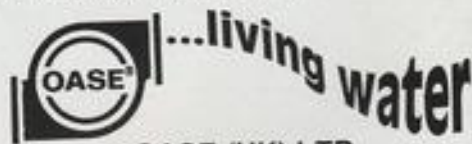
OASE — the big name in big-hearted pumps

The OASE name is known world-wide for quality and reliability, with THREE-YEAR GUARANTEES on most of its three-dozen models of fountain, submersible and other pumps spanning 4-290 l/min (50-3800 gal/hr), turnover rates. Notable, too, are remarkably low running costs.

In fact, the only problem you're likely to have is with pronunciation (OH-AH-Sir, for the record) when first asking for OASE equipment by name.

This, you'll find, is well worth doing. Just two examples are the 40W, 35 l/min (460 gal/hr) Aquarius II (RRP now down to £99.99) and the 60W, 65 l/min (860 gal/hr) Nautilus 4000 (now just £159.99). Then there are the Aquodex submersibles, moving up to 220 l/min (2900 gal/hr).

OASE pumps are backed by an unrivalled range of fountain nozzles ... pool liners ... filters ... lights ... plus the new Europond 200 system, the natural answer to purifying pond water.



OASE (UK) LTD

3 Telford Gate, Whittle Road, West Portway Industrial Estate, Andover, Hampshire, SP10 3SF

For the name of your nearest stockist,
use our Hotlines:—

Tel: 01264 333225 Fax: 01264 333226

QUALITY KOI COMPANY

Visit the Koi Specialists at Britain's

Most Popular Koi Store also with a fantastic

Tropical Fish Department — 180 Tropical Stock Tanks

VOTED BEST SPECIALIST POND/KOI OUTLET BY PFK READERS' POLL



New Season Japanese Koi — most varieties.
Standard to show quality all quarantined in our Hi-Tech quarantine ponds.

SEND FOR FREE BROCHURE/PRICE LIST —
INCLUDES INFORMATION ON OUR HI-TECH
FILTRATION SYSTEMS AND ALL EQUIPMENT FOR
THE MOST EFFICIENT & COST EFFECTIVE POND
CONSTRUCTION.

WELL WORTH A VISIT

For extra discounts use our customer privilege card,
in-store or mail-order.

All Koi & Goldfish pond construction items and accessories ★ Pumps ★ UV Sterilisers etc. In fact WE SELL THE BLINKING LOT — all at reasonable prices, including ★ Rubber pond liners from 38p sq ft. Boxed Butyl prices on application. We sell Beauty Foods, Hikari Foods, Tetra Foods, Omega Foods. Concrete ornaments, Granite ornaments, Medications, Test Kits, etc. etc.

SPRING SALE * SUPERB KOI UP TO 50% OFF

Huge discounts off all Aquariums & Equipment

& 20% off Tropicals

BRIDGE END, BRIGHOUSE, W. YORKS HD6 3DN
Tel: 01484 722015 Fax: 01484 400515

Open 6 days, 10am to 6pm. Closed Wednesdays.



DIRECTIONS: EXIT 25 OFF M62 THEN
1 1/2 MILES (opposite Star Pub)

WE STOCK SOME OF THE BEST KOI IN THE UK

clear water, it would probably be wise to switch on the Ultra Violet steriliser at this time. It will help keep the bacterial count down, thus reducing the chance that the Koi will succumb to viral or bacterial infection or parasitic infestation. (See **Lance Jepson's** and **Barry Goodwin's** articles elsewhere in this Supplement).

Koi keepers who have their ponds heated during the winter months, will not have quite the same problems, because, even if their Koi have been given a winter, this will not have been as long or severe as in the unheated pond.

Spring is also the period when checks should be made on all pipework, pumps, filters etc. The long, cold winter months could well have caused cracks to appear where all was well a couple of months earlier. Another task is to change, if usage time requires it, the UV steriliser tubes in order to maintain efficient operation in killing 'green water' and minimising the free-swimming bacterial and parasite count.

Safe dispensation

If we are unlucky enough to have a problem with one or more of our collection of Koi, it becomes necessary to take some action. Most keepers with a few years' experience under their belt, will recognise the symptoms early and will treat them accordingly. Many others, however, may be new to the hobby and will turn to friends, a club or books and *A & P* for help.

If you haven't already done so, spring is a very good time to familiarise yourself with the subject of safe administration of aquatic remedies, so for those new to the hobby, here's an updated piece written a couple of years ago.

1 The universal way of expressing the ratio of drug to water is in parts per million (ppm). This terminology ensures that we can administer drugs at the correct dose rate, regardless of pond size.

1 ppm means: 1 part of substance (A) in (or added to) 1,000,000 parts of substance (B). The parts must be in the same units on each side of the equation, e.g. gals, litres, grams, etc.

2 In order to make use of this method of dispensing drugs accurately, it is necessary

to know, again accurately, the total volume of our pond and filter system.

The easiest way to find this is by the use of a water meter when initially filling the pond. Volume estimation is not as easy to do once the pond is filled, even assuming that it is a rectangular or regular shaped set-up. The most difficult to calculate is the ornamental pond of irregular shape and, probably, of varying depth. Whatever the circumstances, do take your time to ensure accuracy (please don't forget the interconnecting pipework) because a 10% error will mean a 10% overdose of drug which, in the worst case, could kill the fish.

While, in many cases, an overdose may not have any immediate affect, there may well be, say, gill damage which will affect the lifespan of a Koi and bring its life to a premature end. Most of the treatment doses as recommended in books and magazines have been tried and tested over many years, so it would therefore be unwise to go to the other extreme, which is to under-dose. Apart from doing little good to the Koi, it is a waste of hard-earned money!

3 Having found the exact volume of the pond, we should ensure that, for our purposes, it is quoted in litres. If not, the conversion factor from gallons is 4.54, i.e. there are 4.54 litres in 1 Imperial gallon. So, to calculate the volume in litres of a 6,600-gallon pond, multiply 6,600 by 4.54 = 29,964 litres.

Let us say that the dose rate for formalin is 15 ppm. Then, from the above, we can say that 15 ppm is 15 litres ... to ... 1,000,000 litres. By simple proportion, therefore, $29,964 \times 15 = 1,000,000 = 4495$ litres (450ml rounded up) = the amount of formalin required for use in a 6,600 gallon (29,964 litre) pond system at a rate of 15 ppm.

4 If we wish to work with powdered drugs (e.g. malachite green often comes in this form), it is a simple task to convert. As 1ml of water = 1 gram, it can be seen from the above, that a simple formula can be derived which will make our lives a little easier:

$$\text{Qty of drug (ml or grams)} = \frac{\text{Volume of Pond (litres)} \times \text{dose rate (ppm)}}{1,000}$$



Anaesthetising a Koi in readiness for treatment of ulcerations which resulted as a consequence of rising spring water temperatures.



A microscope is a very useful tool to have at hand.



Heating will help even out spring swings in temperature.

5 I hope that these calculations need never be made, but just in case, I would suggest that you write this formula, together with the measured pond gallonage, on a piece of card and keep it handy in, say, your medicine chest, so that it is to hand should that unfortunate need ever arise.

As I said at the beginning of this article, spring is a difficult time for our Koi. It can also prove equally stressful for Koi keepers! However, if we take sensible precautions, there is no reason why we and our fish can't survive this critical period in a sound state of body and mind. Then, we can both look forward to a successful, trouble-free and enjoyable season. **MAP**

KAROBAR KOI *Everything for the Koi Keeper*

PHOENIX 2000 KOI FOOD

1kg.....£6.95 10kg.....£34.95
5kg.....£21.95 20kg.....£59.65

Please state size of pellet when ordering
4-5mm/6mm/8mm/Jumbo
Mini and baby size - PO4

UV STERILISERS

50 watt.....£85.00
15 watt.....£59.95
8 watt.....£55.95

BRUSHES - 16" x 8" £2.95 each
Minimum order, carriage paid (12)

Salt £5.50 per 25kgs, carriage
extra

G4 Black £54.95 (5kgs)
G4 Clear £40.95 (5kgs)



1995 SPRING SPECIAL OFFERS

BIOHOME

Economy: 1lt £6.95 - 3lts £20.00 - 5lts £27.95
10lts £49.95 - 20lts £96.95

BIOHOME PLUS

1lt £10.95 - 3lts £32.00 - 5lts £48.95
10lts £96.95 - 1 litre = 800 grammes

STOCKISTS OF PURITY ON TAP FILTERS

Bottom drains, slide valves, filters etc,
Filter media, Canterbury Spa, Lytag

VERY COMPETITIVE PRICES ON
HIKARI FOODS

EXPORT ORDERS WELCOME

ALL PRODUCTS CARRIAGE PAID UNLESS OTHERWISE STATED

PAY US A VISIT - YOU WILL NOT BE DISAPPOINTED

NEW SHIPMENT OF KOI ARRIVING END OF MARCH
62 Bucknalls Drive, Bricket Wood, St Albans, Herts (please ring for directions)
Telephone: 01923 677734 Fax: 01923 681807

OPENING HOURS: Winter - 1st November to end of February 4 days.

Thurs, Fri, Sat, Sun 10.00 am - 4.30 pm



Summer - 1st March to end October 6 days, 9.30 am - 6.00 pm. Closed all day Wednesday



Black Knight FILTER BRUSHES



- At least 95% of goods are despatched within 24 hours of receipt of order
- Carriage is paid by us
- All sizes ex stock

Additional statutory rights of consumers in the UK guaranteed

BLACK KNIGHT brushes are made with non-toxic polypropylene and non-ferrous 304 stainless steel wire. All filter brushes have a loop at one end for hanging (length of loop not included in dimensions)

We have been the actual manufacturers since 1951 and BLACK KNIGHT are the accepted market leaders. Our automated production methods allow us to offer top quality at low, low prices. BLACK KNIGHTS are used by fish farms, hatcheries, aquariums, hospitals, national water authorities and many thousands of fishkeepers, both in Britain and overseas.

Please send two first class stamps for a copy of "THE AMAZING BLACK KNIGHT FILTER BRUSHES" - this booklet explains how you can make fine filters at low cost (this book is also sent free with all orders)

Ask for the name of your nearest BLACK KNIGHT stockist (between high priced imitations) or post your order to us today with payment (cheque or postal order) or you can use your credit/debit card and order by telephone.

VISITORS BY ARRANGEMENT ONLY PLEASE

AN UNCONDITIONAL GUARANTEE

If you do not agree that the brushes you purchase from us are the best value in the U.K. or you do not agree that they are the most efficient filters in the U.K. then return the brushes to us (used or unused) within 21 days from their receipt and we will refund the full purchase price and your return postage. This guarantee is in addition to your statutory rights.



| SIZE | WIRE | PRICE |
|------------------|----------|---------------|
| Length | Diameter | Including VAT |
| Filter brushes: | | |
| 9" | 4" | L £1.50 |
| 12" | 4" | L £1.75 |
| 16" | 4" | M £2.10 |
| 20" | 4" | M £2.50 |
| NEW 24" | 4" | M £2.90 |
| 30" | 4" | L £3.60 |
| 39" | 4" | L £4.10 |
| 102" | 4" | L £8.50 |
| NEW 12" | 6" | H £2.80 |
| 16" | 6" | H £3.20 |
| 20" | 6" | H £3.70 |
| NEW 24" | 6" | H £4.00 |
| NEW 28" | 6" | H £4.35 |
| NEW 32" | 6" | H £4.70 |
| NEW 36" | 6" | H £5.00 |
| Spawning brushes | | |
| 102" | 5 1/2" | L £9.50 |

(L = light M = medium H = heavy)
Please add packing charge of £2.00 if total is under £25.00
IF YOUR BRUSHES ARE NOT DELIVERED WITHIN 4 WORKING DAYS PLEASE TELEPHONE US

To: The Speedy Brush Company (A),
Mount Pleasant Farm,
Bishing Road,
Chart Sutton,
Maidstone,
Kent, ME17 3SP
Fax: (01622) 743307

(01622) 747299

9.00 - 1.00

2.00 - 5.00

Monday - Friday

approaching spring



As Alan Rogers explains, spring conditioning of Koi cannot be considered in isolation. It must form part of a year-round programme which, ideally, should be set in motion during the previous summer.

By Len Quinn, the author

Like many other experienced keepers, Len Quinn hand feeds his Koi with brown bread during spring. This, allied to the clarity of his water, allows him to inspect his fish for signs of trouble.

Spring is probably the most important period of the whole year for Koi. In reality, it is a follow-on from winter, so when I decided on the subject **Approaching Spring**, I felt it necessary to bring both seasons together for the greater benefit of this feature. This also reflects the fact that life has a habit of travelling in full circles and not in sharply marked fits and starts.

Pre-spring temperatures

The over-wintering of Koi is, essentially, a matter of dealing with unfavourable low temperatures over a prolonged period. The condition in which our Koi arrive into spring is dependent on how meticulous we were in our preparations during the previous winter. For most of the duration of winter and, sometimes, the early spring months, Koi go into a state of semi-hibernation, the degree of which is directly related to the surrounding water temperature. It is therefore important that healthy strong Koi, displaying no visible symptoms of disease, well nourished with adequate energy reserves, are prepared for such an ordeal. Naturally, these torpid conditions associated with semi-hibernation will continue until the long-awaited arrival of warmer pond temperatures.

I have a friend who is an avid ornithologist, and part of his studies is to record migrational behaviour patterns for all birds. One important aspect of his research is to log prevailing weather conditions and ambient temperatures on a weekly basis. After a methodical study, I found these records were meticulously accurate and very informative. Together, we were able to summarise a ten-year span from his log

books relating to the southern counties of England and showing that the prolonged period of unfavourable temperatures for our Koi can vary between 12 to 22 weeks, according to the severity of those winters.

Temperatures falling below 48°F (8.8°C) will create stress in a healthy Koi and, as they decline dramatically, the degree of stress and subsequent threat to life progressively increase. Weak and sick fish will experience great difficulty surviving such harsh conditions, especially with average readings hovering around 40°F (4.4°C) for a three- or four-month period, let alone the stern extremities of water close to freezing.

In reality, for Koi to flourish, grow and live healthy natural lives, they need to enjoy eight months of the year revelling between 65°F (18°C) and 75°F (24°C). Don't misunderstand me, Koi will survive ranges between 50°F (10°C) and 60°F (15.5°C), but at such low temperatures they can never be expected to develop their full potential. Optimum growth and development would be expected between 75° (24°C) and 82°F (28°C); such temperatures are unlikely to be achieved and sustained in the UK without the assistance of reliable pond heating.

Ravenous feeding

The preparation for the spring revival should, in fact, have started during the end of last summer while the Koi were enjoying warmer temperatures and had good healthy appetites. I have frequently witnessed 'seasoned' Koi exhibiting an uncanny instinct corresponding to the time when summer is inevitably drawing to a close, by displaying a ravenous search for an endless supply of food, with insatiable appetites.

In this race against time, they have developed this remarkable awareness in seizing every opportunity to fortify themselves with adequate food and nutrients, for the sole purpose of storing essential energy resources for another winter siege. The process which controls digestion and absorption of any food source virtually ceases to function around 44°F (6.6°C) and, indeed, at such temperatures feeding must be ceased altogether.

Frequently, newly imported Koi are a little reticent in taking part in these ravenous feeding rituals. Such slow response is indicative of their inability to relate to seasonal and environmental changes which have taken place. Japanese Koi, especially adult and mature specimens, will unquestionably need some time in the UK to be able to adapt to a number of physiological conditions, aided by a general settling in period with minimal tensions.

These critical periods of distress experienced by recently imported Koi relate to hours of daylight, shorter summers, which will limit time for growth (storage), prolonged — and therefore significantly colder — winters, an indifference of water quality and, finally, being confronted with an unaccustomed source of food.

Young characteristics

Younger Koi have the ability to adjust to many changes much more easily than older



Spring is a critical time for Koi. Close inspection is a must.

time to be digested completely by the processing enzymes before temperatures plummet yet again. Undigested food must not be permitted to decay inside the gut, because of the possibility of causing rancid actions or harmful pathogen activity within the digestive system. If unfriendly temperatures and frequent variations continue, this induced stress will eventually result in considerable loss of defenceless Koi.

Dormant problems

Beginners to the hobby often encounter a number of unexplainable 'spring deaths', for which bacterial and pathogenic ailments, triggered by stress, are accountable. These problems, however, are often the result of events that took place during the previous autumn.

Autumn brings with it the lowering of temperatures and the reduction of daylight hours. Subsequently, Koi respond with a number of physiological and biological changes, such as a reduction in their rate of metabolism, the chemical processes which affect stages of growth, energy production, storage of energy reserves and the removal of waste materials. These are intricate processes reflecting nature's ability to adapt to seasonal changes.

These metabolic changes also greatly affect the complex nervous system, oxygen demands, muscle reactions, blood circulation and functional response of most internal organs. Furthermore, the effect of low temperatures is seriously detrimental to a Koi's ability to control its immunity resistance; consequently, such Koi are placed at greater risk of infection and disease, especially during the early spring danger period.

Artificial heat

Fortunately, the elements associated with most diseases are equally restrained in the less favourable, low temperatures of autumn and winter. Based on this conclusion, many Koi keepers, while being suitably equipped to heat their pond, still recommend their Koi are annually subjected to a 'cold rest period'.

In theory, one has to consider the advantages of enforcing a term of stressful cold endurance for the eradication of suspected parasites. Some may call this preventive medicine, while others, having tried both methods, seriously challenge the logic behind such theory.

To heat or not to heat, that is the question. This is a controversial subject, which has been contested for a number of years now.

Those Koi keepers fortunate enough to have heating installed, are able to cope with unpredictable fluctuations, heated ponds having the capability of controlling these temperature variations and, thus, also possessing the added advantage of minimising stress.

The ability to reduce or control stress at any level is an enormous asset. In my opinion, employing heat at lower temperatures to protect Koi, rather than utilising it (as some hobbyists advocate) solely to improve development during summer through the extended maintenance of optimum growth periods,



TOP — Autumn harvesting of Koi in Japan. What happens in the weeks that follow will determine just how successfully or otherwise these fish will tackle the dangers of the following spring.

ABOVE — Newly harvested Japanese Koi awaiting sale.

is particularly useful. Naturally, if expense is no problem, then, ideally, use heating both for cold weather protection and for beneficial summer growth.

By utilising heating facilities to prevent temperature swings, we are able to eliminate one of the major differences between the UK climate and that of Japan, effectively controlling climatic conditions at the 'touch of a button'. Although costly to run initially, the very thought of a valuable Koi being 'zapped' as late spring frosts appear and night temperatures fall, must surely be a serious consideration, as the true costs of the exercise.

Shallow ponds offer neither benefit nor protection in spells of adverse weather. The smaller the volume of water, the more rapidly thermal variations take place. Whereas this loss is recognised in winter, the consequences of a rapid increase on an extremely hot summer's day is often not fully perceived when, after sunset, the water is subjected to a rapid temperature decrease. A summer variation of 10° to 15°F (5.5-8°C) overnight is commonplace within shallow ponds and such circumstances will create a high degree of distress, which will not be tolerated for long by most

Koi before health and general conditions are affected.

Koi keepers not equipped with heating facilities can often find economical alternatives to consider. Simply conserving thermal loss with any form of pond covering during spells of ice, snow, frost and bitterly cold winds (be that during autumn, winter or spring), will always offer valuable protection to the Koi. Continual stress will eventually resign a Koi to further weakness, but by providing this cover protection, we can reduce the degree of stress in our fish, permitting them a far healthier prelude to face a new spring.

Spring tips

As milder weather approaches, Koi will respond once again with bouts of increased activity, continually foraging for fresh nourishment. It is at this time when experience plays a vital role. While Koi activity continues, check on your local area weather forecasts and make daily observations of pond temperatures.

Observe the activities of all your fish, watching for any loners that refuse to shoal



PURITY ON TAP



The UK's leading aquatic purification manufacturer -
1,000's of our systems now in daily use.

Wickfield Farmhouse, Newbury, Berkshire RG16 7AL
TEL: 01488 648319 - HELPLINE OPEN 7 DAYS

The latest technology specifically designed for aquaculture,
independently evaluated, at the very best prices and
backed by 25 years of filtration experience.

FOR KOI-KEEPERS

The "KP", "MM" and "Hflux" and the new "Hi-Mer" systems from £109.50
now with "short travel" carbons for unrivalled performance.

FOR MARINE-KEEPERS AND TO "SOFTEN" WATER SAFELY.

9 purpose-built Reverse Osmosis systems UK
designed, manufactured and supported
- from £130.50 -

FOR MARINES - TO KEEP VITAL MINERALS PRESENT - WITH NO WASTE!

The "Marines" from £110.00
Nitrogen from £50.00

FOR DISCUS, TROPICALS, WITH "METALS" REMOVAL IN ALL WATER.

The great "CBR" series from £85.00
and for supreme purification the
"Metalax" range from £121.00. -
5 years in development

DRINKING WATER AND COMMERCIAL SYSTEMS Industrial purification/ro,
"whole house" and "under-sink" systems from stock or made to order.
MEASUREMENT AND ELECTRICAL Kent all plastic water meters from
£54.00, Hanna pH and TDS meters from £36.00.
SPARES AND PURIFIER PARTS The most comprehensive range of parts
and replacement cartridges to fit most types of purifier.



FENLAND FISHERIES

THE FISH FARM
MEADOW DROVE
EARITH, HUNTINGDON
CAMBS PE17 3QF

KOI

OUR KOI STOCKS ARE NOW PERSONALLY SELECTED
ON OUR TRIPS TO ISRAEL WHERE WE VISIT EACH OF
THE KIBUTZ IN THE MAG-NOY CO-OPERATIVE
NEW STOCKS 3"-26" IN FOR EASTER

ORNAMENTALS

WE ALSO HAVE A WIDE RANGE OF OTHER POND
FISH AVAILABLE - COMETS, SHUBUNKINS, ORFE,
GHOST KOI, Etc

FILTRATION

COMPLETE RANGE OF FILTERS FOR PONDS FROM
500 - 4,000 GALLONS. DIY FILTER MATERIALS,
FLOCOR, FOAM, BRUSHES, MATTING, WOOL, Etc

ACCESSORIES

PUMPS - AQUADEX, AMPHIBIOUS, PRIMA, LINERS,
MEDICATION, FOOD

**YOU WILL FIND US 300 YARDS PAST THE
INDUSTRIAL ESTATE**

**OPEN 7 DAYS A WEEK 9.00AM - 5.30 PM
TEL: 01487 841 858**

The sound of summer ...



...is a water garden from Wildwoods.



Relax to the soothing sight and sound
of a water garden. At Wildwoods you
will discover one of the country's
finest aquatic displays, featuring
everything you could possibly need to
create your very own water garden.

**PONDS • PLANTS • FISH • FOUNTAINS
LINERS • PUMPS • LIGHTING • AQUARIUMS**

**Open 7 days a week including Bank Holidays
Late opening Friday until 7pm April-September**

Send for our
Catalogue and
Price List



Specialists in
Pump & Fountain
Displays

Wildwoods

WILDWOODS WATER GARDENS, THEOBALDS PARK ROAD,
CREWS HILL, ENFIELD, MIDDX EN2 9BP TEL: 0181-366 0243
(South of M25 between junctions 24 & 25)



Koi being prepared for export from Japan. Those that arrive in the UK will have to face very different conditions if they are bought soon after arrival and are introduced into unheated outside ponds.

with the rest. These are by far your greatest guides to seasonal stability, and before long the right time for feeding becomes very obvious. These Koi will have survived weeks of deprived feeding, and if in doubt, another week could be considered cautionary tactics. Remarkably, acclimatised Koi have the durability to survive between four to five months without food.

There are two principal times for feeding each year, the autumn (which we discussed at the beginning of this article) and, most importantly, springtime. Protein is essential to boost low energy reserves, so an easily digestible wheatgerm food in pellet form is the easiest spring solution. Avoid difficult-to-digest vegetable matter while temperatures remain close to the seasonal average.

This can be offered later in the year, once the water warms up.

Other alternatives could be boiled wheat (barley) which will sink and may be appreciated by those fish still a little sluggish from winter recovery. I add a touch of salt during the boiling process, and thoroughly drain off the liquid while allowing to cool before being given. Small pieces of brown bread can also be offered without any problems.

Only token amounts of food should be offered at first, increasing steadily as temperatures dictate and fish demand gradually increases. As the season and activity progress, Koi should be fed a quality staple diet, supplemented with known favourite tit-bits, lettuce, Chinese leaf and boiled

rice; try boiled diced potatoes occasionally.

By late spring and early summer, signs of spawning by active and healthy Koi may be recognised and, by then, food can probably be offered several times each day in small amounts. Offer only amounts of food which the Koi can consume in a period of 15 to 20 minutes, administered several times a day by the time summer arrives.

Health watch

Keep a close watch for any raised scales, ulcers and the symptoms of parasite infections. Once Koi are moving freely during early spring, catch and closely inspect for damage and treat accordingly. The cold water symptom of Fish Pox may be prevalent at this time, but need not cause undue concern. (See also, **Lance Jepson's** and **Barry Goodwin's** articles in this Supplement).

With spring activity going almost full swing, beware of blossoms falling into the pond from nearby trees or shrubs. This is the time when pond maintenance and daily observance should be at its most proficient, as ammonia, nitrite and nitrate levels are all inclined to rise.

Filtration will need to be in a pristine order to manage the extra activity taking place. A good practice at this time of year is to give the filtration system a boost of biological bacteria with one of the proprietary cultures available on the market. This will assist faster colonisation of aerobic bacteria within the filter media, which, due to winter conditions and reduced nitrification demands, will have diminished. (See **David Twigg's** article for further spring tips.)

There can be no substitute for experience, for, as we learn from the principal requirements of winter, we also learn from the necessities of spring, summer and autumn. Each season of the year is very different for the Koi to contend with. I remember writing once, that Koi were bred for aesthetic looks and not durability. Given the right surroundings, motivation and meticulous attention to detail, they seem to come through pretty well against over-

POND PRIDE

JUST FIX it

simple to use

SEALS LEAKS
IN PONDS



EVEN SEALS
LEAKING PONDS
UNDERWATER!

Available from all good Garden Centres,
Pet & Aquatic Shops.

King British, Bradford, BD5 9ET.



SPICE PITTS FARM,
CHURCH ROAD,
NOAK HILL,
ROMFORD, ESSEX RM4 1LD
Tel: (01708) 341376

H. TISBURY & SONS

THE SPECIALIST FOR QUALITY POND AND FANCY GOLDFISH

Family business established over 40 years

Over 10,000 ornamental pond fish always in stock along with lilies, marginals and oxygenating plants, pools, pumps, filters, cascades, liners, and all other pond equipment

**Summer hours: Open 7 days a week
10 am - 5 pm**

SAE for all enquiries

CASCADE WATER GARDENS

JAPANESE KOI

ALL OUR FISH WILL BE PERSONALLY
SELECTED ON OUR TRIP TO JAPAN
RETURNING MID-APRIL. DON'T MISS IT!!!

ISRAELI KOI

****JUST ARRIVED****
THE BEST FISH WE'VE EVER PICKED
EARLY VIEWING RECOMMENDED

KOI BITZ

FILTRATION SYSTEMS - UV's - VORTEX -
PUMPS HIBLOWS - DRAINS - PIPE - FITTINGS
- MEDIA - LINERS - FIBREGLOSSING
CONSTRUCTION - TREATMENTS - FOOD

YOU WON'T BE DISAPPOINTED

VORTEX-CHAMBER SYSTEM - NEW FOAM CARTRIDGE NOW IN

NEWBANK GARDEN CENTRE, BURY ROAD
RADCLIFFE, MANCHESTER. JUNCTION 17, M62

0161-725-8142



Open 7 days
a week

WORLD OF KOI

SPECIALIST SERVICES TO KOI KEEPERS

POND PLANTS NOW IN STOCK (Marginals, Lilies, Oxy's etc)

NEW KOI
NOW IN
STOCK

POND DESIGN
AND
CONSTRUCTION
SERVICE

KOI POND
CONSTRUCTION
VIDEO ONLY
£9.95

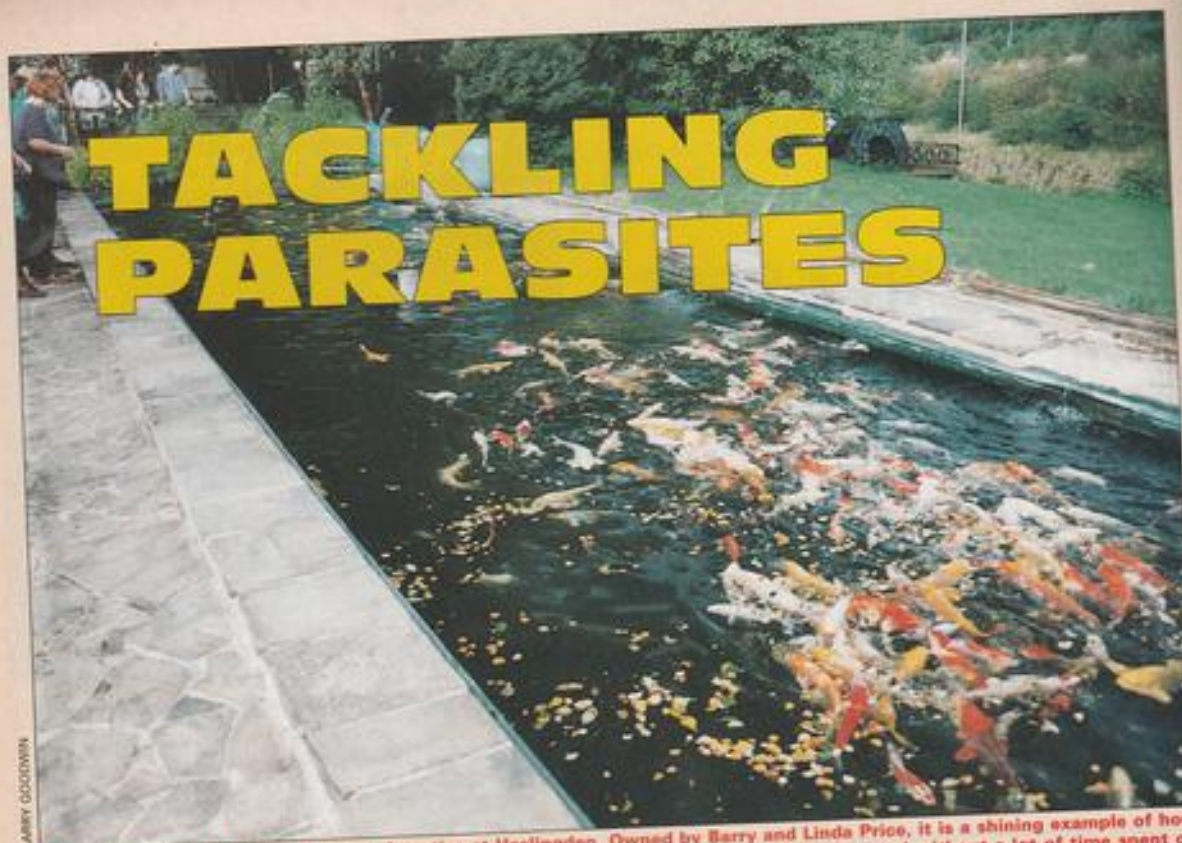
TMC UV's
8 WATT £49.95
15 WATT £59.95



BENCEWELL FARM, OAKLEY ROAD, BROMLEY, KENT
Tel: 0181 462 9479. Fax: 0181 462 7883
only 6 miles from junction 4 of the M25, near Bromley Common



**EVERYTHING FOR THE KOI ENTHUSIAST IN OUR HEATED
LANDSCAPED SHOWROOM**



BARRY GOODWIN

This highly stocked pool is at Valley Aquatics at Haslingden. Owned by Barry and Linda Price, it is a shining example of how to keep water in pristine condition. You will not, as a hobbyist, be able to stock at this level without a lot of time spent on maintaining the water and, thus, preventing the onset of parasite problems.

