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The Better Fishkeeping Magazine

INSIDE
TETRA COMPETITION
PLUS
FOCUS ON ... TROPICAL BREEDING

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CONTENTS

FEATURES

FOCUS: The Breeding Truth

Linda Lewis has a few well founded admissions to make 49

Koi Over The World — Pt 2

Barry Goodwin concludes with a comparative technical round-up 54

The A&P Costa Rica Quest

Derek Lambert with more Central American marvels 61

The Only Good Fish is a Dead One

Dr Keith Bannister is only joking but there is a serious side 66

COVER

We can all dream, can't we? Many congratulations if your pond was like this during this summer. If not, then take note of our autumn pond care article and perhaps it will be next year.

PHOTOGRAPH BY DAVE BEVAN

REGULARS

COMMENT

Name that Fish! It sounds like a new TV panel game, doesn't it? Well, it is certainly a bag of tricks or a tantalising puzzle to be sorted before you get the correct answer.

The problem is further compounded when all those alternative popular (or commercially-created) names are involved, so it's probably best — in the absence of a worldwide, multi-lingual, instantly-available database — to stick with the good old standby used by ichthyologists.

If you think today's popular names can be a little over-imaginative then, before you read 'Fifty Years Ago' try to imagine what fish the Malayan Airship Fish might be!

Readers will have been given a first hand experience of the establishment of new species through Steve Grant's article in the January and March 1998 issues of A&P which brought home to us armchair experts just how involved and drawn-out the process can be.

Obviously prompted by these articles the question was raised in our July issue whether more modern techniques such as using DNA samples and computer technology could rescue the situation and make it more fool-proof (or maybe even quicker).

Quick to respond to any readership reaction, and acting on the principle of 'we know a man who does', we immediately sought out a highly qualified person to delve into this area for us and, in this issue, we are fortunate to have a blend (if the author won't object to being so classified) of both areas, longstanding tradition coupled with modern know-how — yes, he's just got a computer!

The result is a highly-entertaining and informative account as to how the process works. If you thought the taxonomic side of fishkeeping was as dull as ditchwater (okay, okay, I know ditchwater can be just as interesting as any other body of water) then you'll be pleasantly surprised.

Despite looking forward and taking every advantage of today's technology (probably out of date by the time you read this) there is also room to apply yesteryear's experiences; High-, Low- or No-Tech Goldfish keeping makes an thought-provoking article, proving that there's room for almost every level of technology where fishkeeping is concerned — which brings us back to 'Fifty Years Ago' once more.

EDITOR

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Dave Garratt takes you into the Lion's Den!

Lionfish

Pterois volitans, drifting along stalking a meal!

PHOTOGRAPH: GORDON WIGENS

Lionfish frequently attract the attention of both aquarists and casual customers alike when on display at the local retailers. They have a spectacular, or even bizarre, appearance that rarely fails to impress. Whilst the name Lionfish predominates they are also known by many widely differing popular names, for example, Turkeyfish, Butterfly Cod, Scorpion fish, Fu Manchu and Zebrafish.

The common name that for me typifies their explosive arrangement of colour and fins is the one often used to describe *Pterois radiata*, ie, The Fireworks Fish.

P. radiata probably shows the fin extension better than other species but all Lionfish have these extended fin rays, many with decorative inter-connecting skin between them.

> Lionfish are natural predators, suitably equipped with sizeable mouths enabling them to engulf prey in one swallow

The common name of Scorpion fish gives a big clue to a major characteristic of these fish — their ability to deliver a potent shot of venom from special hollow fin rays.

A big mouthed predator!

Lionfish are natural predators, suitably equipped with sizeable mouths enabling them to engulf prey in one swallow. Lionfish hunt by gently drifting through the water with their fins extended but whether this an active or a passive form of hunting depends on who you read.

Some authorities say they drift, resembling a piece of floating vegetation, towards their unsuspecting prey. Others suggest they actively herd their prey towards a suitable striking position using their outstretched fins. Either way the outcome is the same, a lightning fast strike that engulfs the

prey in one mouthful.

When choosing suitable tank mates remember the formidable size of the mouth and keep to tank mates at least half the size of your Lionfish. Do not overlook the fact that even a small 4in specimen is going to have a disproportionately large mouth and will probably be quite capable of consuming a 2in Damsel for dinner.

Words of warning

Lionfish are beautiful, fairly gentle, non aggressive, hardy in captivity and fairly easy to feed. From this description they sound like an ideal beginner's fish. However, they do come with a couple of inherent problems.

The first problem, whilst not quite a sting in the tail, is a sting from the fin rays.

The second hurdle to overcome concerns the fact that it may not always be easy to wean them off live food.

The sting

Do not underestimate the power of the venom released, the seriousness of a sting, or the almost unbearable pain. The venom is delivered via dorsal, pelvic and/or anal, elongated spines. The spine enters the victims body, a sheath shrouding the spine is pushed back and venom is released into the victim's tissues.

The topic of Lionfish envenomation (and other fish of the Scorpaenidae family) will be covered in more detail in an article appearing in next month's issue.

Take particular care when working in the tank and always use tongs to feed your charges. If you are stung the crucial first aid treatment is to flush the area with water as hot as you can bear (but without adding to the problem by causing scalds) as soon as possible after the stinging incident.

The heat will help to denature the venom thus helping to prevent further absorption into your system. A trip to the hospital is to be recommended as they may want to give antibiotics to help prevent any infection developing in the wound.

Most healthy adults will not come to any long term harm, although full recovery of the affected area may take many weeks. The very young and the elderly are likely to suffer a more adverse reaction whilst people who are allergic to wasp and bee stings are advised not to keep Lionfish.

Aquarists who have young children would be well advised to ensure no little fingers can venture into the tank! Although non-aggressive a Lionfish, like most creatures, may well use its defence mechanisms for attack if it becomes threatened or cornered.

Live foods

Lionfish will obviously be used to live food when they arrive direct from their natural habitat into the wholesaler's tank. They may prove very difficult to wean off live food and therefore may demand a great deal of patience on behalf of the aquarist.

Live food can be provided in the form of River Shrimps or freshwater fish such as Mollies and Guppies. This may be unacceptable for many people and a alternative, but dead, food source will soon be sought. Any meat-based commercial food will suffice with Cockle, Mussel, Squid and Lancefish all offering possibilities.

You may find that by mixing a quantity of dead food with a little live food the Lionfish will start striking at the dead food. If so quickly reduce the amount of live food to nil and once regularly taking dead food do not feed any live food again.

A method requiring more patience but much less hit and miss is to loosely attach a piece of mussel or Lancefish to a piece of cotton and dangle this in jerky movements in front of the Lionfish in the hope that if it is hungry enough it will strike. A Lionfish is always more likely to feed if it has been starved for a few days. Once taking dead food do not feed live food again — ever!

The topic of feeding difficult

Pterois antennata **has the longest fin rays of all the Lionfishes.**

PHOTOGRAPH: A&P LIBRARY

marine fish was covered by myself in last month's issue of *A&P*.

Suitable tank mates

Despite their spectacular appearance Lionfish can be so docile and inactive as to be a touch boring. It may be wise to house them with some active fish, bearing in mind they must be large enough not to be considered a potential meal, for example Angels, large Wrasse, Triggers, Surgeons and Batfish.

So why have I never kept one?

Personally I have no experience of keeping Lionfish and despite their obvious popularity, as witnessed by the numbers seen in retailers' tanks, I know very few aquarists who have kept one.

My own views will always be coloured by a previous bad experience of weaning a predator off live food. Off course there is also the minor factor that a Lionfish has the ability to cause me considerable personal pain — or maybe I am just a coward at heart!

