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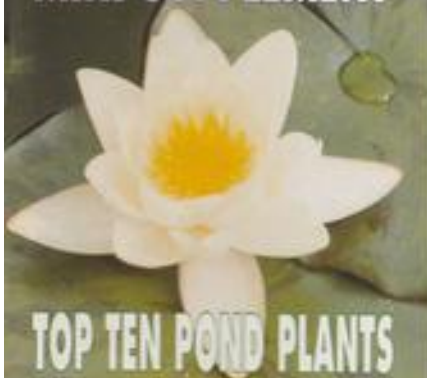
**KEEPING & BREEDING  
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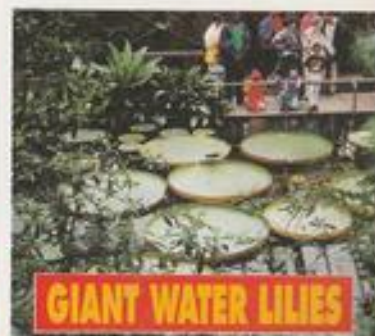


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JULY 1995  
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The June issue of A&P was incorrectly indexed as Vol 60 No 6. We apologise for the slip-up.

EDITOR John Dawes

ART EDITOR Adam Turner

SENIOR ADVERTISING  
MANAGER  
Lesley Anderson

ADVERTISING  
MANAGER John Young  
Tel: 0181 904 6886

ADVERTISING  
SALES  
Rosemary Brookman

ADVERTISING  
PRODUCTION  
Pauline Philpott

PUBLISHED BY Dog World  
Publications  
9 Tufon Street, Ashford,  
Kent TN23 1QN

TELEPHONE:  
ADVERTISING AND  
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CLASSIFIEDS &  
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## editorial

### Down-under dilemma for pet lovers

Real or imagined, any problems we may have regarding what animals we can or can't, should or shouldn't, keep as pets, would seem to pale into relative insignificance when compared to the apparently incomprehensible challenges which our Australian counterparts have to contend with.

In an eye-opening article entitled **Down-under dilemma: why is the Australian pet trade losing out?** published in the trade journal *Pet Industry News* — Australia, Queensland-based Englishman John Coborn catalogues a list of examples of bureaucracy gone wild, some of which almost defy belief.

For example, did you know that if you want to keep a native snake in

Queensland, you need to apply to the Department of the Environment and Heritage (wildlife) for a permit, but if you want to keep Koi, you need to apply to the Department of Primary Industries (Fisheries), and if you want to keep a de-sexed rabbit, you need to go to the Lands Department to obtain a licence?

Carpet Snakes must be captive-bred and bought from a licensed breeder (seems not too unreasonable), but you need to apply for a movement permit to take it home and, if you want to take it, say, to a school for a lecture, you need two further movement permits, one for the outward journey and one for the return!

Koi are 'legal' in New South Wales, but 'noxious' and therefore illegal in Queensland. Then, in Western Australia "it is regarded as a serious offence to keep any reptile for hobbyist purposes..." And so it goes on...

And we think we've got problems?!

John Dawes





# XENIA: The Barometer Coral

Not all corals are difficult. Follow some basic rules and, as Nick Dakin shows, you too could enjoy the delights of the Star Polyps.

Photographs by the author

**X**enia (pronounced zee-nee-ah) should, by all rights, be the most popular coral in the tropical marine aquarium. That crown, I am sure, is firmly held by the many species of anemone, but *Xenia* must, at least, deserve to come a close second, for it is not a difficult coral to maintain and can perform a vital function in the health and well-being of aquaria.

How often have you been able accurately to judge the welfare of your tank by merely looking at it (that is, when all test results appear optimum and *before* things start to slide downhill)? Fortunately, close observations have shown that many species of *Xenia* are the very first invertebrates to react when water quality begins to deteriorate.

They do so by refusing to display their polyps permanently, and in doing so, alert the mariculturist to a possible problem that will undoubtedly affect many, more difficult, corals in the very near future; hence its new title of 'The Barometer Coral'.

## Into the unknown?

The family Xenidae is made up of seven genera, and even the most ardent of hobbyists is unlikely to come across more than a handful of illustrated species within aquarium literature. These are usually the 'Pulse Corals' such as *Xenia umbellata*, *X. portogalensis*, *X. elongata*, *Heteroxenia fuscocens* and *Anthelia glauca*, all of which

hold eight pulsing pinnate tentacles on rather elongated stems. They are incapable of retracting fully, in most instances, but rather shrink in size considerably.

Pulse Corals are, it has to be said, not the easiest of invertebrates to maintain unless superb water and lighting conditions are on offer, and should never be considered by newcomers to the hobby. Not so the *Xenia* species that are the subject of this article.

*Xenia* species spread quickly in an adequately maintained aquarium.

All mariculturists interested in invertebrates will have come across many species of these delightful polyp colonies, if they do not own one or two already. However, identifying species using literature commonly available to the hobbyist will prove a fruitless exercise, as none appear to be illustrated.

Albeit a strange situation, the mariculturist need not be unduly alarmed, as merely being able to identify a species does not automatically guarantee keeping it successfully. Certainly, the subjects of this article are not difficult to maintain, and success with them will go a long way in



Many species form attractive polyp mounds.





Three species of *Xenia* growing closely together.

helping the hobbyist gauge whether or not conditions are correct for the majority of invertebrates.

## The species

Often commonly referred to as Star Polyps, the *Xenia* species I wish to consider are many and varied in colour and form, but they do have certain unifying qualities that make them easy to identify.

First, while retaining an eight-point symmetry to their tentacles, the stem is short and holds the polyp close to its base. The base is often a fused, encrusting mass which is rather rubber-like in quality; it is usually purple in coloration, but can be shades of brown in some species.

The polyps can quickly withdraw totally into their base, leaving nothing for predators to browse upon, giving full protection to all but the most determined attackers. When the polyps do eventually emerge, it is always amazing to witness just how many are held within the reasonably thin base.

Polyp coloration varies from species to species, but includes various degrees of green, brown and silvery-grey. The 'eye' of the polyp is, on the whole, white, but this can also be changeable.

As far as can be ascertained, the total number of species is unknown. However, I have personally counted what appear to be at least 12 individual species (I have 7 species in one show tank alone) but there may be many more just waiting to be discovered.

## Breeding

The most common method of reproduction in the marine aquarium is by division. This happens as the basal mass increases in size and develops new polyps. Most hobbyists keeping *Xenia* find that it spreads at quite a rate; as much as one centimetre every month, depending on

the species. This rate of growth quickly gives the new aquarium an established appearance as the polyps cover previously bare rockwork or glass.

So quickly is its spread in the wild that gorgonians and sea whips positioned close to a colony will often find the polyps spreading rapidly up their branches, gradually killing the 'host' as they do so. 'Xenia trees' are the result and are readily available through any good stockist. *Xenia* will also perform this 'trick' in the marine aquarium, so it is wise to keep them and gorgonians/sea whips at a comfortable distance if the latter are to be preserved in their original state.

I have no doubt that *Xenia* reproduces sexually, with eggs and sperm being shed into the open ocean to found colonies in faraway locations, but this does appear to be a rare occurrence under captive condi-



Perhaps the best known Pulse Coral: *Xenia elongata*, a beautiful but delicate species.

tions and cannot be relied upon as a means to spread a favoured species to the other end of a large aquarium.

If the marinist wishes to achieve rapid colonisation in other parts of a display, then portions of a well-established colony can be carefully eased off of a rock and placed elsewhere. Those species which form more of a mound can be cut with a very sharp scalpel and the pieces distributed accordingly. This may sound like brutal treatment but, in reality, *Xenia* recovers very quickly and is soon ready to start spreading once more.

Another less reliable method of propagation requires that the mother colony is left in a particular location for a couple of months, whereafter it is moved to a new spot. In that period several polyps will have spread onto the new rock and will be left behind as the main colony is removed. These individuals will then be free to form a colony of their own.

## Feeding

It has been suggested that species within the family Xenidae do not feed on microscopic plankton but gain all their nutrition from the symbiotic algae within their tissues, and this would appear to make a great deal of sense.

The polyps are constantly on show and make no attempt to collect or capture live food, even if they are offered it. Indeed, they tend to retreat until the water is clear again. What a blessing this is, as unnecessary pollution from food additives is avoided altogether.

## Water movement

To give of its best, *Xenia* needs two definite requirements, the first of which is good water circulation. Sluggish, stale water gathering around the polyps will cause a very poor showing, whereas heavy



turbulence promotes good aeration and an increase in polyp vitality.

The second requirement involves high intensity lighting, preferably metal halide, although any high-specification tubes in sufficient numbers will bring the polyps straining to their full glory.

It must be remembered, though, that these are optimum conditions and *Xenia* will often put on a very acceptable show even if conditions are not entirely perfect. Having said that, there does come a point when even *Xenia* will not give of its best and we must look to this as the 'barometer effect', which generally is a good indication that something is requiring attention.

## Water conditions

As with practically all invertebrates, the maintenance of good water conditions is vital and in this, *Xenia* is no exception. Aim to provide the following at all times:

**Volume:** Over 20 gallons nett (not gross) — c 90 litres

**Temperature:** 75-78°F (24-25.5°C)

**Ammonia & Nitrite:** Zero (not even a trace)

**Nitrates:** Will tolerate 25ppm (parts per million) but less than 10ppm is far preferable

**Phosphates:** Less than 0.5ppm (preferably zero)

**pH:** 8.1-8.3

**SG (Specific Gravity):** 1.022-1.025

**Redox Potential:** 300-450mv

**KH (Carbonate Hardness):** 7°dKH (Natural Sea Water)

**Efficient protein skimming and activated carbon filtration as standard**

**Good water circulation**

**Fish stocking levels:** maximum of 1in of fish per 6 gallons nett (2.5cm per 27 litres)

**Filtration:** Undergravel or trickle filtration providing the above parameters

**Water changes:** 10-15% every fortnight

## An ideal coral?

Newcomers are frequently bewildered by the sheer number of corals and other invertebrates available to them and are often completely at a loss to know which ones to start with. Notwithstanding doing a little bit of homework, *Xenia*, of the various species featured here, can be recommended unreservedly as an excellent starting point.

Even if water conditions are allowed to slip and the colony becomes reluctant to make an appearance, an improvement in conditions (generally, a reasonably large water change) will often see the polyps spring into action once more. This, of course, has the benefit of enabling the newcomer to assess the high degree of water quality necessary to keep invertebrates successfully — something a significant number of mariners totally underestimate.



Green Star Polyps. Note the purple base.

## Useful tips

- 1** *Xenia* is a very resilient animal, and even when there have been no signs of life for a very long time, a significant improvement in water conditions will often bring about a miraculous recovery as the polyps begin to extend once more.
- 2** If a newly introduced *Xenia* fails to bloom within 2-3 days, try gently massaging the basal mass with a clean, soft toothbrush. It often encourages the coral to spark into life. If there is still no reaction after another few days, then water conditions need attention — your 'barometer' has indicated a 'change' is required.
- 3** Keep *Xenia* colonies free from algae, especially slime algae which will smother it. *Caulerpa* (a seaweed) can also

establish a foothold within the colony and be almost impossible to remove as it gets deeply rooted.

- 4** Never give up on *Xenia*. I have been known inadvertently to wash a piece of rock under the cold tap, only to find that on replacing into the aquarium, several *Xenia* polyps pop out to greet me. (But don't try this at home, as they say!)
- 5** Why not collect different species of *Xenia*? They are readily available, easy to keep, multiply without any effort and look great; much more desirable than spending hard earned money on vastly difficult corals that will often only give heartache, rather than pleasure.



A *Xenia* colony overtaking a gorgonian to form a 'Xenia Tree'

## Footnote

Since writing the above it has been brought to my attention that the species mentioned may fall within the family Clavulariidae which is, of course, not Xenidae. If this is the case, then we should not be calling the animal commonly referred to as *Xenia* by that name at all, as it does not occur within that family! (Indeed, lists from wholesalers are identifying the same animals as *Clavularia* sp. and *Xenia* spp with gay abandon. This, of course, does nothing to improve matters!) Once again, the taxonomists seem to have left us floundering....

Since there appears to be no consensus of opinion either way, I think it best that, for the time being at least, we go along with popular perception and leave *Xenia* alone. However, once a definitive answer does come to light, I will certainly try to let interested readers know through the columns of A&P. (NB. Any information regarding this matter from our readers will be gratefully received.)



# MALAYSIA

## PART TWO

# PEAT SWAMP FORAYS

**W**hy don't you comb your hair?" was about the hardest question asked by the customs as I made my regular traverses across the Singapore/Malaysia border to Johore. The sight of the tangled mess of boots and nets in the boot of my car usually disarmed the officials at the various borders I came across in my travels as they realised that they were dealing with another harmless lunatic biologist!

Underworld Betta (*Betta persephone*). With a double ration of fishing gear we were, presumably, doubly harmless and were soon travelling on the old road that runs parallel to the motorway between Ayer Hitam and Yong Pen.

The habitat that we wished to visit is bordered by the south-heading side of the motorway but, fortunately, we found an underpass that led to a dirt track that runs by the side of this biotope.

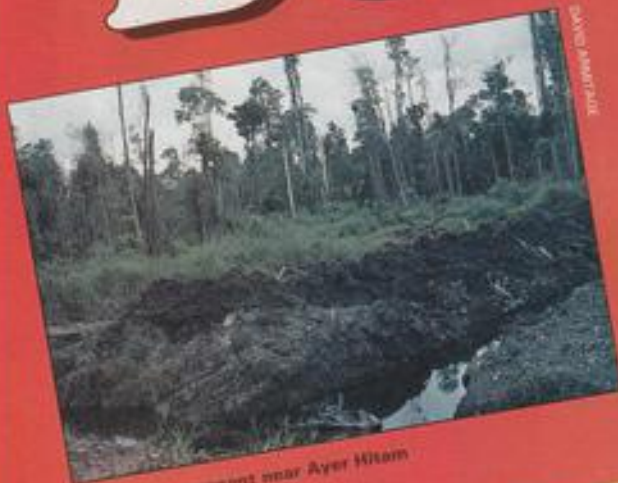
At first sight, this does not look a promising site, as it is heavily disturbed, with fallen branches littering the forest floor between the stumps of removed trees. Large drains have been driven into the habitat, from which flows black water (which is what Ayer Hitam means).

We walked along the edge of one of these deep drains and I was surprised to see Heok Hui shoving his net into a small puddle on the floor

member of the Wine-red Betta (*Betta coccinea*) group, the afore-mentioned Underworld Betta. This species was most numerous nearer the edge of the forest remnant, from where we could hear the ominous sound of distant chain-saws. All these fish were found in shallow puddles (which must have climbed to very high temperatures under the Malaysian sun), hiding under the debris and leaf-litter in water which was of moderate 4.9pH.

With about a dozen specimens in captivity, we judged it time to move on to our next habitat of the day, but delayed for a while to watch a flock of small parrots that were cavorting about in the crowns of the few dead trees that were still standing in an adjacent piece of the swamp.

# Bettas



Peat forest remnant near Ayer Hitam



The Underworld Betta (*B. persephone*)

## Peat forest remnant

On one of these occasions, I travelled with Heok Hui Tan, a Singapore University undergraduate (and AAGB member), who works with Dr Peter Ng, to fish in the tiny remnant of forest that is home to the

of the ruined forest. He immediately straightened up with a cry of triumph and extricated a large pair of brown (wild-type), short-bodied, Three-spot Gouramis, *Trichogaster trichopterus*, from the net, along with a few fry which I judged to be about a month or two old.

We fished several of these puddles, some of which were just flooded wheel ruts and found additionally, Climbing Perch, *Anabas testudineus*, the blubblenest-ing *Betta bolica* and finally, the miniature

## Underworld relations

*Betta persephone* has a particular attraction for me, as it was the first and, so far, only bubble-nesting fighting fish that I have bred. I first saw it in 1985 at an AAGB Members' Weekend lecture by Allan and Barbara Brown, where it was described as being an unidentified species that they had caught in July 1984, during their trip to Peninsular Malaysia. In February 1985 Dietrich Schaller collected the same fish about 3km from Ayer Hitam. The following year he described it as *Betta*



## David Armitage completes his successful search for the slender, beautiful, dwarf Bettas of the Malaysian Peninsula.

Part 1 of Peat Swamp Forays was published in the February issue

*persephone*, naming it after the daughter of Zeus who was abducted by Hades to rule the underworld, hence both the scientific and common names.

Allan Brown told me that, in 1992, he had revisited the 1984 collecting location of the Underworld Betta only to discover that a new highway was being constructed over the original collecting point. However, by crossing the construction point, he found some of the original swamp forest where the species was managing to survive.

This Betta is currently regarded as one of the *Betta coccina* group, all species of

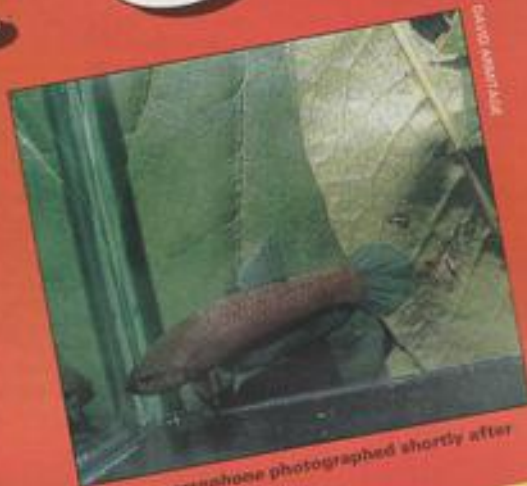
which have 9 abdominal vertebrae compared with the 10-11 of other *Betta* species. To the layman, they are recognised as dwarf, slim Betta species (often bright red with a green body spot, although *B. persephone* is an exception) that inhabit the flooded forest floor.

Other members of this group that are currently recognised include the Wine-red Betta (*B. coccina*), allegedly from Sumatra, 'Jealous' Betta (*B. levida*)

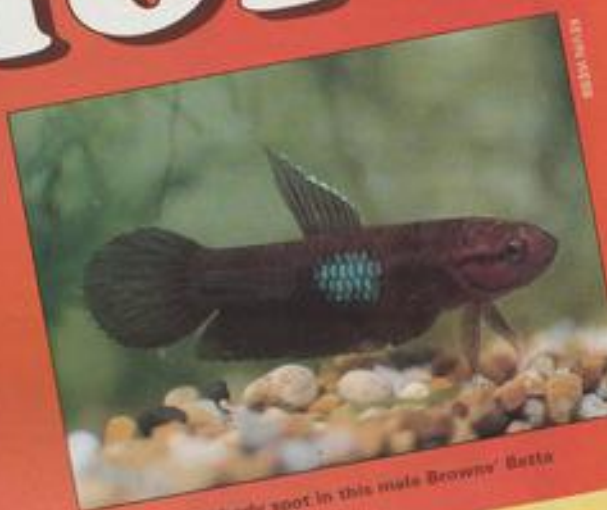
extreme south-west of Peninsular Malaysia and the enormous numbers collected for the trade near Muar (also in Johore), by local fishermen for export, also suggest that they are more widespread.

In appearance, they differ markedly from other members of the group. Superficially, they are dark

# f Johore



Male *B. persephone* photographed shortly after collection.



Note the large body spot in this male Brown Betta (*B. brownorum*).

### UNDERWORLD BETTA FACT FILE

**Latin name:** *Betta persephone*

**Common name:** I suggest 'Underworld Betta'. A member of the *Betta coccina* group.

**Habitat:** Under leaves on flooded forest floor.

**Distribution:** Johore, S.W. Malaysia

**Maintenance:** Pairs in 2-gallon tanks

**Decor:** Java Moss, floating plant cover.

**Food:** Prefers live food, but will eat small flakes.

**Water values:** pH 5 (3-6), 22-24°C (72-75°F) for maintenance, 24-26°C (75-79°F) for breeding.

**Sexing:** Males with blue fins and long pelvics.

from the west coast of Peninsular Malaysia, Tussy's Betta (*B. tussya*) from the east coast, Brown's Betta (*B. brownorum*) from Sarawak and the Red Betta (*B. rutilata*) from Kalimantan. As these are all relatively small species, they have been largely overlooked until recently, and it is likely that more species of this group will become recognised in the near future.

The most recent addition to the group, the Red-finned Betta (*Betta miniopinna*), from Pulau Bantan, Sumatra, is also the most closely-related to the Underworld Betta. One of the reasons that they have only recently been discovered is that traditional fishing methods cannot be used in typical habitats, or because net meshes are too large for these small fish.

The Underworld Betta is sometimes regarded as coming only from the habitat that I have described, but there are hobbyist reports of very similar fish from the

brown-bodied fish with iridescent blue fins and white-tipped red pelvics. The highly reflecting blue eyes are another feature. When juvenile, or when sparring, they often show two longitudinal body lines. However, in sunlight, by torch-light or when courting, you will see that the velvet blue iridescence also covers the body, and it is this subtle beauty, as well as its interesting behaviour, that makes me so fond of this fish.

The powdery nature of the body pigmentation can mask the appearance of 'Velvet', to which this species group is prone, and which should be cured with 2 teaspoons/litre of salt.

### Aquarium care

In an earlier article, I described the aquarium set-up required for Licorice Gouramis and, since these often share the same black-water habitats as the *B. coccina* group (although in a different niche), it is not surprising that they require similar



treatment, with one important exception. To sum up, you will need acid water of pH ca. 5, and 22-24°C (72-75°F), floating plant cover and Java Moss on a bare base; a tank of only 7 litres (1.5gal) will suffice for a pair of these 3 cm (1.2in) dwarfs. However, where I recommended a 2-inch long, 1 inch diameter tube (c5 x 2.5cm), anchored to the base, to act as a cave for Licorice Gouramis, *B. perophora* and most of the other members of the group, require the same tube to be floating. They take to it as though it was their equivalent of the 'ideal home' and wild-caught fish normally take up residence in minutes.

Underworld Bettas, in particular, are weak swimmers, and both males and females rest in these tubes in between bouts of foraging. Live food of appropriate size is preferred by the entire group of fish, but this particular species will also take a little flake which, again, makes it a bit of an exception.

## Spawning

Unfortunately, the sexes are pretty indistinguishable *in-situ*, but in the photographic tank, you will notice only the male has blue fins and his pelvics tend to be noticeably longer (at least in young fish).

I have watched pairs spawn many times in the floating tubes. The male first builds a bubble nest in the roof of the tube and tends this for several days before the pairing occurs. By this time, the bubbles are usually spilling out of the tube from both ends.

## References

Schaller, D. (1986) Laubschlupf. Eine Überlebensstrategie in einem besonderen Biotop und die Beschreibung einer neuen Kampffischart. *Aquar. terrar. Zschr.* 39, 297-300.

Witte, K.E. and Schmidt, J. (1992). *Betta brownorum*, a new species of anabantoid (Teleostei: Belontiidae) from northwestern Borneo, with a key to the genus. *Ichthyol. Explor. Freshw.* 2, 305-330.

The details of the pairing in the tube tend to be obscured in a swirl of fins and circling bodies but apparently, after release, the eggs are clamped by the pectoral and pelvic fins of the female and the male then picks them off and sticks them to the bubble nest. This contrasts with the Siamese Fighter (*B. splendens*), where the eggs are released into the nest with newly-made bubbles.

When the young hatch, they hang by their heads from the bubbles and the male may try to keep them in his care for nearly a week. Occasionally, they will be seen falling out of the nest and struggling back up to it. When they do eventually swim free, they are relatively large for anabantoids (labyrinthfish) and it is not long before they are able to cope with micro-worm. The 20 or so young are quite red at this stage and well-tolerated both by their parents and any siblings from earlier spawnings. It is, in fact, reported that larger juveniles will take part in defending their parent's territory.



The elegant Wine-red Betta (*B. coccina*).

## Delights and concerns

I was very pleased to have met with the Underworld Betta in the wild but, obviously, concerned about its restricted habitat. A survey is needed to determine the real range of this and other related small species which are so easily overlooked or confused with juveniles of other species.

In the afternoon of the day in which we visited Ayer Hitam, we travelled to some brown-water habitats near Pontian Kachil. These were now on the edge of industrial developments or oil-palm plantations. Plenty of labyrinthfish were present here, such as the Crescent Betta (*B. imbellis*), the Croaking Gourami (*Trichogaster vittatus*), 3-spot Gourami (*Trichogaster trichopterus*), Climbing Perch (*Anabas*) and even the Pikehead (*Laciscephalus*).

However, I wondered if the specialised dwarf species of the Wine-red Betta group or the Licorice Gourami (*Pareuchromis*) would be able to adapt if and when these agricultural or urban habitats are the only niches available to them. **APP**

## THE BETTA COCCINA GROUP

Species	Common name	Location	Identification
<i>B. brownorum</i>	Brownish	Sarawak	Body spots in both sexes; white-tipped pelvics
<i>B. ferruginea</i>	Brownish	Borneo	No body spots; reddish-green fin patches
<i>B. coccina</i>	Wine-red	Sumatra	Body spots in both sexes; black-tipped pelvics
<i>B. bender</i>	Yellow	W. Malacca	Body spots in both sexes; green-tipped pelvics
<i>B. pinnatifida</i>	Red-tipped	Borneo, Sumatra	No body spots; dark blue body and fins*
<i>B. perophora</i>	Underworld	Sumatra, Malaysia	No body spots; dark blue body and fins
<i>B. nana</i>	Red Karamania	Kalimantan	No body spots; red body
<i>B. nana</i>	Topsy	E. Malacca	No body spots; green spots at fin

\**B. pinnatifida* indistinguishable from *B. perophora* by scale counts and location.

For further information on anabantoids write with SAE to Anabantoid Association of Great Britain, c/o 18 Chiltern Crescent, Doncaster, South Yorkshire.

# FASCINATING FISH FACTS

## Virgin Births

New aquarists are often (perfectly understandably) taken by surprise when a female livebearer that has been kept away from males all of a sudden starts dropping fry.

The answer lies in a remarkable ability possessed by females of the live-bearing family Poeciliidae. This family includes all the common species like Guppies, Mollies, Swordtails and Platies.

What happens is that the males produce 'packets' of sperm, rather than

'free' sperm, so that, when they mate, the female is able to store these packets until they are required. As each batch of eggs ripens, the female 'releases' the required sperm to fertilise these eggs, retaining the other packets for future use.

As a result, a female Poeciliid can produce many broods of fry following a single mating. Therefore, virgin births are merely normal broods produced by females which have mated at some stage prior to their being bought.



Female Guppy giving birth.



# Summer Pond Care

Susan Stephenson offers her seasonal pond care maintenance words of wisdom.



SUSAN STEPHENSON

A healthy pond in early summer.

Summer is the time when the plants, insects and other animals relying on the pond are at their busiest, and even on the stillest days, the water surface seems always moving. There is no better feature in the garden in summer than a pond, but there are a few things which need to be attended to in order to ensure the pond gets the maximum benefit from the long warm days.

## Regular checks

First, have regular visual inspections of the pond, ensuring the water is clean, fish — if present — are healthy and plant life is flourishing. These natural indicators give the best signs of the health of the pond environment.

Finish planting aquatics for a display in their first season. In balmy weather, keep the pondwater oxygenated by occasionally adding fresh water from a hose with a spray attachment. Keeping the flow gentle, but using the spray, will reduce the water temperature, which is particularly important in shallow ponds where evaporation is quickest.

Clean rainwater from a butt trickled in is probably the ideal way to replace water lost by evaporation, as tapwater contains many nutrients which can result in increased algal growth, but the spray method is the best practical alternative.

## Insect and algal control

Deal with any signs of aphid infestation immediately. The safest way is the water spray method, where the insects are knocked into the water by spray from a hose-pipe. They either drown or are eaten

by fish, but insecticide may have to be resorted to in the worst cases (be extra-careful about chemicals, as they can build up in pondwater!). Be particularly careful if using chemicals where fish are present and **ALWAYS** read the instructions.

On a warm still day, spray carefully and allow the spray to fall on the leaves **ONLY**. Aphids are quickly killed and dry on the leaves, instead of falling into the water. Even after eradication, make regular checks for re-infestation.

Where insects have attacked leaves just above the water surface, push down the affected parts just under the water and weigh them down to keep them immersed while the fishes feed on a live bonus meal.

Control may be needed of *Chironomus* (midge) larvae which although small, green and very difficult to see, can do more harm than aphids. They eat the leaves of water lilies, *Apogon distachyos* (Water Hawthorn) and some other aquatic species, attacking both lower and upper leaf surfaces, leaving a skeleton of the leaf after removing living tissue. If untreated, the plants may become defoliated. Treatment is difficult, but the methods for aphid control and swift removal of all affected parts as soon as the infestation is spotted may have some effect.

Remove algae before large masses form, but beware of removing young fish, too. In summer, even ponds which have been free from filamentous algae can have unexpected blooms of it. It may be that small amphibians arriving at the pond have tiny strands of weed

attached to them. Insert a thick pole into the algal masses and twist to gather up the weed which can then be lifted out.

Algae can become a problem in some small ponds if there are long periods of sunny days. Although ponds need sunlight, too much can result in excessive algal growth. The shallower the water, the greater the concentration of light on its volume, so the greater potential for algal growth.

## Other techniques

Water lilies, which relish the sun, can be planted to shade the water below their leaves and sometimes small quantities of black vegetable dye (seen, for example, at Chelsea and Hampton last year) which is reported to be harmless to fish and plants, can be added to the water to combat algae in a shallow pond.

The dye also gives a mirrored effect to the water's surface. After a while, the dye will disperse. If, however, too much is used, or if it is used too often, submerged plants could begin to suffer through lack of light.

Excessive algal growth is encouraged by the presence of decaying plant and animal matter such as water snails, mussels and leaves, so remove these.

Many submerged aquatics, like algae, draw their nutrients straight from the water, but these higher plants are more robust and can make survival difficult for algae as they will extract nutrients at a greater rate and more efficiently than the algae. Examples are the 'oxygenators' such as 'Crispa' and *Eloidea*, Milfoil (*Myriophyllum*) and Hornwort (*Ceratophyllum*). Plant them in thick clumps of one bunch per 0.2 sq m/2 sq ft of water and allow them to colonise two thirds of the pond.

Floating plants such as Fairy Moss (*Azolla*) and Water Hyacinth (*Eichhornia*) also take nutrients from the water very efficiently and can simply be dropped into the pond, but care is needed as some varieties spread very rapidly.

Adding to the population of zooplankton is known to reduce the algal population; zooplankton are found in animal manure and barley straw. Barley straw is



SUSAN STEPHENSON

Small ponds tend to become overgrown as summer progresses.



also excellent breeding material for *Daphnia* (water fleas) which fish enjoy. About one bale of straw per 5,000 gallons (23,000 litres) applied in **spring** is the suggested dosage.

## Plant maintenance

Reduce the growth of surface plants if necessary (particularly floaters such as Duckweed) to allow light to penetrate to underwater plants. Defoliate water lilies if the leaves are hiding the flowers, cutting the leaves off well below the surface. Thin growths of oxygenating plants from time to time.