Barry Goodwin selects the most common Koi parasites to check for as we prepare our fish for the coming season

Illustrations by the author

Parasites are a fact of life for Koi and Koi keepers. They are a problem that we must constantly be on our guard against. We must learn to recognise the symptoms displayed by affected fish, both in behavioural patterns and in their visual appearance. This applies to the visual appearance of affected Koi, and to the visual appearance of the various parasites when examined under a microscope.

Springtime vigilance

There are certain times of the year during which you should be especially vigilant: spring and autumn, with perhaps springtime being the more important of the two.

Why is it that springtime is so critical in this respect? To explain this simply is not too easy without a good knowledge of the life cycles and breeding patterns of the parasites concerned. So I will try to explain these, together with the methods employed to deal with individual parasites once we are able to identify them.

Koi will, even in the best managed systems, carry a certain population of parasites which are controlled by the individual

defence system of the fish. This system will provide a defence mechanism and enable the Koi to deal with any physiological damage sustained from parasites by promoting good healing and preventing infection. It would therefore seem important that this defence system should be kept at peak efficiency to combat problems during the time of the year when the Koi, because we keep them in an unnatural environment, are most vulnerable.

The immune system of a fish does not always function at peak efficiency, however, as many factors can be responsible for lowering it. Two of these are:

(i) During the winter, at temperatures of below 50°F (10°C), the immune system begins to shut down, as does the metabolic rate of the Koi, thus preparing it for winter when it will adopt a form of 'hibernation'.

(ii) During periods of stress, such as caused by poor water quality, or temperature fluctuation, the immune system will also be lowered in its effectiveness.

In the wild, a carp is certainly subjected to (i), but as it will be in an almost infinite amount of water, when compared to a Koi in a pond, the temperature will lower itself

steadily and the carp will progress from autumn to winter in a controlled manner. Likewise in spring, as the temperature rises, the wild carp will progress steadily to higher temperatures.

For our Koi it is a different story because, as they are in such relatively small amounts of water, the temperature of this will fluctuate more rapidly, following every rise and fall of the ambient temperature. One day, for instance, the Koi can be at 55°F (13°C) and the next day it can be back at 48°F (9°C) or lower... and this can even happen many times during March, April, May and June!

This causes stress during springtime which, in turn, encourages the parasites to multiply at a time when the immune system of the Koi is largely ineffective, largely due to the artificial environment that we Koi keepers must provide.

Water quality also plays its role at this time of year, as many keepers are tempted to overfeed, causing ammonia problems, nitrite problems, or both, for a filter just waking up from winter, thus creating more stress and yet another reason for the immune system to be lowered when, really, the Koi could do with it being functional.

These, then, are the main reasons we must keep a careful watch during springtime and carry out the necessary prophylactic (preventive) medication of our pond

ALL CLEAR WATER PURIFIERS

Commended by top fish keeping magazines for "honestly correlated results" and for producing purifiers "specifically designed for fish".

AllClear invite aquarists and koi-keepers to see their whole lifetime UK test results. Come and see them at shows and talks.

Tapwater varies from zone to zone & from Land's End to John O'Groats. Find out about AllClear's flexibility!

AllClear — the purifier that claims less — and does more!

Contact Ann Telford for technical advice, sales & suppliers

Telephone: 01277 214911 24 hr Fax line: 01277 201740

All Clear Water Purifiers
59, Hartwood Road, Brentwood, Essex CM14 5AG

HOW KANG KOI

Exclusively Japanese Koi

High Quality always in stock from 5" to 26" imported and selected by ourselves

Food, filters, media, pumps, medications, water quality products

Opening hours from 4th April
Tuesday to Saturday 10am - 6pm
Sunday & Bank Holidays 10am - 1pm
Closed Mondays only

**81 New Road East, Copnor,
Portsmouth**

**Tel: 01705 663812
Fax 01705 672429**

TO WISH ALL THEIR CUSTOMERS A HAPPY EASTER

AVENUE FISHERIES

ARE OFFERING, UPON PRODUCTION OF THIS ADVERT, 20% OFF ALL ITEMS PURCHASED DURING THE MONTH OF APRIL. IN ADDITION TO THIS, OVER THE EASTER BANK HOLIDAY, FREE RAFFLE TICKETS WILL BE AVAILABLE WITH THE PRIZE BEING A £250 VOUCHER REDEEMABLE AGAINST FISH OF THE WINNERS CHOICE

AVENUE FISHERIES

— **01480 215408** —

46 ROOKERY ROAD, WYBOSTON

BEDFORDSHIRE MK44 3AX

FISH IN QUARANTINE NOT INCLUDED IN OFFER

NISHIKIGOI INTERNATIONAL

EXTRA SPECIAL OFFER TO KOI KEEPERS

IF YOU LIKE THE KOI FEATURES IN THIS ISSUE OF ASP YOU WILL JUST LOVE EUROPE'S TOP KOI ONLY MAGAZINE — NISHIKIGOI INTERNATIONAL

NI is published 4 times a year and the latest 64 page information packed winter issue 1994/95 issue of NI has just been published and contains some of the very best Koi information and photographs. All issues of NI are good but our winter issue is just a bit special so if you have been thinking about trying NI for some time — now's your chance!

SPECIAL OFFER No 1
= **3 Magazines for just £12.50**

THE LATEST ISSUE WINTER 1994/95, SPRING 1995 AND WE WILL THROW IN ONE TOP 1994 BACK ISSUE ALL FOR A SPECIAL UK PRICE OF JUST £12.50

(EUROPE = £17.50 REST OF WORLD = £22.50)

SPECIAL OFFER No 2
= **7 Magazines for just £32.50**

ALL THREE MAGAZINES INCLUDED IN OFFER NO 1 — PLUS ALL 4 1995/96 SUBSCRIPTION ISSUES THROUGH TO SPRING 1996 ALL FOR A SPECIAL UK PRICE OF £32.50

(EUROPE = £37.50 REST OF WORLD = £42.50)

WHEN YOU HAVE DECIDED WHICH OFFER YOU PREFER SIMPLY TICK YOUR CHOICE AND COMPLETE THE COUPON BELOW AND MAIL OR FAX IT BACK TO US OR IF YOU PREFER SIMPLY CALL THE HOTLINE NUMBER AND WE WILL PROCESS YOUR CREDIT CARD ORDER OVER THE PHONE.

Your Surname Initials Mr/Mrs/Ms

Address

..... Post Code

Payment Details: Total Enclosed = £

Cheque/Access/Visa Credit Card Number

Expiry Date Full Name on Card

When you have completed your form send it with your payment to:

NISHIKIGOI INTERNATIONAL

7 Canterbury Avenue, Lowton, Warrington, Cheshire, UK, WA3 2HA

Telephone: 01942 726864 Fax: 01942 723914

The success with which we can carry this treatment out depends on many things: the size of our filter, the age of our filter, filter maintenance, stocking levels, pond maintenance, temperature stability, etc.

Who is responsible?

Parasites can be introduced to a pond at other times of the year, of course, and many Koi keepers blame dealers for this, but are such accusations fair? Can dealers be entirely blamed in this manner, or must the Koi keeper carry his or her share of the responsibility for the onward transmission of these dangerous infestations?

The complex nature of the whole problem is somewhat hard to understand, but at the root of all infestations is usually some sort of trigger factor which can cause fish to weaken and become susceptible. Certain parasites can then multiply out of control, causing damage to body and gills which become prone to the secondary problems of bacteria and fungus.

At any time of the year, movement from the dealer's vats, a possible large change in pH, a rise or fall in water temperature and the level of stock in the Koi keeper's pond, all cause stress, affecting immune responsiveness, and can influence new additions.

A good dealer will realise that it is counter-productive to sell infected Koi, but despite stringent precautions it is unrealistic to expect any dealer to sell totally parasite-free fish as most (all) fish, as explained earlier, do naturally carry low levels of different parasites. As long as nothing happens to trigger an infestation, they will live quite happily with the natural load.

The greater stocking level you maintain, or the smaller the surroundings are that you keep your Koi in, the greater is the need for the preventive use of anti-parasitic remedies.

Infection routes

There are some generalisations that can be made with regard to the way parasite infections are usually contracted. For instance, parasites can be encouraged by:

(a) New fish

If you have recently introduced fish, then, possibly, you brought in a pathogenic (disease-causing) organism with the new stock.

(b) Transport

The movement of the Koi may be the cause, as the dealer from whom the Koi was purchased may not have the problem with the rest of his or her stock.

(c) Temperature

If your Koi was not properly packed for transit, i.e. in a polystyrene box for insulation, it could suffer temperature fluctuation, in particular temperature drop. This reinforces what I have always said — that you should quarantine your own stocks, even if this has already been done by the dealer.

(d) Water quality

The parasite could also have been dormant in your own pond and, perhaps, a drop in the standard of water quality due



Paula Reynolds, aquatic consultant, at work during one of her weekend Koi clinics. If a consultant is available near to you, this will prove to be a great help in diagnosing parasitic problems.

to the introduction of the newcomers, or the resultant weakening of the individual from any or all of the above, has signalled to the parasites that now is the time to multiply, while resistance is low.

You can now see from these points that there are a whole range of factors that will influence the outcome of parasitic infestation with new pond introductions. It could also be that the keeper does not regularly check his or her pond for ammonia and nitrite and could have significant levels of one or both, in which case, new introductions of small fish could rapidly succumb, both from stress and environmental pollution.

Test kits

You must learn how to interpret the results of your test kits, as the instructions for use with some may bear more relevance to aquariums where conditions required are vastly different to those within a Koi pond. Make sure that your kits are 'pond kits' if possible as, although the actual



chemicals are the same, the instructions can vary considerably.

Not enough emphasis is placed upon the effects of pH on ammonia and nitrite, yet this can vastly affect their toxicity on your fish. Ammonia is more dangerous at higher pH levels as nitrite is at lower levels. The only level of either of these pollutants you should accept is zero, apart from when you are maturing a new filter. Anything else and you will have lasting problems in controlling parasites and promoting good health for your Koi.

Pond treatments

With an established pond at maximum stocking level, you can also look at what you need to do during the year to keep parasites at bay.

There was a time when it was recommended that a pond should be treated with anti-parasites once a month, but it is now realised that this can be counter-productive in respect of stress levels and water quality, so the question now is if it really is necessary to treat at all. The answer to that must be 'yes' and the current recommen-



A shelf full of pond remedies. Make sure that when you buy your medicines, you get the correct advice on how and when to use them. These are on display at an aquatic consultancy. Where better to go for advice?



Beautiful Koi at a show. You must beware, though, for if the show is a 'Japanese'-style event, you could run into parasite trouble on your return home. Make sure that you know what precautions you should take if you enter such an event.

datation is that you do it once in the spring and once in the autumn.

Treating in the spring when the temperature is consistently above 50°F (10°C) will break the cycle of reproduction of many parasites before they reach uncontrollable proportions. Likewise in the autumn, treating the pond before the temperature is consistently below 50°F (10°C) will reduce any parasites that the fish may be carrying into winter. It is much easier to do it this way than to try to eradicate a major outbreak which has occurred because you failed to appreciate the possibilities.

What to treat with is, for some Koi keepers, a stumbling block. Malachite and formalin are used by many as a general anti-parasite, but there are other treatments now available that are combined with bactericide. These are very good options and have proved very effective controlling agents.

COMMON PARASITES

Now we can take a closer look at the more common parasites you may come across. I hope that will help you in identification for treatment purposes.

1 White Spot

The White Spot parasite (*Ichthyophthirius multifiliis*) is very quickly fatal to Koi and can be transmitted from pond to pond on plants and equipment that is not sterilised. An attack is usually triggered by temperature drop or stress

WHITE SPOT (*Ichthyophthirius multifiliis*)



and can be noted with the fish displaying extreme irritation and developing a heavy mucus coat which, in severe cases, appears to stream from the body.

Although referred to as White Spot, these tiny parasites can seldom be seen on a Koi, as they tend to disappear into the mucus layer, but they are sometimes evident on fins, where the mucus is not so thick. It can also affect the gills very badly.

The life cycle can take between four and forty days to complete, depending upon the temperature of the water; the higher the temperature, the quicker the cycle. The White Spot cyst develops and releases 'tomites' into the water which need to find a host within three days.

White Spot is a problem that can easily develop after moving a fish from one place to another, or in a new pond with an immature filter, where it can prove very difficult to treat against.

Treatment (generally) is quite straightforward, as malachite and formalin should eradicate the free-swimmers. Formalin should be used at 20ml to 220 gallons (1,000 litres) of water. The White Spot cure from King British is also a good remedy.

2 Skin Flukes

Gyrodactylus is carried by many fish in low levels and normally causes no problems.

Many sources of advice hold that it only replicates at higher temperatures, but experience has shown evidence of large quantities on many fish in colder water. It is, however, not the outright killer that it is held to be by many, but it causes many secondary problems that are killers. Fungus and bacterial infections

SKIN FLUKE (*Gyrodactylus*)



can easily set in at the sites of wounds made by Skin Flukes.

They reproduce on run-down fish, e.g. as many specimens can be in early spring, and in poor and overcrowded conditions, but can easily be controlled by formalin and malachite.

3 Gill Flukes

These parasites (*Dactylogyrus*) come into the country quite regularly and can cause major problems if introduced into your pond. At higher water temperatures, they will multiply and spread rapidly.

The adults lay eggs in the gill filaments which hatch into a free-swimming larval stage. This is the point when Gill Flukes are most liable to transfer between fish. The larval stages mature to juveniles and then to adults and then the cycle is repeated.

GILL FLUKE (*Dactylogyrus*)



At above 60°F (15.5°C) they usually pose a problem and at the height of reproduction (68°F — 20°C), they kill rapidly. You should be vigilant at the higher temperatures, as a Koi that has clamped gill covers, or is breathing heavily, could signal a problem.

Investigation should be limited to taking a swab under anaesthetic from the inside of the opercular (gill) covers, or from the area of the body to the rear of the opercular cover. Juveniles and larval stages should be located in this manner.

If you are not proficient, then do not attempt to take swabs from under the gill cover. Get a more experienced hobbyist or vet to do it for you.

At lower temperatures — such as those experienced in spring — salt, potassium permanganate and Sterazin are effective at killing these parasites. The latter two will not work at higher temperatures, however, but Chloramine 'T' can be effective here.

Organophosphores (Masoten) have been used in the past with success against the Gill Fluke, but this is now unavailable. Be warned that 'Dipterex' is an organophosphore and while some dealers may promote its use, it is not recommended by the manufacturer (Bayer) as a fish remedy.

4 Leeches

Leeches can be introduced to your pond on plants, so the peak danger period lies ahead in the weeks to come as the plant buying season begins to get under way. Therefore, it pays to buy plants from a reputable source.

Leeches tend to attach themselves to the fish at night and drop off during the day

FREE ROBERTS KOI



**SOLE SUPPLIER OF
KOI AND ULTRA-
VIOLET STERILIZERS
TO THE
KYOTO GARDEN,
HOLLAND PARK**

**GRAND
AUCTION
May 8th**
Viewing 1.00 pm
Sale 2.00 pm

AN INDOOR SALES AREA
WITH A SUPERB SELECTION
OF KOI

UV's
LINERS
PUMPS
MEDICATIONS
TEST KITS

MARGINALS AND WATER PLANTS

TRADE AND RETAIL SALES

OPENING TIMES

Thurs/Friday 2.00 pm — 6.00 pm
Sat/Sun/Bank Holidays 10.00 am — 6.00 pm

Mrs J D Squire, Free Roberts, Great Sampford,
Saffron Walden, Essex, CB10 2NY
Tel: (01799) 586 332

T & T Aquarium

- Tropical and cold water fish •
- Accessories •

Rockells Farm, Duddenhoe End, Nr Saffron Walden, Essex CB11 4UY
Telephone/Fax 01763 837001

WE STOCK A FULL RANGE OF TROPICAL FISH AND A GOOD SELECTION
OF FANCY GOLDFISH, AQUARIUM POTTED PLANTS & ACCESSORIES,
AQUARIUM STARTER KITS AT GREAT PRICES
OUR POND SECTION WILL BE OPEN AS FROM 1st APRIL STOCKING ALL
POND FISH FROM GOLDFISH, TENCH, ORFE, TO ISRAELI KOI, POND
FILTERS, ALSO PRE-PACKED POND LINERS.
POND PLANTS WILL BE IN THROUGH APRIL PLEASE RING FOR MORE DETAILS

OPENING HOURS:

MON, WED, THURS, FRI, SAT 10.00AM - 5.00PM
SUN 11.00AM - 5.00PM

Closed Tuesday



FASTMAKE LTD T/A
FIBRETECH
(East Anglia)

The Workshop, Common Road
Throckenholt, Spalding
Lincs PE12 0RA
Tel: Wisbech (01945) 700880

**TRADE ONLY ADVERTISEMENT
UNBEATABLE PRICES FOR**

**FIBREGLASS WATERCOURSES,
FISH PONDS, STOCK TANKS,
KOI HOLDING TANKS**
9 x 3 x 3, 7 x 3 x 2

TELEPHONE FOR BROCHURE

CATERHAM KOI

HAS EXTENDED ITS PREMISES FOR 1995
TO OFFER A MUCH WIDER SELECTION OF
JAPANESE AND ISRAELI KOI

**PRE-FORMED KOI PONDS and QUARANTINE
TANKS DELIVERED TO YOUR DOOR
ANYWHERE IN ENGLAND**

All pumps and UV's currently at 20% below RRP
10% off ultraviolet replacement tubes

Vortex, 3 types of bottom drains, Buryl, Firestone Aquacare,
PVC, box-weld service.

Box filters with UV's neatly concealed in their lids. Attractive
Terracotta Pot style filters. Filters customised to specific needs.

Fish Foods, Books, Test Kits, Gift Vouchers, Medications, Heron
Scarers, Water Thermometers, G4, Venturis, Pipelng, Filter
Media, pond plants etc and FREE ADVICE.

Summer Opening Hours from 1st April 1995
Mondays 10.00 to 17.00 Sundays 10.00 to 16.00
Tuesdays 14.00 to 17.00. Wed-Sat 10.00 to 17.00
Bank Holidays 10.00 to 16.00

Knights Garden Centre, Bletchingley Road (A25)
Godstone, Surrey RH9 8NB
Telephone 01883 741804

We are 1.4 miles from junction 6 of the M25 and
6 miles from Redhill

K O I

The **LARGEST SELECTION** in Surrey
AT

PANTILES AQUATICS
Specialists for the Fish-Keeper

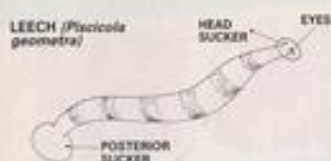
- Vast range of fish including Koi up to 30" long
- Large selection of tropical fish including some more unusual species
- Good selection of fancy goldfish including large show grade specimens
- Large range of preformed ponds and liners
- Large range of aquatic plants
- Large selection waterfalls and streams
- Range of self-contained water features
- Fountain ornaments * Bridges
- Oriental poolside features in granite and bamboo
- Full range of pumps, filters and accessories
- Water Garden lighting
- Full or part construction service
 - Aquariums and all related equipment
 - Sound advice
- First class after sales service
- Open 7 days a week at



**PANTILES
GARDEN CENTRE**
ALMERS ROAD,
LYNE, CHERTSEY, SURREY



01932 874919



and may therefore be missed. The small circular wounds that are left, very quickly become infected, and are hard to miss.

Leeches are extremely difficult to eradicate and the reason for this is their breeding cycle. The adults lay eggs in cocoons and, while they are so encapsulated, they are impervious to all chemicals that could be employed to destroy them.

The cocoon survives for up to three months and this must be taken into account when treating. The cycle could take six months to break, so you need to monitor very carefully.

A mix of salt and Sterazin, or a good proprietary brand of anti-parasite specified for leeches can be used here. Continue the treatment for another three months with your chosen brand of chemical at the recommended dose and this will eradicate hatchlings as they emerge. The salt and Sterazin treatment is very effective as the salt increases the power of the Sterazin quite considerably.

If you had a leech problem in your pool last season, now may be a good time to discard all plants from your pond and replace them with fresh ones. Inspect these very carefully for cocoons under the leaves, and treat with potassium permanganate before putting them in the pond.

5 Anchor worm

Lernaea should not be a problem for the hobbyist, as it should be picked up by the dealer before sale and eradicated. Anchor Worm can generally be destroyed with commercial parasite treatment which will take care of the lower stages of the life cycle. The specimens evident on the fish will all be females which go on to develop egg sacs; they should therefore be removed

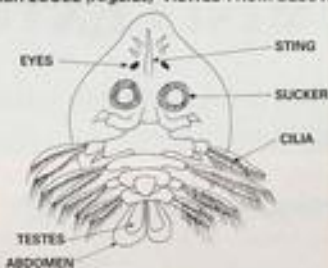
before these sacs mature. It is very easy to miss Anchor Worm, especially on the underside of the fish, as once out of water, they tend to merge into the mucus layer.

You must remove the females with tweezers while the fish is under anaesthetic. Be careful you remove the 'anchors' as well; the technique is to pull steadily, don't snatch at them. Dab the wounds with bactericide to lessen the chance of infection.

6 Fish Lice

Argulus can come in with infected fish and are large enough to see with the naked eye if you know what you are looking for. It is hard to believe that a vigilant Koi keeper would buy fish that were so infected, but it does happen. Treatment is straightforward using commercial remedies.

FISH LOUSE (*Argulus*) VIEWED FROM BELOW



7 Costia (Ichthyobodo)

Costia is a killer of fish. It should be eradicated through normal dealer-applied anti-parasite treatments before the fish are put on sale.

If you obtain fish — either from a dealer or a fellow Koi keeper — that are infected with *Costia*, this should tell you that the person concerned has failed to carry out quarantine properly.

Symptoms of this infestation include 'dull' areas on the skin. Fish may lose their appetite and will swim with clamped fins. Scraping and haemorrhages of the skin may also result.

Costia (Ichthyobodo)

FLAGELLA



8 Chilodonella

Again, *Chilodonella* often comes in with infected fish and should be the responsibility of the person supplying the fish to clear it up before sale.

Chilodonella is a very serious parasite, but is one that is easily eradicated with commercial remedies. Its symptoms include excessive mucus production, clamped fins and respiratory distress.

Chilodonella



9 Trichodina

This, yet again, tends to come in with infected fish which appear to have a white film over parts of their body.

Trichodina can multiply by normal reproductive means, as well as cell division. Under the latter circumstances, it will multiply so quickly that you will have difficulty in controlling it. It is probably the biggest 'problem' parasite there is. Overstocked ponds, ammonia and nitrite contamination, and generally poor environments, are all conducive to its survival.

Despite its seriousness, it would respond to all the normal anti-parasite remedies.

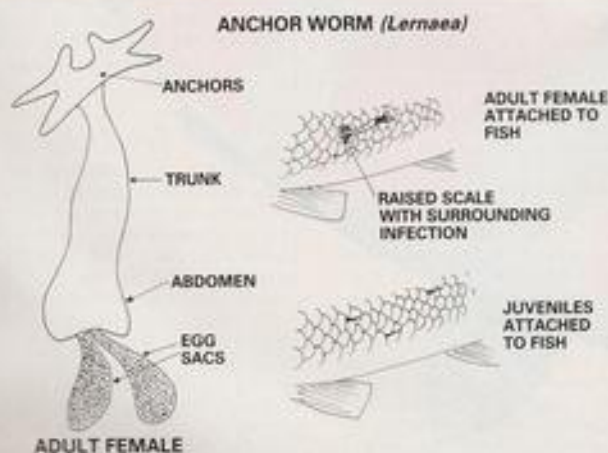
Above all your best remedy is your own power of observation, and the effort that you put into maintaining a pond of good quality water. Just remember — you don't get 'owt for nowt' in Koi keeping.

Spring is now with us, so putting in an energetic effort to set things up for the coming season, should ensure that the months that lie ahead are full of enjoyment, rather than despair.

Trichodina
THIS PARASITE HAS AN
UNMISTAKABLE SMALL
'CATERPILLAR WHEEL'
APPEARANCE



CILIA
THESE ARE QUITE
MOTILE AND SPIN
THE PARASITE



JAPANESE KOI Co. Ltd

**THE NEW AQUATIC SUPERSTORE
TAKING FISHKEEPING INTO
THE 21st CENTURY!**

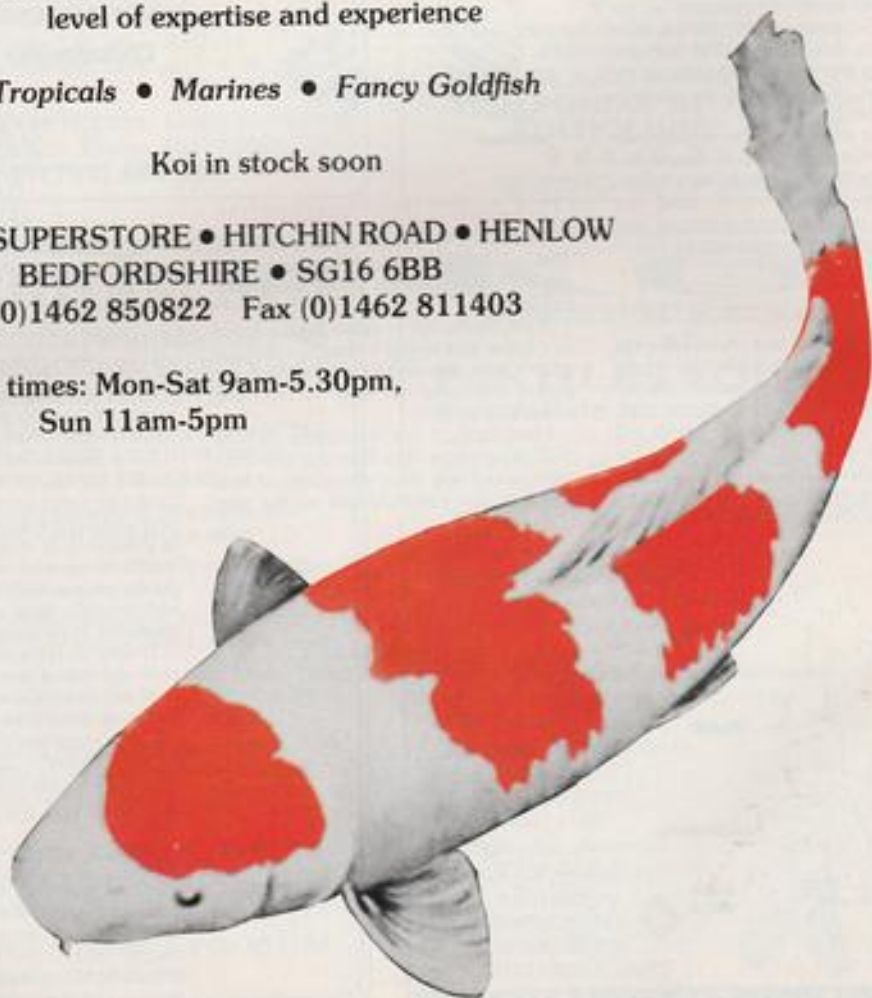
On our 2¼ site, we have something of interest, whatever your
level of expertise and experience

Tropicals • Marines • Fancy Goldfish

Koi in stock soon

AQUATIC SUPERSTORE • HITCHIN ROAD • HENLOW
BEDFORDSHIRE • SG16 6BB
Tel (0)1462 850822 Fax (0)1462 811403

Opening times: Mon-Sat 9am-5.30pm,
Sun 11am-5pm



THE MICRO-KILLERS



Vet Lance Jepson identifies the causes of some of the main viral and bacterial infections that affect Koi in spring and offers valuable tips on how to prevent and treat them.

Illustrations by the author

Bacterial diseases in Koi can be a source of minor headaches, in the form of those small ulcerations that just will not clear up, or major heartaches, such as the loss of an entire collection. The watery medium in which Koi live is a potentially hostile environment. The water and the substances either suspended or dissolved in it provide an ideal breeding ground for a vast array of disease-carrying organisms, some of which will attempt to invade the fish if given an opportunity.

The Koi's defence against such an onslaught is its skin, which when intact, provides a fairly impenetrable barrier against bacterial invasion, and its immune system.

The immune system

In order to explain how disease can result, it may be helpful to review some aspects of the immune system. The immune system consists of two parts:

- ① Numerous individual cells which actively seek out and destroy bacteria. One such important group of cells are termed **macrophages**.
- ② **Antibodies**. These stick to foreign bodies, such as bacteria, and by doing this, they allow the body defences to recognise an invader. They can also trigger off the destruction of the bacterium to which they are attached by

interacting with other blood components.

Unfortunately for the fish, the immune system can be affected by internal and external influences:

① Stress

When a Koi is unable to adapt completely to its environment, it will be stressed. Obvious stressors include poor water quality, bad handling techniques and inappropriate nutrition. The Koi's body responds to these by releasing 'stress hormones' which have an unfortunate side effect of depressing the immune system.

② Temperature

Koi are 'ectotherms'; their body temperature closely follows that of the surrounding water, so many of their physiological processes depend upon the water temperature. One such process is antibody production.

At temperatures of 18-25°C (64-77°F) antibody production is at its best, with antibodies appearing in the blood roughly 7-11 days after infection. There is also a very good memory response, whereby if a Koi has been exposed to a particular bacterium and produced antibodies to it, when it is then presented with a second challenge of the same bacterium, there is a quicker response (4 days), plus higher levels of antibody. This would be typical of the situation in late spring, summer and early autumn.

If carp are infected at a time of high temperature, and it then drops to around 10-12°C (50-54°F) within 7 days, antibodies will be produced but at a much slower rate. At temperatures below 10-12°C, there is no memory response. This situation mimics what we find in autumn or early spring, when warmer periods alternate with colder snaps.

Carp which experience a bacterial challenge at low temperatures will not produce

Classic symptoms of septicaemia as exhibited by Goldfish and Koi.

antibodies, so long as they are kept at these temperatures. Subsequently raising the water temperature will trigger an antibody production, but it will take longer and antibody levels will be lower. This would be the situation in Koi exposed to infection during the winter and early spring.

If carp are exposed to a very small bacterial challenge at low temperatures, some of them can become **immuno-tolerant**. This means that they will fail to recognise this particular bacterium as an enemy and will not mount any sort of immune response even if the water warms up to the optimum of 18-25°C.

Taken a step further, this could mean that these fish can become carriers of a particular bacterium and will act as a continuous source of infection to the other Koi without showing any signs of disease itself.

③ Endotoxin

This is released by certain bacteria, and it can completely suppress the activity of the blood-producing tissues throughout the body, as well as the activity of the white blood cells.

1 BACTERIAL DISEASES

We have already alluded to some of the factors which can lead to the development of a bacterial disease. These include:

① Presence of the bacteria

The usual bacteria isolated are environmental contaminants, such as *Aeromonas* species or *Pseudomonas*. Others occasionally found include *Citrobacter* and *Edwardsiella*. Other important bacterial diseases are the *Mycobacteria* (Fish TB) and the *Cytophaga*-like bacteria (which includes *Flexibacter* and *Cytophaga*).

② Presence of synergistic bacteria

In most cases of ulcer disease in Koi, it is usually *Aeromonas hydrophila* that is isolated. However, it is thought that this is a secondary invader, and that it is a different species, *A. salmonicida*, that is able to form an initial lesion, which *A. hydrophila* subsequently invades and swamps out the slower-growing *A. salmonicida*.

③ Poor nutrition

Inadequate amounts of food, or poor quality food can severely affect the ability of a Koi to fend off infection. Stores of the fat-soluble vitamins, such as vitamin A, can become depleted during the winter months, while extra vitamin C may be useful if the fish is ill.

④ Poor water quality

Detectable levels of ammonia and nitrite, high long-term nitrate concentrations, or inappropriate pH and water hardness will eventually result in sufficient

stress to cause an immuno-suppression.