I have to admit they are fairly hardy, reasonably priced and make a pretty spectacular addition to any suitable marine tank, whilst providing a good talking point with inquisitive guests.

Finally I would like to deny any responsibility for disappearing fish or excruciating pain caused to anyone who purchases a Lionfish on the strength of this article. You may change your mind after reading next month's offering!

Seriously, taking precautions with tank mates, adopting a common sense approach and respecting the capabilities of the fish you should have no real worries

Popular Lionfish species

Fu Manchu Lionfish (*Dendrochirus biocellatus*). A dwarf species that only reaches 4in in captivity. It earns the common name of Fu Manchu on account of 'moustache-like' extensions on either side of its mouth.

Dwarf Lionfish (*Dendrochirus brachypterus*). A very ornate dwarf species reaching 4-5in in captivity. Found in the Indo-Pacific and Red Sea the fish has short fins with elongated rays interconnected by tissue between them.

Common Lionfish (*Pterois volitans*). Probably the most common Lionfish seen in the UK. Generally found to be the largest species in captivity with a possible tank size of 8-10in. The species hails from the Indo-Pacific region. It has elongated rays with interconnecting tissue.

Spotfin Lionfish (*Pterois antennata*). A species with very elongated fin rays. Found in the Indo-Pacific and Red Sea this species can reach a captive size of 6in.

Firework Lionfish (*Pterois radiata*). Another Indo-Pacific and Red Sea species. Has extremely elongated fin rays and a size in captivity of 6in or so.

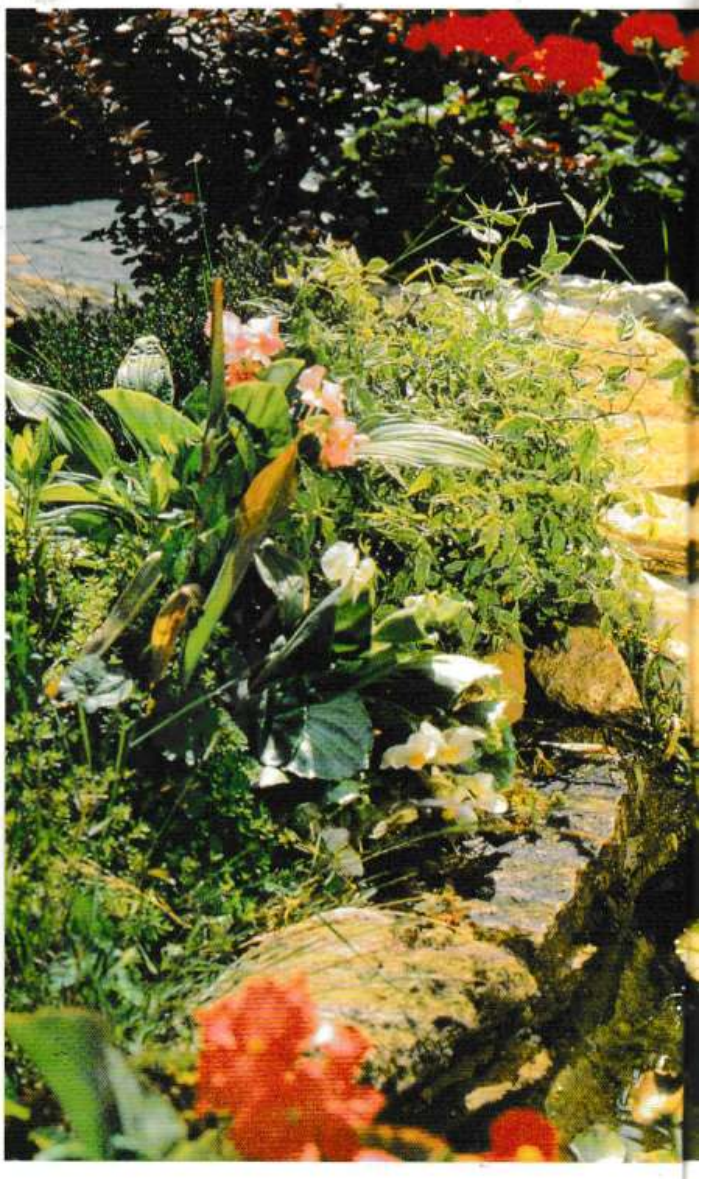
***Dendrochirus* sp. are probably the most decorative Lionfish and do not grow quite so large.**

PHOTOGRAPH: A&P LIBRARY

Nick Fletcher, *of Hozelock-Cyprio, says that time spent on your pond now will save a lot of winter worries*

PHOTOGRAPHS BY THE AUTHOR

Autumn



Lush poolside vegetation, fountains and cascades — an image to retain over the long, bleak winter ahead.

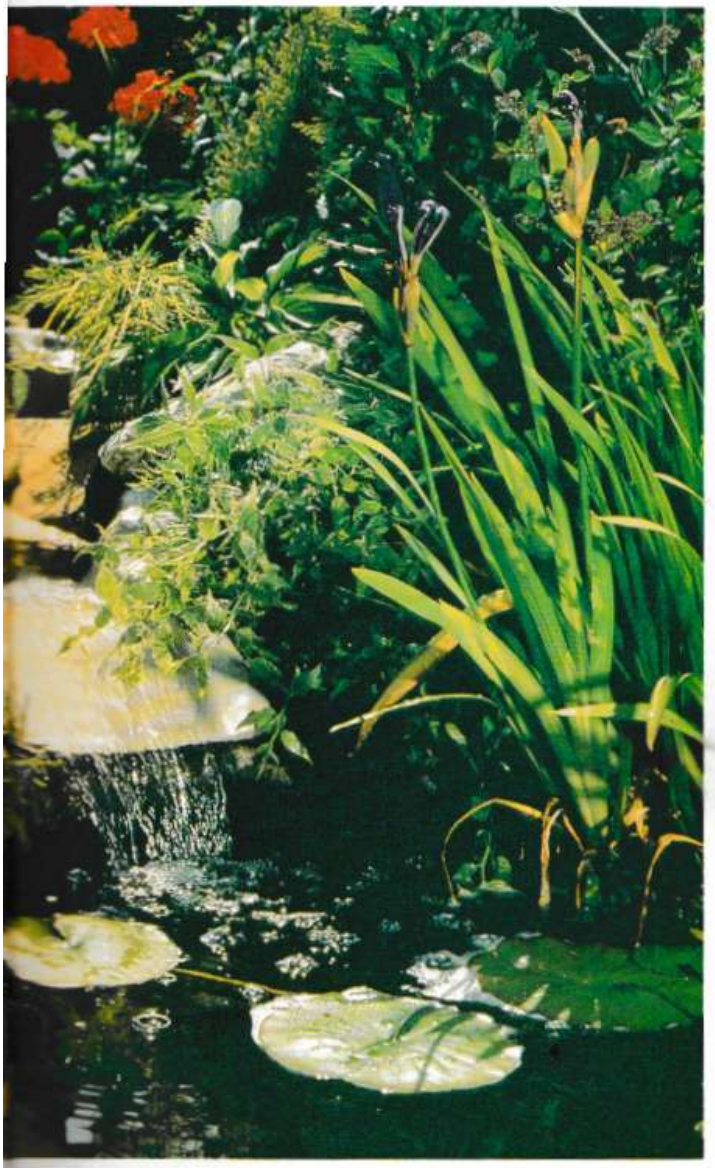
There is nothing you can do about shortening days and the slowing of activity in your pond but ensure your fish go into winter strong and healthy in an environment that places minimal strain on small metabolisms

Funny how it creeps up on us. As you go to post your credit card payment (the card took a bit of a hammering over summer's final sweltering Bank Holiday, didn't it?) you spy a mist rising off your garden pond. A light breeze gets up, causing the Silver Birches to shiver as they shed their first yellowing leaves into the water.