Some water plants will need thinning during the summer to prevent them becoming too large for their allotted space. If baskets need to be lifted to allow side shoots to be cut back or division of the plants, the water can become muddy and take a day or so to settle, but if the pump is switched on, the filter will strain the silt out in a couple of hours.

New plants can be settled in and older ones tidied up and fed with aquatic fertiliser pellets to boost growth.

Be on the alert for pests and fungal infections in the second half of the growing season.

## Pond margin plants

Plants of the margin need some attention in the summer months. Give gladioli a good soaking in periods of dry weather or if the soil dries out. Stake them if needed.

The flower stems of Bearded Irises to canes and cut flowers for indoors if wished. After flowering, cut back stems and top-dress poor soils with a general fertiliser. Dig and divide irises that have been undisturbed for three years. Check for leaf-spot disease and select the best single rhizomes for re-planting in newly enriched soil. Leave the tops of the rhizomes above the soil surface. Prepare a sunny, well drained plot for July-August plantings.

Prick out seedlings of February-sown Primulas in seed boxes ready for planting in September. Alternatively, prepare a shaded area with sphagnum peat and sharp sand dug into the top few inches, together with a dressing of a general fertiliser at 3 oz



Fish will require regular feeding throughout the summer season.

## SUMMER PLANTS

<b>1 Early season</b>	
Water Hyacinth	<i>Eichornia crassipes</i>
Day Lily	<i>Nymphaea</i>
Water Hawthorn	<i>Aponogeton distachyus</i>
Monkey Flower	<i>Mimulus</i>
Frogbit	<i>Hydrocharis morsus-ranae</i>
Umbrella Grass	<i>Cyperus sp</i>
Water Lily	<i>Nymphaea</i>
Flowering Rush	<i>Botanus umbellatus</i>
Primrose/Cowslip	<i>Primula spp</i>
Plaintain Lily	<i>Asiatic spp</i>
Bladderwort	<i>Utricularia</i>
Japanese Arrowhead	<i>Sagittaria japonica</i>
Japanese Clematis-flowered iris	<i>Iris kaempferi</i>
<b>2 Late season</b>	
Ligularia	<i>Ligularia</i>
Lobelia	<i>Lobelia fulgens</i>
Bugbane	<i>Cumifuga</i>



Free-floating algae (green water), as well as filamentous types, can cause a few headaches with regard to visibility.

## SUMMER JOBS

- 1 Check visually for signs of disease or infestation in pond
- 2 Regularly remove decaying or dead vegetation and animal matter
- 3 Prick out and thin seedlings and plants when necessary
- 4 Remove algae and duckweed regularly
- 5 Separate fry from parent fish
- 6 Dig and divide irises
- 7 Regularly top up and aerate water when necessary
- 8 Clean biological filters and pumps

per sq yard. Keep the bed or boxes moist and shade from direct sunlight.

Divide clumps of Golden Club (*Orontium aquaticum*) and replant. Dead-head self-seeding plants. Remove weeds regularly from moisture-loving plants in the bog garden.

When feeding plants around the edge of the pond, be careful not to spill any fertiliser into the water, as it will encourage algae. It is better to use natural organic food, such as well-rotted manure or a liquid feed based on seaweed, rather than a chemically based one that may leave excess nitrate in the soil, which can leach into the water.

## Fish care

If fish are present and become more active, it will be necessary to feed them with high-protein foods when the water temperature rises above 15°C (60°F). Do ensure that uneaten food does not lie in the pool and pollute the water.

If there are fry present, then try and separate them from the parent fish if there are too few safe hiding places to stop them being eaten.

New fishes should be acclimatised or kept in quarantine before being released into the pond. One diseased fish can provoke havoc in a previously healthy pond. Periodically check the fish for signs of parasites or disease and treat accordingly.

Clean biological filters and pump strainers. If the pond becomes polluted or very dirty, then a total pond clean-out may be necessary. Try to avoid the time when fry are present.

Install any new lighting so you have it to enjoy during the season. Clean pump filter and fountain jets as necessary.



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# WRITEBACK

## BIOPLAST LETTER OF THE MONTH

### How far is far enough?

I have followed with interest, and not a little sympathy, recent events regarding the protests against the transporting of live animals. I wonder, however, how many supporters of the campaign, after a good day's protesting, might be tempted by a nice prawn cocktail or fish and chips.

I have kept all types of fish and invertebrates, including prawns and a cod. All of them have become tame, fed from my hand and come to know when I approach, proving, I think, that they can think and remember and have feelings.

Not for these the quick dispatch in an abattoir. If they survive the suffocation on the deck of a boat, they are then either filleted alive or, as prawns, boiled alive.

My point is how far should we take all this? If you saw David Attenborough's recent programmes on plants, then you'll know that lettuces are all-thinking and all-feeling!

Richard Friend,  
Lowestoft, Suffolk.

Richard, your new and most interesting slant on this vitally important ongoing subject wins you the July BioPlast Letter of the Month award. £30 of BioPlast products will shortly be on their way to you from our sponsor. (Tel: 01335 630230).

### The show debate (further thoughts)

The large shows are in desperate need of change, as your recent articles highlight. For years, it has been, in the main, the keen stalwarts who have organised these events, usually one of the country's area federations. Initially, there were very large shows with member clubs putting on some sort of display, the main focus being on fishes that had won certain classes at local and area shows. The larger festivals would invite traders and other organisations along for added variety. Often, the whole lot was sponsored or supported by one of the large companies.

As your writers and correspondents have stated, there seem to be the same old faces, year after year, putting everything together, manning individual stands or carrying out particular duties, but even this is changing. In general, the hobby has lost numerous of the most dedicated workers at all levels, with not enough new ones filling their shoes.

Traders need to make a living; they need more than just to cover their costs. It is therefore the number of people attending these large shows, and the money they subsequently spend, that determines their continued

success. There are signs that, at least, some of the big shows will fail. Look at Manchester last year. Even compared to the year before, about half of the hall was empty, with very few traders attending. Also, some of the larger companies that have often sponsored these events have had to draw in their horns as their profits have diminished from the changes in the economy.

So what is the answer? Maybe the days of these shows being run from a hobby base are fading fast and a more commercial approach is needed to attract people: a change in the overall format, more for youngsters to do — instead of just being dragged around by their parents — more things geared to informing people of how to learn about the hobby, and not just displays of fish and equipment of what is available, but serious advice on how to use it.

Other possibilities could include a national competition run months prior to the event, widely advertised and sponsored by a major company, with valuable prizes, discount vouchers, freebies, more actual working visual displays and better surroundings... the list is endless. If something is not done, and soon, then we, the hobbyists, are going to be the losers in the long run.

Jeff Challands,  
Cichlid Data,  
Newton Aycliffe,  
County Durham.

### Captive breeding comments

I would like to thank R Cannon for the letter which was featured in *Write Back* (ASP April 1995 edition), and offer my congratulations on it being chosen as *BioPlast Letter of the Month*.

I cannot disagree with the very interesting points raised by Mr Cannon, which prove there is more than meets the eye when it comes to breeding fishes. I do, however, have a natural urge to defend his criticism of my apparent conflicting advice.

It is standard practice with biologists who are involved in breeding fishes to disregard weak and deformed specimens, as these would normally not survive in nature. This seems to be the best approach for the majority.

Cryogenic storage (deep freezing) is a technique which may prove to be a much better way to maintain genetic diversity, but, as far as I understand, at present it is still uncertain that gametes can withstand such treatment. If a system can be developed where the gametes will survive, then this is surely a great step forward.

However, a problem which will still remain is the administration of so many species which require help to ensure a future for them. I work within a zoological environment and do not have access to cryogenic storage equipment, so what hope has the amateur aquarist?

Because of the profound lack of resources available for research organisations in terms of funds, space, know-how and manpower, it is now a growing belief that the involvement of hobbyists in important breeding programmes is vital.

Perhaps fishkeepers shouldn't delude themselves about the results of their efforts where

breeding to save species is concerned, as it may well turn out to be totally inappropriate to re-introduce captive-bred fishes into the wild. Nevertheless, their efforts should not be discouraged, since some species have already been successfully re-introduced and, in any case, the information which can be gained from hobbyists is likely to be of great importance to aquaculture projects being established in, or close to, natural habitats.

Aquaculture, in conjunction with habitat conservation, is another possible way forward. Not many fishkeepers are in a position to be involved directly with in situ conservation, whereas they can still be involved in captive breeding while working from their fish rooms.

One aspect Mr Cannon and myself haven't mentioned in our respective articles and letters is that a growing number of species are being found to have natural capabilities of dealing with the effects of in-breeding. This is particularly so with some species which are found in small localised habitats, where the naturally small populations have survived through in-breeding. It is like the Cheetah, which was once believed to be on a path to self-destruction because the remaining world population is closely related and each individual's genetic make-up is identical. It now appears the Cheetah has developed a biological solution to the problem.

The more species of fishes we find with their own natural solution, the more likely fishkeepers can be directly involved and successful in species conservation, providing, as Mr Cannon rightly points out, natural habitats are sufficiently protected in the first place, which means a lot of hard work in raising public awareness.

Colin Grist,  
Aquarium, Bristol Zoo.



Some species appear to have in-built mechanisms to combat the effects of in-breeding. It is not known if Clownfish (these are Clownfish eggs) are among these.



1995 YORKSHIRE  
AQUARIST FESTIVAL

# 'BEST EXHIBIT OF THE YEAR' with AQUARIAN



BERT KOI

It is weight, rather than length, which determines how much waste a particular Koi will produce.

## Misleading fish inches

As a novice Koi Keeper and also an advisor to MAFF on fishery matters, I find myself writing with some degree of concern regarding the matter of advice given on the installation of filtration in my soon-to-be-constructed Koi pond.

Having telephoned a good proportion of the established southern Koi dealers on the potential purchase of ready-made units, there appears to be a great deal of conflicting (albeit willing and friendly) advice.

The problem seems to start when the matter of 'inches of Koi' is raised. This calculation gives, according to those who I spoke to, an acceptable stocking density for filtered ponds. I can tell you right now... it doesn't! It could also lead to problems with those who keep small fish and want to move up to larger ones.

Fish weight and length is NOT a linear relationship. I was assured that, for the purposes of any Koi pond filtration system, 30 6-inch fish create a similar biological loading to 10 18-inch fish, since both give a loading of 180 'fish inches'. This misinformation, coming as it does, from several of the leading producers of Koi pond filtration systems, is mindboggling, and to my mind, shows the degree to which Koi keeping and science don't mix as well as they might.

The reality is that 10 18-inch fish will create vastly more waste product, simply because they are many times the weight of 30 6-inch fish. It would be sensible therefore to know the total weight of the fish to be kept, rather than their combined lengths. This would, at least, provide a reasonable guide for Koi dealers on which to base their calculations of appropriate sizes for filters, and avoid gross overstocking.

I did finally find a dealer in Chidham near Chichester who recognises that the concept of 'fish inches' is ridiculous and is honest enough to admit that the best filtration is often inspired guesswork, part applied science and the use of the best units for the required job. His twelve years of Koi pond building experience testify as to his professionalism, as does the 100% success of his modular filter systems in producing water of almost supernatural clarity and quality.

He is now installing his self-made units next to my new pond. They are manufactured to a standard that many of us thought had long gone, and being modular, are easily expandable. As he told me: "If you ever hear the term 'Koi inches' used, you can be sure that the person concerned isn't in a position to give reliable information on your beloved fish". Caveat emptor!

Jonathan Bruno,  
Littlehampton,  
West Sussex.



LES GASH

TOP AQUARIST

Top aquarist Les Gash, winner of 'Best Exhibit of the Year' at YAF '95, with his group of breeding *Rasbora heteromorpha*. Les has previously won Best Exhibit at YAF in 1992, 1993, and 1994.

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# Tomorrow's Aquarist

BY GINA SANDFORD



BUG

of the month



## Bug of the month

Sometimes I think I must be losing my marbles! Last month I said I'd do damselfish in July — I did them in April, so I thought you might like Gammarus, the Freshwater Shrimp instead.

Summer is a good time for catching Gammarus; they inhabit freshwater streams and congregate under stones or among the roots and vegetation along the banks. In shallow water, it is best to don a pair of waders and paddle in the stream, hold your net on the substrate downstream of a rock and lift the rock. As you do so, all manner of little wriggly things, including some Gammarus and a lot of debris, will drift with the current straight into your net. Put the whole lot into a bucket of stream water.

Alternatively, you can once more hold your net downstream, but this time just down from some roots near the river bank. Shake the roots with your

free hand and, again, shrimp and debris will flow into the net and you can put the whole lot into your bucket.

These little shrimps are accommodating creatures. They like to cling to things, so suspend your net in the centre of the bucket close to the water surface and in a few hours shrimps will be clustering thereon. Lift the net out, put your hand underneath to catch any shrimps that fall off, and transfer this live food completely free from all the debris to your aquarium.

Take care feeding Gammarus to your fish, as populations of unstarved shrimps have been known to build up and decimate plants.

A chance comment on the early morning farming programme on Radio 4 regarding Gammarus proved extremely interesting. It was mentioned that some specimens that got into tanks of glass eels (elvers) had stripped the flesh from the young eels, just leaving the bones!

## It's holiday time again

Just a few tips to help ensure that your fish survive your holiday.

- 1 Make sure that tank maintenance is done a couple of days before you leave, just in case there is a problem with filter seals and the like.
- 2 Arrange for the lighting to be either on a time switch (try borrowing one of the plug-in sort, so that you don't have to wire it

into the system) or that a neighbour is willing to come in twice a day and turn it on and off. If this cannot be arranged, it is preferable to leave the lights off all the time, rather than on for 24 hours a day.

- 3 Get someone, preferably a fishy friend, to check that everything is working properly: filters, heaters etc, and make sure you show them where everything is, including spares and how to fit them, should the worst happen.
- 4 Leave instructions for what to do if the power supply

fails; for example, how to restart a power filter.

5 Your fish can go without food for two weeks. The only exception to this is if you have fry; these will need feeding and you must ensure that your minder knows how and when to do this, including keeping a supply of brine shrimp on the go if need be!

6 Whenever possible, avoid planned breeding programmes that coincide with holidays; annoyingly, there are always fish that spawn the day before you leave. Personally, I prefer to leave them to fend for themselves until I get back, on the principle that they've done it once, so they'll do it again ... when I get home, with any luck!

7 If you must leave food, make up small packets, each one containing enough for a single feed. Label each with the day and instruct your minder to put only the contents of that packet in the aquarium on that particular day. Many fish are killed with kindness, because an inexperienced minder has overfed them and polluted the system.

8 Leave an emergency telephone number of an experienced aquarist that the minder can contact if something dire should happen. Don't forget to ask first to ensure that the aquarist is willing to be on standby.

9 Enjoy your holiday!

## Shows you might like to attend

The Association of Aquarists has sent in a list of shows around the country that cater for juniors. I make no apology for including the ones that have already been held as well, because you might like to make a note of the contact number and give them a ring in preparation for next year's event. The A of A's Secretary, Judith Aylmer, writes:

"With reference to your article in TA about showing fish, I would like to invite all those interested in this area to come to the Association's Open Shows, most of which have a separate junior class, ideal for those just starting out. Unlike at some shows, the public are not excluded when judging is taking place, and judges are always ready to offer help and advice. (If the judges are a bit pushed for time, there are always experienced 'showers' around who would be only too pleased to pass on some tips.)

21 May, Robin Hood Aquarists, Nottingham. Show Sec: Dillys Hinton, 01159 631635.

18 June, Tongham AS, Show Sec: Andy Pearce, 01252 25686.

1 July, EAF, Dunstable, Show ▶



As long as your fish are healthy, as this Red Tuxedo Platy clearly is, they are probably best left to their own devices while you are away on holiday.



## Tetra TA COMPETITION

### THINK OF YOUR FISH AT HOLIDAY TIME

As you make all your holiday plans, don't forget to plan for your fish as well. If you follow a few simple rules it should ensure that when you return, yours or they are all fit and healthy. (See also Gera's holiday tips in this month's TA). Here are a few further suggestions:

It is best not to introduce new fish to your aquarium in the month before you go away, as it could affect the existing biological balance. Carry out a partial water change three weeks before you go away and clean up the aquarium. A couple of days before your holiday, carry out a final 20%-25% water change. Use a water conditioner, such as Tetra AquaSafe, at every water change to neutralise any potentially dangerous chlorine.

If you will only be gone for a few days, don't worry too much about feeding. Fish are able to tolerate long periods without food in the wild, using internal reserves of food to tide them over. Algae, plants, insect larvae and small pieces of food in the aquarium will also provide emergency rations if needed.

If a friend is going to feed them for you, leave clear instructions — too much food can be fatal. You could use an automatic fish feeder, which can be programmed

to feed at regular intervals. Granular foods, such as TetraPreme, are ideal for such feeders.

For living plants in the aquarium lighting is essential. If your absence is for two or three weeks, to invest in a timing device to switch lights on and off automatically may be prudent.

Now that the fish are taken care of, to help carry such essential items as towels, sunscreen etc, we have 10 Tetra Holdalls to give away to readers of *Tomorrow's Aquarist*.

Simply unscramble the following five words that appear below, put the answers on a postcard (or the back of an envelope) with your own name and address and send to Dept HT, Tetra Competition, PO Box 2162, Bournemouth BH2 5ZA to arrive no later than 15 July 1995. The first 10 correct entries to be drawn will each receive a Tetra Holdall.

For detailed advice on any problems associated with fish or ponds contact the Tetra Information Centre, Lambert Court, Chestnut Avenue, Eastleigh, Hants SO5 3ZD.

IRQMAUU  
GALEA  
NAGLURRA  
COBLOIGALI  
ITLAPRA



◀ Sec: Chris Ralph, 01256 63220.  
1 October, Milton Keynes A.S., Show Sec: Nigel Aylmer, 01908 319324.

15 October, Basingstoke A.S., Show Sec: Paul Dean, 01734 701261.

A late note from the A of A states that at the European Aquatic Fair in Dunstable (1-2 July), all junior entries will be

marked after judging, with a 1st prize of a watch sponsored by Renault (UK). There will also be an instant colouring competition at the show with materials supplied by "Early Learning".

Hemel Hempstead A.S., who boast a large junior membership, will be promoting "Showing Fish" on their stand, so do go along and chat with them.

1995 YORKSHIRE  
AQUARIST FESTIVAL

# 'BEST COLDWATER FISH' with AQUARIAN



ERIC WILLIAMS

TOP AQUARIST

Top aquarist Eric Williams has specialised in coldwater fish for many years, winning numerous major awards including 'Best Coldwater Fish' and 'Best Coldwater Breeders' at YAF '95.

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# KOI TALK



by  
Alan  
Rogers

With the summer now into full swing, I have been informed that a number of hobbyists are experiencing gill problems with their Koi. As water temperatures peak around the seasonal maximum, good fish growth is usually being promoted. However, life is not always that simple, and with all this increased activity going on, conditions are also encouraging to all undesirable parasites and bacteria within the pond.

Hopefully, this edition of **Koi Talk** may help a number of hobbyists to understand, and possibly avoid, the pitfalls of an epidemic of gill infections.

## Efficient heart

Any animal which has a lifespan of a hundred years or so rarely develops a heart problem. The Koi's heart is a very efficient three-chambered pump which circulates blood through the brain, to the gills, to the organs of the fish and finally to all the muscle tissues. Although it is possible that certain parasites can be encysted in the heart, the main cause of heart failure is congenital (natural occurrence).

It has been suggested that with decades of inbreeding and selective breeding of Koi, we may possibly see more genetic heart problems in future years, but nonetheless, this is purely a speculative theory for considera-



SHYOUSH MOCHIMARU

tion and no immediate cause for concern.

## Delicate gills

The gills, on the other hand, are very delicate and are constantly exposed to the environment. This exposure to all qualities of water renders them susceptible to a whole host of problems. Unlike lungs of air-breathing animals, gills are used, not only for respiration, but also for excretion and osmoregulation (maintenance of stability of the 'internal environment' within the tissues).

The function of the gills is to facilitate a complex exchange of oxygen and other gases for carbon dioxide. In addition to this exchange, more than half the ammonium excreted from the fish is via its gills. Osmoregulation also permits the gills to regulate the salt and minerals in the water coming into and out of the fish.

So, from this important role which the gills perform, it should be easy to understand that any condition which can cause damage or disease to the gills will indisputably interfere with one of the most vital functions of the fish.

Such a disorder, if left untreated, will eventually lead to death of the fish. It is therefore important to recognise any contributing factors which could bring about the lowering of the Koi's health when gill damage is suspected. The main issues leading to such damage are toxicities (these can arise from numerous sources), extremes in pH readings, excessive use or overdosing with pond treatments, nutritional deficiencies, parasites and, of course, bacterial infections.

Any of these issues can result in the destruction of the delicate gill tissues, or even the excessive production of mucus which inhibits respiration and excretion through the gills.

Here's a word for those hobbyists who believe in heavy baths of salt for eradication of parasites ... **beware!**

As for the detrimental effects of toxins, these come in the form of ammonia, nitrite, chlorine or chloramines, aluminium and, as already mentioned, the administration of pond medication in 'overdosed' amounts.

Pond overdoses can be induced over a period of time and not necessarily at one initial treatment. A slight overdose may not create real problems, but merely a temporary setback to the Koi's health. However, if a second dose is administered before the Koi has had sufficient time to recover, then serious problems may have been initiated. Pond over-treatment has always been a major cause of disasters and fatalities.

## Brown blood

Ammonia can be present as ammonia ( $\text{NH}_3$ ) or ammonium ( $\text{NH}_4^+$ ). Ammonia is lethal and toxic in any presence, whereas the ammonium ion is relatively non-toxic. Nevertheless, all attempts to eliminate it should be made by improving filtration efficiency.

The presence of ammonia can decrease the effectiveness of the oxygen-carrying capabilities of the blood, thus reducing the efficiency of the gill functions.

Nitrites are also extremely toxic when absorbed by the fish, and elevated levels of nitrite in the water could ultimately cause a condition known as **Brown Blood Disease**. Other chemicals, and especially the presence of hydrogen sulphide, can also cause this condition. The most obvious signs are brown gills and chocolate-coloured blood.

The nitrite ions compound with the red blood cells and will also

restrict the ability of the blood to transport oxygen. This can be a common occurrence and is a serious problem where overcrowding/overfeeding is concerned, especially on fish farms where catfish and trout are raised as edible fish for the table.

## Other problems

Extremes in pH readings can also create problems with ammonia toxicity. The higher the pH, the greater the concentration of ammonia ( $\text{NH}_3$ ).

At the other end of the spectrum, if pH is permitted to drop lower than 6 to 5.5, the nitrifying bacteria are inhibited, causing further biological filtration stages to depreciate in the process.

From fresh tapwater and the periodical topping up process comes yet a further complication to the Koi environment. Chlorine and chloramines are used for the purpose of disinfecting drinking water in residential supplies, but are toxic to Koi. Even low concentrations of these and other 'approved chemicals' in our drinking water are known to burn the gills and, at the very least, cause severe irritation within the gill tissues.

All too often pond medications and treatments affect the nitrifying bacteria in the biological stages of our filter systems, and these can have a detrimental knock-on effect on water quality and general fish health. Further, a variety of foods should always be offered, as any vitamin/mineral deficiencies can cause serious gill degeneration.

## Epidemics

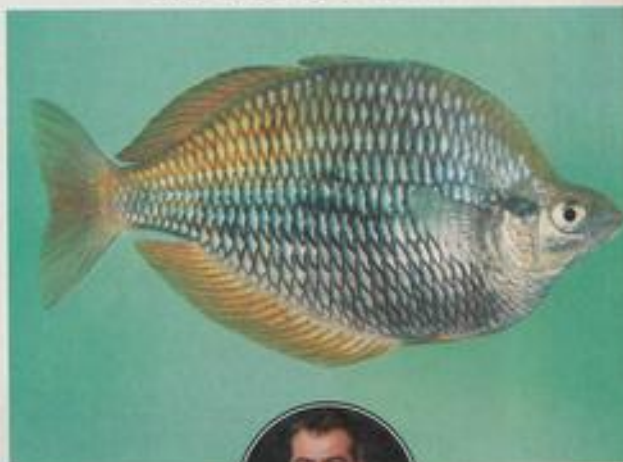
Most Koi keepers are aware that parasites and protozoa can attack the gills of fish. Even a minor parasite epidemic can have



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A selection of parasites. Left to right: Gill Fluke (*Dactylogyrus*), Fish Louse (*Argulus*), Anchor Worm (*Lernaea*), *Trichodina*, *Costia* (*Ichthyobodo*).

devastating results on the delicate gill membrane. *Costia* (*Ichthyobodo*) in high concentrations have been known to feed on the epithelial cells (lamellae), eventually destroying the gill tissues.

*Trichodina* is another parasite which is commonly found on the mucus of the skin, as well as the gills. *Chilodonella* and *Oodinium* (Velvet Disease) are also common problems that will attempt to destroy the gill membranes if permitted to flourish and gain a foothold on weakened Koi.

Monogenetic trematodes are usually flat parasitic worms (flukes) and will cause asphyxiation by the process of destroying the gill membrane and causing 'clubbing' of the gill filaments. Some species are livebearers, some are egglayers, and nearly all of them attach themselves to the skin and gills of Koi with special organs of adhesion in the shape of hooks or suckers.

*Dactylogyrus* and *Gyrodactylus* are two of the most commonly found, but there are, of course, many other trematodes listed that infest warm waters.

Bacterial infections in the gills are generally secondary infections of earlier gill membrane problems. Bacteria will cause the interruption of blood supply (necrosis) and the final destruction of the filaments, or sometimes create excessive mucus on the gills, which will result in increased respiratory movement, followed very shortly by suffocation.

## Solutions

Most symptoms of gill infection or disease can usually be detected in the early stages by the constant desire of the Koi to rub or flash themselves on the bottom or sides of the pond. Heavy water changes affecting pH or chemical changes to water quality can also create these same symptoms.

Later stage developments may see the Koi listless, hanging near the surface or near to a waterfall return where the oxygen content is greatest.

Most of these parasites will need a microscope to identify

them and to monitor the progress rate of their eventual elimination. Most parasites can be brought under satisfactory control by the use of Malachite and Formalin stock solution and treated at 1ml to 17.6 gals. Commercially produced Sterazin or potassium permanganate used at the rate of 1.5 grams/220 gals has also proven effective.

I have found that, in stubborn cases, while short baths in salt or formalin give a brief period of relief, chemicals based on trichlorfon effectively combat these parasites.

## Prevention tips

There are many possibilities and practical advice relating to the prevention of gill infections developing in Koi ponds. One of the most important tips is to maintain superb water quality at all times. Make regular water changes and monitor/test all water readings regularly.

Maintain high oxygen input all year round, especially to the filters; clean/maintain your biological filter on a regular basis; observe early warning signs of any abnormal fish behaviour; beware the use of excessive chemical pond medications and abnormal chemical treatments to your fresh water supply.

Take ultra care when introducing new fish that you are not also introducing disease and possible parasite infections to your existing stock.

Awareness at all times is of paramount importance and can be best described as 'preventive maintenance'. Stick to it religiously and it will certainly go a long way towards giving you trouble-free and healthy Koi. Talk to you soon.

## Koi Fact:

What is *Nishikoi*?  
*Nishikoi* is the Japanese word for dwarf koi.



# KEW'S GREEN AMAZON GIANTS

Chris Rosam visits Kew Gardens to get a close-up view of the amazing Victoria Lily.

There are few places in the British Isles with the space and tropical temperatures all year round to grow the giant South American Victoria Lily. One such place is the magnificent Princess of Wales Conservatory located within the Royal Botanic Gardens, Kew, West London, where the Victoria takes a starring role as the centrepiece plant of the huge 180,000-litre tropical pool.

Kew has had a longstanding connection with the Victoria, as it was here in the early 19th century that viable Victoria seeds first arrived in Britain. These were the halcyon days of the Victorian Conservatory and a



This eight-week-old Victoria resembles an ordinary water lily.

race quickly ensued to be the first to cultivate and propagate these great plants, a race which Kew were to lose to the famous gardener Sir Joseph Paxton in 1849, then the head gardener to the Duke of Devonshire at Chatsworth in Derbyshire.

During early June, I visited Kew to meet the staff responsible for the cultivation of this monster plant, and the upkeep of the pool which houses it.

The Conservatory was opened in 1987, is fantastically well designed and covers an area of 4490m<sup>2</sup>. It is sectioned into ten separate and different climatic zones, in which temperature, humidity and lighting are all computer controlled. The zones range from arid desert to tropical wetlands, in which the tropical pool and six 900-litre aquariums are located, all well stocked with freshwater tropical fish and plants.

If you like the so-called 'Tankbuster' fish, you will be well catered for, as the pool houses many large species which enjoy sufficient space to grow to their full potential.

## Annual giant

The whole of the conservatory is under the supervision of Mike Marsh, who has a team of botanial horticulturists working under him, including Chris Kidd who is charged with the day-to-day upkeep of the aquatic plants.

When I spoke to Chris it soon became clear that, despite the many scars and scratches inflicted on him by the spiky stems of the Victoria, this was undoubtedly his favourite plant.

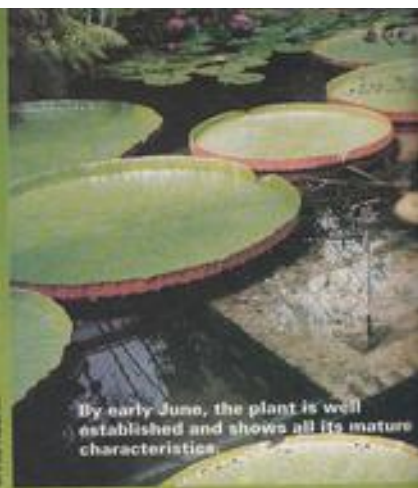
Remarkably, the Victoria is grown as an annual, taking only four months from germination to flowering. Chris explained that the variety grown was *Victoria* 'Longwood hybrid', a cross between *V. amazonica* and *V. obovata*. The seeds of this variety are imported from the USA, as even Kew do not have the space to grow both plants concurrently and cross-pollinate them.

## Germination & growth

The pea-sized seeds are sown into shallow pans at a temperature of 90°F (32°C) during late January. Germination normally takes 4-14 days, after which the seedlings with their hastate (spear-shaped) first leaves are pricked out into 3in (7.5cm) pots of loam. The next leaves produced are arrow-shaped, and the first floating leaves kidney-shaped.

At this point, the best plant is selected and potted into a 12in (30cm) pan and transferred to the main pool where the characteristic circular lily pads develop. This normally takes place towards the end of March and, at this stage, the Victoria resembles an ordinary Lily. Only when the leaves reach a size of 600mm (2ft) do the edges start to upturn. After a few more weeks, when the plant has put on some more growth, it is transferred to the loam pit, a huge underwater planter measuring eight feet square and filled with unsterilised loam.

Once installed into the loam pit, a



By early June, the plant is well established and shows all its mature characteristics.



Blooming just about to start.

growth explosion occurs and over the next few weeks, the pads grow steadily larger and the upturns higher until, by the end of June, they can measure a spectacular 1.8 metres (c 6ft) in diameter and the upturns 20cm (8in) high.