② Parasites

The Fish Louse (*Argulus*), Gill Flukes (*Dactylogyrus*), Skin Flukes (*Gyrodactylus*) and the protozoan *Epiplatys* have all been associated with initiating bacterial infections. The route of entry of such infections is via the traumatised skin due to the presence of the parasite. Heavy parasite burdens in general will debilitate the fish and make them more susceptible to bacterial infections. (See also Barry Goodwin's article).

③ Infected individuals

There are three types of such high-risk fish: clinically affected fish, asymptomatic carriers (ie fish showing no symptoms) and the corpses of dead fish. All three types will contaminate their immediate environment, and in the case of cadavers, their being eaten by healthy fish provides an easy avenue for infection.

④ Trauma

As a result of bad handling practice, or vigorous spawning efforts, heron attacks and so on.

Diagnosis

A definitive diagnosis of a bacterial infection depends upon laboratory culture, using sterile swabs with the samples taken in a sterile manner. Such laboratory culture also allows one to test the sensitivity of the isolated bacteria against various antibiotics. This provides invaluable information needed for the successful treatment of bacterial disease. It will add a significant amount to your vet's fees, but if it is not done, then treatment will be more guesswork than science. You get what you pay for.

Fortunately, there are some symptoms that the Koi keeper can pick up on, which will start to give an indication that a bacterial disease is at work. In general, bacterial diseases present as one of three categories: **peracute** (sudden), **acute** (fast onset) and **chronic** (long-term).

① Peracute

This, unfortunately, usually presents as a sudden death with no obvious external signs. Swabs taken during a post-mortem examination will grow large numbers of pathogenic (disease-causing) organisms. One should rule out water quality problems and poisoning.

② Acute

Affected fish show classical septicæmic signs, with blood streaking and blotches (haemorrhages), especially on the skin and fins. Other symptoms are behavioural, with the diseased fish losing their appetite, becoming sluggish, with fins clamped.

Individuals separate from the main group and will be found at the pond edges. Many of these effects are as a result of endotoxins released from the bacteria. Younger fish succumb first, and in a serious outbreak, most of those affected may die. It is important to rule out parasitic infections as another possible cause of skin and fin haemorrhages. Another, although still very rare possibility, is Spring

Viræmia of Carp (see later).

③ Chronic

Ulcerations are probably the commonest presentation of a relatively longstanding bacterial infection. These can vary from being small punctate ulcerations, to extensive erosions of the body wall. These ulcers are not only a serious gap in the body's defences, but the fish can also suffer from the loss of salts and the dilution of the body fluids, as it is no longer able to control its fluid and salt balance accurately.

Other presentations can be long-term muscle wastage, especially with the mycobacterial infections. Bacterial Gill Disease is another chronic manifestation involving bacteria, although the bacteria are only part of the problem and gain a hold on the gills only after poor water quality has damaged these delicate tissues.

Treatment

Treatment should consist of two courses of action. The first is to provide an optimum environment for the fish to recover in. This involves checking on and, if necessary, correcting any predisposing factors (see above).

The second is to tackle the disease infection itself. Where possible, raise the water temperature to 20-25°C (68-77°F) to stimulate maximum antibody production. Maintaining the Koi in a 0.55% sodium chloride solution (built up over three days by adding roughly 1 tablespoon per gallon per day of sea salt or pond salt — not table salt) helps to balance the osmotic difference between the fish and its surrounding medium. This helps to prevent the loss of body salts and the influx of water.

Choices

The management of ulcers does, to some extent, depend upon their size. Small ulcers may be just left, their healing depending more upon antibiotic medication and enhancing the Koi's innate healing capacity. Larger ulcers require some attention, possibly with the need to anaesthetise the fish first.

The ulcer is cleaned up using a proprietary iodine compound, such as **Tamodine (Vetark)**. Not only does the iodine kill off most of the bacteria present at the ulcer, but the physical cleaning removes any dead or devitalised tissues.

It may be beneficial to coat the cleaned ulcer with **Orabase (Squibb)** which will act as an osmotic barrier, and may also prevent the entry of opportunistic fungi.

A covering of Orabase will help seal in the treatment.



Expect the Orabase to swell up and drop off within a short while, but hopefully a thin layer will remain to act as a barrier.

As the ulcer heals, skin cells migrate in from the circumference of the ulcer and underneath the layer of Orabase if used. Once this re-epithelialisation is complete, the ulcer then fills up from below. Therefore, repetitive cleaning of ulcers can actually slow down the healing process, as one will be continually removing the inwardly migrating skin cells.

Choice of antibiotics is down to your veterinary surgeon. Culture and antibiotic sensitivity testing is very important to help choose the right antibiotic. That, unfortunately, is not the end of the story, as new legislation effective since January 1995 could end up restricting the variety of antibiotics that a veterinary surgeon is able to prescribe.

Administration

Having selected the right antibiotic, our next problem is how to get it into your Koi. Most Koi, barring very small specimens, can be injected. I prefer to inject immediately in front of the dorsal fin between the 'fillets'. Some people inject into the muscle at the base of the pectoral fins — fine in large Koi, but a problem in smaller fish.

Injections into the tail and flank muscles are not to be recommended on two counts. First, the arrangement of the muscle blocks means that the drugs tend to be squeezed out of the injection site as the fish swims off, and second, a significant amount of the blood drained from the tail and flanks by the veins passes through the kidneys first, before being diluted in the general circulation. Because some antibiotics can damage the kidney tissues at high concentrations, I do not recommend this route.

Antibiotic-impregnated foods are available on veterinary prescription. These foods are presented either as a flake or as sinking pellets and are ideal for feeding to contact fish which may be at risk, but useless if the affected fish are showing

Large, but treatable, ulcer in the gill cover of a Koi.



Cleaning the ulcer with an iodine-impregnated swab.

SWALLOW AQUATICS

AQUALIFE & WATER GARDEN CENTRE



POND PUMPS

| | Rec Ret | Our Price |
|-----------------|---------|-----------|
| LITTLE GEM | £25.99 | £20.95 |
| LITTLE DIAMOND | £35.99 | £29.99 |
| DIAMOND 140 | £52.99 | £42.99 |
| DIAMOND 220 | £60.84 | £49.99 |
| DIAMOND 300 | £74.99 | £59.99 |
| DIAMOND 400 | £82.99 | £67.99 |
| DIAMOND 650 | £109.99 | £88.99 |
| DIAMOND 850 | £132.99 | £104.99 |
| DIAMOND 1200 | £152.99 | £119.99 |
| DIAMOND 2000 | £165.00 | £124.75 |
| DIAMOND 3000 | £199.99 | £146.25 |
| AMPHIBIOUS 180 | £87.81 | £69.95 |
| AMPHIBIOUS 300 | £93.57 | £74.95 |
| AMPHIBIOUS 450 | £106.85 | £84.95 |
| AMPHIBIOUS 620 | £117.21 | £94.95 |
| AMPHIBIOUS 770 | £141.79 | £114.95 |
| AMPHIBIOUS 1400 | £185.34 | £144.95 |
| AMPHIBIOUS 1800 | £232.22 | £179.95 |
| CASCADE 100 | £33.99 | £29.95 |
| CASCADE 1000 | £60.49 | £49.95 |
| CASCADE 1500 | £76.99 | £59.95 |
| CASCADE 2000 | £91.79 | £69.95 |
| CASCADE 3000 | £126.49 | £99.95 |
| CASCADE 4000 | £149.99 | £119.95 |
| CASCADE 6000 | £170.99 | £129.95 |
| PRIMA 2 MANUAL | £147.50 | £124.95 |
| PRIMA 4 MANUAL | £167.50 | £139.95 |
| PRIMA 6 MANUAL | £217.50 | £179.95 |
| ESPA NON SUB | | £195.00 |
| CASCADE 1000LV | £70.89 | £59.95 |
| CASCADE 1500LV | £88.69 | £65.95 |
| CASCADE 2000LV | £101.25 | £79.95 |

POND HOOPER £219.00

JAPANESE KOI CARP

from 4" to 2 foot
All on special offer.
60 ponds and 40 tanks well stocked
with Coldwater fish.
E.g. Goldfish, Shubunkins, Sarasa,
Tench, Gudgeon, Minnow, Orfe and
a wide variety of Fancy Fantails.
Our Coldwater Systems hold
20,000 gallons of water.



FIRESTONE

Aquacare Rubber Liners
20 Year Guarantee
E.g. 8' x 6' £23.04

BUTYL LINERS
20 Year Guarantee
E.g. 8' x 6' £25.92

PVC
10 Year Guarantee
E.g. 8' x 6' £9.60

PHONE FOR
PRICE LIST

BIOLOGICAL FILTRATION

Effective techniques for
removing harmful substances
from your pond water
Cyprio.
PRICES FROM £29.95

**U.V. POND
STERILISERS FOR THE
SERIOUS
ENTHUSIAST**

Hozelock, Cyprio, Yamitsu, T.M.C.
Prices from £54.99
The ultimate answer to the
"Green Water Problem"

POND PLANTS

One of the largest selections of pond plants in Essex
15 varieties Waterlilies potted..... from £4.95
100 varieties Marginal potted..... from £1.95
4 varieties Deep Water Plants..... from £2.50
15 varieties Oxygenating Plants..... from £1.45

A WIDE RANGE OF LOTUS AND
GLASS ART PRE-FORMED
POOLS AND WATERCOURSES

Electrical Lighting, Medication,
Pond Pumps, Test Kits. A wide
range of fish food e.g. Dry,
Frozen and Live Food.

Chemicals and lots more.

SPECIAL OFFER

While Stocks Last
HAGEN AIRPUMP
MODEL 40
90 OUTLET CAPACITY
Ideal for Koi Ponds or
Fish House

M.R.P. £326.00
OUR PRICE £189.00

MASSIVE SELECTION OF MARINE FISH
AND INVERTEBRATES FROM AROUND THE
WORLD. NEW STOCKS ARRIVING WEEKLY
AT EXCEPTIONAL PRICES. ONE OF THE
LARGEST SELECTIONS OF TROPICAL FISH
AND PLANTS, OVER 200 STOCK
AQUARIUMS, SUITING EVERYONE'S
TASTE AND POCKET. RARE AND
UNUSUAL ALWAYS IN STOCK. AFRICAN
CICHLIDS A SPECIALTY. ALL FISH FULLY
QUARANTINED.

MAKE A DAY OUT
Bring the family, visit the New
Reptile Section at
EAST HARLING



(A129) LONDON ROAD,
RAYLEIGH, ESSEX



OPEN SEVEN DAYS A
WEEK ALL YEAR ROUND
9 am - 6 pm



(B1111) HARLING ROAD,
EAST HARLING, NORFOLK

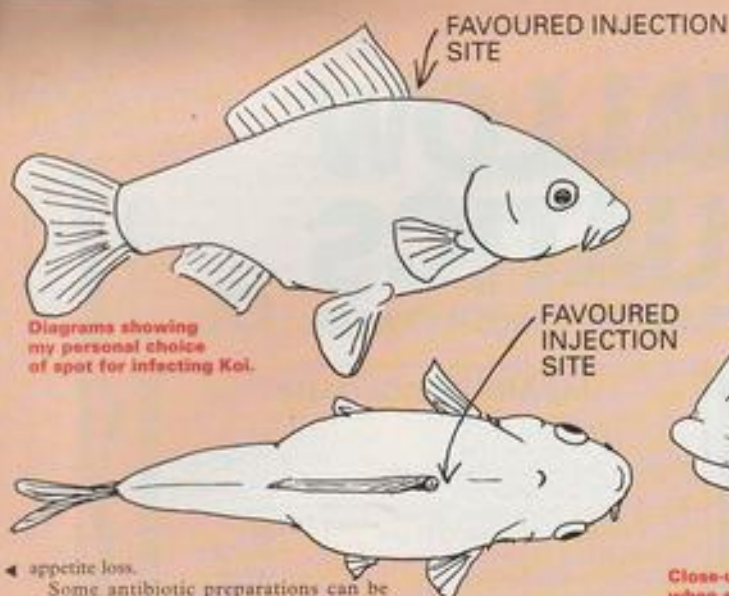
HELPLINE &
AFTER SALES
SUPPORT

LARGE
CAR PARK
FOR OVER
200 CARS

01268 781265 **01953 718184**

(4 lines)

(6 lines)



◀ appetite loss.

Some antibiotic preparations can be made up into baths for small Koi or those not feeding.

The risk of bacterial disease can be minimised by the following:

① **Good husbandry practices**

Pay particular attention to water quality and watch out for any problems that could be placed upon the list of predisposing factors.

② **In-feed immuno-stimulants**

These work in two ways. The **glucmannans (or glucans)** work by stimulating macrophages, so that they consume more bacteria, as well inducing an increase in bacteria-destroying enzymes. Others called **mannan oligosaccharides** actually bind to the lining of the gut, thereby preventing pathogenic bacteria from gaining a foothold there.

③ **Vaccination**

There is a vaccine available (**Aquavac Cyprinae CE by AVL**). This vaccine is specifically against *A. salmonicida* which, as outlined above, appears to be the initial culprit in the majority of *Aeromonas* outbreaks.

④ **Euthanasia**

This can be applied to two groups of fish — those which are chronically ill, with little or no chance of cure, such as those with fish TB, and those which are identified as asymptomatic carriers of infection.

2 VIRAL DISEASES

In the case of bacterial disease, I have tried to present a more practical approach to their management. With viral diseases this is very difficult, because aside from ensuring good captive conditions to minimise stress, there is little that can be done. We have no drugs to help cure infected fish, and although UV sterilisers should kill viral particles in the water, the volumes involved in a pond will mean that many will not be exposed to the UV rays.

To the Koi keeper, the most important viral diseases are **Carp Pox** and **Spring Viraemia of Carp (SVC)**. The former is usually of little consequence, while if you



Carp Pox, while being unsightly, is usually not fatal.

have SVC diagnosed, I'm afraid that a plan of action will be imposed on you by the Ministry of Agriculture, Fisheries and Food (MAFF), since SVC is a notifiable disease, so I shall content myself with giving some basic information on these diseases.

Carp pox

This is actually a herpesvirus belonging to the same family as our own *Herpes simplex* (cold sores), although there is no risk of infection. A better name is **Cyprinid Herpesvirus 1 (CHV-1)**.

This virus' family background gives us a clue to its habits. Once a fish becomes infected from viral particles in the water, or possibly due to skin damage from ectoparasites, the virus is able to hide in certain cranial and spinal nerve roots until the fish is stressed. This is when it makes an appearance.

The commonest stressor is lowered water temperature and, certainly, Carp Pox usually makes its appearance during the cold winter months. The lesions themselves are raised, waxy-like masses, particularly on the fins, as well as the skin.

The disease is not usually fatal, with the possible exception of very young fish, and the lesions usually slough and disappear as the waters warm up in late spring when the

RAISED, WAXY LESIONS TYPICAL OF CARP POX



Close-up diagram of what to look for when searching for signs of Carp Pox.

fish are less stressed and are able to mount an immune response. The condition is very likely to crop up year after year.

Spring Viraemia of Carp

This disease is not, as yet, native to the UK and, as it is notifiable (i.e. MAFF needs to be notified of an outbreak), it tends to make the news when it is diagnosed, as happened last year (1994).

It can appear in a wide variety of clinical pictures, but, classically, affected fish are bloated with fluid (**ascites**), their eyes stick out (**exophthalmia**) and the cloaca is swollen and protruding. There may be multiple haemorrhages, thereby mimicking a bacterial septicæmia and, indeed, there may be a secondary bacterial infection. The fish are lethargic, with occasional bouts of erratic, uncoordinated swimming.

Predisposing factors are low, or rapidly fluctuating, temperatures, external parasites — outbreaks may be traced back to the introduction of recently imported fish.

As I mentioned above, if you definitely have SVC, then it will have been confirmed by MAFF and I'm afraid your choices will be limited either to euthanasia of all your fish and complete sterilisation of your ponds, equipment etc, or a two-year plus ban on any movements of fish in or out of your pond. For this ban to be lifted your fish and pond must test negative for SVC for two years.

As a matter of fact, the Koi industry was nearly destroyed in 1994 by the introduction of legislation which stipulated that only Koi farms which had been tested regularly and found to be free of SVC could export to the UK — this excluding all Japanese producers! Fortunately, thanks to the concerted efforts of both OFI (UK) and Ornamental Fish International, this disaster was avoided — SVC has never been recorded in Japan.

KOI KOI KOI KOI KOI KOI KOI KOI KOI

Orange Park Aquatics

12 ACRES OF GROWING PONDS TO VIEW

Large stocks of "Grown On" Japanese and Israeli Koi as well as Ghosts, Orfe, Golden Tench, Shubis, Comets, Mirror Carp etc. Also regular imports of fish all of which are properly quarantined prior to sale.

Building or rebuilding your pond, come and see our selection of Working Ponds and Filters from 600 to 6000 gallons.

Pumps, Filters, U.V.'s, Brushes, Matting, Etaflow, Specialist Pond and Filter Equipment, Hikari and Tetra Food, Medications, etc. Liners off the roll or to order.

Directions: M18 exit Junction 3 signposted Scunthorpe West and Centre to join M180, next roundabout right to Scunthorpe Town Centre, next roundabout fourth exit to A159 signposted Gainborough. Continue approx 1/4 miles (past Asda on right) over roundabout, over motorway flyover, 1 mile later crossroads turn right to East Butterwick. Continue 1 mile Fish Farm on right.

Tel: (01724) 762115 - 763403

TAMWORTH AQUATICS

Following major refurbishments, selective Koi are now available. Ponds, pond liners, plus all fixtures and fittings.

Also stock Tropical Fish, Fancy Goldfish, Plants and all foods (frozen foods etc).

Good range of aquariums in stock, also custom made

Tel: 01827 285801.
Closed Mondays

BONEHILL MILL (On A5), Fazeley, Staffordshire

THE KOI PALACE

JAPANESE FISH & FOOD
Easter Special — Hand
picked 5-6" Tanchos
Anytime by appointment
31 BEAUMARSH ROAD
ST LEONARDS-ON-SEA
EAST SUSSEX
Tel: 01424 852244

PAUL'S

Koi & pond specialist
Cleveland Trading Estate
Darlington
Koi & coldwater fish, food,
LVC's, pumps, filters, liners,
medications etc
Tel: 01325 340084

A GUARANTEE ON MY FISH?

YOU CAN AT

AMWELL AQUATICS

We guarantee our fish for 5 DAYS! Ask
our staff for all the details
ALL YOUR POND AND AQUARIUM
REQUIREMENTS UNDER ONE ROOF
plus friendly advice. Drop in and see
us at The Van Nage Gin Co., Amwell
Hill, Great Amwell, Nr Ware, Herts
SG12 9RF. 01820 877111

BLUEBELL HILL KOI

GOOD QUALITY, HEALTHY
JAPANESE KOI
Open mainly evenings and weekends
Please telephone first before calling
146 Common Road, Chatham,
Kent. Tel: 0634 884669
We are situated 5 minutes from M2 Junction 8
3.5 minutes from M20 Junction 8

FILTERS

YOKI GARDEN CO
"ESTRELLA," MAIN ROAD
(A259), CUTMILL, CHIDHAM,
WEST SUSSEX PO18 8TP
Tel/Fax: 01243 576247
VORTEX — FILTERS/MODULAR
— B/DRAPS —
Send SAE for further details

WOOD LANE KOI

Healthy, Happy Koi
Food, medication, etc.
23 Wood Lane, Elm Park,
Hornchurch, Essex
Telephone 017084 71143
Open 6 days 10am-5pm.
Closed Mondays

MANOR FARM

NEW BARN ROAD,
SOUTHFLEET, KENT
Tel 01474 834411

PLENTY OF KOI FROM 3"
UPWARDS

PLUS A WIDE RANGE OF KOI
RELATED GOODS AND
FOODS ALWAYS IN STOCK

OPEN 10.00 am - 6.00 pm.
TUESDAY-SUNDAY

ULCERS:

for the first time ever you can vaccinate
your Koi against ulcers. It is effective for two
seasons and costs as little as £3 per fish.
For further information on Koi vaccination
and Koi medication contact:

EPPERSTONE PARK
HATCHERIES
Epperstone By-Post, Woodborough,
Nottingham NG14 6DM
Telephone 0115 964410

THE KOI SHOP

Japanese Koi — the real
thing — direct imports.
Fully quarantined.
Everything for the Koi Keeper.

OPEN 7 DAYS A WEEK

132 Ensbury Park Road
Bournemouth
Tel: (01202) 536778

WORTHING KOI

Est 1984
8 Stear Road, Worthing, Sussex
BN13 3LY

Tel: 01903 261423 Fax: 01903 693026
A good selection of healthy, quality
koi 6"-20" always available. We
specialise in 6"-10" High Grade Koi
from Japanese breeders we regularly
visit. Full design for filters and ponds
from drawings to construction.

Agents for Party-on-Tap
Distributors of Prokal
Premium Koi Food
QUALITY · INTEGRITY · SERVICE

WHARF AQUATICS

Excellent selection of quality
quarantined coldwater and
tropical fish
Pond liners 20p sq ft. 20yr guarantee.
Wide range of our own ponds.
Fibreglass & fibreglassing service
available

Tel: (01773) 861255
88, WHARF ROAD, PINXTON, NOTTS
1 Mile from J28, M1
CLOSED WEDNESDAY

PARK GARDEN KOI

Japanese, Israeli and English
Koi. Excellent range of quality
pond fish and plants plus all
accessories

Pond construction service

OPEN 7 DAYS A WEEK
0454 201118

PARK
GARDEN CENTRE

NAUTILUS AQUATICS

KOI FROM 2" TO 18" AND ALL OTHER
VARIETIES OF POND FISH, PLANTS AND
LILIES.

ALSO PONDS, PUMPS, FOUNTAINS,
WATERFALLS

All you need for the garden pool at sensible prices

OPEN 7 DAYS A WEEK

SPRING GREEN NURSERIES, PONTEFRAC T ROAD,
CROFTON, WAKEFIELD WF4 1LW
TEL: 01924 864779. FAX: 01924 865272

AQUAVITA ADVISORY SERVICES

WORKING WITH THE HOBBY, FOR THE HOBBY, IN ASSOCIATION WITH THE F.R.A.S.

AQUAVITA: for Modular Filtration

AQUAVITA: for Marina Pond Pumps

AQUAVITA: for Portable Patio Ponds

AQUAVITA: for Pipe, Fittings and Ancillaries

AQUAVITA: for Filter Medias, Water

Conditioners and Medications

Full Marketing & Aftersales Support from:

The Aquavita Centre
1 Lane End, Old Usbridge Road,
Rickmansworth WD3 2XU.

Tel: 01895 824556 Fax: 01895 823663

KOI KOI KOI KOI KOI KOI KOI KOI KOI

I LOVE MY

NISHIKOI



THE HIGH PROTEIN AT 37%
IS THE OPTIMUM LEVEL TO PROMOTE MAXIMUM
GROWTH WHILST MAINTAINING BODY SHAPE IN
YOUR KOI



VISIT YOUR LOCAL STOCKIST

WILD ABOUT PLATIES

PART TWO

Easy species



Photographs – unless otherwise indicated – by the author.

LEFT – Lake Catemaco – home of the appropriately known Catemaco Platy.

Derek Lambert introduces three species of Platy that adapt well to aquaria and will breed regularly, given a few basic considerations.

In this part of the series I am pleased to be dealing with one of my favourite livebearers, the Catemaco Platy. This species was the second of the wild Platies that I kept; and although the original population in the hobby had little in the way of colour, it still had a quiet charm all of its own. The other two species represent the old and the new. The Southern Platy was one of the very first Platies to be described by science and Ander's Platy is one of the more recent.

1 Ander's Platy

Scientific Name: *Xiphophorus andersi*
Meyer & Scharl, 1980.

Synonyms: None

This relatively new species was first described by Meyer M.K. & M. Scharl (1980) in "Eine neue *Xiphophorus*-Art aus Vera Cruz, Mexico." *Saunderbergiana Biologica* 60 (3-4): pp. 147-151. The species was named for Prof. Dr F. Anders.

The type locality was the Rio Atoyac by Finca Santa Anita, near the town of Chico in the state of Vera Cruz, Mexico. This collection was made on 24 February 1979 by E. Hnilicka. The type specimen is a 33.6mm (c1.3in) S.L. (Standard Length (ie) snout to base of caudal fin) male. So far, this species is only known from the type locality.

Males can achieve a maximum size of

2.5cm or 4cm (c1in or 1.6in) depending on size, morph, while females reach 7.5cm (3in). This is a relatively drably coloured, slender Platy whose males have a short sword. There are two size morphs in males of this species, with the large one showing a 'pseudo-gravidity' spot ('pregnancy' spot found in females) above the gonopodium, the male mating organ. The body has an overall brownish coloration, becoming dirty white in front of the gravid spot. The fins are brown, with several darker crescents in the dorsal fin of both sexes.

Aquarium care

Ander's Platy is a peaceful species which does well in most conditions. Ideally, a well planted tank with good filtration suits them; alternatively, large, regular, partial water changes should be undertaken. In the wild, this fish lives near the banks of a fast-flowing river. If the adults are well fed and the aquarium heavily planted it is possible to breed this species in a natural colony situation, in which case, males will sex out more slowly and achieve a greater adult size.



Male Ander's Platy – this is a small morph.



Black form of the Catemaco Platy (this is a male).



All the populations of Southern Platy (this female was collected in the Rio Jamapa) are distinguished by their deep bodies.

2 Southern Platy

Scientific Name: *Xiphophorus maculatus* (Gunther, 1866).

Synonyms: *Platypoecilus maculatus* Gunther, 1866. *Poecilia maculata* Regan, 1906.

The Southern Platy was first described by A. Gunther (1866) in "A catalogue of the fishes in the British Museum." London, vol 6: 368 pp. The name refers to the black spot patterns so common in this species.

The type specimens are two females, the largest of which is 32mm (c1.3in) S.L. with a spotted dorsal fin and one spot in the caudal peduncle. The other fish is 30mm (c1.2in) S.L. and has two tail spot patterns - 'One Spot' and 'Comet'. These fish were purchased by the British Museum from Cuming, who obtained them from Mr. Salle. The collection site was only given as Mexico by Mr. Salle who, it is assumed, collected the fish himself.

The Southern Platy has a very wide range in nature. It is found in the Rio Jamapa in Vera Cruz state, Mexico, along the Atlantic coastal drainages, to Belize and Guatemala. It is restricted to the lower elevations and coastal plains, where the temperatures are somewhat warmer. This species has now been introduced to many parts of the world by man.

In nature, it is concentrated in spring pools, ditches and swamps. It can rarely be found in slow-moving streams and main river channels. The substrates are normally mud and clay, with dense stands

of aquatic plants or emergents. It is rarely found where there is no plant life.

Males achieve a size of 4cm (1.6in) and females 5cm (2in). However, there are great size differences, depending upon which population the fish belongs to. All populations - irrespective of other factors - are deep-bodied and have rounded fins. There are many different colour forms in nature, with differences between various populations, as well as between individuals of the same population.

Aquarium care

The Southern Platy is the perfect community fish, being small enough for most community tanks and totally peaceful. It will tolerate a wide range of conditions, but prefers warmer temperatures than most of the Swords, with about 26°C (79°F) suiting them best.

Plenty of plants in the tank makes them feel at home and, if well fed and maintained in a species tank, they will flock breed. Broods are born on a monthly cycle and can number upwards of 40.



A beautifully coloured Southern Platy - male from the Rio Belize.

3 Catemaco Platy

Scientific name: *Xiphophorus milleri* (Rosen, 1960)

Synonyms: None

The Catemaco Platy was first described by Donn E. Rosen (1960) in "Middle-American poeciliid fishes of the genus *Xiphophorus*." Bull. Florida State Mus. Biol. Sci., vol. 5, No. 4, pp. 57-242. This species was named for Dr Robert Rush Miller, who collected it and many other new species of fish.

The type locality is a small tributary of Lake Catemaco about 2 miles South East of the town of Catemaco. The holotype* is a male 23.2mm (0.9in) S.L. and the allotype* is a female 28.5mm (1.1in) S.L. (*see Part 1 - February '95 for definitions of these, plus other technical items). Both fish were collected by R.R. Miller and M. Miller on 29 March 1957, together with 241 young to adult fish. It is only known from the lake and its surrounding feeder streams.

In general, this species is found in the shallow areas close to the banks of the lake, where there is some growing vegetation, but it is most prolific in the small shallow streams which flow into the lake, where there are considerably more growing plants and hiding places.

Different size morphs of this species exist, with males from 1.5cm up to 3.0cm (0.6-1.2in) long and females up to 4.5cm (1.8in). Despite its very limited range, this small Platy has also evolved into a number of different colour morphs. The commonest form has a brownish-green body coloration fading to white on the belly.

The male may exhibit fine black speckling, particularly towards the rear of the body. Where the lateral line meets the tail there is a single dark spot. The fins in general are clear, with the dorsal having two dusky crescents, one in the mid region of the fin and the other at the edge.

Other morphs include a black form in which the fine black speckles on the male are intensified, so that the fish is almost completely black. Females of this strain usually have several black stripes along the



This Rio Jamapa Southern Platy male exhibits a black dorsal fin and body speckling.



Tropical
FISH FOOD
King British

Fish live longer with

King British

Tropical

FLAKE



yes!

For FREE Treatment Guide for Fish Tanks or Ponds send S.A.E. to King British, Bradford BD5 9ET or Phone 01274 573551



LEFT - This large morph Catemaco male has a distinctly marked (black) gonopodium.



BELOW - A nicely speckled black morph female Catemaco Platy.

flanks. This seems to be the smallest morph, with males barely reaching 1.5cm (0.6in). The largest morph has black stripes along the body of both sexes and the male may exhibit a false gravid spot and a black gonopodium. Females of this morph, when in good condition, take on a dusky appearance over the ventral regions. Full adult size for males of this strain seems to be about double that of the black form, and even the females are larger.

will stand a certain degree of neglect. Ideally, the temperature should be approximately 23°C (73°F) but they will tolerate anywhere between 20-27°C (68-81°F), without any obvious signs of stress. In mimicry of their natural habitat, some

plant cover in the tank is appreciated, as it gives the females somewhere to hide from the over-ambitious males.

The diet should consist of small life foods such as *Daphnia* and baby brine shrimp, but they seem to survive on a diet consisting of flake food alone, if that is all that is offered. Broods are born on a monthly cycle, with up to 50 being known, but about 20 being average.

The fry grow fairly quickly and males start to sex out in only three months. These early maturing fish will remain small and carry the genes for small size and early maturation. Therefore, careful selection of your breeding stock is a must, if the size is to be maintained over the generations.

The large morph strains of this fish are more prone to eating their fry, so it is wise to isolate a gravid female to give birth. Once the fry are about one month old, they can be returned to the adult tank. The small morphs can be colony bred without any problems. **AM**

Aquarium care

This is an easy fish to maintain in the aquarium, being at home, both in a species tank or a community tank with other small peaceful fish. While good tank conditions are appreciated, this species

In the final part of this series I shall be dealing with the three most endangered species of *Xiphophorus* - The Northern Platies. These Platies are the most difficult to keep in captivity and, because of their imperilled state in the wild, must be maintained in aquaria if their long-term survival is to be guaranteed.

Airport Aquaria

HEATHROW GARDEN CENTRE
SIPSON ROAD, WEST DRAYTON
MIDDLESEX (Next to Forte Crest Hotel,
formerly Post House Hotel, M4 Junction 4.)
Telephone: 0181-897 2563
OPEN 7 DAYS A WEEK

WATERWAYS

A COMPREHENSIVE SELECTION OF
SELF-CONTAINED FOUNTAIN
AND WATER FEATURES

**THE COMPLETE
WATER GARDENING
CENTRE**



MINI FEATURE MEGA CHALLENGE

When *A & P* editor **John Dawes** decided he wanted a small water feature, little could he have guessed that it would take him nearly 2,000 miles to get one.