Come to think of it, all the vegetation in and around the pond is looking distinctly tired. You look up to see Swallows and House Martins gathering on the telephone wires like musical notes on a stave — they are off to warmer climes: if your fish could talk they'd probably be asking the birds about the joys of overwintering in Africa.

There is nothing you can do about shortening days and the slowing down of activity in your pond — unless of course you are one of the tiny minority of serious Koi keepers who heat the water so that their pets can be fed right through the year. What you can do is to ensure that your fish go into winter strong and healthy, in an environment that places minimal strain on small metabolisms.

Almanac



The not-so-big clear out

Perhaps your filter system is due for an upgrade? Winter will give you time to decide on a new system such as a compact unit from the Pro-Filter range.

Hopefully, the message is getting through to pondkeepers that successful maintenance does not mean major panic blitzes, part-draining the water, bucketing out silt and then topping up with a fine chilled cocktail of chlorine, chloramine and dissolved metals direct from the tap. This, would you believe, is stressful to fish, puts a huge organic load on filters, and plays havoc with water quality as anaerobic bacteria are stirred up. The fact that most Goldfish survive such onslaughts is by the way — see how Koi react, but make sure they're not yours!

How did the tradition of the bi-annual mega clean-out arise in the first place? When fountain pumps with strainers were commonly used to feed water to filters, it was inevitable that debris would build up in the pond itself. Instruction leaflets actually advised us to place the pump on a raised platform or a few bricks, so that we didn't have to clean the pre-filter so often. If the pump was missing most of the dirt, where did (or didn't) it go? It stayed in the pond!

Fountains and waterfalls are great assets to ponds in the warmer months, though they should always be switched off in winter (the chill factor). But filters really need a pump to themselves, and one that can handle solids. The Prima range (or the recently developed Clearforce) will transfer all the muck into the filtration system, and it is so much easier to keep a filter clean than it is to immerse yourself up to the armpits in black silt.

Pond hardware

A typical garden pond will incorporate a fountain/waterfall, filter and UVC (ultra violet clarifier). Of these items only the filter with its associated pump will need to be run through the winter, to keep the aerobic bacteria population in the media ticking over. The bacterial colonies will decrease, but then again, those that remain will not be dealing with a high ammonia loading — feeding will have tailed off, and by-products of fish respiration will be reduced. At the same time the cooler water will hold more dissolved oxygen to assist in the oxidation of waste.

Fountains and waterfalls, which assist in the warming of the pond in hot weather, will do just the reverse in winter and so should be turned off. Their pumps can be taken out of the pond, dried off and sent for servicing if required, or stored in a bucket of water in a frost-proof location where rodents will not gnaw at the cables.

Solids-handling pumps servicing filters can be moved closer to the filter outfall, so that the water circulation forms a short loop rather than takes in the whole pond. if the pond is shelved, pumps can be moved higher in the water (but not so high that they risk being frozen in if ice later forms). The idea is to give fish an undisturbed haven in the deepest part of the pond. If possible run a pipe from the filter outfall almost to the water surface, so that it doesn't splash. Turbulence will only serve to chill the water.

UVC's, once switched off, should not be left outside — otherwise there is the danger of ice expanding within the quartz sleeve and cracking it. The whole unit should be removed, drained, dried and stored ready for spring.

Limescale build-up on the quartz can he removed using vinegar on a soft cloth. Now is the time to buy replacement lamps, rather than wait for the melee of the first warm weekend of the new season.

Water clarity is not usually a problem in winter. Single-celled algae die down naturally, loose filaments from Blanketweed will not be present, and fish will not be stirring up fine suspended particles as they do when they are more active.

If your filter cartridges/foam sheets are looking a little tired late autumn is a good time to replace them — not all at once, as mixing new with old will not cause a sudden drop in nitrifying bacteria populations.

AUTUMN ALMANAC ...
saving winter worries

Net or cover?

Netting your pond over in autumn to trap fallen leaves may make sense if your neighbourhood timber is a Horse Chestnut. But most trees and shrubs found in gardens have small leaves, quite able to penetrate the mesh of the usually-advised strawberry net. Getting at them involves unpegging the net and the hassle can mean yon shrug your shoulders and avoid the job altogether.

A more sensible plan is to devise covers for the pond. These can be polythene sheets over timber frames, polycarbonate offcuts from double glazing companies, or simply free-floating sheets of bubble wrap with holes cut at intervals for gaseous exchange. Depending on your DIY skills, covers can rest flat across the water surface or form a pitched roof. Clear hinged panels can be incorporated for viewing and feeding your fish.

Such covers do keep ambient water temperature up a degree or two, but their main benefit — besides keeping leaves out of the water — is to slow down otherwise rapid temperature fluctuations which can be extremely damaging to fish. if you doubt this, invest in a maximum/minimum thermometer and note the highs and lows in air temperature over a week in late autumn.

Covers can be made in several sections. This makes them easier to move around, and it means you don't initially have to completely cover the pond. Similarly, come the spring, you can take them off one at a time.

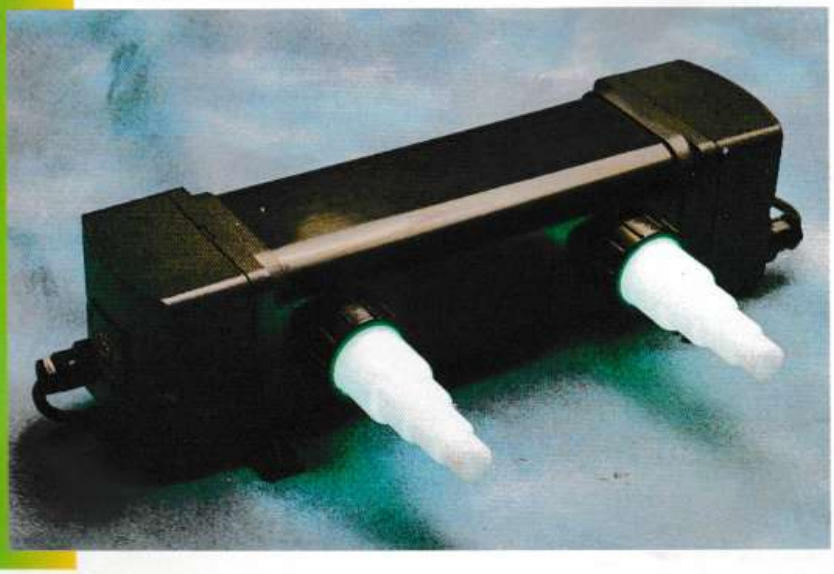
Autumn fish health

In the course of the summer many pondfish acquire minor scrapes and bumps from spawning and other causes. Providing water quality is good and the injuries are not deep or infected most will heal of their own accord. But fish immune systems and the ability to regenerate damaged tissue are temperature-dependent.

Leaving a damaged fish untreated in the pond over winter will lead to all sorts of problems, as will optimistic dosing with a broad-spectrum remedy ineffective below 50°F.

The last thing the other pond occupants want is water quality knocked back by chemicals. It is better to net out the affected fish and transfer it to a heated indoor hospital vat or large aquarium.

Here's an alternative to winter storage for your fountain pump and UVC — in a relatively small body of water the UVC can have sterilising properties, while a matured foam pre-filter on the pump will give biological



The UVC can be taken out of commission over winter — or else run in an indoor hospital vat.

purification. Even your pond hand vac will come in handy to remove fish faeces.