## Stale cider flowers

The first flowers appear in mid-May, but are cut away so as not to divert the plant's strength from growing the huge leaves which make it the star attraction. Although the flowers are very attractive, if short-lived, they are rarely seen by the public, as they are nocturnal. They also pervade a heavy perfume when open, described in many books as reminiscent of crushed pineapples. However, to Chris







Kidd, the smell resembles stale cider and not particularly to his taste!

A popular myth is that — for pollination — the Victoria requires the presence of a particular beetle which becomes trapped when the flower closes in the mornings. Kew have found that the plant is quite capable of self-pollination and had a jarful of seeds to prove it.

## Gross feeder

The area over the Victoria is provided with three huge metal halide lamps which are photo-electrically controlled to provide a constant photo-period and illumination throughout the year.

In theory this means that the Victoria could be overwintered, something the staff at Kew would like to achieve in order to keep their star attraction in place throughout the winter. In previous years, at around November, the plant's rhizome has outgrown the loam pit and risen up out of the soil, where it has desiccated and the whole plant died. This then leaves a huge empty space until the following year.

As would be expected for such a large and fast-growing plant, the Victoria is a gross feeder. Every two weeks it is fed by pushing several home-made fertiliser

The Victoria display at Kew. The children in the background give an idea of scale showing just how large the individual pads are.



The beautiful patterns of a pad as it unfurls are well shown in this photo.

bombs into the loam pit. These are made by mixing a slow-release fertiliser with clay, making fist-sized balls and allowing them to dry before use.

## The pool

As impressive as the Victoria, is the pool that houses it. It is split over three levels, each divided by low weirs. The first and highest section is the filter return and biological filter bed on top of which are grown Water Lettuces (*Pistia stratiotes*) and Water Hyacinths (*Eichhornia crassipes*). Although initially added to hide the filter medium, they consume a large amount of nitrate from the water and perform a very useful job.

The second section, divided from the first by one of the weirs, houses *Nymphaea* lilies, more *Pistia* and a small Victoria on a temporary basis, along with tropical marginals. In between these plants can be seen large Archerfish (*Toxotes jaculator*), busily knocking down small insects and aphids with squirted jets of water. The Archerfish combine well with the conservatory's biological pest control policy, making a good ally in the fight against aphids.

This section of the pool can also be viewed from below the waterline, through the three large portholes. It is here that most of the large fish can be best viewed. As the water is of good clarity you can see far into the pool and view a large Pacu, Pangasius Catfish, 9in Sucking Loaches, Clown Loaches, Silver Sharks and various *Ancistrus* cats, to name but a few. The staff at Kew have plans to aquascape this area to be more reminiscent of the rain forest in flood, and add public information notices highlighting the importance of the role played by fish like the Pacu in the distribution of seeds around the flooded forest.

## The filter

When one sees the filter plant room, located beneath the porthole viewing gallery, it becomes obvious why the water is so clear. After the water is drawn down from the largest and lowest pool, it is forced through to large sand filter vessels providing mechanical filtration. As the sand filter allows free-swimming algae to pass through, the next step is to UV sterilise the water and, finally, to pump it back to the biological filter bed located in the top level of the pool.

Compressed air is forced into the filter

bed to keep the white bed colonised with aerobic bacteria. The filter bed comprises a deep layer of Hortag and ceramic tubes.

While it passes through the filter plant room, the water is heated to 30°C (86°F), although by the time the water has reached the large display area, the temperature has dropped to 27°C (81°F). Incredibly, the temperature control within the conservatory is so precise that the water temperatures remain constant throughout the year.

In spring 1993, the filtration system throughout was upgraded from taking 2½ days to turn over the pool volume to just 5 hours, a turnover of 36,000 litres (c 7,900 gallons) per hour!

All of us have probably wondered what it is like in the tropics where many of our favourite fish and aquarium plants originate. If you can't afford a trip to the real thing, then a visit to the Princess of Wales Conservatory at Kew will give you a fair insight. I thoroughly recommend it. **ABP**



The individual flowers last for only one night in all their glory. This one is already beginning to fade.

## VICTORIA LILY FACTFILE

- 1 First discovered in 1801 in northern South America.
- 2 Viable seeds collected by Schomburgk from the River Berbice, Guyana; first arrived in England during 1837.
- 3 A race ensued by botanical societies and private enthusiasts to be the first to induce the Victoria to flower.
- 4 A flower was first produced by Paxton at Chatsworth and a year later at Kew.
- 5 When first discovered, the plant was thought to be a species of *Euryale* but later renamed *Victoria* in honour of the reigning British monarch.
- 6 Three types exist: *Victoria cruziana*, *V. amazonica*, and a hybrid of these two species *V. 'Longwood hybrid'*.
- 7 The flowers are short-lived, lasting only 24-36 hours; they only open at night and change colour on subsequent openings, changing from white through to crimson-pink. They exude a pungent perfume.
- 8 The pads are among the largest leaves of any plants, measuring up to 2.0m (c 6.5ft).
- 9 The leaf undersides are red or purple and, along with the stalks, are covered with sharp spines. The undersides are heavily ribbed and veined, helping to give the leaves buoyancy.



## BREEDING:

# The Blue Emperor Tetra

John Rundle introduces the easy-to-breed, 'other' Emperor

**W**hen is an Emperor Tetra not an Emperor? The answer is when it is the *Ipaichthys keri*. Let me explain ... it all comes down to the confusion of using common names for our fish. In your dealer's tanks, you will find a beautiful tetra under the name of the Emperor Tetra and it is possible that, in another tank, there will be yet another fish, just as outstanding, called the Blue Emperor Tetra.

In fact, these two fish are not even in the same genus. One will be *Nematobrycon palmeri*, this being our fish in the tank marked Emperor Tetra. This species has been around for a long time and has been a favourite of aquarists all over the world. *Ipaichthys keri*, the so-called Blue Emperor Tetra, is fairly new to the hobby.

Without doubt, at the present time, the Blue Emperor would be the second choice between the two fish if most fishkeepers had to pick which one they bought. I hope, though, that through this article, I can convince you that *keri* has a lot to offer, and not only as the ideal fish for the living room tank. It is also undoubtedly one for the aquarist who, like me, loves to breed fish.

## Easy breeding

The Blue Emperor cannot be classed as one of the so-called 'problem fish' when it comes to breeding. I have bred this little tetra many times without any problems at all. By following the guidelines that I have

for this fish, I can obtain broods of up to 150-plus fish.

I tend not to have a set pattern for breeding groups of fish, for instance, tetras. You can find books that will group all these fish together and tell you to use the exact same procedure. In fact, there are many factors that will determine the size of the brood, or if the eggs will hatch, or even if the fish will spawn in the first place. I therefore look at these points and use them to breed certain **individual fish**, rather than **groups of fish**.

Over the years, I have kept notes and it is to these (at the present time I attempting to place all of these notes on to a database) that I turn to when breeding fish. The Blue Emperor is one of the fish in my files. Its record contains one or two factors that, if used, will give success.

## Sexy adipose fin

Many tetras can be sexed by looking at the shape of their bodies; with Blue Emperors, this is not the key factor. Females do not show any great roundness

in the belly area and do not require to be very fat to breed. Size can be used to sex them, though, but only when the fish are adult. The females are slightly smaller than the males, but again this is not a sure way of sexing them.

To be 100% sure that you have a pair, look at their tiny adipose fin. This is the small fleshy lobe on the fishes' back between the dorsal fin and the caudal fin. Males have a bright blue adipose, while females have one that is red to orange in colour.

## Water preference

The Blue Emperor is at its best if kept in water with a pH no higher than 7.2 (ie. very slightly alkaline) and a hardness of up to 6dH. These readings can vary slightly.

It is wise to remember we are dealing with a fish which comes from relatively soft waters. Having said this, I would guess that the bulk of the fish you see in your dealer's tanks are not wild fish; it is these fish that are a little more tolerant to slightly varied water conditions.

When it comes to breeding, it is best to aim for 7pH (neutral) and 6 or lower dH. In my case, the water comes out of tap at 7pH and 1dH. This is ideal for breeding many tetras, but it can cause problems with sudden pH drops ... but that's another story.

## Tank set-up

There is no need to use a large tank to breed the Blue Emperor Tetra; keep within the range 12 x 8 x 8in to 18 x 10 x 12in (30 x 20 x 20cm to 45 x 25 x 30cm). I breed my fish in all-glass aquaria of 15 x 7 x 12in (38 x 18 x 30cm) in a 'bare tank set-up', that is, with no substrate such as gravel.

The first step is to clean the breeding tank well, prior to filling with water. I pre-clean breeding tanks using salt to act as a steriliser. Do not use table salt; use cooking or marine salt. Once the tank is clean, it can be filled with water; a depth of 6 to 7in (15-18cm) will be fine.

## Keri Factfile

Scientific Name: *Ipaichthys keri* (Gery and Junk 1977).

Common Name: Blue Emperor Tetra.

Habitat: Rio Ariguama, Amazon River.

Size: Males 4cm (1.5in); Females 3cm (1.25in).

KEITH HAYZ



Blue Emperor male. Note the blue adipose (second dorsal fin).



The more commonly seen Emperor Tetra

ALAN C. HEDDERLEY



A heater/ster set between 25°C and 26°C (77-78°F) can now be placed in the tank and left for 24 hours. Do not fit any type of filtration to the set-up at this point. If the fish were spawning in their own biotope, they would deposit their eggs into such things as fine submerged grasses or plants. In my case, to act as substrate plants, I use nylon wool mops. Prior to placing in the tank, the mops are cleaned in very hot water.

Do not use too many mops for these fish. I use one floating mop suspended on a cork or strip of polystyrene and two mops resting on the floor of the tank. We now have the tank ready to accept the selected breeding pair of Blue Emperors.

## Spawning

It is worth noting that to breed here, the females do not have to be all that plump. A slight roundness in the belly region will indicate the female will breed. Another point is not to breed these fish once they are too old. You will find that young adults will be more eager to spawn and supply large broods.

The selected pair of fish can now be placed into the breeding tank. I tend to do this in the evening, a habit that I have from when I was working. I always used to put egg-layers of this type down to breed on a Friday or Saturday evening. This way, I could be around to remove the parents before they had time to eat the eggs. Even now that I am home all the time, I still place fish down to spawn in the evening, but not only at weekends.

I find that the Blue Emperors will spawn the morning after they are placed in the tank. There are times when they hold back until the second day, but if they do not spawn on this day, I will remove them and start again with a fresh tank.

In my fish house, there is access for some filtered daylight and as the early morning light enters, this seems to trigger the fish to breed.

If you are on hand, you will see the male



One of my breeding tanks

showing his best blue hues and attempting to drive the female into the mops. The pair will appear to come together and both will start to quiver. It is at this point that the female will release a few tiny clear eggs which will be fertilised by the male. As soon as you see the female not responding to the driving male and hiding within the cover of the mops, you will know that the spawning sequence is over.

It is at this point that I remove both the fish before they decide to start eating their own eggs. I now cover the tank with newspaper to keep out any bright light, as the eggs are a little sensitive to light.

## Hatching

At the suggested temperature, the eggs will hatch in 24 hours. If you are careful and just lift one of the mops, you will see very tiny splinter-like fry moving on the tank bottom. I tend to keep the tank covered until the fry are free-swimming, i.e. another four to five days on. Remember do not feed the fry until they reach this stage. Up till now the fry have been feeding off their yolk sacs. It is at this point that I fit a small sponge type filter.

When the fry are free-swimming, the covers are removed and they are fed their first food, which is infusoria. I prepare my own cultures using powdered milk; two such cultures are used. This is to allow me to have a supply of infusions at all times.

In the case of the Blue Emperor, we could be looking at having to feed about 100 to 200 fish. It is at this stage that problems can arise. If the infusoria culture is a bad one, it will pollute the water and kill the fry. On the other hand, it could be a good culture, but the fry are not being fed the quantity they require to sustain them until they can take the next size food.

I tend to work to a fixed datum: for a brood of about 100 to 200 tetra-type fry, I will feed 200ml of infusoria culture. This, I find, will keep them going until they are large enough to take the next

food, which should be within four to five days from the free-swimming stage.

## Second foods

The second foods that I use are both live foods: brine shrimp nauplii and micro-worm. I feed brine shrimp in the morning and micro-worm in the evening.

Again, you have to be aware of the size of the brood and feed only enough that can be eaten in one sitting. If you do happen to overfeed, then remove all uneaten food, as this will start to pollute the water and can cause all sorts of problems for the tiny fry that would be about 1.5mm (0.7in) at this stage. I also change about 25% of the water each week.

## Moving on

When the fry are around 3mm (.125in) they are moved to larger tanks to grow on; these will be either 75cm (30in) or 90cm (36in). I will now add a little crushed flake food to their diet, plus the live foods.

You will now, at this size, begin to see the young fish starting to show colour: a dark band along their flanks. Once at this stage, all problems should be over. Just make sure that you keep up on the water changes of 25% to 30% each week.

Within 12 weeks, you should have a fine shoal of Blue Emperor tetras which, I am sure, you will have no problem moving on to friends or even a local dealer. **AF**



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# Pond Pump Ponderings



## Things to think about

### PART TWO

Peter May moves on to some vitally important points that need to be considered before taking the final plunge and choosing your pond pump.

*Illustrations by the author*

**Y**ou feel as though you need a pump for your water garden. The urge is upon you and nothing is going to stop you. Your well-earned lucre is burning a hole in your pocket, the fish are gasping for oxygen, the atmosphere around the pool is fortid, the frogs are bored to tears. There are no two ways about it. It has got to be a pump ... but which one?

Pause and pull yourself together, reflect and ponder. You are about to become one of the country's foremost experts on pond pumps, so don't rush into things like an Orfe into an office. Patience.

Most importantly, you must be aware of all your requirements before you buy. This will help your aquatic dealer to know what he or she has got to offer that would suit you. Is it, for example, for a fountain, waterfall or filter or a combination of these?

### Fountains/waterfalls

With regard to a fountain, the plants have a problem. Lilies cannot abide being anywhere near splashing water, so leave plenty of room for both. So that it does not spray the total contents of the pool out over the lawn the one night you accidentally leave it on, the pump will need to be positioned at least the height of the spray clear from the edge of the pool.

Geyser-type fountains or foaming jets have a more solid and less easily blown column of water. They make very effective pool oxygenators too. They are easy to see and are non-clogging. However, they require a fairly substantial pump to keep them going.

If the pump is just for a waterfall, you don't really want any more than the total volume of the pool turning over every hour. Anything above this, and the waterfall not only looks out of proportion, but the pool also has great difficulty in settling down and the plants have a hard time keeping on top of things. Allow 50-60 gallons per inch width of waterfall at the height/head you require.

If you want the pump to run a waterfall and a fountain, then estimate that the pump's performance at the waterfall will be reduced by at least 20%.

So, bearing everything in mind, go for a



**Pumps for waterfalls should be able to turn over the total volume of a pond about once every hour.**

little more performance than you think you need. You can always restrict flow, but you can never boost it. Besides, debris collecting in the prefilter will soon dampen down the performance.

### Siting the pump

When it comes to plumbing and siting the pump, remember again that the flora and fauna of the pool would prefer as little disturbance as possible from moving water. Therefore, site the pump as near as possible to the fountain or waterfall and as near to the surface (certainly raised from the bottom) to avoid as much turmoil as possible. This also reduces the pipework and, in turn, the friction loss that professional pump suppliers regard as most important.

For every foot of pipework, every fitting, bend or hosetail, you are reducing your pump's performance by huge amounts. In view of this, you must fit the widest possible hose that the pump will take and keep all fittings to a minimum (they are expensive anyway), otherwise you might as well have bought a smaller pump.

### Filters

With filters, you will want to turn over the complete volume of water in the pool once every two hours, so siting it as far away as possible is probably necessary. Allow a loss of 7 to 10 gallons per hour in pump performance for every 10ft of maximum-bore piping.

As well as taking this into account, the size of the pool (therefore, the size of the filter) will dictate the size of the pump



## TEN THINGS TO LOOK FOR

- 1 Guarantee: this should be a minimum of one year continuously rated.
- 2 Pumps for filters: these should have large inlet holes to take detritus to be filtered.
- 3 Pumps for filters should be powerful enough to get the maximum performance out of the filter which, in turn, should be capable of processing half the volume of the water in the pool every hour.
- 4 Centrifugal vanes on the impeller don't get clogged.\*
- 5 If the motor has no seals, then it is an induction motor and therefore easy to maintain.\*
- 6 Induction motors must have ceramic bearings or better.\*
- 7 Induction motors need an efficient pre-filter or strainer of their own.\*
- 8 Make a comparison of the water heads in different designs of pumps and not just in the range of one design.
- 9 It is worth looking at the power rating, ie Watts, and drawing a comparison with other pumps of a similar performance. It will not only give you a guide to the running costs but also a clue to its efficiency. Take some gallons/litres conversion tables with you.
- 10 If you are unsure about what you require, find someone who really knows what they are talking about. If you cannot, go somewhere else. Or if things are really busy, come back at a more convenient time when the retailer is liable to be less harassed.

**Note:** Items marked\* will be discussed in the final article in the series.

required, eg a 1,000-gallon pool will need a filter capable of processing 500 gallons per hour and a pump capable of delivering that to the height of the filter.

I would not advocate running the outlet of a filter down a water course as a stream, but just have the filter separately and unobtrusively discharging into the pool. In this way, you can get maximum performance out of the filter and pump by having the filter situated more or less at pool level, with the pump on the pool bottom in summer and halfway down in winter.

## Pricing the project

In the purchase of consumer durables, price is a limiting factor. If it wasn't, more of us might be driving around in Mercedes, wearing Rolex watches, using Miele washing machines and playing Blaupunkt stereos ... But before you decide what is going to be the maximum you will spend on a pump, you have to budget for something that might turn out even more expensive.

Where is the electrical power to the pump coming from, and where and how is it going to be fitted in? The bits and bobs and junction boxes, switches, plugs and cable can easily outstrip the cost of the pump, price-wise. There is quality and rubbish in all this gear as well, and there is also the right way you have to do it. No short cuts, please!

R.C.C.B.'s (very sensitive Residual Cur-

rent Circuit Breakers) are essential for any electrical appliances outside, and knowing what the British standards for outdoor power installations and following them accordingly, is a must and not cheap. Get professional help if you don't understand.

With all the costs of installing your pump, you might feel that the running costs are pretty insignificant in comparison. It is, however, worth looking to see if a particular



Fountains can prove the difference between life and death during hot, humid nights. However, for optimum effectiveness, pond, fountain and pump need to be properly matched.

pump that is more expensive may have lower running costs for the same performance and, if it is liable to be running non-stop, it might tip the balance towards that better-quality pump.

What makes one pump more expensive than another, while another is cheaper to run for the same amount of power input to power output is inherent in the design.

(TO BE CONCLUDED)

AP

## What does your retailer want to know?

### 1 Fountain, waterfall or filter or combination?

Many smaller pumps come with all the fittings and, often, a jet coming straight from the pump ready for instant installation. There is often the facility to 'tee' off with a hose to the top of a waterfall. If you want to run a fountain and waterfall together, you will need a flow valve on the pipework and on the fountain head to balance them to your satisfaction. The pump may come with a fountain adaptor that already has a flow adjustment.

### 2 Height of fountain. Height and width of waterfall.

### 3 Size of pool.

### 4 Type of fountain, type of waterfall, type of filter.

### 5 For a waterfall, is all the pipework in situ? If it is, will it affect the performance of the pump? How far does it go?

### 6 Will you want any of the electrical fittings, connectors or waterproof plugs to 'plumb in' the power supply effectively? If it is already installed, will the pump's own cable be long enough to reach the supply?

There are probably many more questions, but the answers to the above should be enough to get the ball rolling.

**Footnote:** We have asked Peter to extend his original two-part review into an extra instalment. Some items that were initially planned for Part 2 will therefore now appear in Part 3, eg, how different types of pump work, etc.



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# Koi: The Long Hot Summer

As the song says, "Summertime ... and the living is easy". Can it really be that simple? Now is the time of year when our Koi are at their most active and we certainly should be able to gain the most from our hobby without any problems.

It is also the time of the year, however, when we should be most on our guard against any problems occurring, as at the temperatures we are now (hopefully) experiencing, small problems can develop very rapidly into much larger problems, virtually overnight.

Perhaps the first thing we should consider is the higher temperature of the water, and look at what this should signify to us.

## Temperature & oxygen

The first, and probably most important, thing is that warmer water is not capable of holding as much oxygen as colder water. Therefore, for this reason (as we tend to keep a lot of Koi in a relatively small amount of water) we must provide some additional means of aeration.

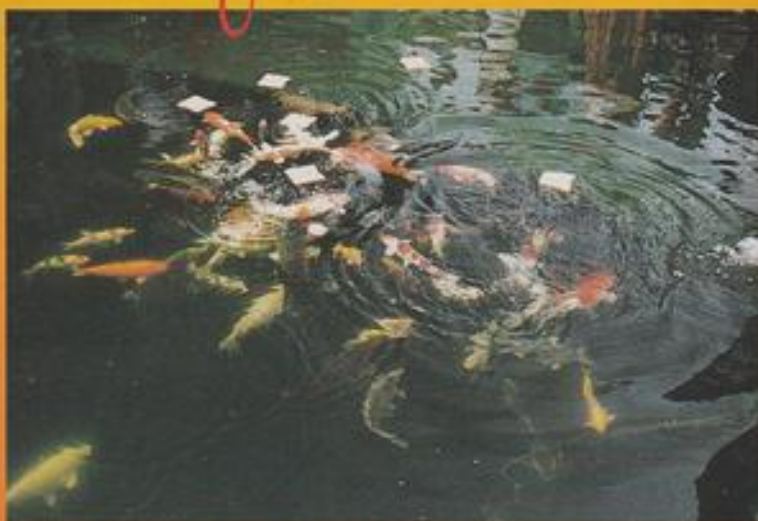
This is normally done by adding airstones or venturis, or by building a waterfall into the system. There is also an 'air-dome' marketed now which, when placed over a bottom drain, not only aerates the water very well, but also creates a circulating current in the water which helps to sweep the pond floor toward the drain, thus ensuring a cleaner pond environment.

It is also the reason why a lot of so-called 'oxygenating plants' are not used in the ponds of serious Koi keepers. Plants photosynthesize during the daytime when sunlight — through its action on chlorophyll (the green pigment that gives plants their colour) — enables them to take up carbon dioxide from the water, and to produce oxygen.

I suppose that this is why they are called 'oxygenators'. It is also the reason why blanket weed floats on hot days; you can quite easily see the millions of small bubbles of oxygen in among the strands of algae.

It is a different matter at night, however, especially during hot sultry weather, as in the absence of sunlight plants cannot photosynthesize. Therefore, they cannot generate the oxygen which they've been using during the day for respiration. Neither can they take up the carbon dioxide they generate during respiration.

So, the overall effect during the hours of darkness, is reduction in dissolved oxygen levels and an increase in carbon dioxide. This has caught many a Koi keeper unawares and has been responsible for



Feeding always elicits a bit of a frenzy in the warmer weather. Feed your Koi a good-quality balanced diet with plenty of variation. Brown bread would be better than the white bread shown here, however.

High summer may be enjoyable for us, humans, but for our Koi — as Barry Goodwin explains — the hot weather can bring with it a host of challenges.

*Photographs by the author*

wiping out whole ponds of fish through oxygen starvation.

Photosynthesis and respiration are also responsible for the sometimes rapid changes of pH in the water which can stress Koi and act as a 'trigger' for all sorts of latent parasite and disease problems.

## Injuries & new fish

The second thing to consider is that if your Koi have spawned during the springtime, it is more than likely that they will have sustained some damage during this process. This can range from 'skinned' heads, to bruising, to missing scales, to open wounds, which, if left untreated, can become bacterially infected and possibly lead to much more serious problems, or even the demise of that particular Koi.

You must therefore make sure that all wounds or damaged areas are treated as soon as they occur, with a topically applied bactericide to prevent infection setting in. At these higher temperatures, healing will take place rapidly, but by the same token, certain types of infection (if they should take hold) could progress quickly through the pond, so be on your guard.

This is also the time of the year when you will probably be thinking about buying more fish to put in your pond, and once again, I have to urge caution.

It is a certainty that if you buy fish and put them straight into the pond, you will bring in disease or parasites at some time, which could spread to the rest of your collection. I cannot stress too strongly that you must carry out quarantine procedures with newly purchased fish, irrespective of whether or not your dealer has already done this.

This should be done for whatever period you decide is appropriate. As a guide, I would suggest that you allow them to settle in for seven days, during which time you should observe them and make sure that they all behave normally and are eating and passing waste. Ensure also that, during this time, no visible external parasites are evident, such as Anchor Worm, Fish Lice, leeches, etc.

Over the following weeks you should then treat against parasites by dosing with a suitable anti-parasite remedy once per week for three weeks, but take care to follow the manufacturer's instructions.

After this, and a further one week of





Be very careful when catching fish that you do not damage them. It is sometimes better to employ two people, as seen here, to be on the safe side.

observation, you should be reasonably confident that you are not going to introduce parasites to your pond with the newcomers. You must then decide if you are satisfied with this and whether or not there is any chance of your new fish carrying disease. If you feel there is a chance of this, then you are into a different ball game altogether.

To quarantine against disease you would have to know a whole range of factors about the diseases you wish to guard against. For instance, you need to know which disease, what temperature this will incubate at, what the trigger factor is and so on.

Some purists will quarantine Koi for up to a year, but most keepers settle for the five weeks mentioned earlier and only purchase Koi from a well known dealer with disease-free stocks. This is, perhaps, the only way to protect your existing Koi against incoming disease.

I know that there are those of you who are now saying that you have never quarantined fish and have got by, so far, but I can assure you, without any shadow of a doubt, that there are many more who have bitterly regretted this approach.

It is a necessity that you set up quarantine quarters and keep them running all year round, with a resident crew of fish, to maintain the biology in the quarantine tank filter, as the logistics involved in buying a Koi and then setting up quarantine facilities, are mind-boggling. You will not only have the Koi to care for, but also the water quality in a new system, which, in itself, could prove a death sentence for that Koi!

## Feeding

Another area to watch is our feeding routine, as in the warmer weather, the metabolism of our Koi will increase, together with a greater demand for food. You must handle this sensibly, however, increasing the total amount offered by feeding more often, rather than by increasing the amounts offered at each feed.

It has been said that a large hungry carp will eat up to 20% of its body weight in 24 hours! I am not suggesting that you go that far, as a lot of the 'wild' food would be live and, therefore, a lot easier to digest.

You should, nevertheless, feed the best quality high-protein food during the warmest weather, and possibly in five or six feeds a day, or even more, if you are fortunate enough to be a full-time Koi keeper. Believe me there are keepers who buy a 1kg bag of the cheapest food per week and make it do!

Don't just feed your Koi a pelleted diet; while this will undoubtedly sustain them, it is always better to bring in a little variety. Lettuce is a good thing to feed, and it seems to be the floppy salad varieties that go down best.

Just make a hole through the stem,

thread a piece of string through, and hang it in the pond. The fish ignore it at first, but persevere and soon, they will be eating it at a faster rate than you can keep them supplied. The same goes for shrimps.

Leave the shells on, just break them in two and throw them in the pond — I'll guarantee that none of them reach the bottom.

Cockles can be fed in a like manner, and an orange cut in two and dangled in the pond will keep Koi busy for hours. Earthworms are also a very tasty tidbit. In fact, many Koi keepers set up wormeries just to keep their fish supplied.

Feeding foods like this, which can be easily digested, is also a very good means of getting your Koi hand tame, especially if you have a Chagoi to lead the way!

## Pond & filter

Filter maintenance is another item that will need more attention in the warmer weather, with possible daily flushing of settlement areas, weekly 'hoovering' of the pond bottom to clear those areas the bottom drain influence cannot reach and back flushing of the filter chambers weekly. Don't forget to test your water weekly for ammonia, nitrite and pH, as water quality is very important at all temperatures, but particularly so in the warmer weather.

Water changing is another necessity as well, for this helps to keep the bacterial loading in the pond down, helps to keep parasites at bay, keeps down organic levels in the pond and replenishes the minerals that have been used from the water, thus preventing 'dead water' syndrome affecting the health of your Koi.

I would suggest that you change 20% minimum per week in the hottest weather and 10% per week in temperate weather, falling off to 5% per week during the winter. Of course, the replacement water should always be fed via a purifier, thus preventing



Damage, as seen here on this Shows, should have been attended to earlier (especially in warm weather) as it is already infected. It is, however, well within the scope of the average Koi keeper to treat and heal wounds of this nature successfully.





A Venturi return of water to the pond provides an effective means of aerating the water. These devices are particularly useful during high summer.

unexpected pollutants in the tapwater from adversely affecting your Koi.

As stated previously, the metabolic rate of Koi will increase in the warm water, which means that they will process the extra food we are feeding them to produce more energy — fully charging their batteries, so to speak.

This extra energy will be evident if you ever try to catch one of your smaller Koi in warmer water. During such an operation, hormones are released into the bloodstream of the Koi due to its alarm reaction being stimulated. This will give it almost superhuman powers, or so it seems when you see a 10in Koi jump the length of the pond in an attempt to escape your net!

Chemical messages are also sent out by a Koi under these circumstances. These will be transmitted to all the other Koi in the pond, which will become very nervous themselves, leading to undesirable and sometimes unnecessary stress.

Beware of injuries inadvertently inflicted at such times, and only attempt to net your Koi when it is absolutely essential, as even the edge of the net can damage the mucus layer and bruise scales.

### To treat or not to

You may notice, at times, that your Koi will flick and 'flash' themselves on the pond bottom. At such times, the temptation is to think your Koi have parasites

and rush in with the treatment. If you think about it, though, you will quickly realise that if you follow the procedure of prophylactic (preventive) dosing of your pond in spring and autumn, then the problem is unlikely to be parasites, unless, of course, they have been inadvertently introduced due to lack of quarantine procedures. If so, then you only have yourself to blame.

The most likely cause is that there has been a temporary shift in water quality due to any one of a number of reasons. If you see your Koi acting up like this during the warmer weather, then test your water, as the problem is likely to be associated with pH, or an ammonia or nitrite flash, due to the increased feeding, in which case, you could take a hard look at your filter design.

As you can see, dosing your pond with anti-parasite treatment under these circumstances would be totally counter-productive, would stress the Koi and probably reduce the water quality even further.

Always make sure that you accurately diagnose problems before you take any action. If you are not sure, ask someone who is perhaps more experienced than you are.

Only by taking note of all that happens in our ponds, learning what it all means, and finding the correct action to take when we suspect a problem is about to occur, will we become experienced Koi keepers and able to enjoy this wonderful hobby of ours to the full.

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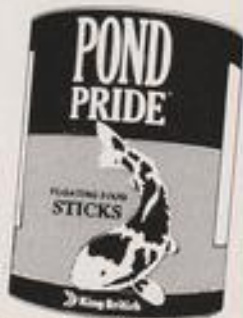
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# SEAVIEW

BY GORDON KAY



## Beautiful boxes

There are two reasons why I keep tropical marine fishes. First, they are almost all drop-dead gorgeous. Secondly, and probably more important for me, they have such entrancing natural histories.