Photographs, unless otherwise stated, by Airport Aquaria.

All I wanted was a small water feature. In fact, I had been wanting one for years. Last July's colourful displays at the Hampton Show provided just the nudge I needed. There was now no doubt: I would finally get my wish. It's not that we don't have room for a pond. We actually have two: a semi-ornamental one and a smaller wildlife one. It's just that I've long been fascinated by small water features, so, pond or not, I wanted one.

No problem, I thought. Nip down to our nearest garden centre and take our pick from the wide range on display. Then take it home, sort the bits out, plug it in and away we'd go... all in a couple of hours.

Wrong! That's what we could have done... had we been in England at the time. But this was Spain, and – as we were to find out – a complete, small plug-in water feature is as alien to Spanish garden centres as a plate of paella is to the average eskimo. I was determined, though – especially since Vivian (my wife) had convinced me that our front patio just wouldn't be the

same without a water feature gurgling away in the background. She was right, of course (and I didn't need much convincing), but neither she nor I could have envisaged the amount of travelling, searching and hassle that it would take to find the individual components and assemble the final article.

The search

The base, consisting of a large reconstructed white stone pot (complete with drain hole) weighed half a ton – or so it seemed. It's amazing what you can get in the back of a Metro, though, with a little

squeezing and ingenuity, plus a lot of buffing and puffing, sweat and back-dislocating effort!

Anyway, the base eventually came, not from a garden centre, since garden centres as such, are relatively thin on the ground in Spain (most plant places are nurseries), but from a large ceramics roadside outlet.

One down, four bits to go. The pump was easy – we took it out from the UK on one of our trips (an Interpet Neptune 1400, complete with step-down transformer).

Then, of course, we needed a reservoir or chamber within which we could stand the pump fully immersed and with suffi-

LEFT – One of the latest designs to make a appearance: a tiered rock

BELOW – The first small features were drilled millstones. They are still deservedly popular today.



LEFT – Giving away no clues regarding its protracted history, our fountain gurgles happily away amid its bed of pebbles.



JOHN DAWES



LEFT - The finished article, in situ in the background.

he original suggestion, we finally ended up with our small (well, smallish), water feature. Looking at it, exerting its ever-soothing effects on us as we sip an ice-cold San Miguel and dip into our evening tapas, I often retrace all the various steps we had to take in getting it together. It looks so 'innocent'!

I must admit, that the whole exercise was thoroughly enjoyable and the end result gives us a great deal of pleasure, largely because of the challenge involved in converting an idea into reality. But, I would equally happily have gone for buying a complete kit 'off the shelf', driven it home and plugged it in. In fact, that is precisely what I plan to do at some stage this coming season here in England.

The challenge this time round will not be the 'chase', or the planning, or the humping around of heavy plant pots. No, it's far more daunting than that... it's trying to choose a system from among the ever-expanding range of mouthwatering designs that are in the process of establishing the UK as the 'Small Water Features Capital of the World'.

cient free space around it to allow for a decent volume of water within the feature base. The solution (Vivian's) was as simple as it's turned out to be effective: an upturned plastic washing up bowl with a hole cut out in the bottom, through which the pump stem projects.

The pebbles involved a number of collecting trips to the nearest beach, with regular cooling off periods in the Mediterranean in between the bouts of loading. It's amazing just how much hardship we have to endure in pursuit of our hobby!??

Finally, there was the all-important silicone sealant needed to plug the drain hole in the flowerpot base through which I planned to thread the pump lead.

Success at last!

Having eventually got all the bits together in one place, it was just a question of assembling everything. Instant operation was out of the question, of course, as the drain hole had to be sealed and allowed to dry first.

This was no big deal though. What, after all, is one extra day in the construction of such a long-awaited object of desire?

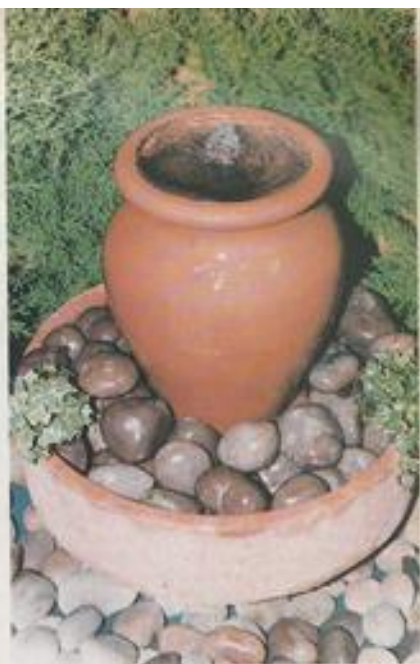
So, several months, a few gallons of sweat and nearly 2,000 miles later

Acknowledgement

During the preparation of this article, I asked Airport Aquaria if they would allow me to visit their West Drayton premises to take a number of shots of some of the systems they had on display at Hampton last year, plus some of their new ones. The aim was to give readers who are not familiar with small water features a little bit of an idea of what's available 'off the shelf'.

The day of my visit was a particularly dull and wet one, and my shots didn't quite live up to expectations. I am therefore indebted to Airport Aquaria for allowing me to borrow a selection of photographs from their Waterways brochure to illustrate this feature.

SEWARD HENRIE



ABOVE - This Ali-Baba terracotta feature which I first saw at the Hampton Show provided me with the crucial nudge to stop thinking and get doing.

LEFT - Children are invariably fascinated by this "hand pump" model. Where does all the water go?

BELOW - The range of designs is only limited by one's powers of creativity.



TRADE "TALK"

OFI (UK) TALK(cont)

New offices

OFI (UK) are due to move into their own independent offices in Trowbridge, Wiltshire, this month. In addition, the organisation is in the process of appointing an assistant for chief executive **Keith Davenport**.

Keith explained: "When OFI (UK) was established in its current format, the Pet Trade and Industry Association (PTIA) agreed to undertake our administration on a contract basis. Since a little over three years ago, when the organisation was incorporated, our membership has almost trebled, leading to an increased amount of administration."

"The arrangement with the PTIA has enabled us to become established as a strong trade association and they certainly deserve our thanks for their support during our first three years. Although we will continue to maintain close contact with Barry Huckle (PTIA secretary) and his staff on matters of common interest, we are now in a position to emphasise our independence by establishing our own office."

New address: Ornamental Fish Industry (UK), Unit 5, Narrow Wine Street, Trowbridge, Wilts BA14 8FJ.

CITES amends proposals

The tropical fish industry was faced with being brought to a halt had proposals made at a recent meeting of CITES been accepted unaltered. However, OFI (UK) chief executive Keith Davenport was among several representatives for the industry (including Ornamental Fish International's US Advisor, **Laif DeMason**) who were able to discuss this issue with key figures in the decision-making process.

Subsequently, the conference accepted new proposals from a CITES working group, which retained the aim of protecting endangered wildlife, while continuing to allow indigenous peoples to make a living from caring for and harvesting their local ecosystems.

Explained Keith: "The initial proposals were that any plant or animal life found within an area of less than 10,000 square kilometres would be included in a list of species banned from trade. While this would help to give protection to large animals, it could

also have included freshwater species, including those which are largely farmed, but specimens of which are also caught from the wild".

Numerical proposals, such as the 10,000 square kilometres, were still included in the revised proposals, but only as guidelines, with a very clear note that they were not to be regarded as thresholds. Thus, the biology of each species proposed for inclusion in the lists must be scrutinised so that endangered species may be protected, but still allowing responsible trade to continue with regard to 'plentiful' species.

Amendment

In February's Trade Talk we indicated that Keith Davenport was to present a paper at a World Health Organisation conference in June. Keith is, in fact, presenting his paper at the **Office International des Epizooties (World Organisation for Animal Health)** to be held in Paris in June. We apologise for the error.

Hozelock sales campaign

Retailers will receive a boost to sales with the launch of an extensive range of POS merchandising material by **Hozelock Aquatics** in support of the company's range of outdoor aquatic products.

Divisional marketing manager **Richard Bradley** explained that the company's Aquatics Division had already taken a significant share of the outdoor aquatics market. "The range of merchandising material provides a boost for retail sales in time for the new pond-keeping season," he added.

Available to retailers are posters and 12ft banners for indoor and outdoor use, bearing the slogan: *Hozelock for the Water Gardener*; there are also transparent display models demonstrating the company's highly successful ultra-violet pond water purifiers, as well as shelf front displays showing the



range of Hozelock Aquatics' miniature pre-formed ponds, to build consumer awareness and aid selection.

Retailers who require further information should contact: **Richard Bradley, Marketing Manager, Hozelock Aquatics, Haddenham, Aylesbury, Bucks HP17 8JD. Tel: 01844 291881; Fax: 01844 290344.**

Expansion at Brooksby

A National Diploma with options in fish farming and fishery management is being added to the range of courses at **Brooksby College, Melton Mowbray, Leicestershire.**

The college already provides a B. Tech First Diploma course, has operated a fish rearing unit for six years for training in fishery studies in the Midlands and has taught fishkeeping as part of countryside studies and animal care courses. Existing facilities at the college include holding tanks, polytunnel ponds and growing-on ponds, as well as a selection of freshwater tropical and marine fish.



In addition, an expansion programme is currently being carried out to meet the needs of the specialist fish courses now being offered. The new development will include a laboratory, warm water hatchery, coldwater tank room, aquaria room, classroom, workshop facilities and a reception area for display purposes.

For further information, contact: **Ann Hurt, Educational Support Team, or Geoff Payne, Course Manager, Brooksby College, Brooksby, Melton Mowbray, Leicestershire LE14 2LJ. Tel: 01664 434291; Fax: 01664 434572.**

Pondkeeping made simple

A full-colour guide to pond-keeping has been published by pond management specialists **Cyprio**. The guide, which also

PONDKEEPING MADE SIMPLE



forms the company's catalogue, is to be distributed throughout the trade and incorporates "an A to Z of pondkeeping and filtration" according to Cyprio's **Simon Morris**, sales and marketing director.

He added: "We believe that this catalogue is the first of its type in the marketplace and shows a range of products introduced by Cyprio as a result of extensive market research".

For information, contact: **Simon Morris, Cyprio, Hards Road, Frognall, Peterborough PE6 8RR. Tel: 01778 344502; Fax: 01778 348093.**

King British goes east

Aquatics products manufacturer **King British** will be showing its new product ranges to customers from all around the world at **Aquarama '95 (25-28 May, World Trade Centre, Singapore)** — see *Aquarama* item in *News* elsewhere in this issue of *A&P*.

The Bradford-based company told *Trade Talk* that it is rapidly gearing up for the exhibition, where it will, for the first time in the Far East, be showing its highly-successful food ranges in plastic pots and modernised water treatments.

"**Barraclough's Fish and Aquarium Supplies** (an associated company to King British), is a major importer of both tropical and coldwater fish from Singapore and Hong Kong, and King British is now one of the country's leading food and fish treatments manufacturers," remarked **Michael Sinclair**, managing director of King British.

KEEPING:

marine hawks

Svein Fosså turns his attention to a group of shy, but greedy and interesting bottom dwellers for marine aquariums.

Photographs by the author

The hawkfishes are small to medium sized, grouper-like fishes, most of which reach maximum sizes of only 6 to 15 cm (2.4 to 6 in). Thus, they are appropriate fishes for the average-sized aquarium. More importantly, they are hardy, beautiful and have interesting behaviour. Their common name is derived from their habit of perching on the outermost branches of corals and other prominences, much like a hawk looks down from a tree top.

Hawkfishes do not possess swimbladders and are therefore rather poor swimmers. It is practical, as well as natural, for them to choose an observation post in a high place in the reef, as well as in the aquarium. Normally, this will be a coral colony. From this coral look-out, they can watch over their surroundings, recognising every move of their prey.

All hawkfishes are carnivores, most of them specialising in small fishes and benthic (bottom-dwelling) crustaceans. A single species, though, the rarely seen Swallowtail Hawkfish (*Cyprinocirrhites polyaetis*), feeds strictly on planktonic crustaceans and larvae.

Greedy 'hawks'

I have kept several species of hawkfishes through the years, and they have all been highly interesting aquarium inhabitants, well worth a closer study for any marine aquarist. The only negative aspect worth mentioning is their unsurpassed greediness. Even a small specimen has the potential of swallowing amazingly large neighbours – a nasty habit, sure to put the aquarist off, no matter how amusing the little 'hawk' is in every other aspect.

Taking into account how difficult it can be to catch unwanted fishes in a fully decorated reef tank, there is, of course, every reason to be extremely careful when selecting other species for combination with hawkfishes.

I do not easily forget the instance where I had to act as an angler, using a *Mysis*-baited hook in order to get an overly voracious specimen out of a 600-litre tank (c130-gal) where it naturally shouldn't have been introduced in the first place!

The above is not included because I get some kind of thrill from telling you of my errors, but rather in order to stress the importance of being careful when selecting animals for the reef aquarium.

As for hawkfishes specifically, they will

normally not be a threat to any fish half their size or larger. Crustaceans, on the other hand, should rather be equal to the hawkfish in size, in order to avoid them being too much of a temptation for the predator. Preferably, hawkfishes and crustaceans should not be kept together at all.

Do also note that hawkfishes are territorial. The aggression towards other hawkfishes – including, but not limited to, the same species – can be troublesome. Unless the aquarium is very big (read "huge"), one will normally be better off keeping solitary individuals only.

Despite their appetite and curiosity, hawkfishes will frequently be shy and wary the first time in a new aquarium. As they get settled down, they gradually turn braver, and may even learn to accept food from the aquarist's hand. Practically every kind of food is accepted, be it frozen or live plankton, bloodworm, *Mysis* etc. Most specimens also rapidly learn to accept flakes and other dried foods.

Rearing difficulties

There have been numerous reports of different hawkfish species spawning in aquaria, but, so far, they have not been successfully raised. As with so many other marine fishes, it does seem, basically, to be a food problem. Although *Brachionus* rotifers have been successfully used as a starter food for some fish species, attempts to feed hawkfish fry on them have all failed.

There is, however, reason for some optimism in connection with various experiments on the use of other foods in marine fish breeding, that are going in several places around the world.

Hawkfishes belong to the Cirrhitidae, a family consisting of nine genera in a total of 34 species. They are all easily recognisable by a general family character: at the tip of each of their 10 dorsal spines, they have one or more short filaments (cirri).

Most of the species are found in the Indo-Pacific, but the family is also present (with one species each) in the Caribbean, in West Africa and by Ascension Island in mid-Atlantic. The Caribbean Redspotted Hawkfish (*Amblycirrhites pinnos*) and several of the Indo-Pacific ones are frequent imports for the aquarium trade.

Redspotted Hawkfish

Amblycirrhites pinnos is the only representative of the family which originates from the Caribbean, and should not be difficult to identify if you know where the fish is imported from. In addition, the numerous small orange spots over the head, upper body and dorsal fin are positive proofs of identity. This is not a frequent import, but certainly worth looking for. Fully grown, it may reach 8cm (3.2in).

Pixy Hawkfish

Cirrhitichthys oxycephala is possibly the single, most commonly seen hawkfish in the trade. Obviously, this relates to the fact that it is also one of the most widely distributed hawkfishes in the wild. It can be found from the Red Sea and eastern Africa, throughout the Indo-Pacific, to Panama on the west coast of South America, an extent of distribution which is rather uncommon in reef fishes.

The Pixy Hawkfish is not very spectacular, but still has a subtle beauty which appeals to most aquarists. Growing to a maximum of some 9cm (3.5in), it is among the medium-sized hawkfishes and not too difficult to find companions for. Bear in mind, though, that it was exactly this species which I had to angle for in my tank!

Flame Hawkfish

Nesocirrhites armatus has a very appropriate name, indeed. The solid, tomato-red colour of this fish makes it among the most spectacular of all, and a true favourite of many aquarists. It reaches us mainly through exporters in Hawaii, but it does not occur in Hawaiian reefs. Most specimens are captured in Samoa, while the distribution covers much of the western and central Pacific, from southern Japan and the Great Barrier Reef to the Tuamotu Islands. Typically, it inhabits

PHOTOGRAPHS from top to bottom – Redspotted Hawkfish, the only Caribbean species.

Close-up of a Pixy Hawkfish, showing the cirri at the tip of the dorsal spines – a characteristic which is unique to this family.

A Flame Hawkfish resting between the branches of an *Acropora pulchra* in my aquarium.

On the reef, the Longnose Hawkfish shows preference for gorgonians and black corals. In the aquarium it is less picky, and here a specimen has occupied a colony of *Acropora* sp.

The Arc-eye Hawkfish is typified by the distinctive U-shaped area behind the eye. The Freckled Hawkfish grows to a size of 22cm (8.7in) and must be considered too large for most reef aquaria.



coral heads of *Pocillopora terracosa* and related species, in very shallow waters. Only rarely it will be found below 10 metres (33ft).

The Flame Hawkfish is very closely attached to its host coral. Frequently, it will remain with the one and same coral colony all of its life. At the slightest hint of danger, it will retreat to the innermost recesses of the coral. If you first observe a specimen in the reef, and then come back some months later, chances are you still will find the same specimen on the very same spot. Still, it does readily adapt to other corals, soft as well as stony ones, in the aquarium.



Longnose Hawkfish

Oxyurhites typus can hardly be confused with any other fish. The up to 10cm (4in) long fish has a most peculiar shape, highly atypical for the family. In the last few years, this species appears to have become more numerous in the trade, but it is still not among the most frequently imported hawkfishes.

It has practically the same area of distribution as the Pixy Hawkfish, but it is relatively rare in nature. Typically, it lives in large gorgonians and black corals (*Anthipatharia*) on the steep outer reef slopes. But it is definitely not picky, and will easily accept, for instance, a *Sarcophyton* soft coral as its home in the aquarium.



Arc-eye Hawkfish

Paracirrhites arcatus shows some variation in colour, including melanistic (black) forms. Yet, all specimens have the distinctive U-shaped area behind the eye. This mark is normally slightly darker than the rest of the head, and enclosed by a tri-coloured border of bright orange, dark brownish red and light blue.

This species occurs in lagoons, or, more typically, on seaward reefs, from the intertidal zone to approximately 35 metres (115ft) depth. It is widespread in the Indo-Pacific, from East Africa to Hawaii and the Tuamotu Islands. The Arc-eye Hawkfish attains some 14cm (5.5in) in total length.



Freckled Hawkfish

Paracirrhites forsteri, a close relative of the Arc-eye Hawkfish, grows much larger than all the other species mentioned above. With a maximum size of 22cm (8.7in), it must be considered too large for most reef tanks. It is not uncommon in the trade, and could be worth considering for large fish-only aquaria.

The Freckled Hawkfish is found in, basically, the same kind of habitats as the former species. Its distribution, though, is larger, including the Red Sea as well.



DYNAMITE ORGANICS REMOVAL WITHOUT CARBON FROM KENT

Revolutionary new Expert Series Organics Adsorption ResinSM removes organics in freshwater or marine aquariums, and is regenerable, over and over again! This product is unequalled by any old or new competitive product. In fact no other resin product even comes close in efficiency. EOA resin is snow white in colour, changing dramatically in colour to a light or dark brown. As with any resin, it works more efficiently in freshwater. Several large stores have converted their freshwater systems to EOA and have thrown their carbon away! Regeneration requires only table salt. EOA is probably the most expensive resin on the market, but considering what it does, it is much more economical than carbon in the long run. And, because of its characteristics, it cannot remove valuable trace minerals that carbon and most synthetic filtration media always do. EOA is the only product, that we are aware of, that does an excellent job of removing the dark stain added to freshwater aquariums by 'African' drift wood. EOA is safe for freshwater (including discus), African cichlids and marine systems (including reefs). Part numbers are EOA 8 for 8 lit. - EOA 16, EOA 32, and EOA 128 for a 1 gallon bucket.

**Sole UK Distributor: Advanced Aquarium Products,
19 Grandale Way, Cliftonville, Margate, Kent CT9 3YH
Tel: 01843 299785**

AVAILABLE FROM ALL GOOD AQUATIC RETAILERS



EAST HAM AQUATICS



- ★ Marines ★ Tropicals ★
- ★ Cold Water ★ Koi
- ★ Aquariums ★ All Accessories
- ★ Ponds ★ Plants
- ★ Pumps ★ Liners

GOOD VALUE, GOOD SERVICE

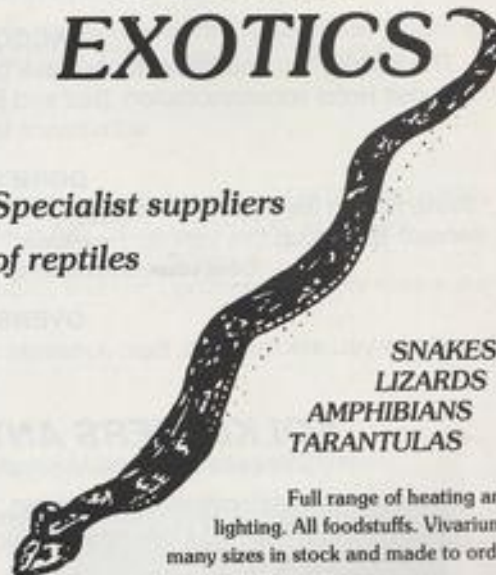


146 HIGH ST SOUTH, EAST HAM, E6
Telephone: 0181-470 3600



PENN EXOTICS

Specialist suppliers
of reptiles



SNAKES
LIZARDS
AMPHIBIANS
TARANTULAS

Full range of heating and
lighting. All foodstuffs. Vivariums
many sizes in stock and made to order

(01902) 331892

TRADE AND RETAIL SUPPLIED



INTERNATIONAL KOI SHOW (UK) **29th & 30th APRIL 1995**

TELFORD INTERNATIONAL EXHIBITION CENTRE
St Quentin Gate, Telford, Shropshire

ADMISSION £3.00 Adults £1.50 Children — Doors Open 9.00 am both days

This is the major indoor Koi Show in Europe, being held for the third year running in this prestigious Exhibition Centre, a two tier show where you, the hobbyist, can exhibit your best Koi in its sector and many of the top U.K. Dealers can exhibit their best Koi in their sector.

HOBBYIESTS

To book your exclusive VAT (free). Please contact Mr Colin Stevens on 0121 588 2446 NOW!!!

DEALERS

A selection of Dealers attending: Shirley Aquatics, Cascade Water Gardens, Lincolnshire Koi, Northern Koi Aquatics, DJ's Koi, Selective Koi Sales, Infiltration, Koinnovations, Clearwater Koi, How Kang Koi, Koi Southwest, Keith Siddal, A E B Ornaments plus *Aquarist & Pondkeeper* and many more.

VISITORS

An event the Koi world is awaiting eagerly to see, come and see the stunning collections of Koi that will be on view, visit the dealers taking stand spaces with their new stocks on display. A fully Licensed Bar and Dinner areas are open both Show days.

ACCOMMODATION

The Holiday Inn and Moat House have been block booked for the weekend. The package includes Hotel accommodation, Bed and Breakfasts, Dinner and Dance on Saturday 29th and admittance to the Show both days.

DINNER DANCE ONLY

Being held in the above exhibition halls in the Banqueting Suite. A full four course meal being served! The group this year is "Heartbeat" with Bridget singing, she is described as having the best voice in clubland — a must at £22.00 per person.

OVERSEAS VISITORS

On arrival if you ask for John, Bev, Jonathan or Colin, we will endeavour to show you to the visitors lounge.

KOI KEEPERS ANYWHERE BE THERE!!!!!!

Cheques to be made payable to Dealers Koi International Show

Organisers:
DJ's KOI

Endorsed by:
THE BRITISH KOI-KEEPERS' SOCIETY

Secured by:
U.K. DEALERS

Registered Office: DJ's KOI, Fryers Road, Leamore Industrial Estate, Bloxwich,
Walsall, West Midlands WS2 7LZ
Tel: 01922 493290 Fax: 01922 710191



**MALVERN & DISTRICT
AQUARIST SOCIETY**

22nd OPEN SHOW

ON

SUNDAY, 16th APRIL, 1995

AT

THE YOUTH CENTRE
ALBERT RD NORTH
MALVERN, WORCS

Schedules available from:
Show Secretary: Mrs W L Smith
49 Lydes Road, Malvern, Worcs WR14 2BY
Tel: (01684) 567995

BioPlast

Food For All Fish



We Set The Standard

Unit 1, Old Railway Goods Yard, Kildwick Crossing
Cross Mills, Knaith, West Yorkshire BD21 7DA



Ornamental Fish Consolidators Ltd.

371a High Street, Harlington, Hayes, Middlesex UB3 5DQ, United Kingdom.
Telephone: 0181-897 3099/0181-897 3702 Fax: 0181-897 6550

Offering: **WEEKLY DIRECT IMPORTS**

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

TRAN-SHIPMENT services throughout United Kingdom & Eire, and the Continent at a very reasonable price.

ALL SHIPMENTS WILL BE COLLECTED ON MONDAYS

PLYMOUTH/SOUTH WEST REGION

Customers in Plymouth/nearby area — boxes can be collected at our appointed destination.
Delivery to other areas can be arranged upon request.

WHOLESALE:

South American, African and Coldwater Fish
(We have a large selection in stock)

*** **STRICTLY** ***
*** **TRADE** ***
*** **ONLY** ***



FROGS AND FRIENDS



By JULIAN SIMS

Photographs by the author

Natural predators

Aquarist & Pondkeeper reader Mrs Margaret Bell from Stockton-on-Tees, Cleveland, has recently written in describing a problem of Common Frogs which inhabit her garden pond.

Common Rats have devoured a number of adult frogs, leaving only small piles of bones.

Unfortunately, this problem of rats acting as a significant predator of amphibians is quite widespread. Common Rats eat Common Frogs and Common Toads, even though toads benefit from a more glandular ('warty') skin than frogs. These glands produce bitter-tasting secretions which put some mammalian predators off, for example, domestic cats and dogs. I referred to this protective function of glandular amphibian skins in **Herp Fact** in the June 1994 edition of *Aquarist & Pondkeeper* (pages 92 and 93).

Hedgehogs also eat frogs and toads. In fact, some hedgehogs are actually known as 'self-anointing' animals. These hedgehogs make a foam from the lacerated toad skin and their own saliva. Using their paws, this foam is then anointed onto their spines. Experiments have shown that the wounds inflicted by the spines of non-self-anointing hedgehogs are painful but heal rapidly. The wounds from spines covered in toad skin extract turn septic and

do not heal quickly due to the secretions present. As hedgehogs are relatively common in many gardens, they can be a significant predator of frogs and toads.

On the mainland of Europe, where Polecats are more common, these mammals are also important predators of Common Frogs. Polecats are known to make large stores of live but paralysed frogs for later consumption. Once they have caught a frog, they bite through the spinal cord so that the frogs remain alive and fresh, but are paralysed and so cannot escape. These frogs are said to have been 'piped' and provide a ready supply of food when environmental conditions make hunting difficult.

Other traditional waterside predators of frogs include Herons and Grass Snakes.

Frog tadpoles are also eaten by Blackbirds. Underwater predators of frog tadpoles include fish, newts and the larvae of Great Diving Beetles, as well as the larvae of dragonflies.

CITES News

1 Crocodile ranching

The ninth CITES Conference was held at Fort Lauderdale, Florida, from 7 to 18 November

1994. Five proposals were adopted regarding the ranching of crocodiles: (I described the disadvantages of crocodile ranching compared with farming on pages 98 and 99 of the December 1992 edition of *Aquarist & Pondkeeper*.)

Four of the proposals make previous temporary operations permanent. Three species will continue to be ranching in the following four countries: Black Calmians (*Melanosuchus niger*) in Ecuador; Nile Crocodiles (*Crocodylus niloticus*) in Madagascar and South Africa; Indopacific Crocodiles — also known as Estuarine or Saltwater Crocodiles — (*Crocodylus porosus*) in Indonesia.

The fifth proposal adopted at Fort Lauderdale allows the current temporary operation of ranching Nile Crocodiles in Uganda to continue until the next CITES Conference.

2 Solomon export quota

The 1995 quota for the importation of Pacific Monitor Lizards (*Varanus indicus*) from the Solomon Islands has recently been agreed. The EC Commission has accepted that 800 of these reptiles can be imported into the European Community from the Solomon Islands in the South Pacific during the period from December 1994 to 9 December of this year.

Licensed tortoises

In the February '95 edition of *Frogs and Friends* I reported on the Department of the Environment's review of wildlife sales controls. One outcome of this review was the availability of a General Licence for the sale of Britain's most abundant species of amphibians, i.e. Common Frogs, Common Toads, Smooth Newts and Palmate Newts.

Another change announced as part of the review regards the sale of European Tortoises. These reptiles have not been imported into Britain in significant numbers since the enforcement of EC Regulation 3826/82 on 1 January 1984.

Since that date, the sale,

exchange or barter of European Tortoises — Spur-thighed Tortoises (*Testudo graeca*), Hermann's Tortoises (*T. hermanni*) and Margined Tortoises (*T. marginata*), have been controlled by sale exemptions. These have only been issued by the DoE when vendors have provided detailed information about each reptile.

As from 1 January 1995, General Sales Licences/Exemptions will be issued providing the following circumstances apply:

- (i) the tortoises offered for sale have been captive-bred, or
- (ii) the reptiles were imported for commercial purposes before 1 January 1984, i.e. when their sale was not controlled.

Further details about the issue of General Sales Licences/Exemptions for European Tortoises can be obtained from:

Department of the Environment,
Wildlife and Trade
Licensing Branch,
Room 822,
Tollgate House,
Houlton Street,
Bristol BS2 9DJ.

Licensed tortoises: captive-bred hatchling Spur-thighed and Hermann's Tortoises.



Hedgehog — a common, natural predator of frogs and toads.

Au revoir . . . but not a total good-bye



It is now nearly seven years since editor John Dawes invited me to write a regular monthly column about reptiles and amphibians for *Aquarist & Pondkeeper*. Originally called *Herpetology Matters*, the monthly column first appeared in the September 1986 edition of the magazine. With the introduction of the 'new-look' magazine in November 1993, the title was changed to *Frogs and*

Friends and increased in length to a double-page spread. Perhaps surprisingly, I have received no letter from readers about the change in name! However, my career has recently taken a different direction and I have accepted a new post as an inspector of and adviser to schools. Therefore, with much regret, this will be the last monthly column I shall be writing for

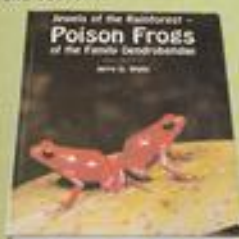
Aquarist & Pondkeeper. I would like to take this opportunity to thank all the many readers who have written in over the years with interesting experiences and anecdotes and questions to be answered. As time permits, I hope to continue to write the occasional feature article for inclusion in future editions of the magazine. In the meantime, I wish you all a great deal of success with the fish, amphibians, reptiles and invertebrates which you keep and breed.

Editor's Note:

We wish Julian all the best in his new appointment and thank him most sincerely for his sterling work on our behalf over the past seven years or so. We also look forward to publishing his excellent articles from time to time in future issues of *A & P*. As from next month, *Frogs & Friends* will be compiled by two of our other popular regular contributors, Bob and Val Davies, who will also be taking on Julian's slot in *Question Time*.

Rainforest jewels

Lavishly illustrated books for the coffee table are usually associated with two of my other passions — sports cars and steam trains. Therefore, imagine my delight to have the opportunity to review a spectacular book recently published by TFH: *Jewels of the Rainforest — Poison Frogs of the family Dendrobatidae*.



This hardback book, written by Jerry G Walls, has the very impressive dimensions of 25cm x

35cm (10 x 14in). It contains 288 pages and over 525 colour pictures. In common with many other current TFH publications, the pictures are laminated for added clarity. These include three pages of drawings of the tadpoles for 18 different species.

Relatively early in the book, 16 pages provide information about maintaining and breeding Poison Frogs in captivity in a section called *The View from the Terrarium*.