Another use for such a facility is overwintering first-year juvenile fish of all species, or any Fancy Goldfish that may have spent the summer outside.

Icing over

El Nino notwithstanding ice over our ponds sometime this winter is still a likelihood. As long as it does not cover the whole surface there is nothing to worry about — indeed, the ice sheet does much the same as a fabricated pond cover in stabilising water temperature. If snow later falls on top of it the insulating properties are increased.

A small electric pond heater to keep a small hole ice-free is all that's required. Some people add salt at half an ounce to the gallon, but while this lowers the freezing point of water and soothes the fish, its ice-preventing properties at that dosage are minimal. Ultimately, Goldfish and Koi are not brackish water fishes, and the presence of salt precludes the use of many medications or of zeolite, a useful aid to ammonia-removal in early Spring when the filter may be struggling to kick in.

A watchful eye

Longer nights and worsening weather are not conducive to enjoyment of a pond, and visits to the waterside inevitably become less frequent and enjoyable. But even in the depths of winter ensure you check your pond over at least once a day. This does not mean poking around with a net, as the fish will fare best undisturbed. But dead fish going undetected, a filter stall, or gale damage to your pond covers can all have catastrophic results if not dealt with immediately.

Emergencies aside, if you suffer acute pond deprivation at the fag-end of the year there's always project planning for the coming season to keep your spirits up. You can be reassured that your sensible autumn campaign will see the fish come through to spring lean, but hungry and healthy, ready to enjoy the renewed fruits of your ingenuity.

Accurate measuring of water temperature will enable your feeding regime to continue late into the year. These are digital thermometers giving instant read-out.

Nick Dakin considers Hard Corals

PHOTOGRAPHS BY THE AUTHOR

Hard by Name, Hard by Nature

Pagoda Coral, *Turbinaria mesenterina*.

Whilst many thousands of invertebrates live on the coral reef, the hard corals are the coral reef! These unique animal polyps extract calcium carbonate from the surrounding seawater to build a calcareous skeleton in which they live and are largely protected from predators.

As they die new polyps build their skeletons on top of the old ones in the same way and so the reef is constructed and perpetuated, sometimes until it reaches staggering proportions. The Great Barrier Reef off the eastern coast of the Australian continent is well over 1,931 kilometres (1,200 miles) in length and built almost entirely by hard coral polyps — the largest animal structure in the world.

Hard Corals, also known as Stony Corals, demand several conditions for healthy and sustained growth

Demanding corals

Hard Corals, also known as Stony Corals, demand several conditions

symbiotic algae supplementary feeding can be very beneficial with some species. Small pieces of Squid and Lancefish can be useful as can be live Rotifers and Brine Shrimp nauplii.

Feed twice weekly in the case of live foods, turning off all the pumps to ensure that the corals have the greatest opportunity to capture a useful quantity. Proprietary 'squirters' are now available so that the foods can be introduced directly into the vicinity of the specimen. This will also largely prevent any fish from stealing the food before it reaches the animal for which it is intended.

Supplements

Various observations have encouraged a belief that the supplements Molybdenum and Strontium help prevent some species from parting with their skeletal bases. Iodine supplements have also proved useful in certain circumstances.

If, however, good quality (ie reverse osmosis) water changes are performed as prescribed or a constant water change facility is in operation there should be little or no need for extra supplements. This is because supplements will always be replenished from a good quality salt mix.

The only supplement that

HARD BY NAME, HARD BY NATURE ... considering Hard Corals

requires constant dosing is kalkwasser, made up from calcium hydroxide. Dosing/mixing units are now readily available which keep the chemical in suspension.

Corals at war

Hard corals require plenty of space and can easily sense the proximity of nearby species that might be a threat. The response frequently takes the form where the more dominant species sets out to attack the weaker one on two fronts.

Firstly, stinging cells are released into the water which will damage the perceived intruder at a distance; secondly, long tentacles called 'sweeper tentacles' can be extended towards the opponent which, being tipped with stinging cells, can prove to be a very effective weapon.

The results of such conflicts are very obvious. The weaker of the corals will appear to be 'burnt' or consistently retracted away from the attacker. Some species, such as *Acropora* sp., will frequently lose all living tissue on that side and become a pure white skeleton.

Should 'fighting' be suspected move the corals as far apart as possible. In many cases it is unfortunate to report that regeneration is either slow or non-existent.

Species to consider

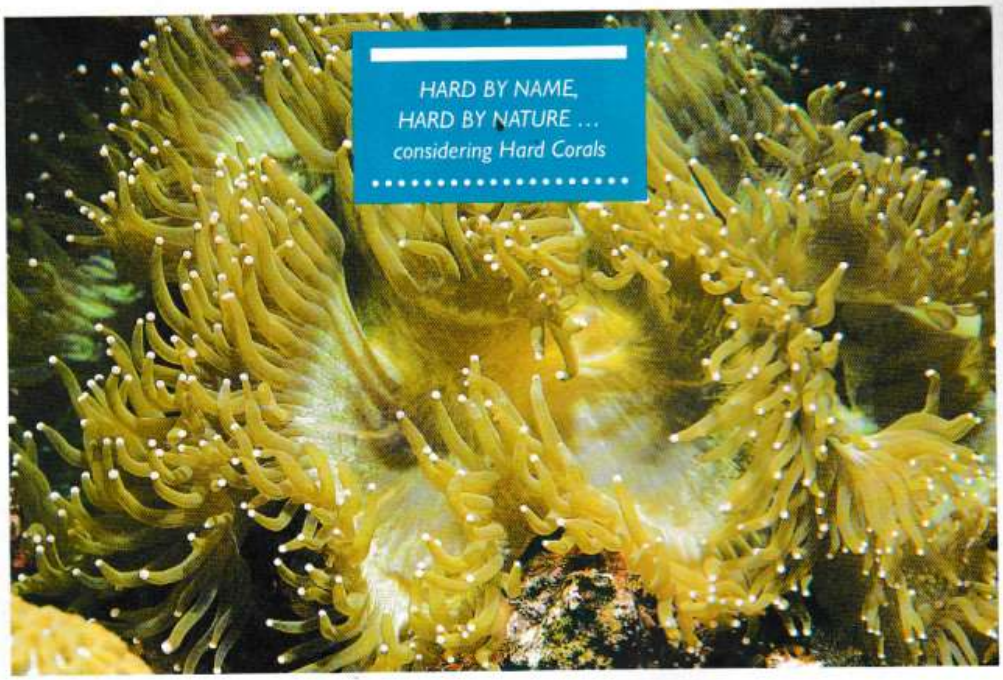
(E) Slightly easier species
(H) Much more difficult species

Tooth Coral (*Euphyllia picteti*) (E)
Frogspawn Coral (*Euphyllia* sp.) (E)
Bubble Coral (*Plerogyra sinuosa*) (E)
Anchor Coral (*Euphyllia fimriata*) (E)
Organ Pipe Coral (*Tubipora musica*) (H)
Plate Coral (*Fungia actiniformis*) (E)
Goniopora (*Goniopora* sp.) (H)
Sun Coral (*Tubastrea aurea*) (H)
Brain Coral (*Leptoria* sp.) (H)
Brain Coral (*Trachyphyllia* sp.) (H)
Moon Coral (*Favites* sp.) (H)
Cup Coral (*Turbinaria* sp.) (H)
Staghorn Coral (*Acropora* sp.) (H)

These are a selection of hard corals commonly imported into the country. The aquarist will often find many other species, some of which

Slipper Coral, *Polyphillia talpina*.