In a hobby chock full of interesting animals, there can be no more interesting family of fishes than the often overlooked Boxfishes, the family Ostracionidae or Ostracionidae. This strange family is related to the Pufferfishes and their most striking feature is the hard 'shell' which encases their whole body, with the exception of mouth, eyes, fins and gill openings.

They move around by employing sculling motions, rather than swimming in the accepted sense, and their fins reflect this, being somewhat reduced in size, broad and paddle-like. Although Boxfishes are rather slow swimmers for most of the time, they CAN put a spurt on if needs be, by lashing their comparatively large tails from side to side.

These fish mostly lead quiet lives, staying close to the bottom, secure in the knowledge that their 'armour' will keep them



A *Lactophrys* species — one of the so-called Trunkfishes.

safe from attack. However, Boxfishes become more vulnerable when they move up the water column, because their hard shell does not extend to their stomach region, which is just like any other fish's. Any attack from below will result in a nasty wound that will, quite often, become infected.

When they are attacked — and indeed when they are dying — some members of the family emit a toxin which kills, not only their attacker, but even themselves and anything else which may be around. This, of course, can be a real danger in an aquarium.

In fact, I have heard tell, from people far more knowledgeable than I, that if there were a line of ten aquariums, all containing fishes, with the first housing a Boxfish which exuded this poison, then if one were to dip a net into its tank water and dip it into all the others, the effects would still be lethal by the time you arrived at the tenth. I've never seen this for myself, but as I say, these people know far more than me.

It is thought that the mechanism for this toxicity evolved as a defence against predators, as the glands which produce the toxin are near the mouth and the favoured way for a predator

to attack is to take a victim head-on.

The family Ostracionidae is distributed all over the world and is common in some areas. There are fewer than 50 valid species, most of which are less than 12in (30cm) long, although there are species which grow to twice the length. The members of the family which you will sometimes see in the shops, all make excellent additions to any quiet aquarium collection which is devoid of any bullies or boisterous species. Their slow movements seem to attract the attentions of the Cleaner Wrasse, *Labroides dimidiatus*, like a magnet, but they appear to resent the attentions of these well-meaning little fishes.

Boxfishes — or trunkfishes, as they are also known — can quickly suffer the effects of starvation, so you would be well advised to reject specimens which have a sunken appearance. These are animals which should be fed regularly; they particularly relish live foods, but will accept all of the usual frozen aquarium fare. It is a shame that Boxfishes are so overlooked, for a more engaging family is hard to find.

## World Ocean Day

8 June 1995 was United Nations World Ocean Day and the Whale and Dolphin Conservation Society was to mark the day by hosting its annual Walk for Whales and Dolphins, on Sunday 11 June.

There were 46 walks around Britain, each one being a maximum of 5 miles long. They took place at country parks, Sea Life Centres and Bass Taverns around the UK. Did you take part?

I have spoken about these events before and you will remember how much fun I've had on them. Write and tell us if you took part this year.

If you would like more information on cetaceans, contact The Whale and Dolphin Conservation Society, The Old Brewery, Newton, Bradford on Avon, Wilts. BA15 1NF.

## Nitrification made simple

Judging by the number of questions I get asked about the Nitrogen Cycle in general — and nitrification in particular — now seems as good a time as ever to run through it again, this time perhaps in a little more detail.

**Nitrification** — that part of the Nitrogen Cycle which is of most interest to marine aquarists — is a step by step process in which complex nitrogenous waste substances are broken down into simpler compounds. Each of the steps is carried out by a particular bacterium producing, as a result of its activities, the substance required as food by the bacterium that comes next.

A new aquarium will go through a series of events characterised by high levels of ammonia, nitrite and nitrate, as the bacteria involved in each stage of the process colonise the filterbed, increase in numbers and then fall

to more moderate levels. By the time they have fallen to these lower levels, they have already produced massive amounts of the waste products that will fuel the next stage of the process.

After the concentration of nitrate has hit its peak, it will drop off and remain at that level — barring a few small fluctuations — for some considerable time. Only when this has occurred can the filter be considered mature and stocking begin.

Of the three by-products of nitrification, by far the most dangerous to animal life is ammonia. While this substance is in a stage of equilibrium with the positively-charged ammonium ion, it can be considered relatively harmless. However, when the pH rises, the amount of ammonia in the system also rises significantly and troubles begin.

The alkaline pH that is necessary in the seawater aquarium means that the dynamic equilibrium between ammonium and ammonia will always favour the

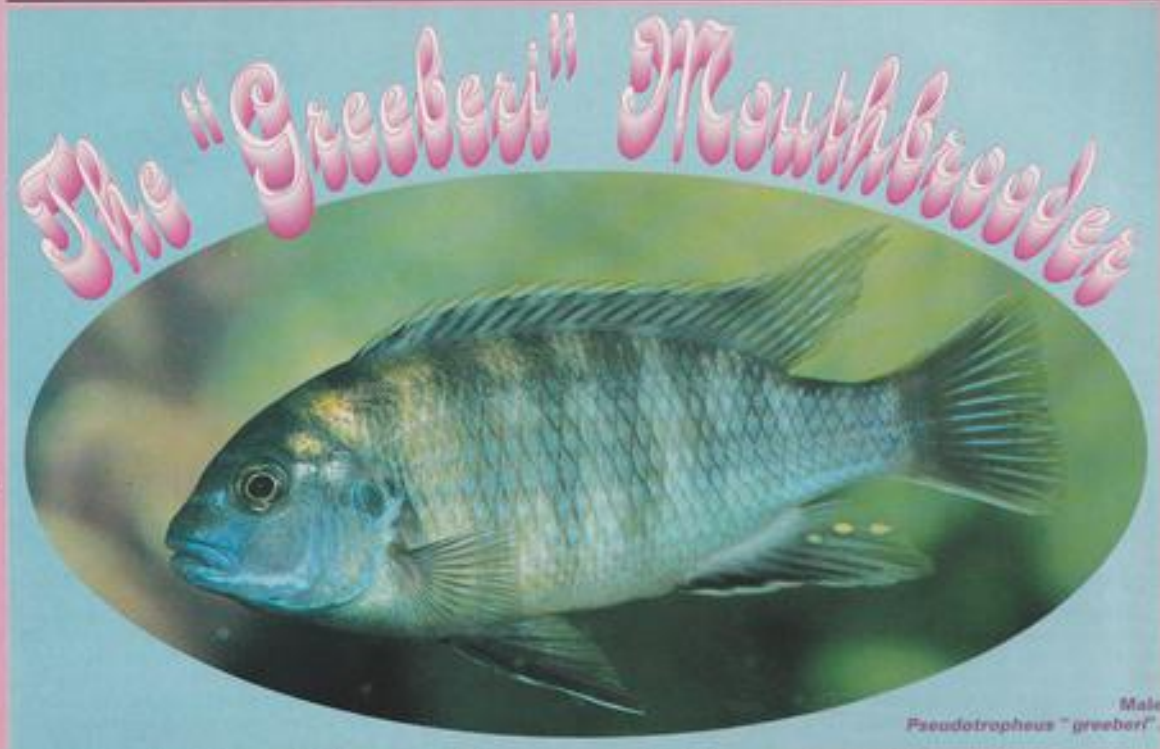
latter, which is the opposite of the state of affairs in a freshwater aquarium, where the pH range is usually lower and favours ammonium.

Conversely, nitrite is far less toxic to marine animals than it is to their freshwater counterparts. This is because sodium chloride — the main constituent of seawater — somehow tempers the toxicity of nitrite. Thus, while nitrite concentrations of less than 1.00ppm can be seriously poisonous to freshwater fishes, concentrations as great as one hundred times that amount pose no real threat in a seawater environment, over the short term.

**Snippet**  
Although the Queen Conch (*Strombus gigas*) was once common in the Caribbean, its numbers have become severely depleted due to massive overfishing. However, culture methods currently being developed in the Turks and Caicos Islands should help to redress the balance.



## INTRODUCING:



I originally selected this beautiful fish from a Singapore exporter's list, firstly, because he could not recollect ever having heard of the species, and secondly, because he could not find it in any of the literature that he had access to at that time.

Enquires to The Natural History Museum (London), drew a blank re the validity of this species. Therefore, doubt must remain whether or not *Pseudotropheus "greeneri"* is a valid name.

As the fish originated from a Singapore exporter (International Aquarium) there is a good possibility that it will appear in the aquarium hobby in the United Kingdom and elsewhere. Hopefully, this article may elicit some details relating to the origins and proper nomenclature of this pretty fish from our readers.

### Background

With the kind co-operation of Ali Diadins, the proprietor of the Aquarium Shop, Agrabeah, Saudi Arabia, 10 medium-sized fish were ordered from Singapore. When the shipment arrived, there were 11 individually packed specimens, all in good health. The obvious care given to the packing and shipping is a credit to the exporter.

The new arrivals were housed in an 85 x 35 x 35cm (33 x 14 x 14in) aquarium with undergravel filtration and a couple of plant pots to act as retreats. Water hard-

We may have doubts concerning its proper name, but as William Ross demonstrates, this attractive species can be kept and bred with relative ease.

Photographs by the author

ness was 120 parts per million (ppm) and the temperature was maintained at around 26°C (79°F).

Fed on proprietary flake food and with weekly 25% water changes, the 11 specimens reached maturity in seven weeks from purchase; there were nine males and two females.

*Pseudotropheus "greeneri"* is a small maternal mouthbrooding cichlid, males reaching maturity at around 65mm (c.2.5in) SL; females are approximately 10mm (0.4in) shorter. The mature male of the species is also much more colourful and has a deeper body than the female.

The pre-spawning behaviour of *P. "greeneri"* is very similar to that of tilapia mouthbrooders (ie Tilapia-like species). The males construct a nest in the substrate by moving the gravel in mouthfuls until a saucer-shaped depression is formed. They defend their nests against rival males and try to entice females to

spawn in it. During courtship male coloration is enhanced.

With the nine males in the same aquarium, there was continuous aggressive activity, but no serious damage was sustained by any one fish; possibly, this was due to there being so many fish, thus alleviating any one specimen from becoming a constant target.

### Spawning records

No spawning was witnessed, but a female was seen to have a distended buccal (mouth) cavity. She was swimming with the other fish and did not receive any assistance from the male. On the fourth day of brooding, this female was moved to a small aquarium; during transfer, no eggs were dropped.

She continued to brood until day 21, when she released approximately 38 fully formed fry. Recorded brooding days for seven spawnings were: 17, 19 (x2), 20 and 21 (x3). Both the females produced fry; one had 36, 40 and 14 fry in successive spawnings, the other 13 and 12.

At first, the fry returned to the safety of their mothers' mouth when threatened. Of seven broodings witnessed, on only two occasions were the fry taken back into the brooders' mouth overnight after they were released; one brooder did it for three nights and the other for nine. Females were left with their fry for periods of time up to 10 days post-release.





Brooding female. Note the distinct chin pouch.

## Growth & development

On release, the fry are, shapewise, miniatures of their parents. Coloration is grey with dark bars on the flanks. Fed on crushed flake food and with continued partial water changes, they grow quickly.

At around 95 days of age, the males start to develop their adult characteristics i.e. coloration and differences in finnage (males have larger and more pointed dorsal fins than females). They reach maturity at five months.

In a spawning, there appeared to be a predominance of male fry; in fact, there were few females produced in any of the five spawnings reared to maturity.

Later, the most attractive male and the two females from the purchased fish were

reboxed in a 70 x 30 x 40cm (28 x 12 x 16in) aquarium with undergravel filtration. For decoration, a 'pseudo-hollow' log with various openings was used, along with a few plants.

The smaller female appeared to dominate this set-up, continuously harassing the larger one. The plants, for their part, suffered their usual fate in a cichlid community. In other words, in the usual gravel-moving business that goes on in such aquaria, they were soon uprooted.

To me, this set-up was not as attractive as the original aquarium with its constant activity. I had intended to use this aquarium for photography, but my attempts were unsuccessful, as the fish would retire into the log whenever a camera appeared on the scene.

## Conclusions

*Pseudotropheus "greeberi"* is a small, attractive and not too aggressive cichlid. It is easily maintained and reproduces readily, with the fry reaching maturity in a fairly short period of time, unfortunately with what appears to be a shortage of females.

With their nest-excavating habits, these fish are not ideal for planted aquaria. Compatibility with other fish species is not known.

"Greeberi" is a good introduction to the difficulties currently being experienced with cichlid nomenclature, as well as to the ease with which many of the less well known species of African lake cichlids can be kept and bred.

Dominant male with siblings. Note the difference in coloration between the dominant specimen and the 'subordinates'.







DAVID TWIGG'S

# KOI CALENDAR

## Return to Avenue



DAVID TWIGG

**Avenue Fisheries — make sure you put them on your list of 'musts' for this season.**

Last week I paid another visit to Avenue Fisheries where Steve Field, his mum and Andrew Wheeler made Lyn and me very welcome. The numerous ponds here, all outside, have their surrounds planted up just as we would do at home, and these are now very well established, such that it is now quite difficult to 'spot the filter'; the 'camouflage' really is extremely effective.

As previously reported in *Koi Calendar*, Avenue have opened up extra land on which they have created half a dozen 'natural'

ponds. They were dug about 5ft deep, lined with polythene and then some of the clay was replaced to give that natural effect. These ponds have been designed for over-wintering or growing on Koi, although I understand that if a customer wishes to house Koi there for any reason, Avenue will discuss it with them.

The Avenue ponds are well stocked with a wide range of both sizes and quality of Koi, and new shipments are being received weekly from Japan. These new stocks, although on show to the public, are quarantined before being placed into the selling ponds.

There is also a well stocked shop on site, where the needs of the Koi keeper are fully catered for. I had a thoroughly enjoyable time at Avenue Fisheries and look forward to meeting the team again later in the year.

Avenue Fisheries are at 46 Rookery Road, Wyboston, Beds, Tel: 01460 215408.

## Jobs for the month

July is one of the hottest months of the year in the UK and one in which we take time out to really enjoy our Koi. Water temperature in the unheated pond is at, or about, its highest and the Koi are swimming freely and always in search of food. The long summer evenings are conducive to relaxation after gardening work is completed and the running water returning to the pond via a waterfall is very therapeutic to weary bodies.

That seemingly ever-present enemy of the Koi keeper, blanket weed, will also be in quantity at this time of year, unless you are one of the lucky people who, for whatever reason, don't manage to grow it.

I have recently been observing, with interest, a few Koi keepers who have purchased a particular make of mains water purifier that will kill algae and fungi. One pond I am observing has had a filter for several years now and doesn't have any blanket weed to speak of, while another has been using one for two years now with the same result; a third has only had the filter a few weeks and the blanket weed is breaking up and falling off the walls of the pond at a wonderful rate.

This sounds as if it has got to be for me, so I rang Chris Truman of MMR International and he explained that my concern that the filter may put something into the pond to kill the blanket weed was unfounded. The patented Catalytic Oxidation Reduction medium that is used to filter out all the unwanted (to Koi keepers) contents of tapwater also removes that vital something that supports blanket weed growth. This was an unexpected and beneficial side effect of this design; one it seems that many Koi keepers are taking advantage of. My order is in the post and I confidently expect to have little or no blanket weed by the time you read this column.

### WHAT'S ON IN JULY

24/25 — Mid-Somerset Section BKKS. Trip to Fair Pennine Show, Wentworth. Contact Alan Purnell, 01458 272132.

25 — South Hants Section BKKS. Wesser Section BKKS visit South Hants ponds. Contact George Rooney, 01420 473188.

28 — London Section BKKS. Speaker is Graham Saunders, Ruskin House, Croydon. Contact Keith Nind, 0181 673 3574.

1 — Suffolk & North Essex Section BKKS. Visit Crouch Valley Section BKKS. Contact Alan Carter, 01206 880211.

— Heart of England Koi Society. Visit Birmingham Section BKKS ponds. Contact me on 01906 495213.

— Northern Koi Club. Coach trip to Yorkshire Koi Society. Contact Tony McCann, 0181 794 1858.

— Peterborough & Cambridgeshire Section BKKS. Visit North Linx Ponds. Contact Gary Fould, 01733 373178 or Alan Peppercorn, 01733 342472.

— Northampton Section BKKS. Visit to Avon Section BKKS ponds. Contact Albert Day, 01604 407381.

— South Hants Section BKKS. Visit to South East Section BKKS ponds. Contact George Rooney, 01420 473188.

2 — Leicestershire Koi Section BKKS. Meeting, B.S.C. Social Club,

Sculancer Road, Leicester. Contact Pip Oskell, 01533 609707 or Kevin Luckman, 01455 250413.

5 — Suffolk & North Essex Section BKKS. Monthly meeting, Sornway Rivers Football Club. Contact Alan Carter, 01206 880211.

— Midlands and Surrey Borders Section BKKS. Quiz night, 8pm, Norton C.I.U. Club, Kingston. Contact Peter Saul, 0181 379 9117.

— Heart of England Koi Society. Monthly meeting. Contact me, 01906 495213.

8 — Mid-Somerset Section BKKS. Essex Section BKKS members visit Mid-Somerset ponds. Contact Alan Purnell, 01458 272132.

— Northampton Section BKKS. Birmingham & West Midlands members visit Northants ponds. Contact Albert Day, 01604 407381.

10 — Northampton Section BKKS. Monthly meeting. Contact Albert

Day, 01604 407381.

11 — Nottingham & District Section BKKS. Monthly meeting, The Western Club, Nottingham, 8pm. Contact Shirley Nind, 0115 981 0623.

12 — Merseyside Section BKKS. Monthly meeting, Brocton Country Club. Contact Phil Adamson, 0151 220 2970.

— South Hants Section BKKS. Guest speaker is Paul Stoney of Shirley Aquatics, 8pm, Devonald Church Hall. Contact George Rooney, 01420 473188.

16 — Lee Valley & Harlow Section BKKS. Coach trip to South Kent BKKS ponds. Contact Mick Fahey, 0181 506 5155 or Alan Burnell, 01273 814636.

— Northern Koi Club. Monthly meeting, Clifton Park Hotel, Clifton, Swinton. Contact Tony McCann, 0181 794 1858.

— Peterborough & Cambridgeshire Section BKKS. Club night, Brooks Snooker Club, Peterborough. Contact Gary Fould, 01733 573178 or Alan Peppercorn, 01733 342472.

23 — Central Section BKKS. Visit by Midlands & Surrey Borders Section. Contact Sue Finney, 0121 747 2733.

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

— Merseyside Section BKKS. Visit from Wirral Section BKKS. Contact Phil Adamson, 0151 220 2970.

26 — London Section BKKS. Speaker is Alan Rogers, Haslem Hollow, Croydon. Contact Keith Nind, 0181 673 3574.

30 — Suffolk & North Essex Section BKKS. Visit by Wesser & Southern Koi Society. Contact Alan Carter, 01206 880211.

### WHAT'S ON IN JULY





Jack and Maureen Howcroft, owners of the Grand Champion Sanka (the fish nearest to them).

## International Koi Show (UK)

The first show of the year was held at the Telford Exhibition Centre over the weekend of 29/30 April and a lovely weekend it was too. Lyn and I arrived mid Saturday morning and headed for the A&P stand where we caught up on the news from our editor, John Dawes and his wife Vivian. This was closely followed by a trip round the exhibition vats that contained a magnificent collection of both hobbyist and dealer Koi.

It is always of interest to me to try to pick the Grand Champion ahead of the judges; always a difficult task, but this year I narrowed it down to two Koi and one was right. This done, Lyn and I toured the incredible variety of dealer stands.

Everything from Koi to pottery was to be seen, through nets, videos, pumps and water plants, embroidered T-shirts, garden ornaments and Koi-orientated jewellery. A raffle for a lovely large Chinese bowl (sponsored by Christopher W. of Manchester) and large round plastic vats (1,600 gallons) were offered for sale or hire.

As usual at these events, there were numerous special offers and I purchased a large bag of Hikari Staple Koi pellets from the Shirley Aquatics stand, but we were sorely tempted by other offers, including a very nice bowl

made by the potter Edward Bowen.

Sunday saw the judging completed and the results pinned to the boards adjacent to the vats. This is where I start my photography; accompanied by Lyn with pencil and paper, we work our way round the show ring taking a photograph of each winning Koi. A great deal of patience is required because these lovely fish know that you want them to swim towards you in a position that is not in a reflection of an overhead light and they really make you wait until they are good and ready to have their photograph taken before getting into the required pose. A long job then, but thoroughly enjoyable, because you get to meet lots of people all trying to do the same thing, and conversation comes naturally.

Yet another name on a telephone now has a face; Anne Mawer of the North Lincois Koi Society introduced herself and updated me on their activities. Thank you Anne. Several other people gave me info for my calendar column and yet another face was put to a name. I was very pleased to speak to Eileen Bowcott of the Birmingham and West Midlands Section BKKs for the first time.

Innovations are an important part of any hobby and this show was not to be left behind. Two items caught my eye: a super wet and dry filter demonstration model continually turning opposite the A&P stand was one, and the other was a long, flexible air 'stone' that had incredibly fine bubbles.

But back to the Koi. The Judges, Paul Jarrett, Keith Bertie and Roy Winterbourne, assisted by Reg Coleman, Shaun Talegies and Bill Johnson, completed their task and declared the winners. Grand Champion went to a 6-year-old Sanka, named Tanya, owned by Jack Howcroft and recently imported from Mushigami, in the Niigata region of Japan. Jack tells me he spent seven days searching for this Koi; this result made his search well worthwhile.

Major prize-winners at the show were as follows (my thanks to Alan Barrett and Marilyn Fleming for their help in producing such an easily understandable listing for me): 323 Koi were entered and the winners emerged from some stiff opposition; well done to them all.

Jack Howcroft, Grand Champion Size 6 Sanka, Best Tancho; J. Fallow, Mature Champion Size 6 Sanka, Best Size 6, Best Sanke, Best Showa, Best Kawarimono; M. & P. James, Adult Champion Size 4 Sanka, Best Size 5, Best Size 4, Best KinGinRin; D. Rowell, Baby Champion Size 2 KinGinRin; Gary & Barbara Found, Best Hikari Moyo; Mr Brune, Best Asagi/Shusui; R.

## SHOW CALENDAR

<b>JUNE</b>	<b>24/25</b>	<b>East Pennine Section BKKs</b> Open Show, Wentworth, South Yorkshire. Contact John Timmis, 01228 289507.	
	<b>28</b>	<b>Suffolk &amp; North Essex Section BKKs</b> Closed Show, Langham Community Centre. This is a real family event, with not only Koi, but also craft stands, side shows including wild birds of prey, bar, refreshments, etc. Opening to the public: 10am. The organisers are predicting that last year's 1,800 visitors will be exceeded, to make it their best show yet. Contact Alan Carter, 01205 866011.	and moved their show to its current venue. Numbers attending increased from 20 or 30 at those early shows, to thousands now, and are attracted by the wide range of Koi dealers and other family entertainment. Contact Jean Richards, 01702 231952.
			<b>AUGUST</b>
			<b>6</b>
			<b>Yorkshire Koi Society</b> Open Show. In this 20th anniversary year this show at Harwood House offers, not only Koi and Koi dealers, but a Birds of Prey Exhibition by the Owl Welfare League, Classic Car Display by the BMW Car Club, an Adventure Playground and Bouncy Castle. Contact John Thompson, 01723 864867.
			<b>12/13</b>
			<b>BKKs Koi '95</b> , Billing Aquadrome, Northampton.
			<b>19/20</b>
			<b>Lea Valley &amp; Harlow Section BKKs</b> , Closed Show, Harlow Garden Centre. Contact Mick Fahey, 0181 508 5155 or Alan Burnell 01279 814638.
			<b>27</b>
			<b>Peterborough &amp; Cambridgeshire Section BKKs</b> Closed Show, Avenue Fisheries. Contact Gary Found, 01733 573178 or Alan Pendergorn, 01733 349472.
			<b>SEPTEMBER</b>
			<b>9/10</b>
			<b>Mid-Somerset Section BKKs</b> Koi Show as part of the "Countryside Cavalcade" at the Royal Bath & West Showground. Contact Alan Purnell, 01458 272132.
			<b>OCTOBER</b>
			<b>1</b>
			<b>Northern Koi Club</b> Show, Cascade Water Gardens. Contact Tony McCann, 0161 794 1858.

Young, Best Hikari Utsuri; Mr Beach, Best Kohaku; S. Coleman, Best Hikari Mui; Best Utsurimono; S. Moreing, Best Koromo; J. Levine, Best Bekko; T. Halsey, Best Size 1.

Six dealers entered the competition and results were: **How Kang Koi**, Grand Champion Size 6 Sanka; **Shirley Aquatics**, Best Size 6 KinGinRin; **Infiltration**, Best Size 5; Best Size 4, Best Size 3; **Clearwater Koi**, Best Size 2; **Cascade**, Best Size 1.

This magnificent Size 6 Sanke owned by How Kang Koi was the Dealers' Grand champion at Telford.





# **TOP TEN** **POND PLANTS**



**an Aquarist & Pondkeeper supplement by Barry James**



# TOP TEN POND PLANTS

Barry James of Everglades Aquatic Nurseries tackles the almost impossible challenge of nominating his ten favourite plants.



BARRY JAMES

Escarboucle — one of the finest reds.

If I had been asked to choose the top ten coldwater fish for garden pools, I would have found the selection easy, as there are only a few species to choose from. Plants are much more difficult because there are literally hundreds of species and varieties to choose from.

Furthermore, new varieties are constantly being introduced. Ten years ago, the average catalogue would have listed perhaps a dozen water lily varieties; today, it is not unusual to find over 50. However, there are still many firm favourites which people see in their friends' ponds and constantly ask for, so I have based my selection on these.

My first two choices are, not surprisingly, water lilies.

## 1 Escarboucle

This variety is generally accepted as being the most brilliant of the hardy reds. It is best described as being of a uniform shade of vermillion-crimson. The garnet stamens are tipped with yellow. As the flower ages, it changes to a dark wine. The

blooms reach 7in (17.5cm) in diameter and lay flat on the surface.

Developed by Marliac, the famous French hybridist in 1909, its parentage is unknown.

Escarboucle is a large variety with leaves up to 12in (30cm) in diameter, but half this in small pools. It will grow in ponds which are between 24-36in (60-90cm) in depth. The clumps increase in size, but slowly, so it is easy to keep under control.

Sometimes, on a still day, the flowers give off a rich spicy scent.

## 2 Canary Water Lily

In July 1887, Monsieur Marliac sent a specimen of this hybrid to Kew Gardens. It took a couple of years to flower, but when it did, it was greeted as one of the finest hardy water lilies ever produced, and six years later was given the Award of Merit. This variety — *Nymphaea marliacea*

'Chromatella' — a top selling variety for many years.



BARRY JAMES



'Chromatella' is therefore one of the oldest, but still one of the most dependable, hybrids today. Because Mariac did not disclose the parentage, its origin still remains a mystery.

Another large variety it, too, dwarfs down in smaller pools when underpotted. Growing in up to 48in (120cm) of water, the vigorous rootstock throws up leaves which can reach 10in (25cm) in diameter.

The olive-green foliage is, in well lit situations, heavily mottled with bronze-purple markings. The 6-inch (15-cm) diameter flowers sit on the surface like golden cups. Generally, the colour is a rich creamy-yellow or canary-yellow in well fed specimens.

The yellow stamens are of a deeper hue than the petals, which are broad and curved. Because 'Chromatella' is a very vigorous variety, it is best divided every couple of years. Also because of the speed of its growth, this has been the top selling variety for many years.

### 3 Water Hyacinth

Water Hyacinths (*Eichhornia crassipes*) are perhaps the showiest of floating plants. The green glossy foliage grows in perfect rosettes, with cordate leaves and grossly inflated petioles. These are filled with spongy 'aerenchyma' tissue which give the plant extraordinary buoyancy.

The roots are dense and finely divided and reach lengths of 1ft (30cm) or more. This characteristic is much used by Goldfish breeders as a spawning medium, and act as protection for the newly hatched fry.

The flowers are borne aloft on spikes and are of a delicate pale violet shade with conspicuous gold and blue peacock-eye marking on the upper petals. Unfortunately, they are seldom produced in the British Isles, except in the warmest of summers. Even then, they last but a single day.

The plant was originally native to South America, but it is now spread widely over the tropical world.

In spite of the thousands that are sold every year, few survive the winter, even when given the protection of a heated greenhouse. They are therefore best treated as annuals and re-purchased every year. They must never be put outside until all danger of frost is past; normally, at the end of May.

### 4 Fairy Moss

Native to the Southern United States and California and ranging through Central America down as far as Southern Brazil, *Azolla caroliniana* is often found growing as an escapee in southern England.

Examined closely, its relationship to the ferns can be readily seen. The fronds are  $\frac{1}{8}$ in (1.3cm) in length and are of a soft, lacy texture and grey-green in colour. Later in the season they turn red-brown with the onset of colder nights.

The dense black roots reach a length of 1in (c 2.5cm) or so. In ponds which are

rich in nitrates and phosphates, such as farm ponds, this species is very rampant and must be strictly and regularly controlled by hand netting. However, it is a most useful plant for preventing the build-up of green water.

In autumn, the fronds of Fairy Moss turn reddish.



Fairy Moss. Several plants have been tipped sideways on to show the black roots.



The beautiful bloom of the Water Hyacinth.



Water Hyacinths and Water Lettuces growing in profusion at Kew Gardens.





Free-flowering mature Water Hawthorn plant.

## 5 Water Hawthorn

A native of South Africa, *Apogonon distachyum* is bone-hardy in the British Isles. It is a beautiful aquatic, a prolific bloomer and one of the few aquatics that can be grown in the shade.

Growing from a tuberous rootstock, it throws up long petioles crowned by broad strap-like leaves which float on the surface. It is known as a deep-marginal plant and grows in a similar manner to the water lilies.

The heavily scented flowers are reminiscent of Hawthorn, which gives rise to the popular name. These blooms are of a unique construction; the white flowers, sometimes tinged with pink, are tightly packed together on a forked spike. The anthers are jet-black, giving a very pleasing appearance.

Water Hawthorn seeds freely, the seedlings falling to the bottom; on germinating, they look like a robust grass.

The depth of water in which this plant grows seems to be immaterial; it is as happy in 6in (15cm) as it is in 3ft (90cm).

For those with a culinary disposition, both the flowerheads and tubers of Water Hawthorn are used to concoct delicious dishes in its native land!

## 6 Golden Club

*Orontium aquaticum*, a member of the Arum Lily family, has gained increasing popularity over the years. This may be due in part to its versatility, as it is capable of being grown as a deep marginal plant,

or as a straightforward marginal.

Widely distributed over North America, this plant will stand the climates of zones extending from Florida to Canada.

The leaves are very handsome dark-velvety green above and silvery below. They are covered with a protective wax layer. If grown in water of 12-18in (30-45cm) deep, the plant adopts the growing characteristic of a water lily, the spear-shaped leaves floating flat on the water. In shallower areas, they stand bolt upright.