211 pages are devoted to describing frogs belonging to the genera *Dendrobates* (26 species), *Epidendrobates* (25 species), *Minyobates* (9 species) and *Phyllobates* (5 species). In addition to many detailed pictures which aid identification, maps of Central and South America are provided which show the regional distribution of each species.

These 65 species of Poison Frog account for just over a third of the total number of the species currently included in the family Dendrobatidae. Very brief mention is made of the non-toxic, but more numerous, members, the 106 species of Rocket Frog — belonging to the genus *Colostethus* (previously known as *Prostheraps*). The single species of *Aromobates* the Skunk Frog (*A. nocturnus*) is also described. Skunk Frogs have a very limited distribution, only being found in the streams of the Venezuelan Andes, in the Trujillo region.

A comprehensive two-page bibliography and detailed three-page index form the final pages of the book.

For this reference work to remain closed and stored on a shelf would be a terrible waste. However, at a cost of £49.95, one might feel inclined to protect such an investment in information because this quality book is certain to attract attention. I am reminded of a precedent from history when other large books were chained to a table to prevent their loss from the first libraries. *Jewels of the Rainforest* is strongly recommended for all those interested in amphibians. ISBN: 0-7938-0299-7



TACHEBROOK TROPICALS LTD
 244 VALDHALL BROOGE ROAD
 LONDON SW14 1AU
 TEL: 071 834 5179
 Large selection of Xenopus Frogs, Anoles — black, white, albino, Tree Frogs, Lizards and Geckos.
Wholesale & Retail

AQUASPLASH
SNAKES, SPIDERS, LIZARDS & ACCESSORIES
 MJS GARDEN CENTRE
 BATH ROAD, HARE HATCH
 READING, RG6 9GJ
 Tel: (01734) 404188
 OPEN 7 DAYS

BARRIER REEF
 For a large selection of Reptiles, Spiders & Amphibians.
 Live & Frozen Foods.
 Books & Accessories.
 38 High Street, Cheltenham
 Tel: 0242 238638

WALKERS AQUATICS & PETS
 59 HIGH STREET, BILSTON
 WEST MIDLANDS WV14 0EZ
 Telephone: 0902 498191
 EXPANDING REPTILE SECTION.
 LARGE SELECTION CAPTIVE BRED
 Full range of equipment, foods and accessories

Regents Reptiles
 THE INTERNATIONAL PET/REPTILE CENTRE
 360 Edgware Road, London W2 1ER
 Tel: 071-258 0931/071-258 2051
 For the widest range in Lizards, Amphibians, Snakes, Chelonians, Anurids. Full range of Accessories and Books.
 Offering a friendly service.
 Opening Times:
 Weekdays 9.30am to 5.30pm
 Saturday 9am to 6pm
 Sunday 11.30am to 4.30pm

c/o PEGASUS BIRDS LTD
 Little Wymondley Hall Lane
 West Hampstead, New Southgate
 Essex CB21 2NQ, England
 Tel: 0277 811779 Fax: 0277 812013
 OPEN 7 DAYS 4 WEEK 10AM TO 5PM
 Come and visit the largest reptile house in the south. All of our stock is beautifully displayed to the public. We supply snakes, lizards, spiders, guinea, lizards, live and frozen food, plus all the accessories you require — too much to list.
Trade Welcome — Friendly Service and Free Advice — Mail Order Access VISA/Mastercard welcome

NEWTS EGGS. Enclosure bred. Prices per 10 eggs: Common Newt £4, Palmate £5, Crested Newt £5.50. European species: Alpine, Marbled £6.50; Banded £8. Instructional 2 hour video £12 plus £1.50 p&p. Mr C Snell, 76 Birdbrooke Road, London SE3 8QP. Telephone: 0181 856 9852.



B J REPT SUPPLIES
 AQUARIUM, REPTILES/PODS
 AQUARIUMS, BOSTON ST 121
 For the most comprehensive selection of reptiles and amphibians, accessories, literature and gifts in the UK, visit our new free 24 page catalogue containing everything you could ever want and still purchased savings that you just can't afford to miss. From crocodiles to corn snakes, geckos to green tree parrots, frogs to inflated dragons, birds to butterflies we have the best selection of captive bred (where available). Also accessories, literature and gifts can be delivered to your door or to your car. We offer you the best prices you can get. Visit us online or call us now for your free catalogue.
 Tel: 01390 340738 Fax: 01390 340811

WARRINGTON AQUARIA & PET CENTRE
 21 LOVELY LANE, WARRINGTON,
 CHESHIRE WA5 1LZ
 TEL: 01925 630064
 A large range of reptiles, Snakes, Lizards, Spiders, Frogs etc in stock, plus all accessories.

LIGHT SENSITIVE SPAWNERS

Creating Natural Conditions

PART ONE

As Dr David Tipping of Birmingham University reveals, temperature is not the only factor which affects breeding success in aquarium fish

The most obvious environmental factor which affects tropical fishes in aquaria is temperature. There is a certain range over which tropicals simply will not survive. Similarly, there are certain temperatures necessary for the successful breeding of fishes.

However, one factor often overlooked by aquarists is the effect of daylength (also called photoperiod) on fishes and their reproduction. This article outlines how photoperiod affects fishes, and explains how even an extra hour or two's illumination can induce them to breed, or increase the rate at which they may do so.

Variable photoperiod

The photoperiod which a fish experiences throughout the year depends on where it lives. At the equator, the daylength is 12 hours of light and 12 hours of dark (abbreviated to 12L/12D) every day. However, the yearly photoperiod changes further from the equator, so that at the North Pole, for example, there are several months of continuous light and several months of near-continuous darkness in each year.

Obviously, most regions are not as severe as these two examples.

In central Britain, for example, we experience a seasonal climate, with shorter winter days (9L/15D at the winter solstice) and long summer days (17L/7D at the summer solstice).

Therefore, fishes which live away from the equator are adapted to survive in conditions which vary seasonally. Very few species live in conditions of 12L/12D and constant temperature all year round, but these are precisely



ABOVE — In numerous species, including the Mozambique Mouthbrooder (this is a juvenile), there is a good correlation between latitude and the duration of the breeding season.

BELOW — The Firemouth: a popular year-round spawner.

M.P. & C. REDNOR



the conditions that many aquarium fishes are kept in.

The effects of daylength should not be underestimated. Studies have shown that in livebearers like the Porthole Livebearer (*Poeciliopsis gracilis*) and the Molly (*Poecilia sphenops*) significantly more effort is devoted to reproduction in fishes kept on 12.9L/11.1D than identical fishes kept on 11.3L/12.7D. In other words, these species will produce better offspring if given only 90 minutes more light per day. So, for those of us who turn the aquarium light on and off randomly, the rewards of a more regular routine may be considerable.

Year-round spawners

Most equatorial fishes breed all the year round if the temperature is high enough regardless of daylength (since it is usually 12L/12D). In addition to these some non-equatorial fishes do not breed in response to daylength anyway, and respond only to temperature.

Examples of

fishes which

breed a

year round

in the wild

include many

species of live

bearers, and cat

fishes such as the

Walking Catfish

(*Clarias*), and some

Synos (*Synodontis*).

However, the cichlid

have the most obvious year

round spawning activity. Many

commonly-kept aquarium species

breed all year in the wild, including

Firemouths (*Thorichthys*

[*Cichlasoma*] *meschi*), Jaguar

(*Parapetenia* [*C.*] *managuense*), and (*C.*

[*C.*] *festae*).

Of the African Rift Valley Lake cichlid there is a good correlation of year-round breeding with proximity to the equator. It is probably the willingness to breed of these cichlids which contributes so much to their popularity.

Seasonal species

However, many fishes will not breed all year round, regardless of temperature.

There are two types of fishes in this group. The first group includes those species which breed seasonally because of temperature fluctuations and habitat availability which occur during a rainy season



Many *Synos* — such as *Synodontis greshoffi* — breed all the year round in the wild.

Inducing these fishes to breed in aquaria is therefore a process of water changes and temperature manipulation.

The second group contains fishes which are waiting for a change in daylength. There is evidence from wild and aquarium studies suggesting that some cichlids and catfishes are included in this group. However, aquarium fishes may be induced to breed 'out of season' by altering the daylength, and some species can experience two breeding seasons a year, rather than one.

Daylength management

So how can we control the daylength in our aquaria? Firstly, it should be noted that the alteration of the daylength may not be healthy for plants if the level of daily illumination drops too low. However, in a fish-only set-up, or in aquaria with tough plants such as Cryptocorynes, there should be no problems.

The aquarium whose photoperiod is to be altered should not receive any natural daylight and, ideally, no room lighting either. The simplest way to achieve this is to cover the aquarium when the lights are off and uncover it when the lights are on. The lights-on phase can then be timed to coincide with the normal evening viewing of the fishes.

So which alterations in daylength are most likely to induce breeding in difficult species? Most species which are photoperiodic are waiting for a relative increase in photoperiod. They are therefore probably very confused because the photoperiod in many aquaria is high all the year round, since apart from the aquarium lighting, the fishes get supplementary illumination from the room lights as well. I calculated that my aquaria at home received a total of 17 hours of light per day, even in December!

Probably the easiest way of overcoming this, using covered aquaria, is to simulate a yearly photoperiod change, with a December minimum of about 10 hours of light per day, and a summer maximum of about 14 hours of light per day. Such a regime requires a time switch, updated and altered weekly, by about 20 minutes per month.



DR DAVID TIPPING

Keyhole Cichlids exhibit seasonal breeding. This pair received only ambient daylight.



CHRIS BARRITT

Mating in livebearing species like the Sphenops Molly (*Poecilia sphenops*) is influenced by daylength.

If attempting to breed fishes out of season, this regime can be condensed into six months, for example, if the appropriate changes to the time switch are doubled.

Ideally, the temperature should also be dropped a few degrees over the 'winter' months. Note that changes in photoperiod will not induce overnight results in the way that water changes do. The fishes may take weeks before they start breeding.

Natural assets

The fishkeeper can also make use of the changing natural daylength by allowing his or her aquarium to receive natural daylight, with only the minimal addition of other light sources. This will also allow the fishes to get some idea of the time of the year.

Some cichlids, such as Keyholes (*Aequidens maroni*) and Kribbs, will breed in spring (from about February to May, in such a set-up, and would probably breed twice in the same season if the yearly photoperiod changes were repeated twice per year, as outlined above. Barbel have been successfully bred twice in one year using this technique.

The use of natural daylight is also beneficial for the breeding of some fishes, such as Danios, which spawn with the appearance of the dawn light.

Daylength is even more important to native fishes. Long daylengths increase the rate of maturation in Blennies, Gobies, Pike, Barbel and Bitterling, for example (though Bitterling are not strictly native to the UK). Some fishes begin sexual maturation in autumn and winter, while the daylengths are short, then complete the process in response to the longer daylengths of spring. One example of this is the Goldfish.

As a final general point, remember that fishes dislike light which comes from horizontal sources. This includes bright natural light if the aquarium is placed too near to a window. In the wild, fishes only receive light from above.

Summing up

In summary, rather than turning the aquarium lights on and off randomly, better results will be obtained by constant illumination with 12L/12D, for near-equatorial species, or a simulated yearly daylength for those species which naturally inhabit countries that are more distant from the equator.

In the former case, the adoption of a constant 12L/12D photoperiod will also be beneficial to any plants in the aquarium. In the latter case, a change of routine, or the small investment of a timeswitch, may be all that is necessary for the successful breeding of that difficult species.

In Part 2, I will be looking at the ways in which changing daylength affects sexual maturation in fish.



Fish live longer with
King British®

SAFE-WATER

Controls Pollution in Tanks & Ponds

yes!



For FREE Treatment Guide for Fish Tanks or Ponds send S.A.E. to King British, Bradford BD5 9ET or Phone 01274 573551

WATER'S EDGE

BY DICK MILLS

'Hair' control

With their continuing research into all things marine, LAHAINA AQUARIUM SYSTEMS have certain strong views on eliminating Hair Algae. As this is usually caused by an imbalance between the Dissolved Oxygen, versus the Carbon Dioxide Cycle, the first thing to do is increase aeration (especially, where remote filtration systems are used). Using two LONG LIFE AIR DIFFUSERS per 100 gallons of water, with the diffusers anchored at the bottom of the aquarium, has been effective in clearing the algae a few days, with any Living Rock returning to full health accordingly.

Of course, lighting plays an important part in any plant (algae) growth and, here again, research has shown that AQUASTAR fluorescent lamps, by Sylvania and used exclusively in Lahaina Systems, are less prone to encourage hairy growths.

Tufa rock has a tendency to crumble and add dust and debris; removing this type of rock and vacuuming up all the dust will also keep down the algae, as will careful limitations in the use of Reef Tank Additives; restricting their use solely to those trace elements necessary for water conditions (such as pH/KH buffers). Employing accurate denitrification filtration will also play an important part in keeping your marine aquarium 'bald'.

Details from: LAHAINA AQUARIUM SYSTEMS, Lifton, Devon PL16 0AJ Tel: 01566 784664/78420; Fax: 784860

Confident start

Most flourishing hobbies start off with a small beginning, and so it is with fishkeeping. Recognising this, KING BRITISH leads the way in helping first-time aquarists. Many of their water quality treatments are packaged with the smaller consumer (tank-wise that is) in mind. SAFE-GUARD, SAFE-WATER, FIN CLEAR and GOLD-FISH TONIC have all been made available in modest, but practical, sized 50ml bottles.

Safe-Guard removes chlorine from new tapwater and reduces stress to fish when they are moved to a new home.



Safe-water consumes harmful daily waste and reduces the number of required water changes.

Fin Clear helps fins to return to full health after physical damage or exposure to raw water.

Goldfish Tonic keeps fish 'regular', as constipation is often a result of poor quality foods whose low cost factor often appeals to beginners who may be ignorant of the dangers of this false saving.

However, it's not just fish that are attracting the beginners' attentions; Terrapin sales are also on the increase. To accommodate this interest, again on the small tank front, TERRAPIN WATER FRESHENER is available to keep their water in tip-top condition.

By providing low cost, low volume packages of the necessary treatments, King British is helping to ensure that all new fishkeepers get off to the best possible start and will therefore remain in their new chosen hobby.

Details of products from: KING BRITISH AQUATICS LTD., Haycliff Lane, Bradford, West Yorkshire BD5 9ET. Tel 01274 573551/576241; Fax: 01274 521245.

Even-more-versatile Pond Workers

The concept of an in-pond filter, ahead of the water-pump means that the pump is fully protected against ingress of hard particles and much of the debris is removed before any external pond filter system is reached. INTERPET'S POND WORKER is already leading the way of such



devices and now, for 1995, comes news of an upgrading and revised design.

There is now an interchangeable filter sleeve system — one fine (supplied with the original Pond Worker) and a new, coarse foam sleeve which comes as an optional extra. The latter sleeve is designed to decrease intervals between cleaning and is particularly effective during periods when the pond owner is away from home, say, for holidays.

Each Pond Worker is capable of filtering a pond of up to 750 gallons (approximately 10 x 6 x 2ft), but two or more units can be used for larger ponds. Water is first filtered mechanically, down to a particle size approaching that of green algae (when used with the supplied Clear Pond) and then

travels through a central chamber, thanks to the beneficial nitrifying bacteria colonising the unique honeycombed structure of the Bio-Media biological filter medium.

Pond Workers are guaranteed for two years and come with a free 16-page Guide to Pond Keeping booklet.

Details from: INTERPET LTD., Vincent Lane, Dorking, Surrey RH4 3YX. Tel: 01306 881033; Fax: 01306 885009

Filter brush-up

As the sizes of pond filters continue to diversify, either from the manufacturers or from inspired D-I-Y, there is a corresponding need for filter brushes to keep in step.

To this end, the SPEEDY BRUSH COMPANY have just announced no fewer than six new additions to their BLACK KNIGHT FILTER BRUSH range: 12, 24, 28, 32 and 36in lengths have been added to the 6in diameter range (doubling the range in the process), while the 4in diameter size has now a 29in model. The 16 and 20in length 4in brushes now feature beaver wire (still non-toxic, high-quality stainless steel) for greater rigidity. All brushes have a dense fill of top quality Hydrotek polypropylene for excellent durability.



Living up to their name, the company usually fulfils 95% of all orders within 24 hours of receipt of order. On receiving two first class stamps, the company will mail you the update brochure *The Amazing Black Knight Filter Brushes*, a copy of which is included with all orders.

Details from: THE SPEEDY BRUSH CO., Mount Pleasant Farm, Brishing Road, Chart Sutton, Maidstone, Kent ME17 3SP. Tel: 01622 747299; Fax: 01622 743307.

Bouga Toads, Puffers... and Zombies

In the Haitian cult of Voodoo — or Vodou, which is the current trendy way of spelling it — a zombie is a person who has been put to death and then raised from the dead by a voodoo priest or shaman. Zombies, the living dead, have no will of their own and usually work in a sort of trance as servants of the voodoo priest, or are sold to work as slaves on a sugar plantation.

For many years this tale has been dismissed as superstitious nonsense by just about everyone who is not a Haitian. But a few years ago, researchers — intrigued by the obstinate belief of even educated, westernised, university trained Haitians, that zombies were, and remained, an all-too-terrifying reality of life in rural Haiti — began to take the story seriously, pouring over old long neglected texts on the mechanisms of zombification and investigating case histories of alleged zombification in contemporary Haiti.

For example, there is the strange story of Clairvius Narcisse who was certified dead by a doctor and buried at a public ceremony in 1962, only to turn up again alive, if not very well, in 1986. He claimed that he had been put to death and turned into a zombie by a voodoo priest and had worked as a zombie on a sugar plantation — observing all that went on around him as through a glass, darkly and distantly, but devoid of the willpower to free himself — before finally recovering his willpower and escaping to freedom on the death of the priest.

Zombification

The stranger-than-fiction chain of events revealed by these investigations begins when a member of the future zombie's family (and sometimes the whole family together) visits a voodoo shaman outlining a grievance against his/her relative and asking for him or her to be made into a zombie.

The shaman, for a fee, prepares a compound to be fed to the victim, which causes him or her to fall into a catatonic state not easily distinguishable from death. All this is accompanied by religious ceremonies, dancing, and the sacrifice of a live white cockerel — a bit of set dressing never did any religious ceremony any harm. Finally, the apparently dead man or woman is shown to a doctor who (genuinely deceived or turning a blind eye) certifies his/her death, and is buried to the accompaniment of all the usual rites in a shallow grave.

In due course, victims 'come back to life', dig themselves, or are helped, out of

The mysterious link between toads, puffer fish, and the 'Zombie Cucumber' are revealed by Dr Andrew Allen in the latest of his occasional 'off-beat' insights into the fascinating world of fish and amphibians.

the grave, and wander about in a dazed trance ready to obey the commands of the shaman or the plantation owner to whom they have been sold as compliant cheap labour.

Eventually, they would recover and return to normality, unless given regular small doses of the compound to keep them in their zombie trance.

Intriguing brew

A Franco-Haitian biochemist managed to obtain a small quantity of the magical compound used to turn people into zombies, and set about analysing its ingredients (biochemical tests to discover the active ingredients present; high power microscopy to identify, via scales, hairs, thorns, fragments of skin, etc, the plants and animals that had been boiled together in the charm'd pot).

He found that nearly all the 40-50 ingredients were functionless and included solely for effect (bat's blood, rats' tails etc). But the compound did contain three ingredients — *Datura*, puffer fish and giant toads — with intriguing properties.

Datura effects

'Zombie Cucumber' is the significant local name given to two species of thorn apple, *Datura stramonium* and *D. metel*, which contain powerful psychoactive tropane alkaloids. Victims of *Datura* poisoning experience strange hallucinations and fall into a trance, which may last for days, weeks, or years.

Datura has an ancient history, for it is said to have been used at the Delphic Oracle. Here, the priestess, called the Pythia, seated on a tripod over a fissure in the rocks, uttered con-

fused and convoluted words in a divine trance, in reply to the questions put to her. The Pythia was intoxicated by the fumes from smouldering *Datura* leaves in the fissure below her tripod. Her replies were interpreted by a priest, in the form of verses.

The strange powers of *Datura* were well-known in India too. The *Thugs* used a poison called *Dhat*, prepared from *Datura*, to send their intended victims into a helpless trance. And Indian courtesans still put *Datura* into their visitors' wine, in order to rob them without interference.

Puffer poisoning

The puffer fish — three species, *Diodon hystrix*, *D. holocanthus* and *Spherooides tennisonius*, are regularly fished off Haiti — contain a deadly nerve poison, *Tetrodotoxin* (C₂₇H₄₇N₃O₈). The dramatic consequences of puffer fish poisoning are well-known in Japan where puffer fish known as *fugu*, are so highly prized as delicacies that many people risk their lives to eat them.

Cases of tetrodotoxin poisoning in Japan read just like accounts of zombification. A victim of *fugu* poisoning suffers initially from ataxia (involuntary movements), hypothermia (falling body temperature) and hypotension (low blood pressure). The eyes dilate, breathing slows and the heart beats slower and slower.

CHRIS SPENCER

Cane or Giant Toad — an essential ingredient of 'Zombie' brew.



Finally, the victim becomes totally paralysed with a very low body temperature and no heart beat, in a catatonic state all but indistinguishable from death.

There are several accounts from Japan of victims of *fugu* poisoning recovering consciousness several hours after doctors had declared them dead. There can be little doubt that more than a few victims of *fugu* poisoning have been cremated alive!

Bouga skin

The third active ingredient in zombie paste is the skin of the giant 9-inch diameter Giant or Cane Toad, *Bufo marinus*, known in Haiti as the *Bouga Toad*, several of which are apparently thrown into the stew while it is cooking.

The skin secretion of the Giant Toad contains a number of cardiac poisons called *bufadienolides* (*bufogin*, *bufotalin*, etc) which lower the metabolic rate and slow the heart until it stops; and a powerful dream, vision and trance-inducing hallucinogen, *bufotenin*.

Bewitching resemblance

To summarise: puffer fish (tetrodotoxin) and Bouga Toads (*bufogin*, *bufotalin*) send the victim into a temporary catatonia indistinguishable from death, while *Datura* (atropine, hyoscyne, hyoscyamine) and Bouga Toads (*bufotenin*) keep him or her

in a zombie trance.

The zombie trance of Haitian zombies doubtless resembles the drug-induced 'witching trance' described and investigated by 15th-17th century scientists, such as Pomponazzi and Giovanni Della Porta. The witch who smeared herself and her fellow witches with a fat-based ointment made from sweltered toad venom

(*bufotenin*) and/or henbane and mandrake (both related to *Datura*, and sources of hyoscyne and hyoscyamine) really did — with the help of a little auto- or group-suggestion — find herself shape-shifting into a rat, a toad, or a hare, or flying out through the chimney on a broomstick flight to a Sabbath, or to join the wild hunt 'hov'ring through the fog and filthy air".

The Bowlers

"You're going to have to do something about your wind problem."



FISH WORLD Magazine



Name: _____

Address: _____

Post Code: _____

Society if any: _____

Send your cheque or postal order to:

Fish World Magazine, Dept QB, 14 Upper Dane Road,

Margate, Kent CT9 2LX

Please make cheque payable to F.B.A.S., THANK YOU

The best value money can buy. This magazine is suitable for all fishkeeping hobbyists whether they have the smallest Aquarium or the largest Pond. Articles include: Caring for your fish, Lighting, Water Quality, Plants, Solving Aquatic problems, Filtration and many other interesting items.

Also includes: Society News PUBLISHED QUARTERLY

Become a subscriber now at the special rate of £5.00 (including postage & packing) Overseas subscribers £15 (inc postage & packing). For FOUR editions, starting with the next issue.

'aquarian'® 20th ANNIVERSARY COMPETITION WINNERS

Thank you all for your enthusiastic response to this great competition.

TOP PRIZE WINNER: Ricci Rutter, Blaydon-on-Tyne, Tyne & Wear

Ricci wins the engraved 20th Anniversary Aquarian pen, plus a gift pack of Aquarian products, plus the bonus prize: Dr David Ford of the Aquarian Advisory Service will visit Ricci to discuss plans for a special aquarium which will subsequently be manufactured and installed, courtesy of Aquarian

RUNNERS UP: The 19 winners of the runner-up prizes consisting of the engraved 20th Anniversary Aquarian pen, plus gift pack of Aquarian products are: Mrs K L Rogers (London), Arnold McNiece (Chesterfield), Katherine Adams (Chorleywood), T. Newth (Liverpool), Paul Busby (London), Marjorie Turton (Bristol), Martin Daniels (Chatham), David Oldfield (Brampton), Paul Gadman (Staines), E. Docherty (Stockport), P. Evans (Barry), Andrew Lee (Reading), John Bloomfield (Bury St Edmunds), M. K. Oliver (Scarborough), Ken Woby (Sittingbourne), Mrs R. E. Thompson (Leiburn), G. Tansey (Leicester), Philip Winsper (Wrexham) and Ann McKenzie-Small (Lincoln).

Congratulations to all our lucky winners, and sincere thanks to Aquarian for their generous sponsorship.

QUESTION TIME

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

All letters must be accompanied by an S.A.E. and addressed to: Question Time, Aquarist & Pondkeeper, 9 Tufton Street, Ashford, Kent TN23 1QH. Harpetology, Bob and Val Davies. Koi, Alan Rogers. Tropical, Dr David Ford. Coldwater, Pauline Hodgkinson. Plants, Barry James. Marine, Gordon Kay.

KOI

Difficult-to-digest gentles

I have been feeding gentles (maggots) to my Koi for quite some time now. Recently, though, some of my fish have been very reluctant to accept them. What kind of food value do gentles have?

I have known hobbyists feed live gentles on very rare occasions to their Koi. These maggots contain an extremely high fat content and their tough leathery skins make it difficult, if not impossible, for the enzymes in the duodenal duct of Koi to break them down as a valued food source. Further, high concentrations of fat or protein sources for Koi should be avoided in a regular diet.

I remember some years ago, while judging at a Koi show, that an exhibitor had been questioned about feeding his Koi in the show vat. Lying in the bottom was a considerable number of live gentles crawling around. He stated that he had not fed his Koi for the last two days, and certainly not in the show vat. The maggots, though, offered a 'gentle' indication that he was being economical with the truth!

A mature watercress vegetable filter servicing a large Koi pool. Other plants can also be used.



Vegetable purifiers

We have a 2,000-gal system with very healthy Koi and other carp.

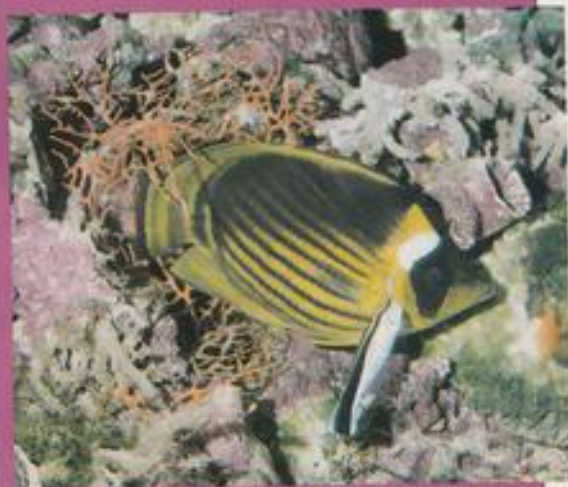
Our filters are two 25-gal 'boxes' containing Floroc, plus layers of foam. We also have a UV steriliser. The pump (a Stuart Turner) has an output of around 1,200 gph.

Would it be possible to 'tap' some of the water off to allow us to install a vegetable filter? If so, is water-cress easy to cultivate in this manner?

Your proposed vegetable filter will certainly cause no harm to your present pond set-up arrangements. I presume when you refer to your 'tapping' off water from your filter, you really mean diverting a proportion of it through the new vegetable filter.

Make sure your watercress is confined to your filter only, as, in ideal and warm conditions, it may become uncontrollable once it develops in your pond. Although not hardy in our waters, but ideal for vegetable filtration, Water Hyacinth, with its long trailing roots, mops up considerable amounts of nitrates in the system. Try experimenting with recommended different pond plants once the 'diversion' is up and running and let me know how the project turns out.

MARINE



Cleaner Wrasse doing its job on the gills of a Diagonal-line Butterflyfish.

Cleaner solution

Everything seems fine in my aquarium: nitrite and nitrate are nil, I change water regularly (25% each month) and everything is feeding. The trouble is that one or two of the fish hang in the air bubbles from the diffusers, although none of them seems to scratch. What's wrong?

Without seeing your aquarium, I cannot possibly say for certain what's wrong, but I would say that the problem is parasites. There are many kinds and, again, I couldn't tell you which are affecting your fish.

Things don't sound too bad at the moment so, rather than throw chemicals at the fish willy-nilly, if your aquarium isn't fully stocked, why not buy a pair of Cleaner Wrasse? They would cure the problem.

Royal accommodation

What would you recommend as a suitably sized aquarium for a Queen Angel or a Blue-ringed Angel?

What would be good tankmates for these fish and can I grow seaweeds in an Angel tank?

I keep my Queen Angel — along with a Blue-ringed Angel and other species — in a 100-gallon aquarium. I consider a 50-gallon aquarium to be the minimum size for such species.

As to the question of tankmates, when reason, and within the usual stocking parameters, large Angels can be kept with most other species. The behaviour tendencies of others, rather than those of the Angel, are most important. There is absolutely no reason why you cannot keep any kind of macro-algae, either.

TROPICAL

Death in absentia

I've recently been involved in an unfortunate incident with a friend's fish while he was away. He left the fish looking very healthy on Thursday. When I checked them on Friday evening, only 36 hours later, all but one of them were dead. These weren't just any fish either. The ones that died were one 6in Oscar and five 5in Dempseys. The lone survivor was a 6in Oscar.

My friend's equipment includes a 48 x 12 x 20in tank which is equipped with both an undergravel filter and an external filter, a heater, and a fluorescent light. He has added an automatic feeder with pelletised food to his set-up, since he was going to be away for a while.

The night I found the fish, all of these were operating normally. The temperature of the water was about 75°F (24°C) although it was almost milky and slightly green, with a slightly oily sheen on top.

Jack Dempseys and Oscars are great water polluters. Good filtration and roomy aquaria are therefore essential.



The aquarium smelled like a fish market, without smelling of decay or rotten fish.

Obviously, it is impossible to say exactly what killed the fish. A post mortem examination would perhaps have helped.

I can make some observations:

① The milkiness and slight smell are significant; . . . they indicate a bacterial build-up which, in turn, indicates a high biological load. Nearly 40in of large-bodied fish is quite a load for a 48in tank. Never forget that the fish have to swim in their

own 'loo', so despite all the filtration, there may have been an ammonia crisis.

② Undergravel filters are good for marines or community tropicals, but they cannot cope with large fish, the gravel soon becoming clogged with biological material that can decay and release ammonia.

③ I think there was a surge in bio-material, perhaps excreta from overfeeding from the auto-feeder, or it overdosed the tank. This led to an ammonia build-up in the crowded tank. This then poisoned the fish and the most

susceptible one died. The dead fish would have increased the ammonia content even further, killing a second fish . . . and so on until only the most robust survived.

④ I would not keep more than two Oscars in a 48in tank and I would not use u/g filtration with such large messy fish. Also, it is best to let the fish starve during absences of up to two weeks. Over that time, I would leave a small portion of food for one weekly feed to keep the water sweet and clean. The fish should survive OK like this.

PLANTS

Second Aponogeton

I read somewhere that there are two species of hardy Aponogetons for the garden pond. I know of the Water Hawthorn and have searched through several catalogues for this second species, but can find no reference to it.

Do you know of this plant, and where can I obtain it?

There is, indeed, a second hardy species of Aponogeton. It was introduced by Perry's, a now-defunct aquatic nursery, and cultivated by them for some years. The species is Aponogeton kraussianus. It comes from South Africa and has strap-shaped foliage and dainty twin spikes of sulphur-yellow flowers, which are sweetly scented. The plant is said to seed freely.