HARD BY NAME, HARD BY NATURE ...
considering Hard Corals



Tooth Coral, *Euphyllia picteti.*

have yet to identified.

Hard corals are not cheap and marinists are warned against buying unidentified corals unless they are certain that they can provide the conditions to keep them properly.

Conservation note

In the past five years marine aquarium technology has advanced considerably and corals that were once considered impossible to keep, are now growing, multiplying and being distributed as captive-bred specimens.

Hard corals are an excellent case in point. Given the right conditions most hard corals will thrive and grow quite quickly. Cuttings are easily taken and can be used to establish new colonies, not only in the same aquarium but in other tanks also.

In this way the hobby is making considerable strides in becoming self-sufficient. If you are successful with a Staghorn Coral (*Acropora* sp.), do not be afraid to take a small clipping and re-locate it into a small piece of underwater epoxy resin.

The marinist will often be surprised at how the cutting survives this procedure and proceeds to establish itself as a new animal in its own right.

By conserving the animals in our own aquaria we are contributing to reef conservation in general. A concept we must all endorse and encourage.

Tips on keeping hard corals successfully

(1) If you are not familiar with marine aquarium chemistry then hard corals are not for you!

(2) If you fail with hard corals do not persist until you have identified the cause.

(3) First hard corals should always be the slightly easier species (see below).

(4) Do not introduce hard corals into a tank with a bad nuisance algae problem. Not only will the water quality be low but the algae will smother the corals.

(5) If you can't keep easier corals or anemones then don't try hard corals!

(6) Make sure hard corals are securely positioned and located at a reasonable distance from each other.

(7) Never introduce hard corals into a freshly matured aquarium. Wait four to six months to let it establish itself and become more stable.

(8) Use reverse osmosis water for make-up and evaporation replacement water.

(9) Monitor water quality frequently. If possible, use accurate electronic meters.

(10) Provide high intensity lighting of the correct quality. 6,500k or 10,000k bulbs are very successful.

(11) Dose frequently with kalkwasser to maintain a high and stable calcium content.

(12) Feed sparingly.

(13) Acclimatise specimens to a new environment very slowly to prevent pH or osmotic shock. Thirty minutes is not too long.

(14) Always purchase healthy specimens that are fully expanded with no signs of detachment, damage or skeletal whitening.

(15) Provide as large an aquarium as possible. Forty gallons nett is a good minimum starting size.

(16) Keep fish stocks as low as possible Do not exceed 1 in per six gallons.

Visit Nick Dakin's website at: http://www.nickd.clara.net

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Coldwater

★ PRIZE WINNING PROBLEM ★

Mr B. A. Powell, from Boston, Lincolnshire, writes:

Q In my youth I kept a coldwater aquarium. I now have a garden pond stocked with 6in Rudd, Orfe and Carp along with Sarasas and Shubunkins. One of my favourite aquarium fishes was the North American Catfish, *Ameiurus nebulosus*. It was amusing, posing no threat to other inhabitants of the tank and never outgrew its space. I know that in the wild catfish grow quite large but my pond is not enormous, only 2m square. Do you think *Amieurus* could be a success as a garden pond fish or could it prove a problem? If you do not feel it to be unsuitable can you suggest where I might obtain one? The fish suppliers in this area cannot supply one, and some have never heard of it!

A The answer to the question of catfish in outdoor ponds often disappoints the questioner as what appears to be an interesting addition simply turns out to be a disaster with, as Mr Powell suspects, the catfish growing too large and preying on the other fish. When kept in smaller quarters such as an indoor aquarium the catfish may well be kept within bounds by tank space and food supply limitations due to competition by other fish; in the outdoor pond these other fish will very likely breed and so offer more food (in addition to any natural food available) to the catfish and so increase its food supply with obvious consequences. Incidentally, the species in question is now more correctly known as Ictalurus nebulosus and grows to around 40cm. Perhaps the question to ask would-be coldwater catfish owners is: "Why keep them anyway?" Along with that other bottom dweller the Tench they would hardly ever be seen (unless the pond was installed on sloping ground and had a viewing window let into one side) and all they would add to the pond life would be stirred up silt and detritus and more unnecessary work for the filtration system and the aquarist. On balance most aquarists feel that coldwater catfish are best left out of the pond. However, should Mr Powell decide to go ahead (can his pond really accommodate yet more fish?) the North American Catfish can sometimes be found at larger aquatic and water garden centre outlets.

Marine

Q Like all aquarists (freshwater or marine) I have suffered with algae problems in my time but now I have a real problem which I hope you can solve for me. The substrate in my marine tank gets covered with a reddish brown covering of 'algae' but whilst I can understand this what really baffles me is that it comes and goes each day. Help!

A The reddish brown 'lawn' effect that you describe it not algae at all but a proteinaceous slime, so the normal measures used in combatting algae will be ineffective as you have probably found out. The cause of this growth (it also appears to be phototrophic — it comes and goes with light) is excess protein and the cause of this is — you've guessed it — overfeeding. One obvious remedy is staring you in the face but you should find that the addition of a protein skimmer to your system will also help to get rid of your problem.

Tropical

Q My shop has Glassfish (*Chanda ranga*) for sale in freshwater. I thought they needed brackish conditions. Is this so?

A In the wild Glassfish live in tidal estuaries so they are exposed to rapidly changing water conditions. They will survive in freshwater but to be at their best should be kept in brackish water. If you buy the fish make the change to brackish water gradually. I know you wouldn't do this but please avoid buying artificially coloured (by injection) Glassfish. This is not only cruel it also drastically shortens the fish's life expectancy.

General

Q Just a small query — we've got about 20 tropical fish but we find it very difficult to keep the gravel clean. We use a siphon to clean it when we do a water change but we'd like to clean it more often than that. As our pump is an all-in-one enclosed case we can't use any products that attach to pumps or filters, which are the only type of filter-cleaner we've seen. Do you know of such a product?

A You may find that one of the battery or mains powered gravel cleaners suits your purpose. Instead of using a syphon to suck up the mulm along with the water these are equipped with a small pump attached to a 'vacuum' end with which you probe the gravel. The water and mulm are sucked up together as they are when you do your water change but instead of leaving the tank the water passes through a small bag which traps all the waste and then returns to the tank. You can then detach the waste bag and wash it under the tap ready for next time. Alternatively, regular use of a Gravel Washer will help, too; simply use this when siphoning out water, all the fine 'clogging' dirt will come out leaving the gravel behind. As you are aware keeping an undergravel filter unclogged is essential for it to work properly. A word of warning, though; most filters are kept adequately clean by the weekly water change, so if yours is clogging a lot faster you may possibly be overfeeding your fish.

Ian Greenwood *looks at another aspect of Discus keeping*

PHOTOGRAPHS BY THE AUTHOR

Red Turquoise.

DISC
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Last month we covered the initial set-up for a Discus display aquarium. After you've set it up and the filter maturation period is over it's time to check all your water parameters, eg, pH, DH, NO_2, NO_3 and Hardness. Presuming your water is in correct condition (I say 'correct' rather than 'perfect' because if it was perfect you would be piping it from the Amazon!) then it's the time you've been waiting for — stocking with fish.

Your first instinct would probably be to dash off to your local aquatic outlet and buy your Discus before any other fish you might want to keep with them. Unless you intend to have a 'Discus only' tank I would recommend you buy their tankmates first, just in case of any water condition fluctuations in the first couple of weeks; it will also give you chance to travel around as many Discus outlets as possible before you make your final decision on size and colour strain of discus that you wish to keep.

As I mentioned last month check for any signs of stress or disease and buy what you want, and not what the dealers wants you to, and, if anything doesn't seem quite right, then don't buy at all.