Once naturalised, Golden Clubs are almost impossible to lift, the roots going

down very deep into the mud. The plant flowers in early summer, bearing a narrow spadix densely covered with small bright-yellow flowers.

Propagation is by seed, which were once eaten by the North American Indians, as was the tuber after boiling to remove its acrid properties.

In deep water, this Golden Club's leaves would lie flat on the surface.











This free-flowering specimen of Marsh Marigold has been grown in the same pot (with some topping up) in shallow water for the past four years.



'Crispa' — the best oxygenator.

## 9 'Crispa'

This ubiquitous plant (*Lagarosiphon major*) is still the most reliable of the submerged aquatics or 'oxygenators'. Originally introduced into this country in 1906 by Amos Perry, the name change from *Eloëta* was caused by the fact that it rarely flowers in Europe and then only produces female flowers.

The thick fleshy stems are covered in tiny reflexed leaves giving the appearance of thick rope. In winter, the plant takes on a 'mealy' appearance caused by the build-up of lime on the leaves. The new growth in spring, however, is very attractive and olive-green in colour, shading to reddish-brown at the tips caused by exposure to sunlight at the surface.

Like all submerged aquatic plants, 'Crispa' is normally sold in lead-weighted bunches. Six of these should be planted in a small square planting basket and sunk to the base of the pool.

This plant is capable of growing in enormous depths. In one lake that I am familiar with, it arises from the bottom mud some 20 feet (6 metres) below and, by midsummer, has reached the surface!

## 10 Water Violet

*Hottonia palustris* is a member of the Primula family. There are just two species in the genus and both show this relationship in the crowded whorls of handsome lilac flowers produced in early summer. A native aquatic, it is widely distributed, mostly in Southern England in canals and marshes.

There appear to be two distinct races of Water Violet, one of which is a calcifuge (hates lime).

The pretty pinnately-divided whorls of leaves are bright green, but often with reddish-brown tinges. The plant is best planted in the cooler months of spring, as it often resents being moved in the grow-





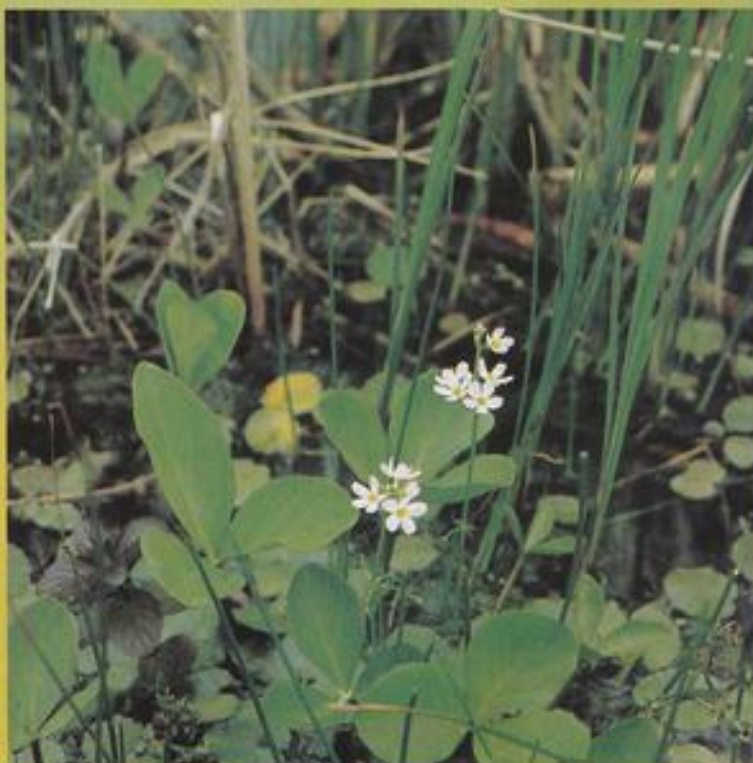
ESBENT JAMES

ing season. For this reason, most plants offered today are in pots ready for planting.

At the onset of autumn the plant produces 'tubers' or winter buds. These fall to the bottom mud and germinate the following spring. This habit means that Water Violets are almost impossible to confine in planting crates for more than one season. When planting, each stem should be planted separately with some root growth. They will often simply rot away if planted in bunches like other oxygenators.



Water Violet in bloom.



ESBENT JAMES

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# WATER'S EDGE

BY DICK MILLS

Photographs on this page — by the author



## New water care treatments

Despite its specifically-geographic sounding name, AMAZON EXTRACT™, from AQUARIUM PHARMACEUTICALS, is equally beneficial for freshwater tropical fishes from other parts of the world, rather than for those species strictly from Amazonian waters. Amazon Extract simply adds natural substances to the aquarium (without affecting pH or hardness) which promote fish health, aid breeding and stimulate fish coloration. South American Cichlids, Characins and Corydoras Catfish will therefore all feel much more at home in waters treated with this product.

Of course, the basic material has to be in good condition too, and the new TAP WATER PURIFIER makes perfect water for the freshwater aquarium and a high-quality base for synthetic salt mixes for the marine tank. Removing such contaminants as dissolved minerals, heavy metals, chlorine, chloramine, organic chemicals and algae-promoting nutrients, the fully-assembled, single cartridge purifier delivers 10 gallons (US) per hour with no waste; simply connect up to the tap.

The unit includes 4oz bottles of pH Adjuster and Electro-Right, Tap Adaptor and 8 feet of kink-free extension tubing (a 25ft tube with connector is an optional extra). A Purifier Refill Cartridge is readily available.

Got a deep tank? The EXTENSION POLE will add 12in to the already EXTENDABLE ALGAE SCRAPERS (do get the right one — either for a glass or acrylic aquarium). Similarly, BIG JOB ALGAE PADS are made for either glass or acrylic tanks. Still with deep tanks, the 34in long SHOULDER-HI AQUATIC GLOVE will keep you dry when servicing such tanks, or even when trying to lift out water lilies from the pond.

New Pond Care® products include ALGAE DESTROYER, whose 18 tablets will treat 900 gallons of water. Very explicit instructions are given with this product: be sure to follow them precisely. pH UP™ and pH DOWN™ may be used to rectify any undesirable fluctuations in pondwater pH as shown up by using the company's POND TEST KITS — new LIQUID pH, NITRITE and AMMONIA Test Kits have appeared (or else you could use the long-established DRY-TAB MASTER TEST KIT FOR PONDS, for which REFILL PACKS are now available).

A comprehensive range of products specifically for pond filters includes SUPER ACTIVATED FILTER CARBON, PHOSPHATE REMOVER, POLYESTER PRE-FILTER PADS, AMMONIA REMOVER and ACTIVATED CARBON-COATED FILTER PADS.

Finally, it's not all 'front of house' stuff and selling support: the retailer is also backed up by means of a comprehensive Technical Reference Booklet which features the Professional Guide for Minimising Fish Losses. You can be sure that the store's (and your) fish, are well looked after.

Details from: AQUARIUM PHARMACEUTICALS INC., 32 Hamilton Street, Summertown, Oxford OX7 2PV. Tel: 01865 56053; Fax: 01865 56092.

## Clean Koi

Overstocking, overfeeding and overmedicating can all cause excessive levels of ammonia, nitrite, accumulated sludge and algae — real problems for Koi and their keepers. The deteriorating water conditions are then bound to cause stress which, in turn, lets in disease and also retards growth.

BAC 2 NATURE, from KOINNOVATIONS, is a totally natural way to improve water quality, act as a corrective and, ideally, work as a preventive measure against all the above. This liquid product contains a high concentration of naturally-occurring bacteria which enhance biological filter start-up and its maintenance, enrich the ecology in the water and reduce levels of blanketweed

and algae. It does not contain any chemical additives and will not harm fish, plants or other wildlife.

An improved version is due for the coming season and can be obtained from Koi dealers throughout the UK or direct from KOINNOVATIONS LTD, Alloa Business Centre, Alloa, Scotland FK10 3SA. Tel: 01295 725077; Fax 01299 725088.

## Advanced filter medium

Despite sounding like a prototype aeroplane, A100 is, in fact, a new advanced filter medium for

aquarium and pond use. This synthetic adsorption resin can remove huge quantities of nitrate, nitrite and phosphates and keep them within safe levels for over three months. As a result, algae are denied vital nutrients, while discoloration of the water is eliminated and unpleasant odours reduced.

A single dose bag will remain effective in 65 gallons for the three month period. The pre-washed medium will work with, or without, any other medium, maintains a stable pH and keeps your hands clean too!

Details from: PET JOY PRODUCTS LTD., 33 New Road, Richmond, Surrey TW10 7HZ. Tel/Fax: 0181 332 7604 or from C.J.L. PRODUCTS b.v., 5705 BX Helmond, Netherlands.



## Baby purifier

With the accent firmly on ponds at this time of year, it may not be a bad time to consider using the well-promoted cartridge-type water purifiers for aquarium use as well.

The new AS2/S SYSTEM from ALLCLEAR appears to fulfil this niche very adequately. It is designed to reduce chloramine, free chlorine, wide-ranging pesticide groups and, at the standard flow rate of 2 pints per minute, lower levels of dissolved metals. Reducing the flow rate by, say 50%, higher levels of metal reduction is achieved.

The full system comprises a rust-proof, wall-hanging bracket, 1xPre-filter, 2x5in height vessels, 2x1/4in hoses, 1xCarbon+ cartridge, product bulletin and fitting instructions. Full replacement cartridge sets are readily available. A water meter is also available as an optional extra.

AllClear have taken great pains of late to emphasise that correct interpretation of 'performance figures' are vital when selecting a water purifying system. Confusions can arise when results quoted for free chlorine, or figures obtained under non-British conditions, are taken as true performance. Also, some test results do not take into consideration the purpose for which water purification is needed (ie, tankkeeping, rather than drinking, cleaning cars or watering gardens).

All AllClear chlorine lifetime ratings are based on reduction of chloramine and are obtained



through independent test results on UK tapwater, AllClear will happily give free individual service ratings based on data submitted from your own drinking water report (available from your local Water Board).

Details from: **ALLCLEAR WATER PURIFIERS**, 59 Hartwood Road, Brentwood, Essex CM14 5AG. Tel: 01277 214911; Fax: 01277 201740.

## The last, and first

With the introduction of its 12th Remedy, the ANTI-CRUSTACEAN PARASITE, the INTERPET treatment range is now complete. Despite being the last addition, the newcomer is, in fact, the first effective non-prescription anti-parasitic treatment available.

Capable of dealing with the higher parasites (Fish Louse, Anchor Worm, Gill Maggots and Fish Leeches), rather than the lower formed flukes and protozoa, the new remedy does not use organophosphates (in themselves, a possible cause of cancer) and is quite safe to use with fish and plants, providing the instructions are followed. Each bottle will treat 110 gallons of water.

The POND MASTER EASY TEST KIT contains the four pond water checks necessary to ensure a healthy environment (pH, ammonia, nitrite and nitrate test kits) plus a special user-friendly, 8-page complete guide to water quality. Each test is carried out in the same way — just drop a tablet into a test tube of pondwater and compare the resulting colour against a diagnostic colour chart.

Details of all Interpet products from: **INTERPET LTD.**, Vincent Lane, Dorking, Surrey RH4 3YX. Tel: 01306 881033; Fax: 01306 885009.



## Improved pumps

Launched in 1994, the SUBMERSIBLE POND PUMPS from **STUART TURNER** have been improved for the 1995 season. Requiring little maintenance during their long life working period, the four models of pumps now have a pre-filter device built in at no extra cost; ten metres of cable together with a fitted three-pin plug allow quick, simple and safe installation.

Selected models have an automatic float switch which protects the pump if water levels drop below a certain depth. All pumps now carry a two-year guarantee.

This ideal basic range is complemented by associated filter products and/or by the higher performance Surface Pond Pumps.

Details of all Stuart Turner products from: **STUART TURNER**, 47 Market Place, Henley-on-Thames, Oxon. Tel: 01491 572655; Fax: 01491 573705.



## All the answers

Following on from their re-released publication *System for a Problem-Free Aquarium* (see *Water's Edge*, A&P December 1994), **DENNERLE NATURE AQUARISTIC** have now issued *Algae Problems?* and *Healthy Water for your Fish and Plants*.

While both are of very modest proportions, each contains an immense amount of guidance (both theoretical and practical) in maintaining aquarium and pond water conditions in tip-top conditions. Cause and effect cases are made for many aquarium circumstances (effects of different foods, for instance, on algae growth) and the relevant treatment steps to be taken.

The *Problem-Free Aquarium Book* can be obtained (price £6.50, including post and packing) from: **HOBBY FISH FARM**, Towcester Road, Old Stratford, Milton Keynes MK19 6BD. Tel: 01908 543330/ 542801; Fax: 01908 542149.

## Connecting the unconnectable

Anyone can put two and two together to make four, but it's not easy when you don't even realise certain 'twos' might be connected. Faced with problems with falling overseas performances from their ALGARID MAGNETIC WATER STABILISERS, **MMR** realised that certain other apparently unrelated causes (chemical pollutants, atmospheric changes etc) were to blame and set about designing new water filters, the SIRIUS range, to rectify matters.

A further problem had to be overcome in the marketing side — convincing people (previously willing to spend thousands of

pounds on fish and pond set-ups) to take that relatively small financial extra step to ensure their fishes' environment was kept at optimum levels.

The 5gpm P30K SIRIUS AUTOMATIC and the lower-rated 1gpm P10K both share similar design features: 3-stage filtration system with central sections having unlimited life. Each model is fully backwashable (manual or automatic) and able to cope with the broadest possible range of man-made pollutants, the resultant aim being to overcome, or minimise, the strange inventions of Man and their harmful side-effects on the aquatic environment.



Results show a marked improvement in fishkeeping water conditions worldwide and the company now advocate the use of incoming water purification units prior to in-line magnetic treatment — a reversal of previous policy — as experience and research in the field show that many pollutants could defeat magnetic treatment and lead to uncontrollable algal blooms.

Details from: **MMR INTERNATIONAL LIMITED**, 39 Marsden Street, London NWS 3HE. Tel: 0171 285 0553; Fax: 0171 482 3518.

## Stress-free start

The starting up period each year for ponds is traditionally one likely to produce stress for the fish. The range of POND TREATMENTS from **HOZELOCK** should alleviate most of them and includes TAP WATER CONDITIONER (a dechlorinator), GREEN WATER TREATMENT (algae remover) and POND BALANCE (blanket weed remover). All can be used without adversely affecting fish or ornamental plants.

Fish ailment remedies include ANTI-PARASITE (acts against White-Spot, Flukes and Slime Disease organisms) and ANTI-FUNGUS and BACTERIA (for Fungus, Fin-rot or Mouth-rot).

Treatments are available in 250ml dispensers to treat 2,500 gallons (11,350 litres). Pond Balance is available in a pack, with measuring spoon, for treating 1,500 gallons (6,810 litres).

Advice and information from HozeLock Consumer Helpline (01844 292002) and product details from: **HOZELOCK LIMITED**, Haddenham, Aylesbury, Buckinghamshire HP17 8JD. Tel: 01844 291881; Fax: 01844 290344.

## Koi greens

While Spirulina is good for colour enhancing (especially red and orange), improves lustre and texture of the skin and reduces risk of disease and obesity, apparently, according to **TETRA'S** Dr David Pool, in its natural state, it is not an attractive food for Koi.

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Details from: **TETRA INFORMATION CENTRE**, Lambert Court, Chestnut Avenue, Eastleigh, Hants SO5 3ZQ. Tel: 01703 620500.



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# Biofiltration Explained

PART  
TWO

## NITROGEN CONTROL

Roger Foggitt of the Tetra Information Centre winds up his two-part review with a look at filter bacteria and what they actually do.

In aquaria, perfect balance is more difficult to achieve and maintain.



M. P. A. C. P. R. O. W. A. N. G. E. R.



TREVOR McDONALD

In the wild, nitrification and denitrification processes balance out.

The first stage of the Nitrogen Cycle in the pond or aquarium is the input of an initial nitrogen source. In the open environment, ie nature, this is carried out by bacteria contained in swellings in the roots of plants, known as root nodules. These bacteria absorb nitrogen gas, which is dissolved into the water from the atmosphere, and convert it to nitrates, which are then absorbed through the root system. The plant uses this nitrate as a food source, converting it to protein and incorporating it into its tissues. The process is known as **Nitrogen Fixation**.

Within the aquarium or pond, there are few nitrogen-fixing plants and, thus, the initial input of nitrogen comes from the food that we supply to the fish.

### Sources of ammonia

The initial toxic product, ie ammonia, comes from two sources. The primary source is as a by-product of the metabolic processes of fish, during which food is broken down by digestive action and the waste products are either excreted, as ammonia, across the gills, or as urea.

The secondary source arises from the breakdown of organic matter in the form of dead animal and plant tissue or excess uneaten food not removed from the aquarium or pond after feeding. This organic material is decomposed by micro-organisms such as protozoa, rotifers, fungi, amoebae and bacteria.

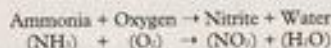
The bacteria at this stage colonise the filter, becoming part of the bacterial slime or film (*zoogeal slime*) mentioned in Part 1 and rely on organics dissolving into the water from the dead animal and plant tissue. Examples of the 20 or so species of bacteria carrying out this process (**mineralisation**) are members of the genera *Aerobacter* (eg *A. globiformis*), *Aspergillus* (eg *A. flavus*) and *Aerobacter* (eg *A. aerogenes*).

For mineralisation to occur efficiently, the conditions of culture must be aerobic.

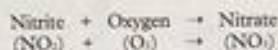
### Nitrification

The processes of the conversion of ammonia to nitrite, and nitrite to nitrate are known collectively as **nitrification**. These are all oxidation processes and require high levels of oxygen to be present for efficient chemical conversion. The conditions required therefore need to be aerobic.

The conversion of ammonia to nitrites is carried out by the bacterium *Nitrosomonas europaea*, which is a facultative autotroph (see Part 1 for explanation).



The conversion of nitrite to nitrate is carried out by bacteria of the genera *Nitrobacter* and *Nitrosynema*, the major species being *Nitrobacter agilis*. These bacteria are, as with *N. europaea*, facultative autotrophs.



### Denitrification

In many biological filters, the conversion of chemical toxins like ammonia and nitrites ends with the final formation of nitrates. This is because, in all filtration systems, it is easy to satisfy the requirements of the nitrifying bacteria, ie supply a food and oxygen source. However, as I have already stated, to convert nitrates to nitrogen gas requires *anaerobic* conditions; thus, we have to remove oxygen. This is a more difficult situation to recreate in a biological filtration system.

For the most part, the build-up of nitrates as the 'final product' of biological filtration, is kept under control by carrying out partial water changes and diluting the concentration of nitrates in the pond or aquarium water. Alternatively, a nitrate-removing chemical resin can be employed in the filtration system to remove the problem.

Another approach is to utilise plants as natural 'nitrate absorbers', a process we call **assimilation**. Plants will absorb nitrates as a nutrient supply (if you look at plant fertilisers, they all contain nitrates) and convert this nitrate into new plant tissues. This method can be extremely effective and is used by many pondkeepers around the world as a method of keeping nitrates under control.

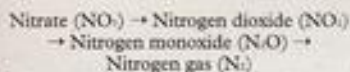
If we can supply the conditions required for biological conversion of nitrates to nitrogen gas, ie *anaerobic conditions*, then we are utilising yet more species of bacteria to carry out the conversion, which is essentially a three stage process, known as **denitrification**.



This conversion process is carried out by several species of bacteria, the major species belonging to the genera *Pseudomonas* (*P. denitrificans*) and *Bacillus* (*B. licheniformis*). The bacteria essentially require, as discussed before, an oxygen supply, which comes from the nitrates and a food (or carbon) source.

This food source is relatively difficult to supply, as many denitrifying bacteria require simple alcohols or sugars to carry out this process effectively. For the most part in aquarium systems, the bacteria rely on sugars dissolved in the aquarium water. In other, more complex, filter set-ups, 'dosing' systems can be incorporated which add small amounts of simple alcohols, such as methanol, to the water to act as a food source.

The stages of denitrification are shown in the accompanying summary equation:



The nitrogen gas produced by this process simply vents off into the atmosphere.

If we consider what is happening during the denitrification process, by looking at the chemical formulae given above, then we can see that, at each conversion stage, a single oxygen atom (O) is being removed from the resulting chemical compound (nitrate, nitrogen dioxide and nitrogen monoxide). It is this oxygen that the bacteria are using when converting nitrate to

nitrogen gas under anaerobic conditions, and if normal atmospheric or dissolved oxygen is present, then the bacteria will not use the nitrate as an oxygen source and therefore not remove it.

### Search for perfection

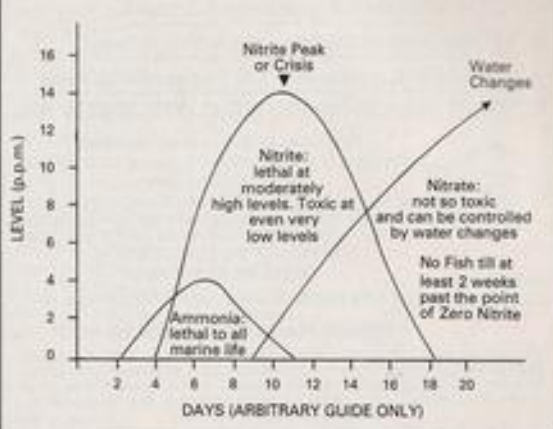
In all aquaria and ponds it is important to remember that it is not just a simple matter of setting up a filter and letting things happen. Rather, in order to create an 'ecosystem' that allows the correct processes to occur, we need to obtain a fine balance between the fish, the plants and all the micro-organisms present in our system.

The perfect balance is something that scientists around the world have been striving for for many years. To create a self-sustaining artificial ecosystem is something that many of us only dream about. Imagine an aquarium or pond that feeds itself,

cleans itself, maintains itself and looks good!

Dreams aside, though, the search for perfection in creating the ideal aquarium or pond filtration system in which to keep our fish, plants and invertebrates etc in the best possible condition, is just one of the things that makes this hobby so rewarding. **NA**

Diagram showing main events of Maturation in a Marine Aquarium



The significance of nitrogen is clear from this graph of the main steps in the so-called 'Nitrite Crisis' period experienced by marine aquaria.

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**H**aving a pond makes it easy to provide damp conditions which might be difficult to achieve in other parts of the garden. My garden, for example, has a thin topsoil on heavy clay. This means that soil is saturated with water for much of the winter and baked bone dry during the summer. I tried to grow, for example, the Chinese Pagoda Primula in the garden, but it very soon died under these conditions.

I have found that plants, such as Hostas and certain Primulas, can be more successfully grown in pots placed on stands in the most shallow areas of the pond. With the bottom of the pot just under the water surface, moisture can freely wick upwards to keep the roots damp. Also, by surrounding them with water, susceptible plants can be very effectively protected from slugs without resorting to the use of chemicals.

### 'Cavity' wall

My ornamental pond has a stone wall built around the edge. This was primarily intended to protect the fish against cats and herons. It also, of course, helps prevent small children falling in. I built it with some gaps between the stones and a central cavity, then filled it with peat-free compost to give some fresh planting opportunities.

Using planting holes near the filter outfall creates a damp atmosphere enjoyed by ferns, while *Leucis corymbosa* hybrids, which produce beautiful flowers in many shades, and *Delosperma deschampsii*, grow well on the wall in full sun. They overhang the water and decorate what would otherwise be bare stone. Saxifrage "Cloth of Gold" likes things a little cooler, and can be grown on a shady side of the wall.

Naturally, the top surface of the wall is well drained, especially if some gravel is put in the bottom of the cavity. This makes it ideal for growing alpines. Mossy Saxifrage forms cushions of growth which nestle between the stones, and gives a nice display of flowers in the spring. If a good-sized specimen is purchased, it can straightaway be split into three or four. Planted at a few inches spacing, the individuals soon spread and grow together to look like one large plant.

*Armeria maritima* seems, to me, much less vigorous, but flowers from June to August to provide some later colour. As its name suggests, very similar plants can be found growing on windy cliff tops next to the sea.

The various Sedums, with their fleshy leaves,

all seem to do well on the wall. Some can continue flowering until quite late in the season when most plants have long since put away their finery. *Caspanula* "Dickson's Gold" is another low-growing plant, but is more broad-leaved and golden coloured than some other alpines.

To prevent all the plants becoming too dry during hot weather, I have installed an automatic watering system. This enables water to be dripped onto the roots of every individual plant for a few minutes per day. The system can be loaded with slow-dissolving fertiliser pellets, but I have no idea whether or not these can be harmful to fish and do not use them. This year, now that the nutrients in the coco fibre compost have been exhausted, I will dress the surface with a little bone meal which will, hopefully, be quite safe.

### Wildlife

Firstly, I will state that information on wildlife refers to British species only. Overseas readers should refer to their own authorities for information on the protection of native species.

There are times when the relatively tiny pond at the bottom of the system provides just as much interest as my Goldfish and Orfe. It is also capable of providing some surprises. My wife likes to decorate the paving with shells and pebbles from the beach. One day I thought one

of the shells had been blown in by the wind and become tangled in the blanket weed I was pulling out. In fact, it was a water beetle, far larger than any I had ever seen before. The beast was well over an inch long. This prompted a visit to the local library, and after consulting a book of insects, I decided it was a Great Diving Beetle.

The Great Diving Beetle is a good flier, so it might be seen in any



*Delosperma deschampsii* grows well and overhangs into the water

# MAKING THE MOST OF YOUR POND

PART THREE

Plants & Wildlife

David Fletcher rounds off his report on the creation of his two-pond system.

DAVID FLETCHER

A central cavity built into the design of the pond wall provides an excellent site for plants







Sooner or later Palmate Newts or other amphibians will find a wildlife pond and colonise it.



Golden Orfe. If kept with Goldfish, the latter should outnumber the former.

garden pond. It is a predator, and preys on small animals, such as tadpoles and small fish. If fish are being bred, it may, therefore, be a good idea to move the fry to an aquarium or netted tank.

One of the first wild creatures I noticed in the pond was the Pond Skater. They live mainly on other insects which have fallen into the water. They must do well by the action of the waterfall sweeping any casualties missed by the fish into their small pond. They appear to breed more than once during the year, and their tiny offspring can be seen on the water for most of the season.

Having frogs in the pond provides an enormous amount of interest for children. They seem to be fascinated by them more than any of the other creatures in the wildlife pond, probably because they are larger, and can be picked up and handled without injury. Suitable breeding ponds are becoming ever more scarce in the countryside, so a small pond in the garden can be of enormous benefit to them.

A couple of years ago, there were warnings about a disease (Red Leg) specific to frogs, which was affecting the population in some places. At the time of writing, I have not heard about any problems for some time, but it would be wise to ask about any disease problems before moving spawn to another area.

Please do not move spawn between wild pools. Certain plants such as New Zealand Stonecrop (*Cranella helmsii*) are not only popular pond plants, but also become invasive aliens when they escape into the countryside. It is a good idea not to help them spread!

If you are very lucky, newts will also find the pond. Great Crested Newts are, unfortunately, rare. It would be best not to allow children to handle them, and generally leave them as undisturbed as possible.

## The law

Stating the legal situation, all native species are protected under the Wildlife and Countryside Act 4, 1981, although licenses can now be obtained for the sale of eggs or larvae of the Common Frog,

Common Toad, Smooth Newt and Palmate Newt. It is perfectly OK, with the land owner's permission, to take a small amount of spawn to start a colony in a new pond.

The Great Crested Newt and the Natterjack Toad have far greater protection. It is additionally illegal to intentionally kill, injure, possess or disturb them or to damage their habitat. This applies to all stages of their life cycle. A licence is required before Natterjack Toads or Great Crested Newts can be caught. They must not be taken from the wild to be put into a garden pond.

Damselflies are frequent visitors to my pond, and can often be seen laying their eggs in the water. So far, I have only seen one dragonfly in the garden, but hopefully, there will be more this year.

Finally, one of the local hedgehogs had our garden on its evening round last year. Not exactly a water creature, but after eating my offerings of cat food (the traditional bread and milk is, apparently, bad for their digestion) it would usually head for the pond, where there is always plenty of clean water available for a drink.

## Ornamentals

I have kept the stocking of my ornamental pond simple. At present, it contains seven Goldfish and six Orfe. The Goldfish were donated by a friend who also has ponds in his garden and, at the time, they were little more than fry. I found that some of them in particular, took a long time to take on their characteristic golden colour, and two changed, instead, to white.

However, I had much pleasure in watching them grow during the four years I have had them, and regard it as an advantage to obtain stock in such a way because there will be no problems with acclimatisation to the British weather.

Now that they have started breeding, it may be a good idea to swap some of the offspring for others from another pond, to prevent inbreeding and keep the stock healthy in future.

My Orfe were bought from local retailers, four golden and two of the blue vari-

ety. They have grown faster than the Goldfish, and are now considerably larger.

I feel that if Goldfish and Orfe are kept together, the Goldfish should outnumber the Orfe. The two do not cause each other any problems, except that in the summer, the Orfe are very greedy, aggressive feeders. They therefore do not give the Goldfish any chance to feed in peace, sometimes even pushing them away to get to the food first.

Goldfish are very tame fish. Like Koi, they will come to you as you approach the pond, and some will take food pellets from your fingers. Orfe, on the other hand, have a much wilder character. I find they tend to stay further away from me than the Goldfish, and certainly would never feed from the hand. However, with their powerful, streamlined appearance, they are always well worth watching as they cruise around the pond.

## Closing thoughts

My pond system is not large or particularly sophisticated. It does, however, provide far more than just a facility to keep fish.

It also provides a place for nature, enhances the garden and provides amusement and interest for adults and an educational opportunity for children.

Maintenance only requires a few hours a couple of times during the season. I can recommend this style of water garden to anyone who wants to become a fishkeeper without going to the additional trouble and expense of building a Koi pond. **ADP**

Parts 1 and 2 appeared in the April and May issues of ADP respectively.

## Acknowledgements

I would like to extend sincere thanks to Sarah Grimstead of the Wiltshire Wildlife Trust, 18/19 High Street, Devizes, Wiltshire SN10 1AT, for her assistance.



# 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 addressed.

All letters must be accompanied by and S.A.E. and addresses to: Question Time, Aquarist & Pondkeeper, 9 Tuton Street, Ashford, Kent TN23 1DN. Herpetology: Bob and Val Davies, Kol, Alan Rogers, Tropical: Dr David Ford, Coldwater, Pauline Hodgkinson, Plants: Barry James, Marine: Gordon Kay.

## MARINE

### Angelic companion

I am really into keeping butterflyfishes and, although I am relatively new to the family, I have been quite successful.

I now want to finish my aquarium collection — all butterflyfishes — with a large angelfish. Which one should I choose?

Congratulations! You have bitten the bullet and have now discovered just how wonderful these fish really are.

As for the angelfish, apart from a few very delicate species, it is a case of paying your money and taking your choice.