This species is also said to come from Australia. I have a few plants of the Australian population, sent to me by a friend in New South Wales. I have been cultivating it for some years and it appears that the species is hardy; it has bright-yellow flowers. It also seeds freely and ger-

mination is rapid.

It produces translucent underwater foliage, rather like *A. ulvaceus*, and some darker floating foliage.

I wonder if this could be the same plant described by Perry. Although it has done well in an unheated greenhouse, I have yet to try it outside.



Expensive CO₂ is best

I have been looking for a regulator valve for my carbon dioxide (CO₂) system. The problem is that I have seen several models, but the price varies from just a few pounds to nearly a hundred. On what basis do I make my judgement?

Although, on the surface, it would seem a simple matter to design and build a needle valve to deliver a set amount of carbon dioxide gas, in practice, the precision needed to dispense a critical volume requires a dedicated approach in the design and engineering of such devices.

In my experience, the cheaper needle valves fail to live up to the manufacturers' claims. In short, the most expensive in this limited market are, undoubtedly, the best.

The sweet-scented blooms of my Australian Aponogeton.

COLDWATER

Barley algal control

I have been told that putting straw into a pond will clear away the pea soup-type of algae. Is this true?

This technique has been investigated by the Aquatic Weed Research Unit at Sonning in Reading for 15 years. They think that it works due to a release of hydrogen peroxide and, though it does not result in crystal water, it will clear the algae within ten days.

One method (the easiest, but not necessarily the most effective) of introducing the barley straw into the water is to put it into a pair of old tights, using 5g per cubic metre. Tie a piece of string to the tights, then float them onto the pond where they will eventually sink; the string can be used later to pull the bundle out when the pond has cleared. See, however, William Wildgoose's article, *Barley-clear Water* in the September 1994 issue of *A&P* for fuller details.

You can also buy pads of straw from many water garden centres: one pad will be enough to clear a pond of 700 gallons, or about 120 cubic ft. An information leaflet costs £5 from the *Aquatic Weeds Research Unit*, Broadmoor Lane, Sonning, Reading RG4 0TH. Tel: 01734 441730.

'Other' coldwater species

I would like to try coldwater fish but do not wish to keep the usual Goldfish

types. What other cool water fish make interesting aquarium subjects?

Suitable fish which do not outgrow their aquarium are Sticklebacks and Minnows, both native to the British Isles.

Bitterlings are particularly interesting during their spawning activities, but do require the services of a freshwater mussel where they lay their eggs.

There are many American fish which are suitable, the Red Shiner and the Sunfish being the most easily available.

Some of the fish which are often termed as 'tropical' will tolerate cooler water conditions, Guppies, Platies, Swordtails, Paradisefish and certain cichlids are just a few

Male: female ratios

Are there any rules about the ratio of male to female Goldfish that should be kept in either ponds or tanks?

It isn't necessary to plan a balance of the sexes. Goldfish are not monogamous creatures.

However, if you would like your fish to breed successfully, then it is advantageous to have more males than females. That way, the female is given more attention, stimulation and encouragement to release her eggs and, of course, with more milt released, there is a better chance that more of the eggs will be fertilised.

Paradisefish: a tropical species suitable for coldwater aquaria.



M.P. & C. PLEWCOB

HERPETOLOGY

Feeding live mammals

Can you please explain the legal situation with regard to feeding live mammals, e.g. mice and rats, to snakes and some species of large carnivorous lizards and frogs? I am particularly concerned about the cruelty of this practice.

With regard to feeding live mammals to captive reptiles, the facts are as follows:

Under *The Protection of Animals Act, 1911* (1912 in Scotland), it is an offence to cause cruelty, that is, unnecessary suffering, to animals in captivity (including reptiles and amphibians).

Unnecessary suffering not only includes injury, but also the failure to provide: (i) food, (ii) water or (iii) the necessary veterinary attention.

In the past, instances of feeding live mammals to snakes have been decided in some magistrates' courts as "cruel" and, therefore, illegal. However, these past cases are not binding, only illustrative for other magistrates in future hearings. Each case is judged on its particular facts. Points to consider include:

- (i) The failure to feed a snake is a form of cruelty.
- (ii) Placing a live rodent in a vivarium with a large snake can cause a great deal of stress to that mammal for several hours and sometimes more than a day, prior to it being eaten.
- (iii) A mammal living in a vivarium for that length of time may actually cause damage to the snake. Cases have been reported of rats gnawing snakes, resulting in the death of the reptile in a very cruel way!

Herpetile library

I would be grateful if you would inform me of any books which will build into a library of herpetology as my interest in this subject develops. At present, I am particularly interested in keeping and breeding Day geckos, genus *Phelsuma*.

A new series, the "RE" books, launched by TFH in 1994 will eventually contain 37 titles. To date, 26 of these have been published. One of the strengths of this series is that the books are relatively



Herpetology books from the RE range.

inexpensive (£5.95) because they only deal with one species or a closely related group of reptiles (or amphibians).

Two titles cover different aspects of the care of reptiles — *Feeding insect-eating Lizards and Reptile Parasites*.

There is also one book about invertebrates for the terrarium, *Tarantulas and Scorpions*. Other titles include *Newts, Harlequin Frogs, Leopard Geckos, Pine Snakes, Burmese Pythons and Mediterranean Tortoises*.

With regard to your interest in Day Geckos, one of the latest books to be published in this series is RE-126 which deals with these reptiles. This book was written by Eric M Rundquist, ISBN: 0-7938-0267-9.

As explained by Julian in this month's instalment of *Frogs & Friends*, changes in his career have, sadly, dictated that he gives up his popular monthly column, plus his slot on *Question Time*.

As from next month, two of our other popular writers, Bob and Val Davies, will be taking over responsibility for our regular herpetological features. Please therefore address all future queries to Bob and Val, c/o A&P.

Thank you, Julian, for all you've done for us and our readers over the past seven years. We wish you all success with your new career responsibilities.

SHORE WATCH

BY ANDY HORTON

Photographs by the author

Under the rocks on the shore, every imaginable creature squirms, scampers, wriggles, slides, darts under cover, jumps, or just remains in one place. Rocks afford the rockpool fish, crabs and other invertebrates protection from the heat of the April sun, retaining vital moisture on the underside, as well as providing shelter from predators: seagulls, oystercatchers, crows and other marine birds, as well as human rockpoolers and collectors when the tide is out.

For this reason, it is important to follow the **Coastal Code** and return all rocks picked up to exactly the same place, and the same way up, as they were found.

Activity

A few warm days can encourage the first people to venture on to the shore at low tide. The rockpool life also increases in the spring season.

As the days become longer and the brighter sunlight penetrates the clouds and off murky water, the seas bloom into life. The microscopic plant life of the oceans is called phytoplankton. This harnesses the increased sunlight, together with carbon dioxide and minerals in the sea into blooms of food at the **Primary** stage of the food chain. This increased food supply provides nutrition directly for sessile organisms like mussels which inhale seawater and filter the microscopic planktonic life. Acom Barnacles, cemented in their millions to the rocks, extract the phytoplankton in a different way, but using their feathery **cirri**, sometimes called feet, to kick the food into their 'crustacean' cavity.

Blennies

April beckons the arrival of more fish and crabs from deep water. Many stay to breed, like the Blenny, also known as the Shanny. This small green fish reaches a length of 16cm (6.3in)



The Common Blenny or Shanny. Blennies are good aquarium choices.

and can be found on the shore until autumn. The early fry will have already hatched from eggs laid and guarded by the adults in the deeper shore pools. The juveniles feed on the **cirri** of barnacles among a varied diet of worms, small crabs and other shore animals crunched by sharp comb-like teeth.

With its mucus-protected scaleless skin, the Shanny can squeeze into crannies. It will be found under rocks and even completely out of the water at low tide. Blennies are ideal aquarium fish. It is best to collect a few small fish about 35mm (1.4in) long. They are gregarious and five fish in an aquarium make an attractive show. They will feed readily on boiled mussel, but thrive better if this diet is supplemented by shrimps, mysids and small crabs.

Echinoderms

On the lower shore, the rockpooler may be lucky enough to discover a green Shore Urchin. It may sometimes be tricky to spot as the spines, which can be tinged with purple, are frequently covered with shore debris like pebbles and seashells. This urchin rasps away at algae. In aquaria it is intolerant of temperatures above 23°C (c 73.5°F) and large fluctuations of over 2°C

APRIL CHECKLIST

On a good day in April, a rocky shore could be abundantly packed with marine life. The list of species given below only includes the most noticeable of the rockpool fish and invertebrates that live here throughout most of the length of the British coast during April. The selection is similar to that found in March, but most species are more abundant.

Bony Fish (Teleosts)

| | |
|------------------------|--------------------------------------|
| Widespread Blenny | Greenling (east coast only) |
| Blenny (or Shanny) | Lichthys pinnatus |
| Rock Goby | Gobius paganus (adult and west only) |
| Butterfish | Fluke (piscivore) |
| S-Banded Pouting | Clay minnow |
| Seahead (Sea Scorpion) | Tautoglabrus |
| Common Goby | Pomatoschistus minutus |
| Small-headed Clinfish | Apletichthys |

Crustaceans

| | |
|--------------|----------------------|
| Shore Crab | Carcinus maenas |
| Rock Crab | Pilumnus eriocheilus |
| Cobble Crab | Cancer pagurus |
| Flawless | Palaemon sp. |
| Brown Shrimp | Callinectes sapidus |

Echinoderms

| | |
|-----------------|--------------------|
| Common Starfish | Asterias rubens |
| Shore Urchin | Panopaea packardii |

Molluscs

| | |
|------------------|--|
| Periwinkle | Littorina littorea (plus four other species at various) |
| Limpet | Patella vulgata (plus two other limpets in the south-west) |
| Grey Topshell | Gibbus umbonatus (other topshells in the south-west) |
| Painted Topshell | Calliostoma zigrum |
| Dogwhelk | Modiolus modiolus |
| Grey Sea Slug | Arca arcuata |
| Mussel | Aequipecten irradians |

Sea Anemones

| | |
|------------------|--|
| Sessile Anemone | Anemone viridis v. A. subviridis (south and west only) |
| Clonal Anemone | Urticina linza (or Urticina) |
| Staghorn Anemone | Actinia equina |
| Flare Anemone | Calliactis pedunculata (south and west only) |
| Scagrat Anemone | Supuria spp. |

Note: The principal monthly records are taken from the English Channel with occasional reports from British Marine Life Study Society (BMLSS) members around the country. They are a general guideline. Most of the molluscs, like the starfish periwinkles and both Urticinae, are present in all months of the year. Reports of other rockpool and shore invertebrates from readers are welcome. All letters will be replied to.



Among the Echinoderms are the Shore Urchins and Common Starfish.

(3.6°F). Urchins belong to a phylum of wholly marine invertebrates called the Echinodermata, which includes the starfish.

Starfish are thought to be typical inhabitants of the shore, but their incidence on British shores can be highly erratic. The Common Starfish is an orange species that has five arms, and is the usual one found between the tides. It can cling tightly to the underside of a rock and care may be needed to extract an intact specimen. This starfish feeds on mussels by humping itself over the bivalve molluscs and consuming the flesh inside when the mussel opens to feed. The Common Starfish is intolerant of temperatures exceeding 22° (c 72°F).

Crabs

All the March visitors to the shore are likely to remain during April. On the lower shore of a spring tide, buried in the sand under rocks, undersized specimens of the Edible Crab will hide. This species is the brick-red crab with a pie-crust carapace that is seen on fishmongers' slabs. The legal minimum size for collection is 14cm (5.5in) across the width of the shell. The Edible Crab is too disruptive for home aquaria.

However, there is the attractive



An Edible Crab feeds on molluscs in various ways. This specimen is trying to prise a limpet off a rock.

Hairy Crab which is the same colour as the Edible Crab, and makes an admirable aquarium inmate if kept away from blennies and wrasses. It is distinguished

by having its major claws always of a different size and, as its popular name suggests, has hairs all over its legs and carapace.

Gastropods

Marine snails with coiled shells belong to the class of molluscs called the Gastropoda. Besides the Common Periwinkle, there are many other species that are permanent or temporary visitors. A far greater variety, including the attractive Painted Topshell, are only to be found regularly on the shore in the south and west of Britain.

In April, on unpolluted shores* rockpools may notice clumps of yellow/orange egg capsules on rocks and mussel beds. These are laid by the predatory snail known as the Dogwhelk. The Dogwhelk feeds on mussels by boring a hole on the outside and sucking out the rich orange flesh; it feeds on Acorn Barnacles by smothering them.

*The Dogwhelk does not breed on shores polluted by Tributyltin tin (TBT).

Filter Feeders

Filter feeding is a term used in aquarium literature. It is actually a term that covers a wide range of feeding methods that all involve filtering suspended organic matter from water.

In practical terms these particles of organic matter can be divided into two groups:

Live Phytoplankton

Rotifer cultures are available for feeding a few organisms like mysids. However, filter feeding molluscs like mussels that feed exclusively on diatoms are impossible to feed on a long term basis in home aquaria.

Dead Organic Matter

Other filter feeders, like some of the sponges, obtain some of their nutrition from surrounding water in the form of dead particles. Sponges and other filter feeders are still tricky to keep in prime condition for long periods in home aquaria, but can be kept alive by the use of special 'invertebrate foods'. The juice of the mussel may not be sufficient on

BRITISH SEA TEMPERATURES (SURFACE, INSHORE)

APRIL

| | °C | °F |
|------------------------|------|----|
| Thurso, North Scotland | 6.7 | 44 |
| Newcastle | 5.6 | 42 |
| Donegal | 8.9 | 48 |
| Brighton | 7.8 | 46 |
| Plymouth | 8.9 | 48 |
| Gibraltar | 15.6 | 60 |

THE WATER GARDENER

MARCH/APRIL ISSUE ON SALE NOW

THE MAGAZINE FOR GARDENERS WHO LIKE IT WITH WATER AND THE BEST GUIDE FOR BEGINNERS AND EXPERTS ALIKE

- Making a stream — instructions for building one in your garden
- Fountains and pumps — a review of the latest models
- Ideas for bridges to cross your pond or stream
- Hostas — plants that thrive in moist soil
- How to clear green water
- Readers' gardens — more gems to visit

PLUS...

- NEWS
- COMPETITIONS
- DEALING WITH THE POND IN SPRING

ON SALE AT LEADING MAGAZINE OUTLETS

BEDFORDSHIRE

JAPANESE KOI Co. Ltd.
 HITCHIN ROAD, HENLOW,
 BEDFORDSHIRE
01462 850822
 Aquatic Superstore. 6000 sq ft on 24
 acre site. Tropicals, Marines, Fancy
 Goldfish, Plants, Ror and all Coldwater
 Fish, Equipment and Accessories.
 OPEN MON-SAT 9.00 - 5.30,
 SUN 11.00-5.00

Chiltern Aquatics 
 The one stop store for all your pond
 and aquarium requirements. Cold-
 water, tropical, marine. Poplars
 Nursery, Harlington Road, Tod-
 dington, Beds LU5 6HE. Tel:
 (0525) 875520; Fax: (0525) 875590.
 Only 200 yards from Junction 12,
 M1. Open seven days a week, 9am-
 5.30pm, open late on Thursday
 until 8.00pm. R/C/T/M/M/P/AA/B.

BERKSHIRE

AQUASPLASH
**PRE-FORMED PONDS,
 LINERS, PUMPS,
 FILTRATION, PLANTS
 AND KOI. AQUARIUM
 AND TROPICAL FISH,
 SNAKES, SPIDERS
 AND LIZARDS**
 MJS GARDEN CENTRE
 BATH ROAD, HARE HATCH
 READING, BERKS. Tel: (01734)
 404188
 
 OPEN 7 DAYS

**WINDSOR
 AQUARIST**
 High selection of Tropical Fish,
 Regular imports of Tropical
 Plants. Extensive collection of
 fancy goldfish, fish & stunning Marines &
 Invertebrates. Quality Aquarists & Cabinets in
 stock or made to measure.
 Open 7 days 9.30 am - 6pm
 Home Ground Craft Centre & Art Gallery,
 Heathlands Road, Wokingham
 Berks. Tel: 01734 775554 RG11 3AW

**COTTISMORE
 AQUATICS**
COTTISMORE NURSERY
 Newbury Road, Kingsclere,
 Newbury, Berkshire
 Tel: 0635 299100
 Everything for the perfect pond
 and aquarium
 R/C/AA/B/P 

PET-FISH
 359 Oxford Road, Reading
 Berkshire RG1 1AU
 Tel: 0734 582162
 Tropical Fish Specialists,
 Marines and Invertebrates,
 Ornamentals & Pond Fish.
 All accessories and large
 aquarium showrooms.
 Open 7 Days per Week
 363 days a year
 R/C/T/M/P/AA/B

**AQUATIC
 SERVICES
 (UK) LTD**
 MARINES, REPTILES,
 TROPICALS, COLDWATER
 IN OVER 200 TANKS
 PLUS ALL ACCESSORIES
 OPEN 7 DAYS A WEEK AT
 WILLOWS GARDEN CENTRE
 MAIDENHEAD ROAD, WINDSOR
 BERKSHIRE. TEL: 01753 820742

BUYERS' GUIDE

For details of advertising in this section please contact or write to, The Aquarist and Pondkeeper, c/o Dog World Ltd, 9 Tufton Street, Ashford, Kent TN23 1QN. Telephone: 0233 621877, Fax: 0233 645669.
 The firms listed are wholesalers or retailers of both in fishes, tanks, plants, appliances and accessories, reptiles and amphibia. Abbreviations: W Wholesale only. R Retail only. WR Wholesale and retail. C Coldwater. T Tropical. M Marine. P Plants. AA Appliances and accessories. B Books. R & A Reptiles and amphibia. ECD Early closing day.

BUCKINGHAMSHIRE

**frosts
 WATERLIFE**
 Tropical, marine and coldwater fish, all sold with unique Quality Assurance policy. Large interior fish room and extensive water gardens.
**FROST WATERLIFE
 FROSTS GARDEN CENTRE**
 Newport Road, Wilton Sands, Wilton Keynes
 Open Daily Between 10 & 14 M1

**The
 Waterlife Studio**
 EVERYTHING FOR THE POND AND WATER
 GARDEN. LARGE SELECTION OF TROPICAL,
 MARINE FISH AND INVERTEBRATES
**BOOKER GARDEN CENTRE, CLAY LANE,
 BOOKER, MARLOW, BUCKS**
 TEL: 0494 528885
 OPEN 7 DAYS A WEEK
 R/C/T/M/P/AA/B

CAMBRIDGESHIRE

**FISHES GALORE
 AQUATIC
 CENTRE**
 WELL OVER 4000 SQ FT OF
 MARINES, TROPICALS AND
 COLDWATER FISH. ALSO A WIDE
 SELECTION OF DRY GOODS.
 Situated at Topchi's Garden Centre on
 the A1 123 between St Ives &
 Huntingdon, Cambs.
 Tel: 0480 421004
 9 am - 5.30 pm 6 DAYS A WEEK
 10.30 am - 4.30 pm SUNDAYS

**ALVENOR AQUATICS
 AND WATER GARDENS**
 Murrów, Nr Woodch, Cambs PE13 4HB
 Tel: 020851 300449
**EVERYTHING FOR THE
 FISHKEEPING HOBBY**
 Tropical, coldwater, pondfish and
 equipment
 Open: Tues-Sun - 9.30am-5pm
 OPEN BANK HOLIDAYS
 Other times by appointment 

**Water ZOO
 PETERBOROUGH**
 Everything for the aquarist and
 pondkeeper in 4000 sq ft of sales area
 300 tanks of tropicals, marines & ornies
 Plus coldwater fish and all the
 equipment. Open 7 days
**438 LINCOLN ROAD
 PETERBOROUGH
 TEL: (07733)
 312142**

**TROPICAL
 POND
 KIOSK**
 Tropical and coldwater fish (1000s in stock)
 really worth a visit
 one of the best centres for choice
 and liner, pumps, filters, UV, etc
 incorporating over 6000 sq ft area
 6'2"-20'
 Open everyday except Wednesday
 ideal centre for all your needs
Parking for 300 Cars
BAMBERS GARDEN CENTRE
 LYNN ROAD, WOBURN PE14 7DA
 Tel: 01945 585458

**CHATTERIS
 AQUATICS**
 14 Pound Road, Chatteris
 Telephone: 01354 692801
**Open Tues to Sun
 10 am-6pm
 Open Bank Holidays**
 R/C/T/P/AA/B

CHESHIRE

Congleton Water World
 Foundry Bank (Nr Leisure Centre)
 Congleton. Telephone (0260)
 272645. Tropical Freshwater &
 Marine Fish & Invertebrates; Cold-
 water Fish, Plants, Ponds and
 Equipment. Mon, Tues, Thurs.
 10am-8pm. Wed, Fri, Sat, Sun, 10
 am-5 pm. W/R/C/T/M/P/AA/B.

QUAY AQUATICS

FOR A FIRST CLASS
 SELECTION OF RAISE AND CRYSTAL
 TROPICAL AND COLDWATER FISH, PLANTS,
 BOOKS AND ALL OTHER ACCESSORIES
**CURRANS ROAD,
 WARRINGTON, CHESHIRE**
TEL: 0925 234780
 Opening Times: Tue-Fri 12.00-8.00 pm
 Sat: 10.00 am - 6.00 pm
 Sunday 10.30 am - 4.30 pm
 CLOSED MONDAYS EXCEPT BANK HOLIDAYS
 R/C/T/P/AA/B

**TOP-UP CENTRE
 (AQUATICS DIRECT LTD)**
THE No.1 AQUATIC DISCOUNTER
 Save 50%
 on Dry Goods & Fish
 Send for Free Catalogue
 Same prices in shop
Silk St, Congleton
 (Off by Free Station off A54 over 400 yds)
 Tel: 0206 270144 Fax: 0206 281184

LIMESTAR TROPICALS
 67 HIGH ST, TAVEN
 CHESTER. TEL: (0527) 749100
 The area's largest selection of Tropical,
 Marine, Fresh and Cold Water Fish,
 Extensive range of Tanks, Cabinets and
 all Accessories. Many Reptiles and
 Amphibians.
 Open Mon, Wed, Thur, Fri 11.00am-
 5.00pm, Sat 10.00am-5.30pm, Sun
 2.00pm-5.30pm. Late Night
 Tue, Thur, Fri 6.30pm-9.00 pm 

**TROPICS
 OF STOCKPORT**
 248E WELLINGTON ROAD SOUTH
 STOCKPORT - TEL/FAX 061-480-9630
 TROPICAL, COLDWATER,
 BRACKISH, MARINES & INVERTS,
 DISCUS, LIVEBEARERS & CATFISH,
 FROZEN FOOD, POTTED PLANTS &
 RARE FISH
 Personally imported from Holland
 and Germany
 OPEN SIX DAYS - LATE NIGHT THURS
 CLOSED WEDS
 TRADE ENQUIRIES WELCOME
 W/R/C/T/M/P/AA/B

DERBYSHIRE

AQUAFLIGHT
 Cichlids from Malawi, Tanganyika,
 West Africa, Central & South America,
 including dwarfs
 Discus a specialty, also Catfish,
 Characins and many others
**Unit 14/15, Lumsdale Mill
 Lower Lumsdale, Matlock
 Derbyshire. Tel: 0629 580006**
 Ring for directions
 Open: Mon, Tues, Fri 9.30am-5pm;
 Thurs 7pm-9pm; Sat 9.30am-4.30pm;
 Sun 1pm-5pm; Closed Weds
 Trade enquiries welcome

DORSET

ALLPETS & AQUATICS
 148 DORCHESTER ROAD
 OAKDALE, POOLE, DORSET
 Telephone: 0202 740504
Open 7 days a week
 Monday-Saturday 9-6 pm
 Sunday 10-1pm
 W/R/C/T/P/AA/B

THE AQUATIC CENTRE
 c/o JOHN BROWN GARDEN CENTRE
 Norton Road, Three Legged Cross, Dorset
 Open 7 days a week - Mon-Sat 9am - 5pm
 Sun 10am - 4pm
 Tropical Marine, Coldwater Plants
 Quality Pond Fish, Japanese Koi
 and Plants and all accessories
Telephone: 01202 823042
 R/C/T/M/P/AA/B

PLEASE MENTION A&P WHEN REPLYING TO ADVERTS

ESSEX

WETPETS

MARINE, TROPICAL & COLDWATER FISHES

BUTYL POND LINERS

TUNZE FILTER SYSTEMS

★ NITRAGON (Nitrite Remover)

★ REVERSE OSMOSIS (WATER PURIFICATION UNIT)

★ TRADE ENQUIRIES WELCOME

"NOW OPEN SUNDAYS"

71 Victoria Rd, Ruislip, Middx. (0708) 744880
Opening Hours: Mon-Sat 10 am-6 pm, Sun 10 am-5 pm



TRANQUILITY AQUATIC CENTRE

1957-1959 High Road, Chadwell Heath
Tel: 081 595 9604 Fax: 081 503 8182
Tropical, marine and coldwater (pond and ornamental). A good range of plants, ponds, pumps, and aquatic accessories. Cabinets and aquariums our speciality.
Open 7 days a week



Everything you need to build and maintain your pond — liners, filters, pumps, treatments, fountains, ornaments, etc + Coldwater, Marine and Tropical Fish, Invertebrates, Live Corals, Reptiles and Exotic Reptiles. All attractively displayed in beautiful surroundings.
WHY NOT PAY US A VISIT
You won't regret it!
342 London Road, Stanway, Colchester, Essex
Open every day
Mon-Sat 8am-6pm, Sundays 11am-5pm
Tel: 0206 210360
Fax: 0206 212070

BASILDON AQUATIC CENTRE

SPECIALISTS IN EVERYTHING AQUATIC INCORPORATING A VAST RANGE OF COLDWATER, TROPICAL & SALTWATER LIVESTOCK PLUS AN EXTENSIVE RANGE OF ACCESSORIES AND AQUARIUMS

MAIN AGENTS FOR SEABRAY, JZWEL AND LIVING WORLD AQUARIUMS, HENRI STUDIO GARDEN ORNAMENTS

NEVENDON ROAD BASILDON, ESSEX (OFF A127)

Tel: 0268 523515
Fax: 0268 526833

Open 7 days a week
R/C/T/M/P/A/S

Pond Koi Care

Spring... Summer... Autumn
Fish Health Water Quality
POND AND FILTERS CLEANED ON REGULAR BASIS IF REQUIRED
Filters, Ultra Chlorin, Pumps, Pond Protection Kits etc. Supplied and installed
Treatment and control of Parasites and bacterial diseases
Pondcare, 10 Year Avenue, Witham, Essex CM8 1TB. Telephone: (01240) 805575
9.15-7.00. Mobile Tel No: 0450 782390.
Fax No: 01240 803740

Skilton, C.J., Aquarist

The most comprehensive selection for Reptile and Aquatic Supplies. Consultants, Filtration and Water Garden Design. We have the equipment YOU need.
Great Gibberich Close, Bury Green, Sutton, Chesham, MK2 7EB.
Telephone: (01294) 805535.
Fax: (01294) 805565

Blue Lagoon Aquatics

Our Speciality is to give the customers an Excellent Service
We offer a wide selection of Hot and Coldwater Fish, Pond Equipment including Filters, UV and Pondliners.
Visit our new pond 90ft long.
LARGE SELECTION OF TOP QUALITY TROPICAL FISH AND AQUATIC GOODS
Call us on 0181 995 9655 or visit us at
157 BROAD ST, DAGENHAM, ESSEX

GLoucestershire

LANGDONS AQUARIA

Everything for your Aquarium and Pond
TROPICAL MARINE & COLDWATER FISH, REPTILES & AMPHIBIANS
82 Falkner Street, Gloucester
GL1 4SJ. Tel: (0452) 303265



THE AQUATIC HABITAT
Shurdington Road (A46), Brockworth, Gloucester GL3 4PU
0452 562791
Everything for the aquarium or watergarden — including Koi — from one of Britain's leading specialists
OPEN EVERY DAY EXCEPT WEDNESDAY
W/C/T/M/P/A/S

Hampshire

CREATURE COMFORTS & AQUATIC CENTRE

15 RINGWOOD ROAD, TOTTEN, SOUTHAMPTON
Tel: 0703 868329
Open 7 days

Also at
CADNAM GARDEN CENTRE
Southampton Road, Cadnam
Tel: 0703 812316 — Open 7 days
R/C/T/M/P/A/S

LYNCHFORD AQUATICS

46 Peabody Road, Farnborough, Hants
Telephone: 01329 542951
200 Tanks, tropical, marine and invertebrate systems
R/C/T/M/P/A/S

Arundel Aviaries & Fisheries (Taylors) Ltd

313/315 Arundel Street
Portsmouth PO1 1NJ
Telephone: 0705 820047
Mon-Sat, 9a.m.-6p.m.
Wed, 9a.m.-1p.m.
Est. over 60 years
R/C/T/P/A/R&A/M

HEREFORDSHIRE

THE AQUATIC WAREHOUSE

BIRCHALL LANE, COLE GREEN, HERTFORD, HERTFORDSHIRE SG14 2NR
Open 7 days 8am till 6pm
Late night Wednesday 7.30pm
VISA/ACCESS Tel: 0707 391196/7

KENT

The Pet Shop of Petts Wood
121/123 Queensway, Petts Wood, Kent. Telephone: Orpington (0689) 825543. Mon. Tues. Thurs. Sat. 9a.m.-5.30p.m. Wed. 9a.m.-1.00p.m. Late night Fri. 9a.m.-7.00p.m. Closed Sun. R/C/T/P/A/B/R&A

BEAVER WATER WORLD REPTILE ZOO & AQUATIC CENTRE

WATLANDS FARM, APPROACH ROAD, TAYFIELD, KENT TN7 5JT
TELEPHONE: 01908 779097
SHOP UNDER NEW MANAGEMENT
Tropical & Coldwater Fish & Plants, Pet Section, small animals & birds. Landscaped Grounds, Plastic & Play Areas, Natural Ponds & Aviary, Wildlife Art Gallery, Refreshments, seasonal hot & cold snacks. Wheelchair access to most areas & toilets for the disabled.
Opening Hours: 10AM TO 5PM - Winter 10AM TO 6PM - Summer

Lancashire



Tropical & Marine Fish Specialists
• Probably the best selection in Lancashire
• Everything for the Aquarist
• Garden Ponds, Fish & Treatments
• Large Wellstocked Storerooms
• Good selection of separate facilities, well used each to its own
• Large car park
Open: Mon 11.30am - Tues 7.30am - Wed 7.30am - Thurs 9.30am - Fri 9.30am - Sat 9.30am - Sun 11.30am-3pm
Quality Homes, Warrington St., 64 Barnwood 884833.
(Richard Pople's Reptiles)
C/T/M/P/A/S/B

Leicester

ULLESTHORPE GARDEN & AQUATIC CENTRE

ONE OF THE MIDLANDS FINEST CENTRES FOR ALL YOUR GARDENING, WATER GARDENING & AQUATIC NEEDS — UNDER ONE ROOF!!
Koi & Coldwater fish, Tropical & Marine fish & associated dry goods etc. Expert advice on hand. Free delivery (20 mile radius)
LUTTERWORTH ROAD, ULLESTHORPE LEICS
0455 202144
Find us on B577, open 7 days

Little Marina

WHOLESALE
201 TONGUE MOOR ROAD, BOI. TON, TEL: 01284 581724
FOR A WIDE SELECTION OF THE BEST QUALITY TROPICAL & COLDWATER FISH IN THE NORTH WEST, OUR DARK BREED DISCUS A SPECIALTY

OPEN 7 DAYS
92 MARKET STREET, FARNWORTH
TEL: 01204 72853

TROPICALS - COLDWATER - MARINES
SMALL MAMMALS - REPTILES
AMPHIBIANS - PLUS EXPERT ADVICE
SMALL ENOUGH TO CARE - BIG ENOUGH TO CARE

A5 Pet & Aquatics

One of the most comprehensive ranges of pet and aquatic goods to be found anywhere. It will not be one of those walled gardens in...
ADWEN GARDEN CENTRE
Loughborough Road (Off A6) Spence, Leicestershire, Leicestershire. Tel: 0114 271660

LINCOLNSHIRE



WOODTHORPE HALL AQUATICS
120 Tanks of quarantined Tropical and Coldwater Fish. Plus all accessories.
Open 7 days a week
9.00am - 5.00pm
The 120ftm. albatross between Adorn & Wilton on the A1375

LONDON (East)

EAST HAM AQUATICS

148 HIGH STREET SOUTH
LONDON E6
081 470 3600
Tropical, Coldwater, Marine and Invertebrates
NEW SECTION NOW OPEN
Mon-Sat 9.30am-6.00pm
Sun 10.00 am-2pm, Wed 1pm-6pm
R/C/T/M/A/S/B

MANOR AQUATICS CENTRE

★ NOW OPEN ★
COME AND VISIT ONE OF LONDON'S NEWEST AND FINEST AQUATIC CENTRES
A FANTASTIC SELECTION OF TROPICAL & COLDWATER MARINE FISH AND INVERTS
OVER 200 AQUARIUMS FULL OF FULLY QUARANTINED QUALITY FISH. A COMPLETE RANGE OF ACCESSORIES: PUMPS - TANKS - FILTERS - PLANTS - CABINETS - LIVE & FROZEN FOODS
OUR AIM IS TO GIVE YOU THE CUSTOMER SERVICE YOU ONLY DREAM OF — TOO MANY SPECIAL OFFERS TO MENTION
OPEN 7 DAYS A WEEK, LATE NIGHT THURS & FRI TILL 8PM
653-655 ROMFORD ROAD
LONDON E12
0181-478-4478

LONDON (SE)

HITHER GREEN AQUATIC SERVICES

13 Nappelhurst Road
Hither Green
London SE13 5ND
02 681 516 1102
Tropical Coldwater Fish And Accessories Maintenance & Problem Consultation

PLEASE MENTION A&P WHEN REPLYING TO ADVERTS

CASTLE AQUATICS

Visit our exciting new aquatic centre with over 90 tanks and ponds of tropical and coldwater fish. We stock a full range of equipment and accessories. Helpful and knowledgeable staff always willing to advise.