> After setting up your aquarium, the filter maturation period is over and your water parameters are correct it's time for stocking with fish

Occasionally you may find wild Discus for sale at very reasonable prices, but I would advise against buying these as they may cause you problems later.

Strains

With over 35 strains of Discus available in the country we couldn't possibly cover them all here but basically these fall into two categories: 'Traditional Strains' and 'New Strains'.

Red Turquoise — traditional strain

This popular colour variant is seen in most Discus outlets. The fish originates from a wild Blue being crossed with a wild Alenquer Red. Typical prices: 2in from £5, 5-6in from £50.

Blue Diamond — relatively new

In my personal opinion one of the most beautiful strains of Discus on the market. Unlike any other strains they are of a 'solid' blue with no other colour markings on the body or fins; also they have no 'stress bars' or at least not detectable to the eye. Don't accept substitutes. These fish can command very high prices — £10-£15 for 2in and £80 plus for an adult.

Super Cobalt — traditional strain

Usually a solid metallic-blue in the body with a black line dividing the body and fins, with some faint red

CUS: ains nd mates

Standard Blue Cobalt.

flecks in the fins. Most are quite 'high-bodied' fish which, I think, makes them even more attractive when they reach maturity, usually at around 16 months of age. Typical prices: 2in from £5, adults £60-£100 for good specimens.

Marlborough Reds — new strain

Originally bred by a Dutch breeder in the Far East and reaching this country four to five years ago; up until recently (over the past 18 months) very highly priced in comparison with some of the more traditional strains. A solid, red-bodied fish with a white face and blood-red eye.

Tangerine Pearl — new strain

Although having been around for some time they have become increasingly popular over the past two years. Tangerine-orange colour in the body with creamy-white pearl markings, black fins and a blood-red eye. Typical prices: from £8, adults £70 upwards.

Pigeon Blood — traditional strain

There are three variants of Pigeon Bloods — red, yellow and white. They are usually of a white base colour with red or yellow spots or lines on the body and sooty-black colour in the fins. Most also have blue flecks in the fins and many people believe that such fish will not raise their own fry — a myth as far as I'm concerned. Typical prices: 2in from £6, adults from £60.

Tankmates

As one of the most debatable subjects within Discus keeping what I'm about to say will almost certainly raise a few eyebrows but I can only comment on what I've kept with my Discus and what I've seen other reputable Discus keepers do in this respect.

Cardinal Tetras are very peaceful, attractive fish which don't grow above 2in and best kept in large shoals — for them to feel most comfortable and for your viewing pleasure. Excellent for adding movement to the aquarium a shoal of at least 10 or more will look stunning with their blue and red colouring. Inexpensive and found in virtually any aquatic outlet.

Emperor Tetra, whilst originating in Colombia, thrive with Discus and may even breed in the Discus aquarium regularly. A peaceful species providing good midwater movement. Easily available and inexpensive.

Rams are very attractive both in shape and colouration; I've kept rams in my Discus display tank for as long as I can remember. Not expensive and an excellent addition to any Discus tank.

Rummy-nose Tetras are my favourite Tetra for the Discus tank and should be kept, like the Cardinal, in large shoals. The colouration of these fish is quite unique with the bright red noses, pale body and a black and white striped tail. A must, and very cheap, too.

Bleeding Heart Tetras are larger than those Tetras previously mentioned with adults reaching around 3in or more. They are peaceful and get on well with all the

DISCUS: STRAINS AND TANKMATES ...
another aspect of Discus keeping

others too; not expensive and readily available.

Corydoras and Brochis catfish are, in my opinion, the perfect catfish for the Discus tank and should be kept in shoals of six or more. Some Brochis can reach 4.5in, a bit larger than most Corydoras but the selection of Corydoras species is much larger at reasonable prices from your dealer.

The Flagtail Catfish are found in the same Amazonian waters as Discus and are happiest in shoals of around five or more. Their black and white tails are stunning and the fish is essential for those wanting to set up a Discus biotope aquarium. Not too expensive.

Royal and Zebra Plecs can be quite expensive but apart from adding stunning looks to the aquarium also serve a useful purpose too — keeping your tank algae free. Obviously you don't rely on algae alone forming their sole diet but should give them sinking wafers and pellets.

Other types of Plec are not really recommended as they can grow quite large, up to 20in. In some cases they have been known to attach themselves to the side of a discus, often resulting in the discus being killed. Royal and Zebra Plecs don't grow very large and are very peaceful compared to other suckermouth catfishes.

Clown and Kuhli Loaches are excellent bottom dwellers for your Discus tank as they spend most of the day sifting through the substrate for any uneaten food which keeps the gravel or sand very clean.

Clown Loaches have some unusual habits to go with their vivid colouration but I have to say I don't see too much of my Kuhli Loaches as they are very often buried in the substrate. Nice peaceful additions and not too expensive.

These have been common decorative species so far to keep with Discus but there are others which some might say shouldn't (or couldn't) be kept with Discus because of temperature, pH differences or incompatibility and aggressiveness (maybe they haven't tried them or they only

Tangerine Pearl.

Malaysian Red Scribbled.

rely on book advice!)

Personally, I've seen virtually every soft water species in with Discus except for Oscars and Piranhas which would be far too aggressive. Here's some of the more unusual species to consider.

Although Angels are not usually thought of as unusual companions for Discus I've heard many debates about their incompatibility with Discus in the long term. All I can say is that every time I've seen the two together it has worked very well with few problems arising.

Although Killifish are not often considered as Discus companions their appreciation of soft water and their vibrant colours make them a peaceful, albeit unusual, addition to the Discus aquarium.

Although many consider Rainbowfish as slightly harder water fishes I can confirm that they do just as well in soft water and are kept successfully with Discus all over the world. So why not give them a go?

Many Synodontis Catfish (especially the Upside down Catfish, *Synodontis nigriventris*) pose no threat to the discus aquarium, however, if you keep larger ones then the smaller Cardinals and Killifish may be at risk. Another good catfish is the Striped Talking Catfish, *Platydoras costatus*.

Although I can hear the gasps of horror already a friend of mine has kept Severums with Discus for over two years without the slightest problems, with both species actually spawning in the same tank.

Whilst your aquatic dealer might say 'you're joking' or 'you've no chance' I would advise you to buy the Severums as young 2in fish and raise them with your young Discus at the same time to avoid any problems with fighting in the future.

Conclusions

I hope this article may have answered some of the questions about possible tankmates for Discus.

There are certainly many other species that could also be considered. Although there will always be fishkeepers who insist you can't keep some of the fish mentioned with Discus all I can say is that you'll never know unless you try.

If you're just starting with Discus or are an old hand don't forget to enjoy what you're doing as the Discus, in my opinion, is the most rewarding fish in the aquatic world.

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If you're just starting with Discus or are an old hand don't forget to enjoy what you're doing as the Discus, in my opinion, is the most rewarding fish in the aquatic world.

Dr Joe Smartt compares progress with results

PHOTOGRAPHS BY THE AUTHOR

Hi-Tech, Lo-Te Systems of Go

Goldfish keepers are fortunate in that they actually can choose the level of technology they use in keeping and breeding their fish

Two lakes — more or less a natural lake open to all the cleansing elements.

Goldfish keepers are fortunate in that they actually can choose the level of technology they use in keeping and breeding their fish. In contrast the tropical marine fishkeeper has by comparison little or no leeway and must rely continuously on a high level of technological input to ensure the survival of his stock.

In some tropical marine environments conditions are very stable and may vary very little during the year. Temperature, salinity, pH, concentration of oxygen and nitrogenous compounds (ammonia, nitrite and nitrate), other nutrient elements and a range of environmental parameters are effectively constant.