Providing that your aquarium is large enough, then any species will be terrific. How-

ever, if I were you, I would plump for one of the tougher species, such as a Blue-ringed or a Queen Angel.

### Falling pH

Although everything in my fish-only tank is OK, I have a recurring problem with the pH. It never stays over 8.0 for longer than a day after a water change, which I do every week at the rate of 10%.

What's wrong? Do you think it's the salt I use?

It is highly unlikely that the salt mix you use is causing your pH problem. It is more than likely that overstocking, overfeeding or both are to blame.

You do not give any details of your aquarium, of its size or its inhabitants, but it would be my advice that you examine your system and its stock very closely, including your management regime.

Blue-ringed Angel — a good choice as a tankmate for butterflyfishes.



GORDON WIGGINS

## PLANTS



GORDON WIGGINS

A mature, but still healthy, specimen of Escarboucle.

### Fasciated water lily

I have a very fine specimen of Escarboucle in my pool which has given me years of pleasure, producing copious amounts of flowers during the season.

This year, however, something peculiar has happened to it. It seems to have formed itself into a solid mass with many small shoots but no flowers.

What is wrong with it?

It would seem that your lily is exhibiting signs of the water lily phenomenon known as 'fasciation'. At one time, this was a complete mystery, but it is now believed to be caused by a bacterium, but the actual species is uncertain.

Certainly, this disease occurs in other plants where the organisms identified have included the bacteria *Phytomonas* and *Corynebacterium*. Unfortunately, no treatment is known for this disease and it is recommended that all the plants infected be destroyed.

Strangely, it is not usual for other varieties of water lilies to be infected, even if they are in the same pool.

### Duckweed control

A few months ago, I accidentally introduced a few leaves of duckweed into my aquarium when adding some new plants. It has now completely covered the surface and is cutting out all the light.

Is there any way of getting rid of it?

Duckweed, or *Lemna* to give it its correct name, is very difficult to eradicate. There is no chemical agent that will destroy it and leave your other aquatic plants intact.

Persistence is the only answer. Net the surface daily until you have removed every scrap, including the bits stuck on the glass above the waterline. You should be able to clear the tank of this pest within a week or so.



## COLDWATER

### Safe stocking

I am hoping to set up a tank for Fancy Goldfish. The size I intend to buy is 48 x 15 x 15in. How many fish will I be able to have?

The golden rule is never to overstock. Always allow plenty of swimming space for the fish; this will give them room to live

their life free from the stress which crowded living conditions cause.

They will be happier, healthier, live longer, develop and grow better, and will be less trouble, which, in turn, will give you more enjoyment from this fascinating hobby. You will also have better control over water quality, for good conditions are

vital if the fish are to remain healthy and free from pests and disease.

I recommend that you allow at least 30 square inches of surface area for 1 inch of fish. Therefore, your tank will allow you to have 24 inches of fish in total.

Do not be tempted to throw a large handful of food just before you leave just to keep them going. Much of this may be left uneaten and, if this happens, it will pollute the tank, causing the fish to become sick and (possibly) die.



PAULINE HOOBINSON

**Avoid over-crowding at all costs. Both you and your fish will benefit as a result.**

### Happy holidays

We will shortly be away for two weeks on holiday and are concerned that the Goldfish in our aquarium will not be fed during this period. I do not feel that we should trouble neighbours or friends to pop in just to feed the fish. Any suggestions?

You can go on holiday and be happy in the knowledge that your fish will fare much better left to their own devices rather than fussed over by an inexperienced 'fishsitter'. On your return, you will find them fit and well, with the water clean and crystal clear.

### Filter turnover rate

What volume of water will I have to put through my pond filter in order for it to operate successfully?

The rate of water flow through the filter will depend on the end results you are hoping to achieve. If you are aiming for crystal-clear water, you will have to have a relatively high turnover rate.

If you are hoping to have reasonably clear water with stable water chemistry conditions, then turning over the volume several times during a 24-hour period will be adequate.

## TROPICAL

### Peaceful community

What fish can I keep together in the same aquarium without fights breaking out all the time?

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

Neon Tetra (*Parachanna ornata*), Cardinal Tetra (*Parachanna axelrodi*), Angelfish (*Pterophyllum scalare*), but note that older Angels can turn nasty, but remain very popular — sometimes the top seller, Guppy (*Poecilia reticulata*), Molly (*Poecilia spp.*) (but not the Black Molly which is really a brackish water fish), Platy (*Xiphophorus maculatus*), Swordtail (*Xiphophorus helleri*), Zebra Danio (*Brachydanio rerio*), Dwarf Gourami (*Coleo caelis*), Cory Catfish (*Corydoras spp.*)

Most aquatic shops list suitable fish as 'community' fishes, which, by definition, means they are compatible. Some good stores use a traffic light system, with a red dot on the display for fish that are dangerous or require special conditions, an amber dot for fish where special

knowledge is needed before buying, or a green dot for easy-to-keep, compatible species.

### Bogwood jelly

I recently bought a piece of bogwood and soaked it for several days as advised.

After a week in the aquarium, the water turned brown and the wood was covered in what appeared to be a form coating of a jelly-like substance. On removing the bog-

wood from the water, this growth disintegrated.

What is it? Is it toxic to fish? How can I prevent it from growing again?

An untreated piece of bogwood will stain the aquarium water brown and turn white, itself. This white or jelly-like growth is a natural aquatic fungus that lives on decaying biological matter; it shows that the bogwood is not fully petrified. It is not the same as fish fungus (a parasitic form that attacks animal cells) and will cause no harm.

However, it is not a good thing to have decaying matter in the aquarium... it can lead to bacterial blooms and consequent water quality problems.

Take the bogwood out and dry it (a cool dry oven if necessary) and coat it with three layers of

polyurethane clear varnish (no other, do not use 'yacht varnish' which contains a poisonous molluscicide). This gives a protective layer and the glossy artificial look is lost underwater. It also stops the bogwood staining the water brown.

If only one (or two, if not well done) layers of varnish are applied, the water gets into the wood via just a pin hole, spreads under the varnish, lifting the layer off the wood and giving it a white appearance in a circle around the hole. If the wood is still damp, the same effect is produced, but in patches.

Note: There is a type of bogwood from Africa that is so petrified it is like stone and will not stain the water or rot, or require varnishing. Ask at your aquatic store.

**My 'peaceful' community aquarium houses a wide variety of compatible species. It contains all top ten tropicals.**



DR DAVID HOBBS



## KOI

### NH<sub>3</sub> problems

Can any level of ammonia reading be regarded as acceptable in a Koi pond? What can be the consequences if quite a low level is present on some occasions?

Ammonia (NH<sub>3</sub>) must be considered a deadly poison at any level. Any presence of such readings must never be left unattended before one attempts to remove it TOTALLY and PERMANENTLY.

If you are detecting low levels of ammonia with a standard hobbyist test kit, then I would be deeply concerned, as the levels you may be relating to are possibly a great deal higher than you realise.

Ammonia presence is usually the result of a combination of a number of things: poorly designed or maintained filters; overstocking; overfeeding; excess build up of fish waste, etc. Often, hobbyists have little perception of the effect fluctuating temperatures and rising pH parameters have on low level ammonia presence, particularly on a very hot day in a pond containing green water.

Even at sub-lethal levels (0.025ppm — parts per million — and lower), ammonia can have a disastrous effect on your Koi's health, a g. gross irritation to the gills causing swelling and secondary infections. It also reduces the oxygen-carrying

capabilities of the red blood cells (haemoglobin) to all essential body tissues, causing Brown Blood Disease. Poor growth, loss of appetite and a greater susceptibility to disease can all be symptoms of ammonia poisoning. Often, recovery from such toxic exposure is not possible.

Ionised ammonium (NH<sub>4</sub>) should also be considered dangerous in a closed pond environment, even though reference is often made that it is relatively safer than the more recognised toxicity of free ammonia (NH<sub>3</sub>).

If it persists, cease feeding your fish, improve/increase your filtration, consider reducing your fish stocking rate, but most important, if you cannot rectify the problem very quickly... move your fish into water free from all traces of ammonia and nitrite readings.

### Fading reds

I have noticed that two fish in my pond, namely a Kohaku and a Sanke, are losing their red colour patterns. The Kohaku is almost totally white now, although other red-patterned Koi in the pond appear unaffected at the moment.

Can you please offer any suggestions to prevent this happening to my other Koi?

There may be several causes

for this phenomenon, some of which the Koi keeper may or may not have control over.

In my experience, the most common cause for this loss of red (h) pigmentation is due to genetics in comparatively young fish. If the fish originate from poor-quality broodstock the h pigmentation may never be stable. Fish in this category will lose varying amounts of colour throughout the different stages of development.

In older Koi this gradual break-up of red patterns can be a result of a natural ageing process.

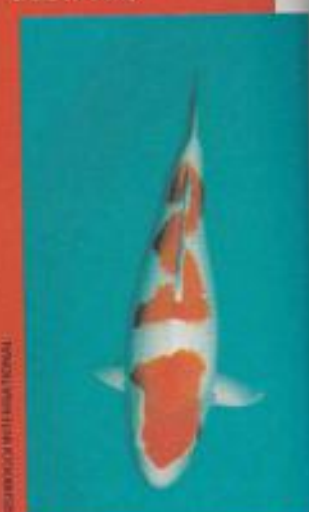
Other aspects can be directly associated with feeding an incorrect/imbalanced diet. In many cases, feeding with colour food enhancers (Spinulina) has little bearing on achieving successful results. If genealogy in bloodline colour is non-existent, all the specialised feeding in the world will be a meaningless waste of time. However, good-quality food definitely helps to maintain colour and vitality in most Koi.

I have never known red patterns, once faded in this manner, to be restored again.

The second most likely cause will be poor water quality and that, in itself, is a subject well beyond the scope of this reply. Hardness of water and high pH readings also have a direct bearing on a variety of colours; each colour will vary according to such water parameters.

Mistakenly, in the past, loss of red coloration has been des-

cribed as "hikku" or "hi-eating worm", and has confused many beginners in the hobby. "Hikku" is a dermatological disorder and can best be described as a disfigurement to the skin by the appearance of "worm-like growths" over red coloured pigmentation (patterns) O/N/Y, and usually found on Koi emanating from good-grade pedigree (see Juno's Koi Talk for an example of this condition).



A top-quality Toran Kohaku. Should such a fish begin to lose its red (h), for whatever reason, it will prove impossible to retrieve.

## HERPETOLOGY

### Lost limbs

Some of my newts have lost their limbs. What causes this, and is it detrimental to their welfare?



This Crocodile Newt (*Tylototriton verrucosus*) had both its front feet bitten off by its companions. As the picture shows, they are beginning to regenerate.

Loss of limbs is not uncommon among newts — they have probably been bitten off by some of their companions.

Newts tend to be short-sighted and will snap at any-

thing that moves. If very hungry, they will go into a kind of 'feeding frenzy' when food is supplied.

This is more common when in the water, but can also happen during the terrestrial stage, especially if several specimens are kept together. Keeping them well-fed will help to avoid this problem, but it can still happen occasionally.

The limbs usually regenerate without any trouble.

### Good general advice

Is there such a thing as a good, general book on keeping reptiles and amphibians?

Although first published (in English) in 1986 as *Breeding Terrarium Animals* by E. Zim-

mermann (Published by T.F.H.) and renamed *Reptiles and Amphibians — Breeding Terrarium Animals* for the current revised edition, this is still one of the most useful and comprehensive general books.

It describes the keeping and breeding of a wide variety of reptiles and amphibians and contains some excellent photographs. Much of the information is based on the considerable experience of the author.

There is a section on housing, nutrition and disease, followed by another on breeding and rearing (divided into reptiles and amphibians). Different reproductive strategies are examined and advice given on incubation, feeding young etc. The remainder of the book describes the breeding of certain 'type' species, followed by a list of species requiring similar treatment.



## INTRODUCING:

# Gosse's Corydoras

German aquarist Hans Evers describes a species that has been known to science since 1972 but is absolutely 'new' as far as the hobby is concerned.

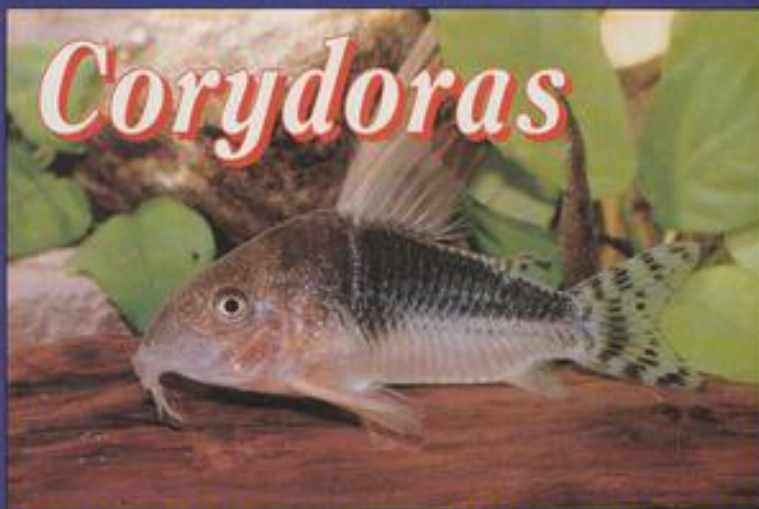
Photographs by the author

During his South America expedition in 1967, the Belgian ichthyologist J.P. Gosse collected several *Corydoras* species, some of them from Brazil. He gave this material to his colleague from Amsterdam, H. Nijssen, who described one of the totally eight new species in honour of the collector as *Corydoras gossei* Nijssen, 1972.

### Rondônia collections

This fish comes from the Brazilian State of Rondônia, from a creek near the town of Guajará Mirim in the Rio Mamoré system. From then on, only specialised aquarists who keep up with the scientific papers about 'their' fish have known about the existence of this uniquely coloured species.

Fortunately, Brazilian commercial fish collectors have started collecting in new regions over recent years, in the process introducing new and fantastic fishes to the hobby. They have also entered the State of Rondônia in their search for 'new' fish and, according to information from Marco Túlio C. Lacerda, one of the own-



Excellent specimen with a beautifully marked tail. This deep-bodied individual is likely to be a female.

ers of the exporting company Trop-Rio, recently imported Gosse's *Corydoras* have been caught near Guajará Mirim, the type locality.

### Long & short snouts

Together with the more common blunt-snouted *Corydoras gossei*, there was also a long-snouted, similarly coloured fish living in the same biotope. Reading the first description of *C. gossei*, I couldn't trace any hint regarding a long-snouted form among the material (1 Holotype and 27 Paratypes — see Footnote). Surely Nijssen would have stated such a phenomenon just as he did for the beautiful *Corydoras otapowensis*, described in the same paper. For that species, he mentioned several long-snouted specimens (later on described as *Corydoras otapowensis*, described in the same paper. For that species, he mentioned several long-snouted specimens (later on

described as *Corydoras condicipubis* Nijssen & Isbrücker, 1980) from among the blunt-snouted ones.

This long-snouted species is undoubtedly, as yet, undescribed, both species making a 'couple' of a blunt-snouted species together with their long-snouted equivalents. We already know that this happens from several other similar examples in the genus *Corydoras*.

### Promising prospects

I received my *C. gossei* from the German import company Bitter Exotics, who received them via Trop-Rio. After the first weeks of illness caused by bacteria, all of my fish settled down well by feeding on the usual 'Cory-diet', consisting mainly of worms and frozen midge larvae.

Some friends of mine have already bred this beautiful fish. They closely resemble the well known Sterba's *Corydoras* (*Corydoras sterbai*), a Cory which became 'a real star' among the others. I hope this will also happen with Gosse's *Corydoras* and its long-nosed partner. They are truly two amazing catfishes.

### Original description

Nijssen, H. (1972): Records of the catfish genus *Corydoras* from Brazil and French Guiana with descriptions of eight new species (Pisces, Siluriformes, Callichthyidae). *Neth. Journ. Zool.*, 21(4): 412-423.

\* Footnote: The Holotype is the single specimen on which the official first scientific description is based. Paratypes are specimens collected and described at the same time as the Holotype.



Long-snouted specimen. Note the faint marks on the tail. This slim-bodied individual is likely to be a male. Is it also a new species?



# HELLO DAD...

Colin Grist of the World of Water at Bristol Zoo Gardens, moves on to the captivating subject of breeding seahorses and pipefishes.

The entralling seahorses are so unusual that it is not surprising that they are among the most popular of marine aquarium fishes. They have independently moving eyes like a chameleon, can even change colour to suit their surroundings, have prehensile tails like some monkeys and the males carry their young in a marsupial type of pouch like a kangaroo. They also have the amazing ability to change the texture of their skin so they can blend in with growths of algae and the surfaces of rocks.

They are the stuff of legend and mythology, and are so different from other fishes that they were classified as insects in early books on natural history. With their hard, bony skin, similar to the exoskeletons of many invertebrates, it is easy to understand the confusion.

However, fishes they are, with the usual gills and fins. In many species, the fins are so transparent they are difficult to see and you would be forgiven for thinking they had no means of propulsion. In fact, they are capable of moving at a surprising speed by using their fins, which can 'fan' at an incredible 70 times per second.

## Challenging fish

Unfortunately, the appeal of these unusual fishes is also their downfall. Seahorses and pipefishes are not easy to keep. For a start, when feeding, they do not compete well with other fishes which are capable of moving faster; therefore, they can rapidly starve to death. They can be seriously disturbed by more boisterous species and they are prone to being stung to death by anemones in the confines of an average home aquarium, while hermit crabs and other crustaceans, including



Side view of a pregnant male

Banded Coral Shrimps, *Stenopus*, are capable of preying on them. Most important of all is their requirement for very large numbers of live shrimps on a daily (even hourly) basis.

If you must mix seahorses and pipefishes with others, then combine them with the likes of Mandarin Fishes, *Synchiropus* sp., which will, in addition, help control copepod populations, and Cleaner Shrimps, *Lysmata*, which will serve in 'mopping up' any uneaten dead foods.

If you are very serious about keeping these fascinating fishes, then have a go, as there are very good reasons for doing so. However, if you do not have the essential time to put into keeping them properly, then please leave them to those who have.

By the most basic description, pipefishes are seahorses straightened out. So, what is good for seahorses is usually good for pipefishes, although, in many cases, they require much smaller living foods.

## Conservation

Although it is a sad fact, most aquarium specimens die prematurely, mainly due to incorrect husbandry, but it is not the aquarium industry which is the main cause for the rapid decline in wild populations. Somewhere in the region of 20 million seahorses are collected each year and distributed through (mainly) China and the Far East to be processed as aphrodisiacs and so-called traditional medicines.

These trades will be extremely difficult and expensive to halt as the means to educate users of these remedies is nigh impossible to put in place, although there are people like Canadian biologist Dr. Amanda Vincent doing their utmost to achieve this aim. Habitat destruction is also taking its toll.

With all this in mind, it is vital to improve aquaculture techniques to provide a sustainable source of seahorses for these trades without necessarily removing them from the wild. To this end, amateur marine aquarists can play a large part in



Pregnant male seahorse with a pouchful of fry. Nutrients are supplied to the babies as in mammals.

perfecting captive husbandry as an aid to conservation. This is a good reason for keeping seahorses, not just because they are unusual additions to the aquarium.

## Aquarium care

The best type of aquarium for seahorses is one which is taller than it is wide. The reason for this will become clear later. Try to replicate the kind of habitat they naturally live in; for example, they are mostly found in beds of seagrass and among coral.

Seagrasses are not easily come by, so some types of *Galathea* seaweed can be used as substitutes. Use good quality living rock with plenty of fronds of algal turf on it, as this helps condition the water and provides a suitable substrate for potential food organisms to live and multiply on.

Pipefishes, in particular, benefit from the use of living rock as they will often find on it the small copepod animals they like to feed upon.

For seahorses, a steady flow of water is necessary to keep their food in suspension and cause it to flow past their anchor points.

These fishes are territorial and males will quite aggressively protect their own individual 'patches'.



# OR IS IT MUM?



**Giving birth.** Hundreds of tiny replicas of their parents enter their watery world.

## Feeding

Correct feeding is crucial to maintaining seahorses and their relatives successfully. I have already mentioned the importance of live foods, but supplying the necessary amounts can prove to be hard work. An adult seahorse can devour 2,000-3,000 tiny shrimps daily, so this can mean a continual regime of offering food.

Live brine shrimps, *Artemia*, are the obvious choice for most aquarists and there is nothing wrong with these, providing they are not the only source of nourishment. Seahorses and their kin require quite high levels of calcium but, unfortunately, brine shrimps contain very little of this substance. So, those specimens which are fed solely on brine shrimps do not survive well.

Myxid shrimps are a much better food, as they contain suitable levels of calcium. These, sadly, are not readily available alive, unless you live near the coast and can collect them yourself in spring and summer. Wild-caught mysid shrimps should, ideally, be sterilised before use with a harmless general anti-bactericide such as Myxazin.

Steps are currently being taken by the Seahorse Captive Breeding Coordinator (see box at end of the article) to obtain some exotic mysids which readily reproduce in the aquarium. Once these are available, it will represent a great step forward in captive husbandry. Frozen mysid shrimps will often be taken by some seahorses, and this method, supplemented with the feeding of live brine shrimps, does well in the long-term maintenance of these fishes.

New-born Black Mollies are also a good source of food, especially if they have been bred in saltwater to avoid sudden death by a massive change in pH and salinity. Some aquarists may find this technique distasteful, particularly as Mollies are not part of the natural diet. However, as a last resort, when nothing else is available, using Mollies as food is preferable to losing seahorses. Mollies are not suitable for most pipefishes.

Most of the commonly available coral reef pipefishes cannot cope with feeding on shrimps as large as adult mysids, or even adult brine shrimps. Newly hatched brine shrimps (not solely!), rotifers and copepods are much better bets for these fishes.

Seahorses anchor themselves to leaves of seagrass, fingers of coral or the branches of a sea fan and catch passing shrimps, or alternatively, they will deftly stalk their prey and, at the crucial moment, suck it into their tube-like mouths. On the other hand, pipefishes cannot anchor themselves, as they do not possess a prehensile tail, so they simply stalk their prey and catch it by taking a sudden sideways swipe with their snout to ingest it.

I feed the seahorses and pipefishes in my care at Bristol Zoo Gardens virtually every time I pass the aquarium housing them, an absolute minimum of 6 times a day. Between 5.00 pm on any one day, and 7.30am the following morning, they do not get any food and visibly lose a little bit of weight because of it, although they soon put it back on during the course of the next day. This illustrates their need for constant feeding.

As a point of interest, I daily observe a pair of Banded Pipefishes, *Doryrhamphus dactylophorus*, joining each other among the antennae of the Cleaner Shrimp, *Lyemnaea ambonensis*, while it is feeding, and waving their snouts from side to side in a form of display. This behaviour may well serve to gain food in the form of copepods which are disturbed by the actions of the shrimp.

## Breeding

Finally, we get to breeding, which is the main aim of this article, although the information above is vital if you want to be successful at this stage.

Seahorses and pipefishes are rather strange creatures, as we have already ascertained, but they are at their strangest when it comes to reproduction. In this group of fishes, it is the males who carry eggs and give 'birth' to their offspring. In the case of seahorses, this phenomenon must be regarded as a real pregnancy. But, before explaining this, let us take a look at the whole mating process.

When establishing a mate, males will vigorously compete with others for a suitable female and, if there is a shortage of males, the females will also compete with each other to secure a partner, but not to the same degree as the males do. Females produce eggs and the males produce sperm in the normal way, but, the eggs are transferred to the male for protection. In pipefishes and sea dragons, the eggs are either deposited under a



Head-on shot of an adult seahorse shows just how slim non-pregnant specimens are. This photograph, along with the one of a pregnant male and a newborn fry, were taken at the newly-opened Seahorse Nature Aquarium in Exeter. (Tel: 01392 438538).



Newly born seahorses fry swim against the 'ocean' of an aquarium.



Pipefish present many of the same challenges as their close relatives, the seahorses.



soft flap of skin, or are just simply stuck to the underside of the fish. However, the process is most spectacular with seahorses, as the males differ from those of close relatives by possessing a complete pouch.

Male seahorses tend to stay with the same partner for life and will even greet each other in the mornings at first light. Courtship is triggered off by a full moon, sometimes a new moon, and involves much spiralling around each other, often rising vertically in the water column, which is why it is best to keep seahorses in a tall aquarium. This can go on for four days, allowing time for the male to prepare his pouch for taking eggs.

The female seahorse can deposit 1,000 eggs into her partner's pouch in less than 5 seconds! After this, soft skin extends to secure the eggs, and the pouch becomes well supplied with oxygen in a similar manner to the womb of female mammals. In addition, the same hormones as produced by pregnant women are supplied to seahorse eggs. Although, as I have already said, it is the fathers who carry the eggs, this process does constitute a real pregnancy.

During the next full moon, the male will begin giving birth, a process which can take over 24 hours. The baby seahorses emerge from their father's pouch as tiny replicas of their parents. They drift into the plankton with the strong lunar currents, where they immediately have to fend for themselves by feeding on up to 3,000 tiny shrimps, or similar planktonic organisms, every day. As soon as the birth is

over, the parents will re-mate while there is still a full moon.

When kept in a well run aquarium and fed the correct foods, seahorses and pipefishes will happily reproduce, providing there is a male and female. Newly imported pregnant male seahorses often release their offspring into the aquarium immediately after being introduced. So, what do you do in these circumstances?

## Rearing

Baby seahorses and pipefishes have the same requirements as their parents, so it is not sufficient to feed them solely on newly hatched brine shrimp nauplii, because of their lack of calcium. Therefore, the rotifer *Brachionus plicatilis*, or similar, is essential as a first food for young seahorses etc. Microscopic copepods living in the aquarium will undoubtedly help in the survival of these young fishes. Details of maintaining rotifer cultures can be found in an earlier article in this series.

Brine shrimp nauplii can be used to supplement the main diet of rotifers and there is no harm in directly introducing a couple of drops of shell-less eggs into the aquarium on a daily basis, where they will readily hatch out. Do not use eggs with shells in this situation, as young seahorses and their like have often been observed choking after ingesting them by accident.

Occasionally, adults will eat some of their young, so it is safer to separate them and rear the offspring in another aquarium with identical water conditions. **MAP**

## SEAHORSE AND PIPEFISH INFO BOX

- 1 Keep them in an aquarium which is taller than it is wide.
- 2 Seahorses and their kin have a high calcium requirement, so they must be fed mostly on living mysid shrimps and copepods.
- 3 Brine shrimps contains very little calcium, so these must only be used as a supplement.
- 4 New-born seahorses etc. must be fed on rotifers.
- 5 Seahorses and pipefishes can take several thousands small shrimps daily. Therefore, it is essential that a regime of almost continuous feeding is implemented.

## Seahorse Register

If any readers already keep seahorses, or intend to make a serious attempt, please contact the Seahorse Captive Breeding Coordinator, Neil Garrick-Maidment, 1 St. James Terrace, Exeter, Devon EX4 6QH. Neil is currently compiling an international register of people, whether professional or amateur, who keep seahorses. If you already keep them, information about your aquarium, breeding successes and details about behaviour etc. are all important. If you are only at the planning stage, it is still worth getting in touch.

## NEXT TIME: BREEDING ANGEFISHES



## Cichlidae Live Part 2:

A Peacock Cichlid (*Aulonocara*) from Lake Malawi. Its feeding habits and those of many other species have been specially filmed for Ad Koning's latest video.

aquarists tend to assume.

While many fishes have only maxillary (jaw) teeth, used simply to seize food, which must then be swallowed whole, cichlids have additional teeth on the lower pharyngeal element (or bone) — LPE — which are used to process it. Both types of teeth vary according to feeding method and prey type, and we are shown sample LPE's of species with different dietary habits.

Next the 'real' entertainment: a guided tour of the three main types of cichlid food. First, insects and other invertebrates, with — star fish — *Latesoma* sifting and *Proocentrus* 'blowing' away sand in the hope of observing something edible; members of various genera using their thickened lips as gaskets to seal off rock crevices, enabling them to suck out prey; and those aquarium favourites the Peacocks (*Aulonocara*, whose greatly enlarged lower jaw sensory pores allow them to 'listen' for invertebrates travelling through the sandy substrate).

Then, the algae browsers: not just the various specialisations of the rock-dwelling Mbuna, but also others like *Cyathochromis obliquatus*, an Mbuna which has abandoned the highly competitive world of the rocky shoreline to graze algae from *Valoniopsis* leaves instead.

And finally the piscivores (the fish eaters). Here, we first perhaps the only weakness of the video: predators are relatively few in number and often need to feed only infrequently to get their fill, so finding them hunting is far from easy, let alone capturing the actual act of prey on film. So, although we are shown the fishes which employ various methods of utilising 'fish products' (not just whole fishes, but fins, scales, eggs, larvae), we do not see them all in action.

Nevertheless, we are shown *Tyrannochromis macrostomus* sitting up to its prey, *Amblochromis livegatorum* playing dead, and — best of all, egg-stealers robbing spawning couples, with eerie 'noo-voe-voe' spawning sequences thrown in.

Technically, the photography is excellent, and even where water clarity is (only slightly) less than aquarium standard, there is no problem with seeing what is going on. I rather liked the use of 'above-water' comparisons — the feeding habits of 'Tuffalunga', 'Crocs', 'Hyaas', 'people' — which add a touch of sardor to the main action.

There is the odd hiccup in the soundtrack volume, but nothing to send you diving for the TV controls — besides which, who cares if the sound is less than perfect with all those wonderful cichlids to watch?

Mary Bailey

# VIDEO REVIEW

## Diving in Lake Malawi, the warm heart of Africa: Feeding Specialisations.

Running time: 50 minutes.  
Produced by: Cichlid Press.  
Available from: BCA Sales (AP), 7 Delamere Avenue, Sale, Cheshire.  
Price: £17.95 (post free to BCA members; non-members please add £1.50 p.p.s.)

Here, at last, we have the real in-the-same-of-guy-you-to-the-belly videos on Lake Malawi by Ad Koning and Gerard Taveling, this time on the feeding specialisations of the cichlids. By now, most of us know that Mbuna graze algae from rocks, and have seen photos to prove it, even though few of us have had the opportunity to go and see for ourselves.

But how many of us know there is a species which burrs over pebbles, looking for invertebrates underneath — an underwater version of our native Turfstone Flower on the seabottom? Or others which feed on mouthbrooder eggs stolen from beneath the spawning female before she can pick them up, or which rob her of eggs or larvae while she is brooding?