436 WELL HALL ROAD, ELTHAM, LONDON, SE9
Near the Woolwich Foot
0151 856 0505
OPEN SEVEN DAYS A WEEK

LONDON (S.W.)

TACHBROOK TROPICALS LTD

244 Yeashall Bridge Road, London SW1N 1BJ
Tel: 071-834 5179, Fax: 071-834 4242

Installation, maintenance and servicing of aquariums and ponds. All full range of fish, reptiles, plants and equipment for sale.

Open 6 days a week 9 am - 6 pm
Closed Sunday
W/C/T/M/F/A/S/B

THE FISH BOWL

133 Dawes Road, Fulham London, Tel: 071-385-6095

Large Selection of Tropical Fish plus a wide range of suitable accessories.

Friendly service

MERSEYSIDE

PETCARE CENTRE & AQUARIA

One of the better aquatic stores. Good selection of tropical and coldwater fish, conditioned and acclimated before sale. Clean displays, quality plants, tanks and all accessories.

Open Mon-Sat 9.30am-5.30pm
102 Alburgh Road Liverpool
Tel: 0151 727 8052

MIDDLESEX

Airport Aquaria
Heathrow Garden Centre, Sipson Road, West Drayton, Middlesex.
Telephone: 081-897 2563. Open 7 days a week. R/C/T/P/A/A/B

PONDS - PLANTS - FISH FOUNTAINS - AQUARIUMS

Open 7 days a week
Wildwoods Water Garden Centre
Theobalds Park Rd.
Crown Hill, Enfield, Middx EN2 8PP
Tel: 081-366 0243
Wildwoods

Rated as one of the top five by 'Which Magazine'

EASTCOTE AQUARIA & PET SUPPLIES

081-868 2480

Full range of MARINE TROPICAL COLDWATER POND FISH & ACCESSORIES

In fact, all the Aquarist & Pet owners needs supplied 'under one roof'

MON TUES THURS SAT 10.00 AM - 4 PM
CLOSED WED FRI 10.00 AM - 7 PM SUN 10.00 AM - 5 PM
LUNCH 2.00 PM OPEN MOST BANK HOLIDAYS
142 Field End Road, Eastcote, Middlesbrough, TS1 1RZ. (3 mins walk Eastcote Tubes)

THE WATERWORLD CENTRE

Bullmoor Lane, Enfield
Tel: 08921 761587

Tropical, Coldwater and Marine fish. Live food, equipment, books, etc. Specialists in Koï Ponds and Filters

POND CONSTRUCTION SPECIALISTS
Pond and aquarium deliveries. Large pet centre.

Open 7 days - 9 am to 6 pm

WEST MIDLANDS

HOLLY BUSH AQUATICS

HOLLYBUSH GARDEN CENTRE
WARSTONE ROAD,
SHARESHILL,
WOLVERHAMPTON
TEL: 0922 418900
MON - SAT 9AM - 5PM
SUN 10AM - 5PM
R/C/T/M/F/A/A/B

SHIRLEY AQUATICS THE MIDLANDS LARGEST AQUATIC CENTRE

Not just the best but the very best for Price, Selection, Quality & Service
Staffed Road, Shirley, Solihull, West Midlands (2 miles from M42 just 4). Open 7 days Ten-Amp. Mon to Sat, 10am-5pm
Sun, 10am-4pm
Tel: 0121 745 9281 Fax: 0121 744 0967 Mail Order Now Available.
W/C/T/M/F/A/A/B

Tropical Waters Aquatics

1181 Warwick Road, Acobles Green Birmingham, Tel: (021) 707 6433
Specialist aquatics, freshwater, tropical and coldwater fish, plants, food, tanks, cabinets and all accessories.
240 display tanks in four separate rooms. Friendly and helpful service and expert advice freely given.
Opening hours: Mon, Tue, Thu, Fri - 10.00 am to 5.30 pm.
Sat 9.00 am to 5.30 pm.
Sun 10 am - 4 pm. Closed Wed

A & D AQUATICS

One of the largest aquatic superstores in the Midlands
Suppliers of all coldwater, tropical and marine fish. Vast range of dry goods
CREDIT FACILITIES AVAILABLE
UNIT 56-57 ROUNDS GREEN ROAD, OLBURY, WEST MIDLANDS.
Tel: 0121 544 6794

MILTON KEYNES

HOBBY FISH FARM

Towcester Road (A5)
Old Stratford, Milton Keynes
Telephone: 0908 542801
DENNERLE SPECIALISTS
Open 10 - 5.30pm.
7 days a week.
R/C/T/M/F/A/A/B

NOTTINGHAMSHIRE

OLD MILL WATERLIFE

Open 9am - 5pm daily
Koï Carp, Coldwater and Tropical Fish. Extensive range of equipment for both pond and tank. Stockists of Jewel Aquarium Systems.
Units 27-28, Old Mill Lane Ind. Estate, Mansfield Woodhouse, Notts NG19 9BG.
Phone or Fax: Mansfield 0623 647317

OXFORDSHIRE

THE GOLDFISH BOWL

116-122 Magdalen Road, Oxford
Tel: Oxford (0865) 241825.
Fax: 0865 794511.
Mon-Fri, 10 am-5.30 pm;
Saturday, 9 am-5.30 pm;
Sunday, 10.30 am-4.30 pm.
For all your fishkeeping needs

SHROPSHIRE

BLUE LINE AQUATIC CENTRE

Shoat Hill, Ford, Shrewsbury
Tel: 01743 850761 Fax: 01743 850888
Tropical & coldwater fish, plants, all equipment. Manufacturers of 'Blue Line' Aquariums & cabinets.
Trade Welcome
Open Tues-Fri 2-6pm
Sat & Sun 10am-5pm.
Closed Mondays

SOMERSET

WATERMARQUE

BARTIC 4, LYNX WEST TRAD. EST., YEOVIL, SOMERSET 0935 55550
24-26 SOUTH STREET, WELLINGTON, SOMERSET 0825 667077
and HAMBRIDGE NR LANGPORT, SOMERSET 0458 251879
All shops packed with a comprehensive selection of water gardening equipment. Well-stocked display tanks full of Tropical Freshwater, Marine and Coldwater Fishes from Guppies to Cichlids, Clown Fish to Butterflies and Gouramis to Japanese Koï. Tanks, cabinets and all the equipment you will ever need available to view.
WATERMARQUE
— The Mark of Quality —
Aquarists the best in the south-west

THE AQUASTORE

124, HUSH YEOVIL, SOMERSET ENGLAND BA29 1BU
Tel: (0935) 234358
Fax: (0935) 202862
Oceans Ahead Over 180 tanks - 3 ponds Tropical Fish, Marine Fish, Coldwater Fish & a Good selection of Cichlids in stock
* BUY 5 OF THE SAME FISH GET 1 FREE *
* Custom made Tanks and Cabinets ***
*** WHY PAY MORE FOR LESS ***
Now open our Small Reptile Corner
OPEN 7 DAYS A WEEK 10.00 AM TILL 6.00 PM. EXCEPT SATURDAY 9.00 AM TILL 4.00 PM

SUFFOLK

KEDINGTON KOI

Bower House, Simons Lane, Kedington, Suffolk
Best quality Japanese Koï and equipment.
Filtration Specialist
Opening Hours: Mon, Thu, Fri, Sat, Sun 10am-5pm
Closed Tue & Wed.
Telephone: 0440 708080

SURREY

CORAL BAZAAR

1/2 Mile of stocked Aquariums
Queens Close, off Chequers Lane, Walton-on-the-Hill, Tadworth, Surrey, Tel: (0737) 812476
Large selection of accessories, Ethem and Turizo agents, Tropical, Marine and Coldwater fish, Ponds, water pumps, etc.
Open: Tue to Sat 10am - 5pm, Sun 10am - 4pm.
Closed Monday. Trade enquiries welcome.
W/C/T/M/F/A/A/B

SEYMOURS AQUATICS

SEYMOUR GARDEN & LEISURE CENTRE
P1 House, By Pass, Ewell, Surrey KT17 1PS
Telephone: 0181 363 0111 Ext: 80
Mon-Sat 10am - 5.30 pm, Sun 10am - 4.30 pm
Tropical, Marine and Coldwater Fish. Comprehensive Pond Plant range. Excellent Parking and Coffee Shop.

PENTANGLE WATER GARDENS

Kingshill Gardens, Creative Barrs Lane, Kingshill, Woking
Tel: (0453) 489757
Coldwater Fish, Ponds, Liners, Pumps, Ornaments, Pond Plants and more. Also Tropical Fish, Plants and Aquaria
Open 7 days, Mon - Fri 9 am-6 pm
Sat - 9 am-5pm, Sun 10 am-5 pm
R/C/T/M/F/A/A/B

SUSSEX

TRANQUILITY PLANTS & AQUATICS

Large selection of Tropical and Coldwater Fish, Reptiles and Amphibians, Plants and Accessories.
10% OFF ALL COMPLETE SET-UPS
179 EDWARD STREET, BRIGHTON, SUSSEX
TEL: 01273 827691

SUSSEX AQUATIC SERVICES

Weyville Garden Centre, Nechells Road, Kingston, Nr Lewes, East Sussex
Tel: Lewes (01273) 477600
Japanese Koï, Ornamental Coldwater and Tropical Fish. Over 40 pond shapes to choose from. Full range of pumps and accessories. Buyl rubber liners.
Open 7 days a week
S/C/T/M/F/A/A/B

TYNE & WEAR

ARMSTRONG'S AQUATICS

121 Bebb Street, Sunderland S86 0NT
Tel: 091 567 1370
Thousands of fish always in stock
Tropical Fish, Coldwater Fish and Plants. Guaranteed fit and healthy.

FOUNTAIN AQUATICS & PETS

JUST OPENED
For all your tropical, coldwater, reptile and amphibian needs. Specialists in aquariums, pond and filter maintenance.
Be sure to pay us a visit first
21 Mile End Road, South Shields, Tyne & Wear
Tel/Fax 0191 454 8662

NORTH EAST KOI & AQUATICS

For all your coldwater fish requirements. Good quality fancy goldfish. Pond construction and filtration specialists.
Largest selection of Japanese Koï in the North East of England. Fully quarantined before sale. Koï related equipment.
Open 10am-6pm everyday Inc. Sunday
Closed Tuesday
Tel: 091 413 1529
10 Main St, Crawcrook Ryton, Tyne & Wear
Fax: 091 413 1530

WARWICKSHIRE

A5 Aquatics

WATLING STREET
MUNDRADON CV11 6GG
Tel: (01203) 047454 Fax: (01203) 573118
One of the most comprehensive ranges of aquatic goods available in the UK. Thousands of tropical and coldwater plants, 300+ varieties of tropical and coldwater fish. See us 7 days of fresh stocked garden.
OPEN 7 DAYS A WEEK 10.00 to 4.00
ACCES. HSA - IMPROV. WELCOME

PLEASE MENTION A&P WHEN REPLYING TO ADVERTS

WILTSHIRE

Old Forge Tropicals
12/13 Estcourt Street, Devizes.
Telephone: Devizes (01800) 72 5851
work; (01800) 72 4522 home. Open
Mon, Tues, Wed, 3 p.m.-6.30p.m.
Thur, 3p.m.-8p.m. Fri, 5p.m.-8p.m.
Sat 9.30a.m.-5p.m. Sun, 2p.m.
-5p.m. RCT/M/P/A/B.

YORKSHIRE

HARLINGTON NURSERIES
Doncaster Road, Harlington,
Nr. High Melton, Doncaster
Tel: (Rotherham)
(01709) 896396
Pet & Garden Centre
Not only the birds go
CHEEP
at Harlington — one of the
CHEAPEST
Pet Centres in the country
25% — 50% OFF
most major items for Fish,
Dogs, Cats,
Birds and small Mammals
Plus an extensive range of
Aquarium Fish, Pond
Fish and Accessories
OPEN 7 DAYS

Aqua-Juu
250 TANKS IN OUR SHOWROOMS
Full of Tropical, Coldwater & Pond Fish.
Massive range of accessories for all your
fishkeeping needs.
Visit our 250/1000 SHOWROOMS. WE
MANUFACTURE OUR OWN TANKS AND GARNETS.
WAD DIRECT TO YOU AT FACTORY PRICES.
Visit our shops:
11 Broad Street, Wakefield (Behind Burger King)
Tel: 01924 378979. Fax: 01924 290638
11 Millard Street, Barnsley (Opposite Market)
Tel: 01224 733433
FOLLOW US ON FACEBOOK

AQUATICA LTD
37 Brook Street, Wakefield,
Lege, the market! Yorkshire
Tel/Fax: (01924) 384473
180 Tanks Tropical, Coldwater Fish, Dis-
cus Specialist, 38 Tanks of Marine &
Inverts, Tanks, Cabinets and Filter Sys-
tems built to your specifications, marine
or freshwater. Reptiles, snakes and
spiders, plus full accessories.
Credit facilities available.
TELEPHONE FOR OPENING HOURS

**WATER GARDENING
SPECIALIST**
Koi/Pond Fish/Pools
All Accessories at reasonable prices
**TRANSCONTINENTAL
GOLDFISH CO. Ltd**
Hampden Garden Centre, Long
Lane, Dalton, Huddersfield
Tel: 01484 420400
Fax: 01484 453302
Major Credit Cards Accepted

**INTERNATIONAL
AQUATIC CENTRE**
126-128 West Bar, Sheffield
Telephone: 0114-275 0147
Open seven days a week
9.30 am - 5 pm
RCT/M/P/A/B

TINGLEY TROPICALS
Bradford Road, Tingley, nr Wakefield
Tel: (0532) 538088
Large selection of tropical and
coldwater fish, plants, books and
accessories.
SPECIALISTS IN CATFISH & RFT GILLY DOLOPS
Open Mon, Tues 1.30-4 pm. Also closed at day Thurs
10 am-4pm. Sat 10 am-4 pm Sun 11 am-4 pm
RCT/M/P/A/B

**WALES
GLAMORGAN**
FISH 'N' THINGS
UNIT 2, WINIFRED ROAD
SKEWEN, NEATH FA 10 6HP
Tel: 01792 812199
Fax: 01792 814789
One of the largest selection of
quarantined tropical fish. Also marine
and coldwater fish. Plus plants, tanks,
pumps and all accessories.
Biolists and Coral Life Supplier.

THE CORAL REEF
Clock Cinema Buildings, Roundhay
Road, Leeds.
Telephone: (0532) 401661.
Specialists in Quality Marine Fish
and Inverts.
Open: Mon, Wed, Thur, 10am-6.30pm. Fri,
10am-6pm. Sat 10am-6pm. Sun, 10am-6pm.
Personal attention given.
RCT/M/P/A/B

WEST YORKSHIRE
**VISIT OUR KOI
& TROPICAL
FISH CENTRE**
Probably the
largest in Yorkshire
Over 150 tanks and
50,000 gallons of pond water
QSS Aquarium & Koi Centre
229 Wakefield Road, Bradford, West
Yorkshire BD4 7NJ
Tel: (0274) 728381 Fax: (0274) 728718
OPEN:
MON-SAT 9.00-5.30
SUN 10.00-4.00

GWENT
THE KOI SHELTER
4 CHURCH LANE, LLANSOY
NEAR USK, GWENT
01291 650 383
Open 6 days. Closed Tuesdays.
Weekdays 10am - 7pm.
Sats/Sundays/Bank Holidays
10am-6pm
HIGH QUALITY JAPANESE KOI AT
COMPETITIVE PRICES

AP 9 Tufton Street Ashford, Kent TN23 1QN 50p a word — min charge £6.00

PRE-PAID CLASSIFIED ADVERTISEMENT ORDER FORM

| | | | |
|--|--|--|----|
| | | | 4 |
| | | | 8 |
| | | | 12 |
| | | | 16 |
| | | | 20 |
| | | | 24 |
| | | | 28 |
| | | | 32 |
| | | | 36 |
| | | | 40 |
| | | | 44 |

Name _____
Address _____
Tel _____

Number of words _____ x 50p £ _____
Box Number if required + £5.00 £ _____
Total for one issue £ _____
Total for _____ issues £ _____
VAT at 17½% £ _____

All advertisements in The Aquarist and Pondkeeper are published in good faith but enquiries or orders from all readers are a matter between the individual and advertiser as a normal business transaction. Advertisements are accepted on the express understanding that the advertisement does not contravene any of the provisions of the Trade Descriptions Act, 1968, or any other legislation.

Copy received by the 8th of the month will appear in the following issue

PLEASE MENTION A&P WHEN REPLYING TO ADVERTS

CLASSIFIED

Lineage 50p per word
(minimum £6) box numbers
£5.00 extra. Semi display.
£9.00 per sq cm (min 3 cms)
and pro rata.

ALL ADVERTISEMENTS SHOULD BE PREPARED AND ADDRESSED TO:
THE AQUARIST AND PONDKEEPER, c/o DOG WORLD LTD
9 TUFTON STREET, ASHFORD, KENT TN23 1QN.
TELEPHONE: (01233) 621877. FAX: (01233) 64569
ACCESS AND VISA ACCEPTED. JUST QUOTE YOUR NUMBER

VETS DIRECTORY

**For Referral Surgeries for
Fish and Reptiles:**

**Lance Jepson MA,
VetMB, GIBiol, MRCVS**

David Cuffe & Associates,
348 South Lambeth Road,
London SW8
Tel: 0171 498 6363

**Lance Jepson MA,
VetMB, GIBiol,
MRCVS**

The Fenton Veterinary
Practice, 21 Portfield,
Haverfordwest, Dyfed.
Tel: 01437 762806
(24 hours)

**For Referral Surgeries for
Fish and Reptiles:**

**Lance Jepson MA,
VetMB, GIBiol, MRCVS**

Animal Medical Centre,
511 Wilbraham Road,
Chorlton-cum-Hardy,
Manchester.
Tel: 0161 5813329

**AVIAN & EXOTIC
VETERINARY CENTRE**

A Veterinary practice specifically set
up to cater for veterinary care and
management of all "exotic animals"

Snakes - Lizards - Chelonis
Amphibians - Freshwater & marine
fish - Invertebrates

Dr Maclean, B.Sc., B.V.M.S.,
M.R.C.V.S.

Empire House, Auster Road, Southen
End, Nr Maldenhead, Surrey SL4 2LA. Tel:
01428-577143/4925/50973
CONSULTATION BY APPOINTMENT

POND EQUIPMENT

**DEEPPDALE
Water Garden Centre**
(Formerly Fortune Fisheries)

Visit our newly opened shop for
all your pond equipment. Wide
range of pumps — Oase, Oster,
Lotus. Plus good selection of Koi
and other species. Refreshments
available in beautiful, peaceful
surroundings

Deeppdale, Pecton, Beds
Tel: 01767 261400

Take B1042, Sandy to Pecton Road, turn at
end of "Locomotive" public house

WATER GARDENS

**Your Complete
Water Garden.
In an Envelope.**

From the world's largest water
garden center, a new 48
page colour illustrated
guide to building and
maintaining your water
garden, plus a
comprehensive
list, with prices
of products,
plants and equipment.
For our new Complete
Guide to Water
Gardening send
£3.99 cheque/PO,
to Stapley
Water Gardens
Limited, Dept. AP54,
Stapley,
Northwick,
Cheshire,
CW5 7LR.

Enter will, come and see
us. Just follow the brown
tourist signs from
Junction 16 on
the M6.

**STAPLEY
Water Gardens**
Telephone: 01275 626111

MICROSCOPES

**MICROSCOPES
FISH DISEASE**

* Single low cost diagnostic kit
for skin and gill diseases.
* Specialist suppliers of
microscopes for home use.
* Books, stains, slides.
* Used instruments bought and
sold.
* Helpline open until 10pm
daily.

Telephone enquiries (01249) 791801.
All page illustrated catalogue (strongly approved)
BRUNN, MICROSCOPES (Dept AG)
Unit 1, Newark Workshop, Park Lane, Garton, Wiltz SW2 9SR

FOR SALE

COMPLETE FISH HOUSE.
Livestock (some Discus)
equipment (including 5' and
6' tanks) first to see will buy at
£1,000. Worth much more.
Telephone Bradford 0274
59530 for more details.

GUDGEON. 1000's for sale.
Parkers Down Fish Farm.
Telephone: 01837 810549.

FOOD

PROMIN high protein granu-
lated fish food. Available in
fine, medium, coarse or
cichlid grades. 41gm tub
£1.86, 114gm tub £3.47, 10oz
tub £6.38, 21oz bucket
£11.42, 3lb bucket £23.12, 6lb
bucket £45.15. Post paid from
Globalcustom Limited, Dept
AP, Barton Stacey, Winchester
SO21 3QL — state grade
required.

**FINEST SELECTED LIVE-
FOOD CULTURES.**
Whiteworm, Grindalworm
£2.50 each, Microworm,
Wingless Fruitflies, £2.30
each. Any 3, £6. SAE list.
Margaret Higginbottom,
Laboratory Livefoods, High
Bradfield, Sheffield S6 6LJ.

WHITE WORM cultures. Top
quality by return post. £2.25
to Marina, 201 Tonge Moor
Road, Bolton BL2 2HR.

FILTERS/PUMPS

**THE MIDLANDS
LARGEST STOCKIST**
SEND FILTER TANKS - SELF PRIMING LARGE BUCKET
PUMPS - VACUUM NUMB COLLECTORS - SAC HOSE
- BOTTOM SUMP FOR CONCRETE UNDER FLOORS -
SUBMERSIBLE PUMPS - FPE FITTINGS
ASHER Pool Centre Ltd
Unit 10, Farnley, Farnley, Doncaster, South Yorkshire
S22 7LN. Daytime Office Hours: 01422 77000 or 01422
77015. Fax No. Day & Night: 01422 77015. Out of
Office Hours: 01422 77015. 01422 77015
CREDIT CARDS ACCEPTED

TROPICALS

N & K AQUATICS

**St James's Square
Barnoldswick, Lancs**
Tel: 01282 813084

Over 100 tropical, coldwater &
marine tanks; plus plants and
all accessories

Open Mon, Wed, Fri 10.00-5.30
Late night Thurs 10.00-7.00
Sat 10.00-5.00, Sun 11.00-4.30

BOOKS

THE WATERLILIES. Henry
Conard's monograph. Facsimile
reprint now available in
paperback, £28.00. Post paid
from Lark Publications, Unit
6, Faraday Place, Thetford,
Norfolk, IP24 3RG. Allow 7
days for delivery.

CLUBS AND ASSOCIATIONS

**GOLDFISH SOCIETY OF
GREAT BRITAIN**

Send SAE for further details
to: Ms Christine Griffin, 32A
North Road, Three Bridges,
Crawley, West Sussex RH10
1JX.

**BRITISH CICHLID
ASSOCIATION**

Send S.A.E. for details or £2.50 for
full sample pack of publication to:
B.C.A. (AP), 70 Morton Street,
Middleton, Manchester.

**THE ASSOCIATION OF
AQUARISTS**

offers you our quarterly magazine,
videos and specialist publications
for just £5.50 single or £7.50 club.
Send to Membership Sec (AP), 2
Telephone Road, Portsmouth,
Hants., or SAE for more details.

**BRITISH KILLIFISH
ASSOCIATION**

For details send 28p S.A.E. to: A.
Burge (Dept AP), 14 Hubbard
Close, Wymondham, Norfolk
NR18 0DU.



WHOLESALE

**MURRAY AQUATICS
SCOTLAND**

1641 Wellington Street, Glasgow G1 6BJ
With over 450 holding tanks and stock
rooms. We can accommodate you from
the largest to the smallest aquatic
dealer

Phone 0141-204 2345,
Fax 0141-204 3211
Trade Enquiries Welcome
BREEDER STOCK REQUIRED

PLANTS

**GREEN LINE
AQUATIC DIRECT**

probably the biggest choice of aquatic
plants at the right prices you'll ever see
FREE 1998 CATALOGUE
NOW AVAILABLE
The Orchard, Hospital Drive, Little Sutton,
Spalding, Lincs PE12 5EL. Tel: 01430 266666
Trade enquiries welcome

PLEASE MENTION A&P WHEN REPLYING TO ADVERTS

Anything to declare?



TOP LEFT — Giant Clams are often offered for sale at holiday resorts.

BELOW LEFT — Trendy and colourful caps and shoes . . . except that they are made of banned snakeskin.

CENTRE — Hawksbill Turtles are protected . . . but here is a polished carapace and a trinket box.

ABOVE RIGHT — Black Coral — illegal bracelets and jangles are made from this species.

Here she comes now, just off the plane. Take a look — she's wearing a smart mini-skirt crafted from snakeskin and a similarly fashioned waistcoat inlaid with pieces of white coral. On one shoulder gleams a brooch: a tiny stuffed gecko. She wears a pair of crocodile leather shoes and a trendy lizard-skin hat (decorated with caiman teeth), while a matching lizard-skin bag dangles from her arm.

Black coral bracelets jangle on her wrists, her hair is fastened with a tortoise-shell clip, and around her neck hangs a threaded shark-tooth necklace. Her watch-strap and belt are made from alligator skin. She is carrying a jar of frogs' legs, a bowl of turtle soup and a musical instrument constructed from the shell of a small tortoise.

As she reaches the arrival hall, she is immediately surrounded by customs officers (and not just because she is attractive!). Some time later, after she has been cautioned and questioned, she leaves wearing a blanket! All her holiday buys have been declared illegal and confiscated.

Well, maybe the above imaginary young lady was rather over the top, but, even so, it is all too easy to buy an item because it looks good, not realising that it has been fashioned from an endangered species. Then you find yourself being closely questioned in the customs channels when you return home.

Dodgy souvenirs

Everyone likes to buy a souvenir when they are abroad, and if the souvenir is an example of local handiwork, so much the better. Most people know by now that exotic furs and elephant ivory are not allowed to be imported into Britain, but what about products made from reptiles,

Going on holiday this year? If so, as Susan Brewer explains, you would be well advised to steer clear of those souvenirs of blown-up puffers, crocodiles' teeth etc which might appeal to you as an aquarist, pondkeeper and herpetologist.

Photographs (all showing items confiscated at customs) by the author

corals, shells and the like?

If you are holidaying in the Caribbean, Sri Lanka or Greece and you see some of the beautiful tortoiseshell (actually marine turtle) bracelets, earrings, combs, mirrors and musical instruments crafted by the local people, you might not discover that these items are banned until you try to bring them through customs. Then they will be immediately confiscated.

Maybe you are in Zimbabwe, or Argentina, and the crocodile shoes and bags look tempting. Let's face it, some of them are very attractive items — BUT it is illegal to bring the skin of any crocodilian, including alligator and caiman, back from your travels. This includes the dead stuffed baby crocodiles used as draught-excluders, bookends and conversation pieces! (There are registered crocodile farms, which can issue a permit — but do you really want things made from the sad remains of beautiful creatures?)

Holidaying in the Philippines? Lucky you — but remember that the Giant Clams which are on sale everywhere cannot be imported into Britain unless you have a licence. (In fact, under certain circumstances you may need two, an export licence to allow you to export the goods from the country of origin, and an import licence, issued by the Department of Trade and Industry to allow you to bring them into Britain.)

Wonderful shells are sold along the Kenyan coast, too — sometimes it's not so much a matter of whether or not you are allowed to import them, but more 'will

your conscience allow you to bring them home?' Many of these beautiful shells are rare, and they are removed from the sea with the living creature still in residence. The creature is killed, the shells cleaned up and sold to the unwary tourists who buy them to ornament their sideboard. Meanwhile, the sea is slowly being denuded of its fauna.

Coral items are on sale in many countries, including Turkey, Kenya and Sri Lanka. Not only can you buy bracelets, necklaces, hair-clips and earrings, but also whole pieces of coral and large coral fans. Some of these things are breathtakingly beautiful, but please don't be tempted, it's just not worth it. Many species of coral are not allowed to be imported, and of the rest, if you buy, you are encouraging the plunder of reefs which are quickly being decimated. If only people didn't purchase such souvenirs, then maybe some of the world's coral reefs could be saved.

Control measures

CITES (Convention on International Trade in Endangered Species of Wild Flora and Fauna) is a treaty, signed in 1973, and its aims are to protect wildlife from over-exploitation and to prevent creatures being threatened with extinction by trade. More than 120 countries are members and they have agreed to ban trade completely in certain endangered species including many mammals (e.g. elephant, pangolin, whale), reptiles (e.g. crocodiles, turtles, lizards and snakes),

SOUVENIR FACTFILE

❑ Don't buy anything made from turtle shell, crocodile skin (unless licensed), snake or lizard skin. You won't be able to import it, and it will be confiscated.

❑ Many shells and corals are also banned. Anyway, the buying of these items as souvenirs just encourages the decimation of coral reefs.

❑ Most lizards, snakes and amphibians are protected under various international agreements. You won't be allowed to import them — and the penalties for smuggling are high.

❑ In 1993, more than 6,000 items made from shells, skin, feathers or fur of endangered species were seized by HM Customs, and almost 1,500 reptiles.

❑ For information on legal/illegal imports/exports contact:
Wildlife Travel Licensing Branch,
Department of the Environment,
Tollgate House,
Houlton Street,
Bristol BS2 9DJ
Tel 0117 9878691

various shellfish (including giant clams), corals (including black coral) and also many plants and orchids. Exceptionally, some licensed trade is allowed.

In addition, a separate branch has been formed, TRAFFIC (Trade Records Analysis of Flora and Fauna in Commerce) which keeps an eye on species which could become extinct if they are excessively traded.

'Loaded' travellers

What about live reptiles and amphibians? Many species are protected within their own countries and are not allowed to be exported under any condition, or in certain cases, only on production of a licence to recognised bodies. This ban has, I am afraid, tempted some people to try to beat the regulations.