The Goldfish, by contrast, may over the year experience temperatures ranging from the arctic to tropical. It is possible to keep Goldfish alive at temperatures in which arctic/coldwater fish such as trout and char live and those suitable for Tilapia and tropical species.

They are also exposed to a wide range of salinities, pH and other environmental variables. Such a high level of tolerance and adaptability admirably fits goldfish for survival under domestication, but also in environments ranging from cool temperate to the near tropical without undue stress.

Cycling of chemical elements

Sudden, extreme changes in environmental parameters may not be tolerated, although substantial changes be accommodated gradually.

Suitable conditions for the life of fish are maintained by a constant cycling of the chemical elements which make up their bodies and those of all living organisms. In practical terms we need to consider the oxygen cycle, without oxygen life of fish would be impossible. The nitrogen cycle is perhaps the natural cycle which demands most of our attention and it is related very closely to the natural processes of

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growth, body maintenance, metabolism generally and finally death and decay.

While the element nitrogen itself is not chemically very highly active, some of its compounds are.

Ammonia which is produced in the natural turnover of body proteins and amino acids is highly toxic at relatively low levels. In the nitrogen cycle under aerobic conditions it is converted by bacterial action to nitrite, itself a toxic material, finally conversion by a final oxidation process to nitrate also by bacterial action produces a relatively innocuous compound.

This is either taken up by plants and used in protein synthesis or reduced to the element nitrogen by anaerobic bacterial action. Nitrogen can be taken up by free-living nitrifying bacteria and those living in the root nodules of leguminous, and some other kinds of plants, to produce compounds which are ultimately transformed into amino acids, proteins and the substance of living organisms both plant and animal.

While it is relatively innocuous and it directly creates few problems of itself it is highly undesirable that nitrate should accumulate in any ecosystem as such. Normally it would be taken up by plants. These occur naturally of course, or may be introduced deliberately by ourselves.

However, they may get there by natural means and we would find few nitrogen-rich bodies of water not supporting plant life, even if it is only periodic algal blooms and blanket weed.

While numerous chemical elements are also cycled, hydrogen, for example, is an intrinsic constituent of the aqueous

This large pond has extra aeration being supplied, vital in warm weather.

environment itself (H_2O) and also of carbohydrates, fats and proteins, but its cycle creates few practical problems.

This is also true to varying degrees of sulphur, iron, magnesium sodium and potassium where the fishkeeper or aquaculturist generally does not have to intervene in any but a minor way, if at all.

HI-TECH, LO-TECH AND NO-TECH SYSTEMS OF GOLDFISH KEEPING ... comparing progress with results

Essential constituents

There are two elements which do merit particular consideration in the context of cycling, these are calcium and phosphorus. Calcium is not only an essential constituent of cell membranes and the skeleton of vertebrates it has an extremely important environmental role in buffering against excessively rapid pH change.

Phosphorus is an essential constituent of nucleic acids (DNA and RNA) and enters into many vital processes at the cellular level It is also (with calcium) the main constituent of bone. The accumulation of phosphorus (as soluble phosphate) in the aqueous environment is a contributory factor to the development of algal blooms and blanket weed infestation.

In the application of technology (or not!) we need to understand the natural cycling processes and to assess whether the natural rates of these processes are adequate for our purposes. It may well be that in extensive systems, with intensification of production, there will be progressively imposed constraints and limitations imposed by the efficiency of the natural cycling processes

Perhaps the best illustration is in the matter of oxygen. The solubility of oxygen in water is a major constraint on the ability of any given body of water to support a larger fish population.

However, since oxygen is present at a higher concentration in the atmosphere than it is in water, there will be a constant tendency of oxygen to diffuse from air to water. Nature abhors a vacuum and there is always a tendency towards establishment of equilibrium.

However, fish are not the only consumers of oxygen. There are numerous invertebrates and bacteria which in addition consume oxygen. The oxygen demands of all these may be such as to reduce concentrations below the level at which fish can survive.

In extreme conditions only anaerobic organisms can exist. These obtain their need for elemental oxygen from oxygen containing compounds such as nitrates in the case of denitrifying bacteria.

In practice where oxygen concentration is likely to be limiting the constraint may be overcome by mechanical means. The oxygen content of water may be maintained by artificially increasing the surface area of water in contact with atmospheric oxygen.

The technology may vary from that of the simple air pump and airstone in the aquarium to complex venturi and other systems designed to agitate water continuously and maximise air/water contact.

The use of such systems is of course particularly important in the summer where higher temperatures promote rapid growth, high levels of respiratory and microbiological oxygen demand while, at the same time, the solubility of oxygen itself in water is reduced.

High growth rates achieved

As a consequence aerators will commonly be seen on fish farms even in very large ponds and lakes, especially in warm areas where very high growth rates can be achieved at relatively high population densities.

The handling of nitrogenous metabolic by-products has benefited from studies whose objective was the improvement of keeping marine tropical fish and also of Koi.

Tolerance of nitrogenous pollution in tropical marine fish is very low and systems designed to maintain their life support system have to operate with extreme efficiency in maintaining virtually zero concentrations of toxic metabolic pollutants.

In the case of Koi the problem arose from the high body weights that can commonly be achieved. The ideal for the Japanese is something akin to a fishy sumo wrestler, but in producing and maintaining such a high biomass (body weight) heavy feeding is necessary with the consequent production of considerable quantities of potentially and actually polluting wastes.

Until heavy-duty filtration systems were developed, growth (and even survival) of Koi was limited.

Essentially the filters serve the same purpose as the practice of mucking out stables, cowsheds and pigsties. The production of waste materials by smaller fish such as Goldfish is very much less.

The Goldfish population of a modest pond, supporting 50-100 fish, could well have a lower biomass than a single medium or large-sized Koi. In terms of numbers Koi population densities have to be very low unless considerable technological support is given.

Several filtration systems are available, the most favoured of which can be called for convenience 'biological'. In

The fish in this large Chinese pond [illegible] by natural re-cycling processes and are hand-fed from this platform.

these, water passes over colonies of the bacterium Nitrosomonas which converts ammonia to nitrite and Nitrobacter which takes oxidation a stage further to nitrate.

If there are aquatic plants in the system such as Watercress, which are capable of rapid growth, the nitrate generated can be taken up as it is produced. In the absence of uptake of nitrate by plants it can be reduced by anaerobic denitrifying bacteria and the resulting nitrogen released.

Sintered glass filter media

Denitrification by anaerobic bacteria is easily achieved by the use of sintered glass filter media. The fissures in sintered glass support both aerobic and anaerobic bacteria according to the availability of oxygen away from the surface.

This system accepts ammonia and delivers nitrogen. Other systems which can be used are resins which absorb nitrate ions, and interestingly the recently-popularised Barley Straw technique in which the growth of bacteria decomposing the straw results in absorption of nitrate. It seems likely that the mulm which accumulates at the bottom of a pond or aquarium could also by its decomposition cause a similar nitrate uptake.

The simplest and most basic filtration system is undergravel in which by means of a basal filter plate with associated airlift, water is drawn through the gravel. This gravel supplies the support medium for nitrifying bacteria converting ammonia to nitrate.

More sophisticated systems provide per unit volume of filter medium a greater surface area for

HI-TECH, LO-TECH AND NO-TECH SYSTEMS OF GOLDFISH KEEPING ... comparing progress with results

bacterial colonisation. The problem with such filter systems is that they can clog and must be serviced regularly.

This done, they work well. Compact filtration systems are ideal when space is limited but high population densities have to be maintained.