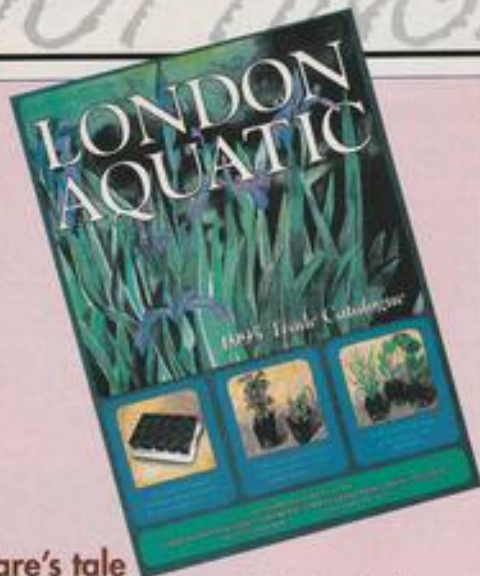
The video commences with an explanation of how feeding specialisations have enabled Lake Malawi to support such a prodigious cichlid species flock by enabling its members to occupy ecological niches which cannot be exploited by generalised feeders or, of course, by fishes with other highly evolved feeding habits. Most species part, and do, consume the zooplankton often plentiful in the lake, but fall back on their specialisations when times are tight.



# COLDWATER

## JOTTINGS

BY  
STEPHEN J. SMITH



LONDON AQUATIC

### Mare's tale

I recently dropped in to plant specialists London Aquatic, near Enfield, Middlesex, and received a very warm welcome from partner Peter Robinson and plants manager Peter Hodgkinson. The company is currently in its 61st year of existence and a quick tour of the many acres of their premises provided me with a great eye-opener.

Aquatic plants provide a further fascinating aspect of the coldwater hobby and, although this is a trade-only establishment, their trade catalogue is a joy to behold. Little wonder that retailers throughout the country are customers of London Aquatic.

Of particular note is the splendid front cover of the trade catalogue — illustrated with pictures produced by former employee John Bennett. Peter explained to me that John is an artist who worked for the company briefly at the time they produced their catalogue and that his illustrations were perfect for the job.

Also eye-catching was a 'new' variety of Mare's Tail which I am very much looking forward to propagating for my own ornamental pond. Now, Mare's Tail are anathema to the average gardener — I know my borders need daily treatment against their spreading!

However, this new variety is called *Equisetum robustum*, Giant Mare's Tail, and looks nothing like the garden rogues I am familiar with. Examples I saw grew upwards of two or three feet in length and, as you can see from the photograph, are most colourful and very impressive.

### When is a Koi NOT a carp..?

Regular readers of these columns will be quite well aware that I cannot abide tautological names (tautological — now there's a word which must be listed alongside rugosity and neoteny...!) By tautological I refer to names which merely repeat their own meaning, examples being Black Moor (a Moor is, by definition, black), Hooded Oranda (what else could any Oranda be but hooded?), or Koala Bear (Koala is apparently an Aborigine word for 'bear'; but what this has got to do with coldwater fish is a mystery...)

Get the point? So why do so many retailers refer to Koi as Koi Carp? What is a Koi if it isn't a carp? After all, we all know, don't we, that Koi is a short form of Nishikigoi, which, I am led to believe, is Japanese for brocaded carp (ornamental Koi to you and me). So, if we translate back, a Koi Carp would be an Ornamental Carp Carp, or a Brocaded Carp Carp, or even a Carp Carp.

Before you accuse me of carping on, or even talking a load of rubbish, perhaps there is a sensible point here. Surely, the qualifying of Carp with Koi is a means of identifying ornamental Carp from, perhaps, Leather Carp, or Common Carp, or any other type of carp.

OK, I think I can live with Koi Carp, but I still reckon a Moor can only be black. By the way, did you see those Redcap Moors on display at the aquatic importers last week...?

### Tewin praise

Fishkeeping friend, colleague, and correspondent Alex Stephenson dropped me a line recently, following his own visit to Tewin Mill Fish Farm. Now, there is a place I have been promising myself to visit for many a year, and simply have never got round to.

However, Alex explained that there were two reasons for his trip; one, there is always the possibility of finding one fish (or several) which simply have to be purchased. Secondly, he simply wanted to 'brush up' on the range and quality of imported fish available.

"Midday on a Sunday is definitely not the best time to make oneself a nuisance to the staff of a busy establishment such as this," explained Alex. "But I was greatly impressed by the hospitality shown by the manager and his staff in showing me around."

What really impressed itself upon Alex was the cleanliness and good condition of the fish generally. "When you consider that an import/wholesale/retail set-up such as this is effectively a staging-post for several thousand fish at any one time, this is no mean feat," Alex added.

So, full marks to Tewin Mill. And, yes, I will make sure that I will pay you a visit sometime this year (I hope...!)



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## FLAKE FOOD



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STEPHEN SMITH

London Aquatic's new 'giant' for the pond.

### Society knowledge

Where is the best place for you to find reliable information on your aquatic interests? Of course, *A&P*! But where next?

So many people approach me utterly confused by the hobby, seemingly overwhelmed by its technicality. Technicality? Yes, when we are repeatedly talking

about water quality, diet, health and welfare, construction of ponds, filter media, etc, etc. No wonder some people are put off — is this a hobby or a degree course...?

However, there is a further source of information which will provide the perfect complement to your subscription to *A&P*, and that is a subscription to your local aquatic society.

Normally, annual fees are extremely reasonable (usually less than a tenner). Also, societies not only provide some cracking speakers, but also the experience of members, who range from novice to experienced expert. And the beauty is that you will get the

chance to chat with people who have had the same problems — and have even made the same mistakes — as you are facing.

So join your local society now. Your local library and newspaper will both have information on meeting places and contact names. So does *A&P* in the *Society World* and *Kol Calendar* sections. And take a friend, too. That way, you will be spreading further the enjoyment of this pleasurable pursuit of fish-keeping.

## HOZELOCK

### PURIFIER COMPETITION WINNERS

As promised in our April issue, here are the names of the 10 lucky winners of our Hozelock Pondwater Purifier Competition.

Jeff Kane — Romford  
 Ronald Mills — Rushden  
 Jo Robinson — Stonehaven  
 Gary Clayton — Hull  
 C.M. Stroud — Old Costessey  
 Paul Simpson — Darlington  
 R. Gardner — Shenstone  
 Mrs. L. Riding — Mossley  
 Mrs. E. Sanders — Colchester  
 J. Macartney — Carrick Fergus

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# THE WATER GARDENER

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# LIGHT-SENSITIVE SPAWNERS

**PART TWO**

## Daylength & Sexual maturity

Dr David Tipping concludes his two-part review of the effects of daylight on the breeding success (or otherwise) of fish.

(Part One was published in the April 1995 issue of A&P)

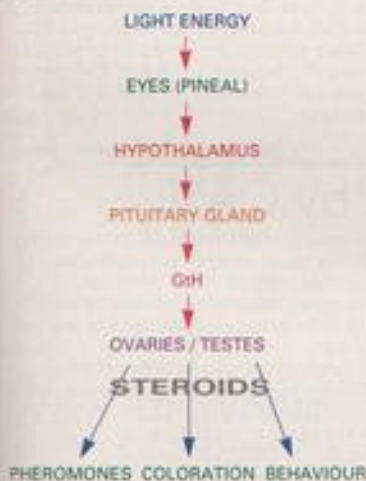
In Part 1, we looked at some of the ways in which aquarists can influence the breeding of their fishes by altering the lighting regimes to which they subject them. We saw that a surprising number of species of fishes breed seasonally, and not all year round, as would be imagined for 'tropical' fishes, many seasonally breeding fishes beginning their reproductive activity in response to a change in the daylength (or photoperiod).

This article describes the chain of events in a fish which causes sexual maturation, once it has been stimulated by an appropriate photoperiod.

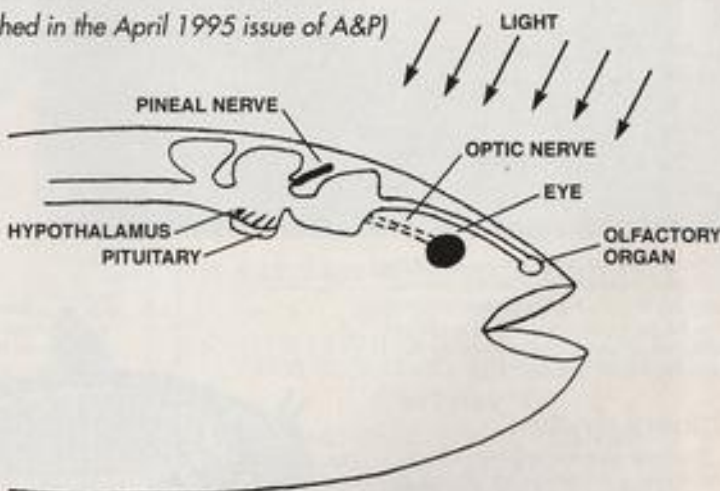
### Brainy responses

In addition to these so-called 'retinal inputs', some fishes (e.g. the Brown Bullhead Catfish, *Ictalurus nebulosus*) sense changes in light intensity through the roof of the brain, in a region called the pineal organ. The pineal organ also produces a hormone called melatonin, which circulates around the body and fluctuates in concentration depending on whether the fish is experiencing light or darkness.

However, the eyes and the pineal only detect whether it is light or dark. It is the brain which calculates whether the length of the day is long or short; this is done in a region called the hypothalamus.



Sequence of events involved in daylength-induced sexual maturation



The 'layout' of the sensory system of typical fish.

### Automatic clock

The brain of vertebrates has its own internal 'clock', which is reset automatically each day at the break of dawn to 0000 hours. Animals which normally mature in response to long daylengths are typically stimulated most by illumination at about 1400 hours. In this case, a daylength of 13 hours of light per day would be insufficient to trigger a response, but a 14-hour day would provide light to coincide with this sensitive phase and cause sexual maturation.

Most photoperiodic fishes respond to increases in daylength. Vertebrates can detect changes in the daylength around them because they 'remember' daylengths from previous days, so that they can tell if the daylengths are increasing or decreasing.

Most photoperiodic fishes are adapted to respond to increases in daylength because these occur in the spring. In this way, they can time their reproduction with their food species, which also breed in spring. Fishes which respond to increases in daylength are called **long-day species**.

### Negative feedback

If the fish receives a stimulatory photoperiod, the hypothalamus activates the pituitary gland to produce hormones which cause the growth of the ovaries or testes. These so-called **gonadotropic hormones**

(GtH) cause the gonads (i.e. ovaries or testes) to increase in size and mature.

The gonads respond to GtH with their own production of steroid hormones. One of the functions of these steroid hormones is to feedback 'negatively' to the pituitary gland, to regulate the further production of GtH. If this didn't happen, the gonads would continue to enlarge, because of the continued GtH production, and finally explode.

### Versatile steroids

The gonads (of both sexes) produce many steroids, each with a different function. Steroids assist with the timing of sexual maturation and the release of the eggs and sperm. They are also responsible for breeding behaviour and changes in coloration prior to and during spawning. In some species, steroids are released into the water, and this induces sexual maturation in fishes of the opposite sex.

Hormones which act outside the body, on another individual, are called **pheromones**. For example, in female Goldfish, steroids which are involved in the maturation of the eggs, are released into the water. Once released, they induce hormonal and behavioural changes in males.

But how and why do fishes stop their breeding season? There are many reasons why fishes breed seasonally away from the equator, but the main reason is the avail-





**LEFT** - Sticklebacks and many other species stop breeding quite abruptly in late summer or early autumn, irrespective of daylength.

**BELOW** - Goldfish respond to the increasing daylengths of spring, although sexual maturation begins in autumn/winter.



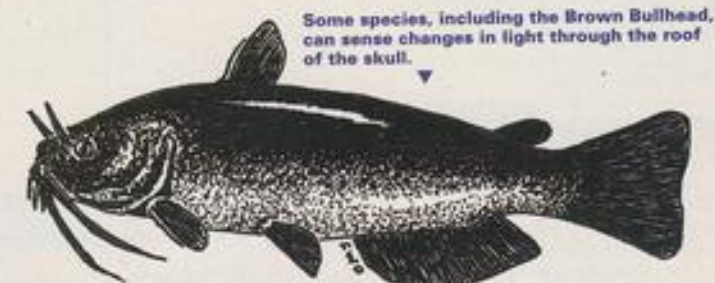
ability of food for the offspring. For reproduction to be worthwhile for the parents, there needs to be a good chance of survival for the young, otherwise the parents are better off saving their energy for the following breeding season.

### Annual rhythm

Since reproduction is linked to food availability, it is common (in habitats distant from the equator) to observe the majority of organisms breeding in the same season. In Britain, for example, flowers, trees, birds, fishes, insects etc. all breed in spring and summer. The further from the equator that organisms live, the shorter the breeding season.

Fishes which are induced to breed by an increase in photoperiod are not necessarily dependent on a decrease in photoperiod to cause a cessation of breeding activity. Sticklebacks and Common Gobies cease to breed spontaneously in late summer or early autumn. Such fishes have an in-built annual reproductive rhythm, which determines at which time of the year they will breed.

These species (and possibly many others) become increasingly sensitive to



Some species, including the Brown Bullhead, can sense changes in light through the roof of the skull.

daylength in spring. This increase in sensitivity leads to the beginning of reproduction. However, after a certain period of time, the fishes stop responding to the previously stimulatory effects of daylength. This leads to a decrease in gonadotropic hormone levels (and therefore steroid hormone levels) and the gonads regress.

In some species the breeding season can be lengthened slightly by manipulating the daylength, but the breeding season cannot be extended indefinitely in this way. This

is because animals have their own in-built reproductive rhythms.

Environmental factors, such as daylength, monsoons or temperature changes serve to synchronise these and induce breeding. The in-built rhythms are also the reason why changes in daylength in aquaria do not always immediately induce fish to breed. It's simply that the fishes' reproductive system is not yet in a state of 'readiness'... much to the frustration and (sometimes) confusion of the aquarist.

**ATP**




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Every child should have the opportunity to visit a rocky shore and discover the variety of life that lives in the pools, in the rock crevices and attached to the rocks themselves. Only for a short period, twice a day, when the tide goes out, are these small fish, crabs and other creatures exposed to the attentions of the human explorers.

But how many children, nowadays, know first-hand about the marine creatures that live between the tides? A few enlightened schools make trips down to the shore when the tide is out and July is one of the more popular months for this activity.

The Gower peninsula in South Wales, the chalk foreshore of the Sussex coast and numerous beaches in Devon and Cornwall, north Wales and Scotland are just some of Britain's lengthy rocky coastline, that receive the attentions of organised parties of students.

The seashore is the best place on these islands to study wildlife in its natural state, as well as geology and other sciences. The real bonus is that it is good fun!

## Rockpools

In a pool on the leeward side of a rock outcrop, the water surface is undisturbed by the slight breeze, and as you peer into the clear waters, a microcosm of the submarine world materialises before your eyes. Calcareous and red-staining seaweeds dye the sloping sides of the pool an attractive mixture of pinks and reds.

By July, many pools are decorated with a beautiful mixture of red and green seaweeds in varying shapes and textures and sheens, some shining with a silvery incandescence.

Adjusting your eyes to look closer, green tufts of Sea Lettuce (*Ulva*) provide an attractive contrast where the conical limpets have not grazed. Topshells of several different species leave meandering trails as they feed on the algae.

## Shore zones

July is a good month for the student. Venturing down on the shore, the alert rockpooter will observe that different flora and fauna occupy different areas on the rocky shore according to the ability of the weed or animal to withstand the drying effect of the sun.

These areas are divided into zones, based on how long the dominant flora and fauna, which are mostly the large brown seaweeds draped over the rocks, can remain out of the water. These seaweeds are known as

# SHORE WATCH

BY ANDY HORTON



5-Bearded Rocklings are brown when adult. The 'beards' referred to are the barbels on the head and chin.



The Common Starfish can be found in astronomical numbers in some years.

'Wracks' and have the scientific name of *Fucus*.

### Upper Shore Zone

The height of the high spring tides is marked on the rocks by rows of barnacles and the occasional limpet. These rocks will not be immersed on the neap tides.

A few brown seaweeds, notably the Channelled Wrack and the Spiral Wrack, will be found this far up the shore. Straggly fronds of the green seaweed *Enteromorpha* occur where there are runs of fresh water.

### Middle Shore Zone

The prevalent brown seaweed is the Bladder Wrack, named because of the bladders that hold the plant erect when, for half the

day, the tide comes in.

Fauna is sparse, with a few Shore Crabs scampering about. On rocks, Beadlet Anemones will look like blobs of jelly, with their tentacles withdrawn. In the pools, the tentacles emerge to capture small crustaceans, and provide an attractive splash of colour. The Flat Winkle resembles bladders and lives and feeds among the seaweeds.

### Lower Shore Zone

For most of the day, the sea will cover the lower shore, so the rockpooter will need to consult the 'Tide Tables' to find out when the shore is accessible.

Seaweed varieties are much greater in this zone. However,

the dominant brown species is the Serrated Wrack, so named because of the saw-like edge to its fronds.

Experienced rockpoolers will head straight for this area, because they know that it will be richest in the number and variety of species.

## Small fish

Blennies and Gobies are the two families of rockpool fish that are true shore inhabitants and these small fish can be expected to be found in the pools and under rocks at the low spring tides in July.

However, over forty other fish, including the fry of much larger fish, regularly turn up in prawn nets trawled under ledges and among the weed fronds. The fish and other mobile creatures, crabs, starfish etc. venture into the shore zone at high tide to feed on the rich food supply. They become trapped in the pools as the tide recedes.

Fish larvae leave the plankton in July and these juveniles rely on the shallow seas, estuaries and the shore zone as nursery and feeding areas. Prawns can be found in their thousands in gullies and pools. Most of these will be small, but others will attain about 10cm (4in) and be large enough for human consumption.

Young Bass, about 45mm (1.8in) long will feed avidly on prawns almost as large as themselves. In the north, young Saithe will fill the same predatory role.

A small elongate silvery fish that is quite common among the weed in July is the last stage of the planktonic life of the Rockling. If you place the fish in a transparent plastic jar and carefully observe it, you can spot the three or five barbels and, more importantly, the unusual dorsal fin arrangement, which consists of a solitary dorsal ray and a slit containing numerous vibrating rays.

On reaching the shore, the fish changes colour over a period of two hours, first to a darker grey, and then to the brown colour of the adult, to begin its demersal life.

## Starfish

Starfish are often thought of as typical inhabitants of the shore, but the only species that is found with any sort of regularity is an orange one called the Common Starfish.

With its numerous tube feet, it is able to cling tightly to the underside of a rock and can be difficult to prise off without detaching one of its arms.

It is really an inhabitant of off-shore mussel beds, where it feeds on mussels and other bivalves, as



## JULY CHECKLIST

As the larval fish and invertebrates grow into juveniles and move inshore during July, the list of species that can be found between the tides grows very large. Only the very common fish species have been included.

### Adult Bony Fish (Teleosts)

Blenny (or Shanny)	<i>Lipophrys pholis</i>
Bullhead (Sea Scorpion)	<i>Taurulus bubalis</i>
Rock Goby	<i>Gobius paganellus</i> (south and west only)
Sand Goby	<i>Pomatoschistus minutus</i>
Cornish Sucker	<i>Lepadogaster lepadogaster</i> (south-west and west only)
Two-spotted Goby	<i>Gobiosculus flavescens</i>
Sand Smelt	<i>Atherina presbyter</i>
Great Pipefish	<i>Syngnathus acus</i>
Worm Pipefish	<i>Nerophis lumbriciformis</i> (south-west and west only)

### Fish Fry

Blenny (or Shanny)	<i>Lipophrys pholis</i>
Common Goby	<i>Pomatoschistus microps</i>
Bullhead (Sea Scorpion)	<i>Taurulus bubalis</i>
5-Bearded Rockling	<i>Ciliata mustela</i>
Garfish	<i>Belone belone</i> (south and west)
Bass	<i>Dicentrarchus labrax</i> (south)
Pollack	<i>Pollachius pollachius</i> (not everywhere)
Seaite	<i>Pollachius virens</i> (north)

**Crustaceans, Molluscs, Sea Anemones, Echinoderms**  
Crabs and other crustaceans found on the shore during July are the same as included for June in last month's *Shore Watch*.

### Dominant Brown Seaweeds

These wracks of the family Phaeophyta will be present in all months of the year.

Spiral Wrack	<i>Fucus spiralis</i>
Channelled Wrack	<i>Palvetta canaliculata</i>
Bladder Wrack	<i>Fucus vesiculosus</i>
Serrated Wrack	<i>Fucus serratus</i>

For further information on brown seaweeds, refer to *A Field Guide to Brown Seaweeds* published by the **Field Studies Council** in their AIDGAP series.

Please write to Andy Horton for the list of the other invertebrate animals likely to be found on the shore during this month c/o A&P.

Reports of shore finds during July are welcome from readers.

well as scavenging and eating the eggs of other animals.

In years of glut, millions can migrate on to the shore, turning large expanses into an orange carpet. These years of glut occur about once a decade.

## Squat Lobsters

Not a true lobster, this brown crustacean is a relative of the Hermit Crab. Like its relative, it has a soft abdomen, but it hides in holes and crevices and does

not adopt a snail shell.

July is a good month to discover this crustacean on the shore, in ones or twos under small rocks, with larger specimens to be discovered near low water mark.

However, like the Common Starfish, in years of glut, millions venture on shore, where half a dozen could be found under each rock over an area of twenty acres or more. When disturbed, Squat Lobsters shoot backwards rapidly like a prawn.

## Notes:

**1 Neap Tides** are the tides when the variation between high and low tide is at its smallest. The best time to visit the shore is at the low spring tides, when the water recedes the furthest, uncovering the rich fauna that would normally be submerged.

**2 Tide Tables** are available in newspapers, tackle shops and ship's chandlers in seaside towns. Low tide occurs just over six hours after the high tide.

## British Sea Temperatures (Surface, Inshore)

	°C	°F
Thurso, North Scotland	11.1	52
Newcastle	12.2	54
Donegal	13.3	56
Brighton	14.4	58
Plymouth	14.4	58
Gibraltar	20.0	68

# FASCINATING FISH FACTS



Ribbon Eel... surprised, or just confused at its colour and sex changes?

## Identity crisis

Imagine how confusing it would be to begin life black, then change into a blue male and then find yourself turning yellow and becoming female! Apparently, this is what is believed to happen to the Blue Ribbon Eel (*Urolophora hutchingsi*).

In appearance, it's hard to imagine any fish that looks more like its name. A tiny head, topped off by permanently erect, flowing nostrils, is followed by a long blue body, exactly resembling a ribbon, which may be over two feet in length.

The dorsal fin extends all the way along and is, in the usually seen 'male' form, bright yellow. This fish even moves like a ribbon, waving in the wind, with the yellow fin rippling along its length.

These remarkable fish always seem to have their mouths gaping open as if in surprise. Maybe they're just confused!

Linda Lewis

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# TRADE "TALK"



## OFI and OFI (UK) aim to stem further industry threat



Proposals scheduled for implementation on 1 July in a consultation document by MAFF (Ministry of Agriculture Fisheries and Food) could have a serious effect on the ornamental fish industry throughout the UK.

Changes in import rules being proposed relate mainly to certain serious diseases of carp and trout and are intended to ensure that trade between EU member states is, at least, as simple as those governing trade from non-member states (third countries). Thus, the proposals seek to impose similar restrictions to trade from third countries as those covering imports from other EU countries.

Imports of tropical, marine and freshwater fish will require an annual licence, as will those of Koi and Goldfish imported from countries not affected by the salmonid diseases ISA (Infectious Salmon Anaemia), VHS (Viral Haemorrhagic Septicaemia) and IHN (Infectious Haematopoietic Necrosis), and the carp disease SVC (Spring Viraemia of Carp).

Imports of Koi and Goldfish from countries with a history of these diseases, as well as other cold-water species, would require licences for each consignment.

Both Ornamental Fish International (OFI) and Ornamental Fish Industry UK (OFI-UK) have been actively involved in safeguarding the interests of the industry, while recognising the need for controls based upon documented evidence to confirm the need for such controls.

According to a statement from OFI, "Within the UK itself, coldwater ornamental fish account for something like 50% of total imports (of ornamental fish) and, consequently, provide employment

for several thousand people, directly or indirectly. We feel that, in their current state, the proposals — especially with regard to single-consignment licences — could put much of the above at risk.

"Practical experiences have demonstrated that there is currently no reason for imposing a single-consignment licence requirement on such imports. Local legislation should be investigated thoroughly before any decisions to put new requirements into force are taken."

OFI (UK) chief executive Keith Davenport has been equally vehement that decisions are not taken without thorough consultation with the ornamental fish industry in the UK: "Clearly it is important to safeguard the fish health status of this country. However, it is important that real, rather than theoretical, risks are addressed and controlled and that controls put in place are truly equivalent to those operating within the EU."

He added: "In our response we have also reminded the Ministry that the Fish Health Rules in the EU apply to watersheds, rather than to whole countries, and this is an important consideration. It would be unreasonable to restrict the exports from the whole of one country, such as China, merely because of a disease recorded in one small area of that country — in this case the far north east."

The proposals are scheduled to be implemented by 1 July, and both OFI and OFI (UK) have been energetic in ensuring that all appropriate considerations are made before then, or that the implementation date is put back at least six months. Trade Talk will keep you informed of progress.

Office manager Sharon Brennan is helping with the King British Transfer Order Line, which is designed to respond to customers' "cry for help".

Explained sales director Peter Webb: "Retailers who are loyal to our products have told us that they have been having difficulty getting supplies from their wholesaler, so the King British Transfer Order Line has been launched to solve the problem."

To 'Phone Sharon', customers should dial 01274 573551.

## Cyprio filter award

Cyprio's range of planter filters received the 'Best Aquatic Product' award at this year's PetIndex, held at the NEC, Birmingham, in April.

The company's managing director Malcolm Goodson received the award and commented: "This is a great credit to all at Cyprio who have worked so hard to develop this product range."

"We wanted to broaden our base by providing a wider range of products to the pond owner and we now see the company being able to deal with pond management on a wide scale."

The planter filter incorporates a terra cotta pot as its housing, and the top can be used as a plant tray, which can be planted with marginal plants.

Cyprio Limited, Hards Road, Frolnall, Peterborough PE6 6RR. Tel: 01778 344502; Fax: 01778 348093.

## Coral Conservation in Sri Lanka

The first phase of work is under way to promote the conservation of coral reef biodiversity in Sri Lanka — particularly the promotion of sustainable use of reef fish and invertebrates. Funded by World Wide Fund for Nature (WWF), the Flora and Fauna Preservation Society (FFPS), Ornamental Fish Industry UK (OFI-UK), and Tropical Marine Centre (TMC), the work is examining current levels of trade in reef species and identifying the main conservation problems.

A follow-up phase, funded through the Darwin Initiative for the Survival of Species will concentrate upon training, education,

and long-term monitoring. The entire project involves close collaboration between Marine Conservation Society (MCS) and the National Aquatic Resources Agency (NARA) in Sri Lanka. Above all, it will involve the collectors themselves, befitting the title of the programme: Sustainable use of reef fish and invertebrates in Sri Lanka.

Coral reefs are of considerable value to the people of Sri Lanka, being a source of food and other resources, as well as having potential for tourism. Ornamental fish exports rate high in terms of value of fishery exports but, at present, collection of invertebrates is very restricted. Through the work of these collective agencies, it is hoped that the coral

reef environment will be appropriately managed and the wildlife and habitats associated with these highly diverse systems will be conserved.

For details, contact: Dr Elizabeth Wood, Coral Reef Conservation Officer, MCS, Hollybush, Chequers Lane, Eversley, Hants RG27 0NY. Tel/fax: 01734 734127.

## "Phone Sharon"

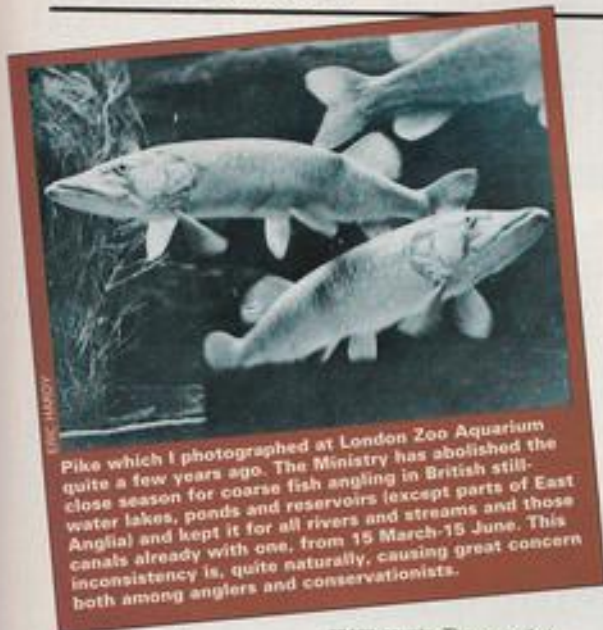
Retailers experiencing difficulties in placing orders for King British products are being advised to 'Phone Sharon' in a new campaign launched by the company.





# NATURALIST'S NOTEBOOK

BY ERIC HARDY



Pike which I photographed at London Zoo Aquarium quite a few years ago. The Ministry has abolished the close season for coarse fish angling in British still-water lakes, ponds and reservoirs (except parts of East Anglia) and kept it for all rivers and streams and those canals already with one, from 15 March-15 June. This inconsistency is, quite naturally, causing great concern both among anglers and conservationists.

## Hyacinth moth control

Water Hyacinth is grown easily in garden ponds and is sometimes found in the wild, flowering into December in the St Helens "Hoties".

In warmer climes, however, it is a botanical disaster. In Australia, government scientists are following up US research by continuing to probe the value of a moth, *Acigona infusella*, to control this plant-pest, under glasshouse and field conditions.

Work in the US showed *Acigona* to be a valuable control of Pickerel Weed, a close relative of Water Hawthorn. Specimens are therefore being reared and released on plant colonies.

## Lea sex changes

A group of toxic chemicals is believed to be causing feminisation in fish in certain British waters and may be linked to falling

sperm counts. They are alkyl phenol ethoxylates (APEs) and alkyl phenols, used in industrial detergents, breaking down into products resembling female sex hormone oestradiol.

In some rivers like the Lea, they have caused serious reproductive disorders of male fish, including testicular cancer and feminisation of males. These pollutants are concentrated in fish, birds and *Daphnia*.

Male Rainbow Trout introduced into rivers with sewage inflows, like the Lea, start to produce female egg-yolk protein. But it has not been established if tumours and other growths on Barbel in the Lea are linked.

## Declining British diversity

Half-a-dozen national conservation bodies united in researching a recent report for conservation of the biodiversity of Britain's fauna and flora.

Among 88,000 terrestrial species and an unknown number

of marine fauna and flora, Britain has 38 fishes, but no certain breeding places of Allis Shad, 6 amphibians, 6 reptiles, 20,000 algae and as many protozoans. Living only in the UK is Ivel's Sea Anemone (last seen in 1983), the crustacean *Alphurpelus gehnnier* and 14 mosses. We have 20% of the world's Shetland Pondweed (*Potamogeton rutilus*) and of Floating Water Plantation.

Water Voles have declined by

70% this century, while only two populations of Vendace (white fish) remain in Cumbria. Only 17 individuals of the water beetle *Graphoderus zonatus* were found in 1993. The Burbot hasn't been found since the late 1970s, and the Opossum Shrimp since the 1950s.