Only recently, a man was prosecuted for trying to smuggle frogs inside his underwear, which must have been extremely uncomfortable, not to say ticklish. I don't suppose the frogs were particularly happy with the arrangement, either!

Another passenger who was stopped had over a hundred snakes and lizards stuffed into his luggage, and an investigation of his house uncovered many more illegally imported reptiles, including iguanas and alligators, which were immediately taken to the quarantine station.

Two potentially dangerous cases were reported this year. The first concerned a customs officer who opened a packet and discovered a container which seemed to be full of frogs. Luckily, realising that live creatures were inside, the officer didn't attempt to open the container but called in an expert, who identified the occupants as the Poison Arrow Frog, *Dendrobates histrionicus*. If the officer had touched the skin of one of these frogs, the conse-

quences could have been quite serious, as a poisonous toxin is secreted under stress which can sometimes cause vomiting and various other side-effects.

Had the frogs been the small yellow *Phyllobates terribilis*, which is considered to be the most toxic animal in the world, the outcome could have proved lethal if sufficient poison had come into contact with an open wound or scratch. (Each frog has about 1,900 micrograms of the toxin, and a human lethal dose is reckoned at around 2-200 micrograms.)

Poison Arrow Frogs have even been sent through the post from abroad on occasion. Apart from being highly illegal, one wonders about the effect of the franking machine on the poor creatures!

The other instance which might well have resulted in severe injury was when a customs officer found a case crammed full with cloth bags, which he presumed contained drugs. It was not until he had almost opened the first bag that the owner confessed that they were full of Rattlesnakes. The officer was extremely lucky — a Rattlesnake is capable of biting through a cloth bag with its poisonous fangs.

Lizards and snakes are regularly found in handbags, baby crocodiles hidden in luggage and frogs smuggled home in tobacco tins. A suitcase crammed with lizards was recently found at a British airport when a plane from Tenerife was unloaded. Nearly all had suffocated to death.

While it may be extremely tempting to scoop up the tortoise which plods across your path as you amble from your holiday villa, don't do it, as many species of tortoise are protected by international wildlife law, and, anyway, you are not allowed to import them into the UK without a permit.

Any illegally imported reptiles and amphibians which survive their traumatic journey are sent by customs to registered breeders or zoos. They cannot be returned to their country of origin as it is impossible



Stuffed Desert Monitor.



Python shoes, bag and pen.

to pinpoint the exact place of capture, and if released elsewhere, disease, or even foreign genetic material, could be introduced into a healthy colony, thus upsetting the balance of nature.

Our mythical young lady was carrying a bowl of turtle soup — well, all products derived from turtles are banned; this includes their oil and their leather. She was also holding a jar of frogs' legs. More difficult this, because many species of frog are used to create this so-called delicacy, but some are banned. I don't know how customs officials can tell which species are in the jars — but rest assured, THEY CAN! (Of course, our poor unfortunate happened to be carrying the wrong kind.)

So, it is just not worth trying to bring these banned items into Britain. Apart from the moral aspect — if you're a reader of *Aquarist & Pondkeeper*, then automatically you must be interested in, and almost certainly concerned about, the depletion of certain aquatic and reptilian species — you will have the goods confiscated, and could face fines and even imprisonment.

Next time you are stopped in the channels, remember that not even customs officers are quite so hard-hearted as they seem. They are just as upset as you by the vast amount of artefacts made from endangered species bought by unthinking tourists, which is why they are so strict with regards to enforcing the regulations. They are trying to conserve the world's rare fauna for future generations.

Leave the corals, the shells, the turtles and the sharks to their oceans and let the crocodiles continue to grin toothily in their swamps. How would YOU like to be someone's holiday souvenir? **AKP**

NOTE:

It is worth stressing that official aquatic trade organisations, such as Ornamental Fish International and Ornamental Fish Industry (UK), have a Code of Conduct and denounce any form of illegal transport of, and trade in, species of fish, invertebrates, reptiles and amphibians. So, they are doing their bit.

DISCUSSIONS

BY STEVE DUDLEY

Pigeon Update

After months of trials crossing Pigeon Bloods with fixed varieties of Discus, the outcome is as follows:

- 1 After crossing Pigeon Bloods with Red Turquoise, the percentage of Pigeon fry was almost equal to that of Red Turquoise and there was no apparent sign of any sports present.
- 2 The same outcome was evident with Brilliant Turquoise.
- 3 However, when crossed with unusual-shaped Discus: High-bodied Turquoise, up to 10% of the Pigeons appeared to be showing this trait. Perhaps, some of their ancestors had high bodies before Pigeon Bloods became known, or perhaps while the Pigeon Blood was being developed.

The final outcome of these crossings will not be available until the fry are of breeding age,

of course. Crossing back selected females that do not show Pigeon traits, with the father will be a little more conclusive, as these fish carry important PBR (Pigeon Blood Red) genes.

Meanwhile, all crosses have now ceased, as I have enough stock to assist with future experiments on PBR's. Presently, I have four pairs of Pigeon Bloods that will successfully raise their own young without any problems, but I am convinced that they will always be a hard strain to cultivate in large numbers, thus presenting an ongoing challenge for any Discus specialist.

Choice worms

- 1 A good food source for Discus are earthworms; not the huge things, but the smaller ones. These can be fed whole or chopped.

Bloodworms (also called Jokers) — probably the favourite live food for Discus.



M.P. & C. PETERSON

When feeding Discus, a look at the size of mouth, will help you determine if a particular worm can be consumed by the fish.

- 2 Whiteworms are another delicacy. These can be raised from a culture and, if looked after correctly, can last years.

3 Microworm is a good alternative to brine shrimp. It is a good first food for fry after they have fed off the parents' mucus. Microworms can be cultured and are very nourishing for growing Discus fry or any other fry.

4 Bloodworms (Jokers) are probably the favourite type of worm enjoyed by Discus. However, they should be used only as an additional food. Having said this, breeders in the Far East feed bloodworms as the main source of food, as they feel that it aids with breeding success.

RIGHT ABOVE — When attempting to breed Discus, always choose good-quality parents.

RIGHT BELOW — Never throw parents with feeding fry into sudden darkness. (see Golden Rule No 3).

Discus in London

QUALITY DISCUS KEPT IN PURPOSE-BUILT FISH HOUSE

Offer for sale the following:

- Red Turquoise (traditional and new strains)
- Golden Dragons • Turquoise
- Opals, Alencers, Pandas etc
- Steel Blues in various strains
- Solids (Cobalts, Super Cobalts etc)
- Water Purifiers from £46 • Spawning cones

SPECIAL LIMITED OFFER!

Large adult fish (quality breeders) from £35-£75
These prices are unbeatable!!!

Now breeding from the following stock

(Full authentication available)

- Pigeon Bloods • Gans • Dirk Schlingmanns
 - Klaus Grobawski • Heinz Stendker
- Always 1,200-1,500 fish available

WHOLESALE • TRADE • DISCUS DEALERS

My prices are consistently unbeatable!

Call Roger Miles 0181-360 6578

Fax 0171-739 5667

FREE delivery nationwide including Saturdays

ANIMALS ANTICS

Queens Hotel Courtyard
Sunny Bax, Doncaster DN1 1LY
Tel: 0302 366411

In stock at going to press: Many rare fish plus all varieties of Discus. We are open Mon-Sat 9.00-5.30, Sun 10.00-3.00.

A visit would bring a pleasant surprise to all serious fishkeepers.

DISCUS IN EAST SUSSEX

POLEGATE PETS NOW OPEN

purpose built discus house housing best quality bred fish — Argenteus, Whitefin Blues, Dragons, Turquoise, Steel Blues etc. All sizes including adults and younger pairs. Also Wharfedale, Topicals and all Accessories. Open: 9.00am-6.00pm, Mon-Sat, 9.00am-4.00pm, Sun. Late night Thursday until 9.00pm. 63 High Street, Polegate, East Sussex. Tel: 01323 833491

☎ ♦ 📠

SELECT DISCUS

Scottish bred quality fish. Large stock of top quality Discus available in Glasgow. All breeding stock carefully selected from top imported lines, i.e. German bred Turquoise, Brilliant Turquoise, Alencers Reds and many more.

For further details telephone
041 554 7985 or 0563 29915,
day, evening or w/e

Discus

THE BEST quality and newest colours of Discus around. Home bred and direct from Malaysia. Fish and videos. Telephone: Durham 091-386 2492.

FROM KENT USE OF REVERSE OSMOSIS OR DEIONIZED WATER IN AQUARIUMS

R/O Right₂ restores all desirable minerals which are removed by reverse osmosis, distilling, or deionization to make the water immediately safe for freshwater fish. R/O Right₂ is a dry powder, and is concentrated. Only 5 to 2 teaspoons, depending on the type of fish, is required per 10 gallons of purified water to create artificial river water conditions. R/O Right₂ includes all the major ions such as sodium, magnesium, calcium and potassium, as well as all of the major and minor trace minerals such as iron, manganese, iodine, copper, zinc, cobalt etc and is phosphate and nitrate free. R/O Right₂ also includes small amounts of buffering compounds to yield a stable pH. No organic chemicals are included. It is recommended that you measure the alkalinity and pH, and use phosphate free Kent pHSTABLE₂ and pHCONTROL PLUS₂ or pHCONTROL MINUS₂ as necessary to provide the proper pH for the fish you are keeping. For saltwater aquariums, R/O Right₂ is not required. The salt mix you are using will provide all necessary minerals. You may experience the need for additional buffering with Superbuffer-OKH₂ or new Marine Aquarium pHBUFFER₂ since the purified water has no alkalinity to speak of.

Sole UK Distributor: Advanced Aquarium Products, 10 Crundale Way, Cliftonville, Margate, Kent CT9 3YH
Tel: 01843 299765

AVAILABLE FROM ALL GOOD AQUATIC RETAILERS





STEVE DUDLEY

TOP TIPS WANTED
Do you have any tips to offer fellow discus keepers? If you have, please send them in.

STEVE DUDLEY



JUST DISCUS
Red Turquoise young discus. Large stock of home-bred 1 1/2 - 3 1/2" from £10. Also breeding pairs Red Turquoise, various prices.
Tel: Sheffield 01742 324381

SOUTH-EASTERN DISCUS. Large selection of quality Discus including Red Dragons, Golden Dragons, Steel Blues, Brilliant, Metallic Cobalts, German Reds and Gans. All Sizes Available from £6.00 each. Also RO's and Spawning Cones. Nationwide Delivery. Telephone: (0622) 872117 (Maldstone).

DARENTH DISCUS. Blues/Red/Uaru. All sizes. 35 G.P.D. - RO Units £140 - Tel: Dartford 0322 864475.

QUALITY EUROPEAN DISCUS
By TOM SMIET
HOLTON GARDENS, BIRLEY, SHEFFIELD, SOUTH YORKS S12 0JG
TEL: 0126 713596 - FAX: 0126 781976
● STOCKS INCLUDE: all kinds of Discus from Europe's top breeders, selected personally.
● MAGNIFICENT - Red Turquoise
● SUPERB - Brilliant Turquoise
● SPLENDID - Steel Blues - as beautiful as Blue Striped
● EXC - Strongest Reds
● PLUS Cobalts, Gold, Brilliant Reds, single sexed Adults, matched and breeding pairs.
● PLUS - top quality, medications for CSD, Spawning cones, Spawning Cones, 10-pyrates Discus food.
● GENCODE - C.B.R. and Metallic Water Purifiers and R.O. Units at lowest ever prices.
Best Trade Deal for you - open 7 days a week - 11.00am
Call And See Q.E.D. The Proof!

Golden Rules for Successful Breeding

- 1 Only breed from good specimens, to ensure good-quality offspring.
- 2 Situate the breeding tank where it is least likely to be disturbed, so avoid movement around the aquarium may induce flight behaviour, which, in turn, could cause the Discus to accidentally knock off eggs or fry from the spawning area.
- 3 Use a pygmy bulb to light the tank at night when fry become free-swimming. Sometimes, if thrown into sudden darkness, the fry will become separated from their parents and if your aquarium has a gravel base, they could perish.
- 4 Be prepared with growing on tanks for your young Discus. The successful hobbyist can expect to rear at least 100 Discus from one clutch.
- 5 Pick out the best specimens for future breeding purposes when they are 6-8 weeks of age. Discard all runts and deformed specimens and sell the rest to pay for your hobby.
- 6 **THE RIGHT CONDITIONS:** Minimum tank size - 24 x 12 x 15cm; 160 x 30 x 35cm; hardness 2-6°GH, pH 6-6.8; Temp 84-86°F (29-30°C).
- 7 **FILTRATION:** simple sponge filter, air powered, this will be quite adequate for the breeding tank.
- 8 **SPAWNING SUBSTRATE:** An inverted flower pot; a traditional German gravel vase (inverted); a piece of plastic pipe; a piece of slate; a broad-leaved plant; a terracotta spaghetti jar.
To be successful, you must ensure that water quality conditions are always maintained.

EAST COAST DISCUS, Pigeon Bloods: 1 1/2" £7.50, Sexed Adults £70.00, Breeding pairs £250, Pairs of Golden Crowns £275, Pairs of Red Turquoise £150, Pairs of

Gan Turquoise £170, Pairs of Metallic Cobalt £170. Also 5" Blue Diamond, Gan, Wattley Solids £45 each, 4" Red Alenquer £15 each. Or entire stock £2,500. Telephone: Great Yarmouth 01502 589674.

EURO-DISCUS INTERNATIONAL

NEW We now have British-bred Pigeon Blood Reds (F¹/F²/F³), Pandas and Tangerine Pearls in stock.
Pigeon Blood sexed adults from \$95.00
Opals and Golden Dragons available very soon.
PRICES FROM \$8.50
PLUS Also - still in stock - all other traditional varieties - Red Turquoise, solid cobalts, etc. in all sizes including breeding pairs.

- * Phone now for quality fish at low prices
- * New Phoenix 2000 Discus food available - contains beef heart and other essential additives in freeze-dried form. 80gms \$4.95 inclusive of p&p
- * New BSS wet and dry filter systems \$24.95 inclusive of p&p
- * Latest technology tap water filter systems always in stock
- * All stock disease free with accompanying certificate
- * R.O. Units 35 US Gallons (TFC Membrane) \$195.00

The Conifers, 4A Vestris Drive Salford, Manchester M6 8EL
Tel/Fax: (061) 788 7432 or (0973) 208787
By appointment only to avoid disappointment

Yorkshire Brine Shrimp Supplies
Unit 19, Cape Mills, Coal Hill Lane, Farsley, Leeds, West Yorkshire, United Kingdom
Fax 0113 239 3426
Supplier of High Quality - Premium Grade Brine Shrimp Eggs and Related Products

Typical Toads

Since the continued widespread destruction of its natural habitat and breeding ponds, one of the most common infiltrators into the gardens of millions of British (and undoubtedly European) homes is a plump, dour-looking amphibian that must be regarded as one of the best natural pest-controllers ever.

The Common or European Toad (*Bufo bufo*) was long associated with black magic, witchcraft and alchemy, leading to widespread persecution. However, in recent years, its deteriorating plight has been recognised. In addition, this and other toads make excellent, long-lived subjects both in the garden or vivarium.

The species

Apart from those regions which are persistently frozen, Bufonids have successfully colonised most of the world's land masses. There are approximately 200 named species of *Bufo*, and as exploration continues into the tropical belt, the list is steadily increasing. Although similar in general shape, the differences in coloration and size of species is extraordinary, ranging from the inky sable of the Black Toad (*B. eximius*), or the 21mm (0.8in) Mozambique Toad (*B. tarbatana beiranae*), to the bulky Marine or Cane Toad (*B. marinus*) which attains 9.4in (24cm) and the impressive Colombian Giant Toad (*B. howlandi*) and Rococo Toad (*B. paracnemis*), both at 10in (25.4cm).

In recent years, availability of Bufonid toads has increased significantly through successful captive-breeding projects, and with such choice the hobbyist may be daunted when selecting a species.

Housing

Although most of the world's toads inhabit dry regions, as they are amphibians, they must have access to damp locations or bodies of water. Where water is not present, such as in arid areas, they procure their moisture from dew or from dawn mist. As Bufonids cannot tolerate hot sun and tend to be chiefly nocturnal (although there are always exceptions to the rule), the vivarium should be furnished with such factors in mind.

When active, toads are rather mobile, inquisitive amphibians and the container should be somewhat larger than that provided for other amphibians. Either all-glass aquaria or wooden surround/glass-fronted vivaria are suitable for housing,

FROM LEFT TO RIGHT —

The European version of the Green Toad is smaller than its Arabian cousin.

An easy species — the African Square Marked Toad.

The plump Moroccan Toad is a highly active species.

A walking Natterjack or Walking Toad.

This is the diminutive Asian Spiny Toad.

the size of which is dependent on: (a) the number of specimens to be accommodated, and (b) the size of the individuals. As a guideline, I have found the following container dimensions to be adequate:

- 2-6, 1/4-in (3.3cm) adult Oak Toads (*B. quercinator*)
- 24 x 12 x 12in vivarium;
- 2-4, 4-in (10.2cm) adult Green Toads (*B. viridis*)
- 36 x 15 x 15in vivarium;
- 1-3, 8-inch (20.3cm) adult Cane Toads (*B. marinus*)
- 48 x 24 x 15in vivarium

Vivarium furnishing is extremely important because it can determine how successfully the toads adjust and eventually breed. Bufonids enjoy hiding and skulking about in relatively cool, damp nooks and crannies or bark chippings, yet they often enjoy long periods of basking under warm (but not hot) spot lamps. At night, they may often bathe in shallow bodies of water or display thigmothermy (absorb warmth from rocks heated during the day). If these conditions can be integrated into the vivarium, then we are halfway to maintaining a successful colony.

The basal substrate should consist of about 1-3 inches (c. 2.5-7.5cm) of dry, pre-sterilised forest bark-chippings (available at garden centres) over which should be arranged plenty of large rocks, pieces of bark and logs. A water dish, in the form of a wide shallow pan, should be placed furthest away from the spot-lamp, below which should be large, flat rock. For small to medium species, live plants can be added, complete with their pots, which can be hidden by rocks and bark.

Heating and lighting

This is dependent upon the origin of the species to be maintained, but for all types (except those from Equatorial regions) a thermal gradient must be present (i.e. warm to cool). Care must be taken in the location of a vivarium in terms of the temperatures outside the

container. Vivaria should never be placed in full view of the sun, or over a radiator. Equally, the location must be frost-free.

It is better to establish the vivarium in an area maintained at room temperature where control can be localised. This can be achieved by locating a spot lamp at one end (for temperate species, a 40W; for desert or savannah dwellers, 60W), while a water bowl and plenty of shade should be located at the opposite end allowing perhaps 5-15°C (9-27°F) difference. Extra warmth can be achieved by a thermostatically-controlled underfloor heater pad or, perhaps, increasing the ambient room temperature. Tropical species require uniform temperature and lighting.

For all species I recommend some form of natural daylight lighting (especially where live plants exist) because even though toads are nocturnal, this seems to influence growth and breeding activity advantageously. Through utilisation of time switches, an accurate photoperiod can be achieved and controlled accordingly throughout a calendar year (particularly important for temperate species). The Table gives guidelines for seasonal temperatures (the range refers to the thermal gradient: cool to warm) and photoperiod for each climatic category of Bufonid.

Daily/monthly care

Once established, the vivarium should be inspected on a daily basis to replace fouled water and expired light bulbs/spot lamps, remove uneaten food, faeces, dead



ds

Marc Staniszewski presents a selection of his favourite toad species and offers his tips for their successful maintenance and breeding

Photographs — unless otherwise indicated — by the author



plants and any signs of fungal growth.

If the vivarium is kept in check, a general clean-down, including disinfection of the container, re-sterilisation of the basal substrate and washing of any rocks and logs can be carried out monthly.

Bufoanids are opportunist feeders and rarely discriminate between taking foul-tasting invertebrates, such as ants and caterpillars, or more amicably-testing grubs and earthworms. The most important advice is to provide a varied, nutritious diet frequently supplemented with a multi-vitamin powder. Toads that feed on only one or two food types are well-documented as showing signs of stress and anxiety, leading to loss of appetite and eventual death if such a practice persists.

Breeding

There are no general rules where breeding is concerned. Particularly with tropical species, it is often a case of chance facilitated by ideal captive-conditions and good health of specimens. The hobbyist may, however, be able to promote courtship behaviour by mimicking natural stimuli.

① **Temperate species** should never be exposed to the potential hazards of hibernation, basically because this is rarely necessary where breeding is concerned. Instead, a cool period with reduced photoperiod (as detailed in the Table), during which time they will often refuse food and remain dormant in their burrows for several months, is sufficient. Species kept in this manner during winter must be healthy, with substantial fat reserves, as — otherwise — they simply won't survive, never mind breed.

Once warmed up in spring, the toads must be moved to breeding quarters where there is both land and a substantial body of cool, shallow, weed-filled water (warmer for more southern species). Here, males should begin their mating calls and amplexus (spawning embrace) may follow. I have found with all the temperate species I have maintained, that this is often a hit and miss affair, especially if only a few individuals are present.

Temperate toads are mainly gregarious in the wild, meeting up in breeding ponds in huge numbers.

② **Warm Temperate, Desert and Sub-tropical Bufoanids** are at the other end of the spectrum, and undergo a period of dormancy underground when there are

intense surface temperatures (this 'dormancy' is known as aestivation). The exact breeding phase is less explicit and can take place during autumn to late spring, depending on the advent of rain. I have had success with the Moroccan Toad (*B. mauritanica*) duplicating such a regime.

③ **Tropical Bufoanids** present the greatest challenge in stimulating, because courtship can be affected by the most insignificant changes, such as decreased predation (i.e. birds migrating elsewhere), increased food supply, slight shifts in temperature, humidity or rainfall, or even moon phases! Such species really do present the hobbyist with a chance to research exact breeding requirements.

Spawn and tadpoles

Most typical toads deposit their spawn in shallow water in endless gelatinous strings containing upwards of 30,000 eggs. This is because shallow water heats up much more quickly than deep water, and so promotes increased embryo development. Temperate Bufoanid spawn should be maintained at 50-65°F (10-18°C), while all other species can be kept in the 65-80° (18-27°C) range (tropical species, more towards the higher end).

Once hatched, the water level should be gradually increased to about 24 in (60cm), in which should be included large numbers of weed such as *Elodea* and *Vallisneria*, plus filtration/oxygenation facilities. Mortality will be high without exception in the first few weeks: up to 75%.

Bufoanids are characterised by having very small tadpoles (even for the giant members of the family) and growth is fairly prolonged. If space is available, tadpoles should be progressively split off into batches of 100 per 24-inch aquarium. After three to six months, out of 30,000 eggs, 500 surviving toadlets can be regarded as a good success rate.

On metamorphosis, toadlets may only measure 5-20mm (0.2-0.8in), depending on species, and so providing such tiny creatures with food can be problematic. A newly-metamorphosed Oak Toad can have difficulty swallowing a fruit fly.

Toadlets are best split up into batches of ten in small, moss-coated margarine tubs and offered copious amounts of

| Climatic Category | Season / Photoperiod (P) and Temperature (T) | | | |
|---------------------|--|----------------------------------|----------------------------------|----------------------------------|
| | Spring | Summer | Autumn | Winter |
| Temperate | P: 10 - 12 hours T: 50 - 60°F | P: 10 - 14 hours T: 65 - 80°F | P: 8 - 10 hours T: 65 - 65°F | P: 7 - 8 hours T: 45 - 55°F |
| Warm Temperate | P: 10 - 12 hours T: 60 - 65°F | P: 10 - 16 hours T: 75 - 85°F | P: 8 - 12 hours T: 70 - 80°F | P: 7 - 8 hours T: 55 - 70°F |
| Desert/Sub-Tropical | P: 10 - 12 hours T: 60 - 70°F | P: 12 - 16 hours T: 70 - 90°F | P: 10 - 12 hours T: 70 - 80°F | P: 10 hours T: 60 - 70°F |
| Tropical | P: 12 - 16 hours T: 70 - 80°F | | | P: 10 - 12 hours T: 65 - 80°F |

greenfly, fruit fly, sweepings, newly hatched mealworm and waxworm. Again, high mortality is often unavoidable and after three months, 100 out of 500 must be regarded as successful. Maturity is attained after 3-5 years depending on health, food supply and size of container.

1 Temperate & Warm Temperate species

Green Toad

One of the most attractive species, those specimens of *B. viridis* hailing from the Balkans and Asia Minor (*B. v. viridis*) are smaller and garnished in grass green on a subtle cream background, whereas those from North Africa and the Arabian peninsula (*B. viridis arabicus*) are darker green with striations of red and grow much larger. European Green Toads are much harderier in captivity and will breed, given a cool period. Lays 20,000 eggs in warm (65°F — 18°C — minimum); shallow water. Lives for 8-15 years.

Oak Toad

B. quercicus is a little toad that, because of its diurnal habits, makes an interesting captive for the small vivarium. Given a cool period, it will often breed in captivity. Deposits around 10,000 eggs from November to April.

American Green Toad

B. debilis is the American equivalent of *B. viridis*, this beautiful, small toad rarely growing over 2in (5cm). Mainly active at night, it requires somewhat warmer conditions than other temperate toads and proves quite taxing to maintain, but well worth the effort.

Other species

A host of other temperate species are well worth considering, including the stocky Western Toad (*B. boreas*), the pretty Red-spotted Toad (*B. punctatus*) and Woodhouse's Toad (*B. woodhousei*) to name but a few. The European toads — the Natterjack (*B. calanota*) and Common Toad (*B. bufo*) are protected in Britain (but licences can now be obtained for their sale).

2 Sub Tropical (including Savannah & Desert species)

Moroccan Toad

B. marmoratus is a large, plump and highly active toad that is also hardy to a certain degree (my own are kept in a greenhouse until the first frosts of winter). Attaining 6in (15cm), it requires large amounts of food, ranging from waxworm and mealworm to dead pink mice and fish. Lives for 20 years or more.

Colorado River Toad

B. alvarius is an impressive species that can attain 7in (18cm). Hailing from the deserts of west-central USA, it needs a warm, dry vivarium with access to a shallow water pan. Has a voracious appetite and is easily capable of devouring mice, but equally takes an invertebrate.

Cane, Marine or Giant Toad

B. marinus is perhaps the best known Bufonid, due to its epidemic spread throughout eastern Australia. It is naturalised in many tropical and arid countries, where it serves only to wipe out natural fauna and pollute water-

ways with its spawn. Conversely, it makes an excellent captive and will attain its maximum size given a varied diet. Devours anything from crickets, to raw steak or even dog meat!

African Square Marked Toad

B. regularis is an affable, easily-kept species displaying attractive markings in the adult, including a cross on the dorsum. Breeding is only likely in temporary summer greenhouse quarters by simulating rainfall after a short dry period. The tadpoles which hatch from the 15,000 or so eggs are among the most rapid to develop (as little as 20 days).

Other species

The Red Toad (*B. caesus*), from southern Africa, the Great Plains Toad (*B. cognatus*) from northern Mexico and the Red-spotted Toad (*B. punctatus*) from southern USA are all worth acquiring.

3 Tropical species

Colombian Giant Toad

B. nelsoni is the toad most hobbyists would love to acquire; this giant beauty is popular in America, but rarely available in Europe. It is apparently easy to breed, if given enormous living quarters which replicate its humid forest environment. If well kept, it repays its keeper by depositing up to 35,000 eggs. If available, it is usually extremely expensive.

Asian Spiny Toad

Adults of this small toad *B. melanostictus* make beautiful specimens because of the many tiny black spines which are conspicuous against the yellow-sand colour skin. Breeds February to May, but needs a humid set-up with plenty of imitation rainfall and freshwater source.

Tree Toad

B. asper is an arboreal toad from the leafy forests of south-east Asia. Attaining 6in (15cm), it is delightfully agile with excellent balance and poise. Creeps stealthily up on its prey like a big cat and snares them with an extraordinarily long tongue. Like most other toads, it proves easy to keep and breed, given space and warm, humid conditions. **MM**

A giant among toads: the widely spread Cane Toad.

CHRIS SPENCER



By far the best known species in the UK is the Common Toad.



COMING UP NEXT MONTH...



Calling all armchair explorers! Tune into our May issue and travel the waters of the **Amazon** in the company of **Dr Chris Andrews**, go out collecting **Harlequins** in **Malaysia** with **Tor Kreutzman** and snorkel with stingrays and **Penelope Millson** in the crystal-clear waters of the **Cayman Islands**.

Alternatively — and almost at the other end of the aquatic spectrum, as it were — **Dr Iggy Tavares** offers the benefit of his experiences with the man-made **Red Parrot Cichlid**.

Or how about learning to keep spectacular miniature **Blaschella** frogs? **Bob and Val Davies** have the perfect article for you if amphibians are your top choice of pet.

- If, on the other hand, you prefer outdoor aquatics, we have the next of our super **Mini-Supplements**: this time from **Dr David Pool** of **Tetra**, who'll be choosing his **Top Ten Pondfish**.

- Changing tack completely, Susan Brewer, whose **Anything to Declare?** article appears in this issue of *A&P*, will be starting a brand-new series of features of a more personal nature with **Mythories and Mythtakes**.

Whatever your preferences, our May issue is likely to have something for you, from **Koi** to **frogs**, and from **breeding marines** to **filtration**. Make sure to join us by booking your copy early, or by filling in the subscription application below. Either way, we look forward to your company in May.



SUBSCRIPTION ORDER FORM

To: **DOG WORLD PUBLICATIONS**,
1 TILFTON STREET, ASHFORD,
SHEFFIELD S23 1QJ
Telephone: 01233 621877 Fax: 01233 645669

RATES: UK £22.50
EUROPE £30.00
AIRMAIL (Zone 1) £49.00
(Zone 2) £55.00

POST TO (BLOCK CAPITALS PLEASE)

MEMBER'S NAME

ADDRESS

POSTCODE

CHEQUE/ACCESS/VISA NO

EXPIRY DATE

PLEASE START MY 12 ISSUE SUBSCRIPTION FOR £ _____
PLEASE START MY 12 ISSUE SUBSCRIPTION WITH THE NEXT ISSUE

Signed

Date



PETER

AQUARIUM PHARMACEUTICALS, INC.

STRESS COAT®

Protect Your Fish Like the Professionals!

- Replaces the protective coating fish may lose in times of stress
-
- Contains aloe vera to promote the healing of skin wounds and torn fins
-
- Helps prevent infection and disease caused by harsh water conditions
-
- Removes chlorine from tap water
-
- For use in fresh or saltwater aquariums



Ask for a squirt of STRESS COAT in your fish bag to protect your fish on the trip home.

STRESS COAT

Protects Your Fish with the Healing Power of Aloe Vera!

STRESS COAT helps repair the damaged tissue of tropical fish with a unique formula that contains aloe vera, nature's legendary first-aid plant. STRESS COAT utilizes the unique properties of aloe vera to aid in the healing of skin wounds or torn fins.

STRESS COAT replaces the protective slime coating fish may lose through handling, fish fighting, disease, injury or other forms of stress. When there are open wounds, STRESS COAT forms a synthetic slime coating that serves as a liquid bandage, preventing the loss of internal fluids and electrolytes.



STRESS COAT is a must if you're setting up a new aquarium, adding fish to your tank, changing water, or if you discover your fish are damaged by disease or injury.

Do as the professionals do . . .
 . . . Use STRESS COAT!

LOOK FOR ME...
 DOG WELLFISH ON
 THE PACKAGE!



AQUARIUM
 PHARMACEUTICALS, INC.
 P.O. BOX 218 • CHALFONT, PA 19914

® Trademark of Aquarium Pharmaceuticals, Inc. ® registered trademark of Aquarium Pharmaceuticals, Inc. © Aquarium Pharmaceuticals, Inc. 1993 4038-01-0203