In the UK, *Prostoma jenningsi*, a Nemertean worm, was last known in 1978 in a Lancashire pond, since filled in. There are now only about 20 known sites of the Medicinal Leech.

The only British record of Steven's Goby is in Plymouth Sound. Only five populations of Pollan are in Loughs Neagh and Erne.

On the brighter side, plans are being discussed to restore some lost haunts and maintain precarious existing ones.

## Nature Notes

**1** Adders tend to favour Welsh moors inclined towards the warming sun and may be absent from adjacent moors facing away. Adders have recently been confirmed at Gors Maen Llwyd and Cors Goch reserves in North Wales. They are sometimes the prey of increasing buzzards. Another increasing predator, the mink, seems to be responsible for declining river bank Water Voles.

**2** An albino sea-urchin, a "Scaddinan's Head", was found recently in St Magnus Bay, Shetlands . . . and released again. Albino lobsters are occasionally found in British seas, while albino flatfish are more occasionally caught.

**3** Most snakes have one lung, the left being rudimentary, but Harvard University biologists recently described an underground "blind" snake (Typhlopidae) which developed a left lung.

**4** University of North Carolina biologists have shown hatchling Loggerhead Turtles have a magnetic directional preference. Others showed they detect latitude by the inclination of the magnetic angle. Hatchlings are also shown to detect wave cues to latitude.

**5** Food has been shown to be the source of alkaloids in the skin of poisonous Dart-frogs, *Dendrobates*, while background brightness causes colour changes in Green Tree-frogs.

**6** Cave Salamanders are colonising abandoned coal mines in West Virginia. Introduced geckos are doing the same in homes in the Galapagos towns of Santa Cruz, San Cristobal and Isabella.

**7** A cloth placed over a snake subdues it for photography.



Most snakes (this is a Grass Snake) are single-lunged . . . but there are exceptions. (See Nature Note No 3).



# NEWSDESK

## Tetra at Hampton

Tetra's appearances at the Hampton Court Flower Show always create a splash, whether it's because of visits by mermaids, Miss Hawaiian Tropic, or celebrities dropping in.

This year, the Tetra stand will focus on a collection of high-quality large Koi, some of which are previous Japanese show winners. A competition will be running for the duration of the show, in which visitors will be invited to guess the total value of the champion Koi (supplied by Koi Water Barn in Kent). Over £1,000 worth of prizes will be on offer throughout the week, which means that 20 prizes per day can be won!

Guessing the value of these Koi will prove more tricky than it may seem, though. Remember that a single superb specimen was recently valued at around £65,000! Tetra won't have this one in their pond, but fish valued at over £1,000 may be on view.

A team of experts will be on hand throughout the week to answer any pond, Koi or general fishkeeping queries and, as ever, the stand will be laden with specialist products and information for enthusiasts or less practised fish fans.

To enter the competition, all you'll need to do is fill in a card and post it in the box at the Tetra stand within the Aquatics Village. The winners will be announced at the end of each day throughout the show, so go along and try to catch one of the specified feeding times.

## Coral reefs at Bristol and Baltimore



NAIB's coral reef exhibit.

An Atlantic/Caribbean coral reef exhibit has been launched at the World of Water in Bristol Zoo Gardens. The launch co-incident with a similar event at the National Aquarium in Baltimore (NAIB), Maryland, USA, which was attended by Paul Davies, managing director of Coral Reef Technology and Colin Grist, senior aquarist at the World of Water, Bristol Zoo Gardens, who were invited to attend the proceedings by Dr Chris Andrews, Senior Director of Biological Programs at NAIB.

Centrepiece of the Baltimore display — an Atlantic coral reef — is a 335,000-gallon doughnut-shaped tank, constructed with 14,000 square feet of fabricated

reef structures, which necessitated the removal of the roof in order to lower sections into place.

Careful research on the reefs of the Florida Keys and tests with colours have resulted in a reef display which is as authentic as possible. Visitors, accompanied by specially-commissioned music, start at the top and look down onto the surface of the water as if from the sun-deck of an ocean liner.

A series of ramps then enable the reef to be viewed at different depths until the Open Ocean Exhibit is reached. This is a further doughnut-shaped tank directly beneath the coral reef exhibit, which contains large sharks, as well as a Small-tooth Sawfish, and incorporates flashing lights to create a fantastic

## Tetra helping Kenyan coral

Testing kits produced and donated by Tetra are being used as part of the Kenya Coral Reef Conservation Project, which has already resulted in water quality improvements at Kisite Marine Park at Shimoni.

According to Tetra, the use of the company's kits revealed anomalies in water quality and this had led to major research into the sources of pollution at the marine parks. The recommendations prompted by the tests have been acted upon by the Kenya Wildlife Service, and feedback provided by the kits will be incorporated into establishing environmental monitoring stations around Kenyan coral reefs. These, explained Tetra, will have the specific aim of monitoring water quality in terms of nitrates, nitrites, pH levels, oxygen content and water hardness.

"The extremely fragile nature of a coral reef system leaves little or no margin for error," said Dr David Pool of Tetra. "The sensitivity of our test kits allows detailed information about the effects of pollution to be gained before they can threaten the delicate ecosystem."

The next stage of the project is based around Mombasa Marine Park and includes training a team of marine park wardens in water quality monitoring. Tetra's hope is that similar successes may be achieved throughout the entire region.



Tetra test kits are helping to conserve corals in Kenya.

## Dazzling Hampton show

No fewer than 25 show gardens will be on display at this year's Hampton Court Palace Flower Show (5-9 July).

Among the designs is the use of topiary rising from an ornamental pool as part of the BBC Radio Four/Radio Times 'Theatre in the Garden'. The garden is in two circular parts, one with a small tiered amphitheatre, the other with a knot garden and a circular pool housing waterproof boxes in which the topiary is planted.

Hampton Court Palace Flower Show is open to the public from Wednesday 5 July to Sunday 9 July between 10am and 7.30pm (5.30pm on Sunday). Admission is £14 for adults (£11 for RHS members), £5 after 3pm (£7 for RHS members), £4 for children aged 5-15.

Tickets can be booked in advance on 0171 344 4444 (public) and 0171 344 9966 (RHS members). A £2 rail voucher is given with every ticket sold in advance.

visual display whenever the sharks feed.

Part of the presentations include a series of addresses collectively entitled Reef Brief, with the aim of highlighting conservation problems on coral reefs and to announce the launch of Project Reef Action to raise public awareness and help to raise funds for reef conservation. NAIB is working closely with Rescue the Reef, an initiative of The Nature Conservancy Council.

One of the largest displays of its type in the UK is the coral reef exhibit at Bristol Zoo Gardens. The ten-foot deep reef structure is housed in a 10,000-gallon aquarium which, itself, is 15 feet in depth and is viewed through a glass tunnel. Collection of the fish on display was sponsored by Coral Reef Technology, enabling Colin Grist to travel to Florida Keys

to be involved with collecting the first batch of specimens.

The exhibit at Bristol Zoo Gardens will have a similar impact as that at NAIB in terms of raising awareness in reef conservation matters. The exhibit has been linked to the work of Coral Cay Conservation in Belize, Reef Relief in the Florida Keys, as well as Project Reef Action. A large invertebrate exhibit is also planned at Bristol Zoo Gardens, while further planned exhibitions are planned to highlight the Reef and Rainforest Project and their plans for Danjogen Island in the Philippines.

All these projects will be featured in special educational displays during two of Bristol Zoo Gardens summer theme weeks: Conservation Week — 31 July-6 August, and Underwater Week — 7-13 August.





the Japanese use their technical skills not to reproduce the natural habitats, but for visitors to have fun with the fishes.

There is, for instance a fish circus where the fish swim through pipes and play with floating balls. Some aquaria are shaped like cocktail glasses or are as tiny as a postcard. Others have a diamond cut glass front to give a kaleidoscope view of the fish; one has a movie screen behind the tank so you view the screen through the aquarium.

fishes are present. In other popular displays, the times of feeding Archermishes are listed and their food is mounted on a target over the tank, so the fish have to hit the bulls-eye for a meal.

The aquarium shown in Figure 2 houses shoaling species and visitors are invited to press a button that starts a motor drive. This operates an endless belt sited behind the aquarium. The belt has black stripes and the fish see these moving and think it is the water. Therefore, they start swimming against the supposed flow in a shoal. A time switch turns the motor off and the belt stops, whereupon all the fish break up and swim randomly again.

In the aquarium depicted in Figure 3 are Blind Cavefishes (*Astyanax mexicanus*). The sign states that they are blind and it invites visitors to rotate the handle in front of the tank, which operates a chain drive that moves chromium-plated bars across the inside of the tank. This, the sign claims, will trap the blind fish!

When the handle is rotated — usually as rapidly as possible by crowds of excited Japanese — the bars move across, but the *Astyanax* with their inbuilt radar, sense the bars coming and deftly swim through to escape. I know they were supposed to do this, but I couldn't help feeling pleased that the fish had apparently beaten Japanese technology!

## High-rise Japanese fishy jokes

As Aquarian's **Dr David Ford** discovered in Tokyo, technology and humour live comfortably together when it comes to displaying fish in unusual ways in public aquaria



Figure 1 shows the Coral Reef aquarium, designed with typical ingenuity. You stand over the double-decker aquarium for a bird's eye view of the coral fishes. The two-tier arrangement is designed so that the predators and their victims are present, but separated!

The most popular features in the aquarium are the tanks where visitors can interact with the fish. There are, for example, Rockfishes in rocky displays and you have to guess how many



Despite the quite awesome technology behind every Japanese project, they retain a sense of fun about it all. For example, Tokyo's national aquarium is called The Sunshine International Aquarium and they build it on the 11th floor of what was at the time the tallest building in the city ... the world's first high-rise public aquarium.

400 tons of water are housed in

nearly 50 tanks, all 140 metres above sea-level, and designed to be earthquake-proof! It is in Sunshine City, a complex of flats, shops and facilities designed to be a 'city within a city' in the Ikebukuro area of Tokyo.

There are the usual 'famous rivers' displays with fish from the Amazon to the Nile. There was even a Loch Ness fishes display the last time I visited. However,





# DISCUSSIONS

BY STEVE DUDLEY

## Tank-bred needs

In the wild, Discus mainly frequent very soft water. They will find it quite difficult to find sufficient food to survive, though, as more often than not, the pH of the water is very low. Many will forage and graze on vegetation and fruit that fall into the water, with the occasional insect or worm that may pass by.

Armed with this knowledge, it would be unwise to keep captive wild fish in a tankful of our tapwater, which will be totally different to that which they are used to, without some kind of upset to the fish.

Most beginners have this in mind from the outset, but, often, they make the mistake of using chemicals to lower the pH and keep the temperature too low. This is where the 'fun' begins and confuses the issues of Discus keeping.

All the water make-up information in older books is associated with wild fish that require lower temperatures and pH than their cultivated counterparts. Tank-bred varieties have never seen a piece of bog-wood, nor have they been used to swimming around in tanks of tea-coloured water, or have probably never been subjected to an 'Arctic' temperature of 75°F (24°C). No wonder so many give up before they have managed to get started!

Many tank-bred fish favour a pH 6.5-7.5 regime with temperatures between 82-86°F (28-30°F). Water hardness is not too critical for just keeping. For breeding though, it is most important to have lower-conductivity water.

## Plague update

After the onset of this disease early last year, it appears not to be too much of a problem at the moment. Most keepers (including myself) have been through this traumatic experience, while those that haven't, will.

Those who have been affected won't get it again... that's until some other mutation occurs. We will then have the Plague with us all over again, so be careful.

## Good v bad parents

Some Discus are just not destined to raise a brood of youngsters. They can be the best-coloured, best-shaped fish in the world, but they make terrible parents.

Why is it always the best lookers which turn out to be sub-standard parents? Well, I have no answer, but I have found the good all-round breeding fish to be mediocre-sized, with the exception of a few good, large breeding pairs that do the business.

Normally, larger fish — especially when around three years of age — are not as enthusiastic about reproducing as younger pairs, although males appear to be a little more interested than females at an older age.

There have been times when I have grown on exceptional looking fish and have not allowed them to spawn by keeping quite a few of them in one tank. When the time has come to introduce them into a spawning tank at the age of 18 months, they just haven't wanted to know.

So there they were: two spectacular fish ready for breeding and the males just sitting and watching or (if they spawned) eating their eggs.

However, in some cases, such fish do — eventually — decide to partake and do have a brood, but not as often as one would like them to do.

## Over-enthusiasm

If for some reason, they manage to spawn successfully but fail when it comes to the hatching to wriggling stage, it is possible to transfer the hatchlings to over-keen brooding parents.

These enthusiastic fish are Discus that like to be sure not to have any white eggs on their spawning site and remove them, eventually damaging their good eggs as well! These fish will look after another pair's spawn without any problems and will, no doubt, make excellent parents given the chance, by some kind of human intervention.

At present, I have a Red Turquoise male that will foster any fry that are put in his tank as if they were his own. So, some fish are, for more than one reason or another, better suited to be breeders than others.



BILLY WHITESIDE

Sometimes it's not the best coloured specimens that make the best parents.

## Safe copepod/planaria control

For years, these small natural aquatic creatures have infested my breeding tanks and, in the early days, caused great losses of day-old free-swimming Discus fry.

I now use a mechanical way to tackle these tiny creatures because I feel that no medication will keep them in check without, at the same time, affecting the fish themselves.

The safest way I know to keep the populations of copepods and planaria down is to use a diatom filter. These filters are handy gadgets that will sieve out all debris down to one micron. I generally use these ingenious appliances just before eggs are due to hatch. I use the filters before fry hatch so that they (the fry) do not become entrapped within the filters.

Here's what you do:  
**1** Carefully wipe all sides and base of aquarium and don't forget to do the corners as well; this is where planaria seem to congregate.

**2** Switch on the diatom filter.

**3** After one hour, you will see the difference and you may well have provided a much safer environment for your precious fry.

I must add that a greater population of copepods and planaria appear just at the hatching stage of Discus eggs. This is probably

due to the shedding of potential 'food' in the form of mucus secreted by the parent fish.

## Phoenix update

I have now used Phoenix 2,000 for most of my Discus for about a year and have obtained remarkable results.

At first, I fed my larger stock on the pelleted beefheart and, within one week, 80% of the stock were thoroughly enjoying it. This was a godsend to me as it released time which I had formerly had to set aside for preparing the beefheart mix.

Colour and condition of the food remained unaffected, but what was very noticeable was an improvement in water quality, which resulted in fewer water changes.

After about six months, my breeders were also flourishing, producing larger broods with fewer deformities. Certain disorders have also decreased, most noticeably swimbladder and 'bloat' problems.

I can't say at this stage if the colour of my adult fish has been improved or that the overall appearance of the fish has been enhanced, but I'm still hugely impressed with the overall results. Even so, as a Discus specialist, I still like to bring some variety to the diet and therefore still use whiteworm, spinach and other treats.



## New German varieties

I see there are a few more varieties around from breeders in Germany. A German associate of mine who deals mainly in Japan, kindly sent me his new catalogue with some nice specimens.

**1** German Wonder — quite similar to the Cobra Discus of Malaysia, with excellent markings and red spots.

**2** Blue Phantasia — sky-blue overall, with red veiled fins and red spots.

**3** Blue Crystal — the entire body solid in colour.

**4** Green Smaragd — solid-green (the entire body).

**5** Rio Purus (Red-Spotted Line) — similar to Red Turks, with amber chest and spotted red in between

turquoise striations (these are my favourites).

A few of the new German varieties (photograph reproduced by kind courtesy of Discus International).



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# FROGS AND FRIENDS



## Europe to the rescue

Ponds are very much in the news this year, which can only be good for amphibians and other wildlife. In February 1995 a £1.1 million project, funded partly by the EC, was launched to save some of our vanishing ponds, which for many years have been filled in or otherwise destroyed — a process which the initiative **Pond Life Project**, is aimed at stemming. It is based at John Moore's University, Liverpool, under the direction of Dr. Andrew Hull.

Estimates put the number of ponds surviving in England and Wales at just under 300,000, some 182,000 having disappeared since World War II. Although some plants and animals are protected under the Wildlife and Countryside Act, the ponds themselves may not be so. A report in the Young Telegraph Magazine claimed that some 200 Sites of Special Scientific Interest (which are supposedly protected) are damaged or destroyed every year!

The Pond Life Project, which will last four years, is basically a regional initiative, mainly in the North West (Lancashire and Cheshire), which, it is hoped, will have applications elsewhere in the UK and in similar European locations.

A number of Councils and other bodies, including three from Belgium, Denmark and The Netherlands are involved, but local community involvement is to be sought to collect necessary information and to provide local assistance in restoring and managing ponds and landscape. A local Pond Warden Scheme will be organised by four Pond Community Officers based at the Wildlife Trusts in Lancashire and Cheshire and two European locations.

Lancashire and Cheshire are fortunate in still having a substantial number of ponds, due to less intensive farming, but even so, their number has been declining and detailed information is lacking.

The primary need in the project is for the collection of information which will be programmed into the Pond Information Network (PIN) so as to be readily available to those involved. Members of the PIN will be offered training in survey skills, data collection and interpretation. Further infor-

mation is obtainable from 'Pond Life Project', John Moore's University, 15-21 Webster St., Liverpool, L3 2ET.

## Easy imports

The Green Anole (*Anolis carolinensis*) has been imported in substantial numbers for many years and it is often regarded as a 'Beginner's Lizard'.

Although relatively cheap, they make easy and interesting vivarium subjects. Males are larger, have a swelling at the base of the tail and enlarged post-anal scales and will display the pinkish throat sac.

Often called American Chameleons, they are able to change colour from light straw through varying shades of green and brown to almost black. They

trum fluorescent tube is recommended. A heater of appropriate wattage can be used for night-time heating. Adequate ventilation is also needed.

Anoles will thrive on the usual insect fare, which can be dusted with a multivitamin/calcium supplement three times weekly. Specimens we have kept had a sweet tooth and would often lick sweet fruit, sugar cubes, crystallised honey etc.

In a large vivarium, Anoles can be kept in groups, but males are very territorial; this could cause problems in a confined space where more than one male is kept. Breeding can extend over 4/5 months, one or two eggs being laid, usually hidden in damp substrate about two weeks after mating. Incubated at 30°C (86°F) they will hatch after 45/50 days; the hatchlings are 6cm (2.4in) approx.



Male Green Anole

also possess the ability to run on very smooth surfaces.

A tall vivarium with living plants and a framework of dead branches is ideal — it can be kept slightly humid (not sodden). A light, daily spraying is needed as these lizards usually lap from bowls, rather than a drinking bowl.

Daytime temperatures range from 23°C to 30°C (73-86°F), dropping to 18°-20°C (64-68°F) at night. Heating can be supplied by means of a thermostatically controlled spot lamp. Since Anoles are diurnal, a full-spec-

## Predatory newt

**Frogs and Friends** (February 1995) mentioned predators on tadpoles.

Aquarist and Pondkeeper reader **Paul Hudson** in Cumbria reported seeing, while carrying out nocturnal 'foraging', a Smooth Newt eating frogspawn. The newt butted its way into the jelly and neatly extracted the eggs. This occurred early in the year when there was possibly little else in the way of food for the newt.

## ON TV

The programme **Animal Detectives** (Granada TV 30 March) contained some horrendous scenes of the treatment of marine turtles and painted a bleak picture as to the survival of these endangered animals. Although, in theory, they are a protected species, the law is apparently openly flouted, especially in the sale of Tortoiseshell.

In December 1992 the Japanese tortoiseshell industry was hard hit by a ban on the importation of Hawksbill Turtle (*Eretmochelys imbricata*) shell, which provides the tortoiseshell. TRAFIC Bulletin (May 1994) reported that Japanese scientists are developing a synthetic tortoiseshell by dissolving sheets of silk in concentrated calcium chloride. This provides thin sheets which can then be laminated to the necessary thickness.

Hopefully, it will be a satisfactory substitute and cheap enough to replace tortoiseshell, or will there always be people who want the real thing? It was estimated that the product would be ready in two years time — for the turtles it can't come soon enough. However, this will have no effect on the use of turtles and their eggs as food, which plays a major part in the continuing decline.

## BHS news

Earlier this year the **British Herpetological Society** introduced a new feature for members in the form of a monthly newsletter which contains details of meetings, short articles, snippets of information etc.

Many members feel this is a useful supplement to the quarterly bulletin, since it is now easier to advertise sales, wants, exchanges etc. and the society does not seem quite as remote.

For membership details write to:-

BHS c/o Zoological Society of London, Regent's Park, London, NW1 4RY.





Barrel Skinks (*Chalcides sepsoides*) showing normal and regrown tails.

BOB & WAJ OWEN

## HERP FACT

Many reptiles have developed unusual methods of protection. One of the best known is autotomy or tail-shedding in certain, but not all, lizards. The vertebrae have one or more special joints (fracture planes) which break when the tail is seized by an attacker.

In some Gecko species autotomy is preceded by tail waving, possibly to attract the attacker's attention towards this less vulnerable part. The would-be predator is left with a wriggling morsel and the lizard regrows its tail. Sometimes, two or three are grown. The new tail does not have fracture planes and so cannot be shed.

Since tails are useful to their owners — they assist in balance, defence, climbing, fat storage, swimming, courtship, mating and so on — there may be a price to pay, i.e. in the temporary loss of these faculties. Certain lizards, such as Green Iguanas, are reluctant to shed the tail because of its usefulness, even though they possess the ability to do so.

Autotomy does not occur in Chameleons — they have a prehensile tail which functions as a fifth limb and is too important to be lost. It is doubtful if they would survive without it. Other lizard families in which autotomy is absent are the Bearded Lizards (*Molochina*), Monitors (*Varanidae*) and the Bornean Earless Lizard (*Lanthanotus*).

Autotomy occurs in certain Lungless Salamanders (*Plethodon*) and the Sand Snakes (*Psemmophis* spp) of South Africa. If caught by the tail, are reported to spin wildly until the rear portion breaks off. As with lizards, the tail is then regrown, but is usually shorter than the original. This latter case may not be true autotomy.

## CONSERVATION CORNER Madagascar

Madagascar, with its unique fauna, has already had much of its forest destroyed and now, a further threat is looming. Proposals to start mining for amethyst (used to produce a whiteniser for paper and toothpaste) which will cause further destruction, was reported in the national press recently.

The exact extent of the mining has not yet been determined, but it is thought that it would destroy 65% of Madagascar's coastal forest. No complete survey of the proposed area's wildlife has been published, so it is unclear which species will be affected. However the habitat concerned is unique, so its inhabitants would probably find it difficult to move out and adapt to other areas.

Some of Madagascar's reptiles and amphibians are not protected by CITES and habitat loss, plus high levels of exports of certain species, have given rise to concern. Some eighteen species of Day Gecko (*Phelsuma*), although on CITES Appendix II, are now banned from entering the EU.

They are mostly little-known species with limited distribution, and most have not been imported into Britain, two exceptions being *P. pusilla* and the Banded Day Gecko, *P. standingi*. These two were imported in relatively small numbers and a few keepers are having some success in breeding them.

The latter is a large, attractive tree-dwelling species with a limited distribution in semi-desert and dry forest regions and was much in demand internationally. This demand caused concern in the zoological community over the depletion of the wild population. To try to avoid this, a National stud book has been set up for this species — it is held at Edinburgh Zoo.



BOB & WAJ OWEN

A pair of Banded Day Geckos.

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## 'Wet fish' at Dunstable

Over 35 feet of aquarium space has been made available for hobbyist-bred fish and surplus stock at this year's European Aquatic Fair (EAF) at The Queensway Halls, Dunstable (1-2 July).

Organiser Malcolm Goss explained that many community fish, as well as specialist fish, Rift valley cichlids, cichlids, livebearers and kribia, will be on display, and that Derek Lambert will be staging his own 'Wet Fish' stand with many rare species being, not only seen, but also available on sale for the first time, while Chester Zoo has also promised surplus fish from their breeding programme.

Added Malcolm, "Pond Warehouse from Hemel Hempstead will supply all the needs of the water gardener and Interpet will be exhibiting for the first time and presenting the Interpet/AAP Challenge Trophy at EAF. Also a first time exhibitor is Aquadome, while Aquarist will be displaying their 20th anniversary exhibition with added displays by Chester Zoo."

He continued, "Those who look for displays of furnished aquaria and those who wish to see set-up perfection in design, must not miss the ones, sponsored by Tetra, while an instant colouring competition has been sponsored by The Early Learning Centre."

Malcolm added that, among the further attractions are a fossil island, aquarium cabinets in acid wood complemented by a shell of Tintin Barts, a display of Borneo, a 'Questions and Answers' booth manned by the Association of Aquarists, and a display of reptiles from Chiltern Herpetological Group, together with Whiparade Zoo.

Heading the list of speakers at the show is ASP editor John Dawes with his new format and irresistible Dragon Fish feature accompanied by a special film about captive breeding of Dragon Fish in Singapore. Also speaking are Brian Walsh, Dr David Sands, Ann Telford and Dr David Fox.

For details, contact Malcolm Goss, 01523 211811 (daytime), 01494 722786 (evenings) or Elaine Dean, 01734 701461.

## New marine club

A new club has been formed for marine hobbyists in and around Lancashire. Lancaster Marine and Reef Club meets on the first Wednesday of each month (8.15pm) at the Royal Chequers Restaurant, Quinlan Place, LA5.

Membership rates are available from club organisers, Russell Thorpe, Tel: 01716 233 9000, Fax: 01716 233 9000.

## 40 for Dunstable

With a membership in excess of 40, Dunstable and District AS has been in existence for over 40 years, and meets on the second Wednesday of every month (8.30pm) at Queensway Hall, Dunstable.

The society plans to hold an Open Show in September. For details of the club and membership, contact Don Sheat, 33 Rudge Close, Luton, Bedfordshire LU4 9XD. Tel: 01562 903364.

# SOCIETY WORLD



## FBAS NEWS

### 1 Gold pin award

Andrew Bartyla, managing director of aquatics manufacturer Rolf C. Hagen, is pictured (right) receiving an FBAS gold pin from Joe Nethersell the former Chairman of the FBAS (now its Vice-President) in recognition of his company's help and generous support to fishkeeping clubs and societies over many years.

Among the items which the company has provided are power-heads, Open Show packs, society packs, t-shirts, the Hagen Helpline, and sponsorship of this year's Supreme Festival of Fishkeeping (3-5 November) Sand Bay Holiday Village, Weston-super-Mare, Avon.

In addition, Hagen will be providing a voucher to the value of £2.00 to all adult paying residents, as well as many more gifts.

For information about the event,

contact: Colin Richards, Beechwood Cottage, 234 Chartridge Lane, Chesham, Bucks HP8 2SQ, or by telephoning 01494 773094.

### 2 Supreme Competition

With the Supreme Festival of Fishkeeping only a few months away, the FBAS has added a further attraction to the event.

The Supreme Society Competition has been designed so that the whole spectrum of fishkeeping can be reflected in displays put on by societies. Each display is to be mounted on an eight-foot long table top and must include items for a ladies section, junior section, breeders' section, furnished tank and a theme area.

Details and rules are available from: Supreme Society Competition, The Orchard, Galcombe, Isle of Wight PO30 5EF.

Alabama 36541, USA. Tel/fax: 334-665 6967; Internet: Ellassoma @cris.com, Compuserve: 75135, 1321.

## New Oscar club

A national club for people interested in Oscars has been formed to provide a national register, a helpline and a quarterly newsletter. The National Oscar Club has stemmed from the enthusiasm of Oscar-keeper Steve Bell, from Portsmouth. Steve has produced a video about keeping and breeding Oscars and has received so much interest from around the country, that he has decided to form a national resource.

All members will receive a manuscript covering all aspects of keeping and breeding Oscars, as well as a club badge, keyring, and a quarterly newsletter. "This will be full of articles and stories about Oscars and other oddball fish kept with Oscars, a problem page, and a 'for sale' section," explained Steve.

A national register will also be set up to enable members to be put in touch with each other while, on a more local basis, members will be able to swap fish to enable people to breed their Oscars.

For information, contact Steve Bell, 81 Havant Road, Portsmouth PO2 6BP. Tel: 01705 662775/670920.

## N.E. Cichlid Group

Cichlid enthusiast Jeff Challands informs us of the launch of a group in the north-east, for all aquarists interested in cichlids. The North-East Cichlid Group is affiliated into the British Cichlid Association and meets at 7.30pm on the last Friday of each month at The Community Centre, The Broadway, Bilingham, Cleveland.

Secretary of the NECG is Chris Marshall, 6 Tenby Walk, Hartlepool, Cleveland TS26 0TG. Tel: 01429 860579.

## Reptile first

An aquaria competition, guest speakers, and trade stands form what is believed to be the first sponsored reptile fair — Reptile Index — in the UK. The event takes place at The Connection, Leamington Road, Ryton-in-Quarriers, Coventry on Sunday 13 August and covers four halls.

Entry is only £2.50 for adults and £1.50 concessions. For details, contact: Godiva Enterprises, c/o 8 Holbrooks Lane, Coventry CV5 4AD. Tel/fax: 01203 581812.

## ACN Affiliate Program

The Aquatic Conservation Network (ACN) has launched an Affiliate Club Program for amateur aquarists throughout the world.

Within a few months of its inception, the programme is reported to have attracted 11 affiliates from as far afield as Australia, France, the UK and the USA. According to ACN, the scheme is designed to instil a sense of stewardship into fishkeeping and to encourage proper and optimum care of aquarium fish, as well as to intensify the focus on the conservation of aquatic biodiversity and to foster initiatives aimed at the prevention of extinction of freshwater fish species.

For details, contact: Rodney W. Harper, Affiliate Club Liaison, Aquatic Conservation Network, 11450 Box Road Ext., Grand Bay,

## DIARY DATES

Sunday 2  
Scarborough & DAS — 20th Annual Open Show, Frangis County Primary School, Scarborough. Bidding: 11.30am-1.30pm. Auction: 1pm prompt. Details: G. Howkaby. Tel: 01723 862205.

Saturday 8  
Port Talbot & DAS — 25th Open Show, Talbach Youth Centre, Auction: 1pm. Details: Mr D. Childs. Tel: 01639 898623.

Sunday 18  
Ostham & DAS — Open Show, New venue: St Pansy School, Ab Lane, Ostham. Details: Arnold Chadwick. Tel: 0181 652 6207.

Sunday 22  
DASB — Auction, Thompson Park

Community Centre, Monkwearmouth, Sunderland. Details: Mrs A. M. Banks, 122 Moor Crescent, Gilegate Moor, Durham DH1 1DL. Tel: 0191 364 1433.

Sunday 30  
Association of Midland Goldfish Keepers — Meeting and Pretty Fish Show (members only), Forest Community Centre, Fossehill Road, Coventry (2pm). Details: Mrs Anne Bloor, 10 Barnett Crescent, Woodford Hayes, Daventry, Northants NN11 3SP. Tel: 01327 81138.

Sandgrounders AS — 25th Annual Open Show, Meigs Cop School, Meigs Cop Road, Southport. Details: R. CBE, Secretary, 13 Lancaster Drive, Banks, Southport, Lancashire PR9 8AE.