However, there is a lot to be said for using the simplest system that is man enough for the job. Failure of a complicated system may be absolutely catastrophic. A simple system operating well within its limitations (which must be recognised) is perhaps less likely to fail and if this does occur the consequences are likely to be less drastic.

Following the analogy of the sintered glass filter medium it might be possible to combine aerobic and anaerobic filtration in an undergravel system If only half the tank base was covered by a filter plate, the other half would become more or less anaerobic and perhaps carry out a useful level of anaerobic filtration.

Control of phosphate levels

The aerobic/anaerobic balance would need to be worked out but this should not be difficult. The control of phosphate levels could be achieved by ion absorption, the use of ion-absorption resins could perhaps produce over-demineralised water.

Reduction of phosphate concentration is most easily achieved by the use of plants such as Watercress which will take up not only nitrate and phosphate ions but other plant nutrients such as potassium, iron and magnesium and keep these cycles going too.

The question of calcium status is one which generally does not present serious problems in spite of difficulties arising from acid-rain in some areas. The use of quick-lime as a disinfectant on fish farms ensures a reasonable level over the production year.

Lime can also be added to promote growth of *Daphnia* in combination with manure. On a smaller scale, aquarium and pond keepers are sometimes concerned about pH status, particularly in soft water areas.

A perceived problem

The natural waters from which soft water is supplied to the consumer generally support fish life and do not pose problems of calcium shortage in growth and development of the individual. If there is a perceived problem this might be relieved by addition of a relatively insoluble calcium source such as hard mollusc shells.

In a natural system of fish production the normal cycling of the elements maintains the system, the inputs of food balanced by the harvest of fish. With intensification the first factor which becomes limiting is frequently oxygen supply.

This is usually seasonal and the problem solved by use of mechanical air or water pumps without undue difficulty, that of nitrogenous waste disposal is more problematical. On large scale operations which maintain large natural or semi-natural reservoirs, it may be possible to operate a natural system to maintain water quality.

For fish farms located on rivers the simple solution may be to extract water, use it and return it with its load of pollutants to the river. The application of the principle that 'the polluter pays' may put an end to this practice or curtail it. I will consider water quality and its maintenance next month.

Just a short development step to install an automatic feeder on this different pond.

BUY LINES

NEW PRODUCT REVIEW

INTERPET

Interpet, the aquarium treatment market leaders, have developed Bioactive TapSafe, a unique approach to making tap water safe for fish.

Tap water is the most convenient source of water for use in aquariums; however, it is designed for safe human consumption but it is not safe for use with fish.

Water authorities add chlorine to water to kill potentially harmful bacteria. Sometimes water authorities use chlorine (chlorine plus ammonia) instead of chlorine because it is more stabble. Chlorine is toxic to fish and chloramine is even more toxic.

A number of heavy metals can find their way into tap water, most notably copper can leach out of domestic water supply pipes and hot water cisterns. These heavy metals are very toxic to fish, even at low levels. Fresh "raw" tap water is also very aggressive to the delicate membranes of fish's skin and gills.

TapSafe is designed to resolve these problems with tap water.

It instantly binds up chlorine, making it harmless; breaks down the chloramine bond and binds up the chlorine; binds up toxic heavy metals, eg, copper from hot water systems, thus allowing use of hot tap water in auariums; adds aloe vera, which forms a protective coating on the fishes' delicate skin and gills; protecting them from the aggressive effects of "raw" tap water. Aloe vera also aids wound healing.

The unique twist to TapSafe is that it also contains a culture of bacteria and enzymes, which boost the essential aquarium biological cycles and breaks down ammonia and chloramine and other sources.

This approach to chloramine means that unlike other chloramine products TapSafe does not affect ammonia test kit results. TapSafe is the ultimate tap water conditioner manufactured under stringent quality control procedures and backed by Interpet's industry leading reputation.

Attractively packaged Bioactive TapSafe comes in four sizes, 30ml, 125ml, 250ml and 500ml. In spite of its unique performance characteristics each size is very competitively priced.

• *Further information from: Interpet, Vincent Lane, Dorking, Surrey RH4 3YX, England. Tel: 01306 881033. Fax: 01306 885009.*

◀ *Interpet's Bioactive TapSafe.*

KINGSHOKO

Kingshoko Instant Filter Start is a new UK manufactured product consisting of live nitrifying bacteria for the elimination of ammonia and nitrite in new ponds/aquaria or when filters have been inhibited by medication or other disasters.

The pure live *NItrosomsonas* and *Nitrobacter* have not been freeze-dried or made inactive in any way, guaranteeing their immediate activity. Kingshoko is the answer for all fishkeepers having difficulty reducing toxic levels of ammonia and nitrite despite throwing money at the problem.

Kingshoko, being live bacteria, cannot be stored on a shelf and immediate use on receipt ensures maximum numbers of organisms are introduced to the filters. Under normal circumstances, reduction of ammonia begins in three days with nitrite levels following quickly behind.

Ammonia is normally eliminated within seven days in freshwater systems with marines taking slightly longer. Maximum efficiency is achieved by the use of Kingshoko in systems with already measurable levels of pollutants so that the live bacteria have food supplies to thrive on and multiply quickly.

Kingshoko is available in quantities for tanks from 16 gallons upwards to ponds of any size.

Save your fish now with Kingshoko Instant Filter Start.

• *Further information from: Kingshoko, Paul's Koi and Pond Supplies, The Forge, Cleveland Trading Estate, Darlington DL1 2PB. Tel/Fax: 01325 340084.*

JOHN MCLAUGHLAN HORTICULTURE

In our August *Buy Lines* the contact number for John McLaughlan Horticulture, producers of Viresco Aqua Algae and Blanketweed Controller, and Aqualin, the slow-release fertiliser for aquatic plants, was incorrect. The telephone number for the company should have read as below and not as published.

We apologise for any inconvenience caused to both customers and to the company.

• *Further details of both products from: John McLaughlan Horticulture, 50A Market Place, Thirsk, North Yorkshire YO7 1LH. Tel: 01845 525585. Fax: 01845 523133.*

POWERBREAKER

Whether you realise it or not there are many instances in the garden where electricity and water mix and certain zones are therefore highly dangerous!

Ponds, garden sprinkler systems, powerwashers and other "wet" parts of the garden are typical instances where you need to watch out for the dangers of electrocution.

The new RCD spur from PowerBreaker.

The new RCD spur from PowerBreaker — named the H921P — is the toughest unit of its type that money can buy. It is waterproof and dirtproof and will provide added protection against electrocution. It has a safety rating higher than any other RCD, and will, therefore, give you and your family peace of mind in the garden.

The large, hinged lid means the status of the RCD can be checked at a glance and it does not require resetting after a power loss.

It costs around £60 and is available from B&Q warehouse stores nationwide.

• *Further information from: GreenBrook Electrical plc., South Road, Harlow, Essex CM20 2BG. Tel: 01279 434561. Fax: 01279 635285. e-mail: gbe@greenbrook.co.uk*

STOCK NUTRITION

Now you can create your own cat free zone with the award winning Garden Watcher from Stock Nutrition.

The unit produces a blanket of high sonic and low ultrasonic sound, which is inaudible to humans, birds and fish — so it is ideal where you want to protect your bird table or fish pond against feline predators.

The area protected by Garden Watcher is up to 4,000 sq ft and is easy to set up. The sound pattern produced by Garden Watcher is harmless to cats, but will deter them from your garden and other protected areas. It will also deter foxes and other wild animals.

The Garden Watcher is mains operated and is supplied with a power supply unit and 10m of cable. Running cost will be approximately 1p per day.

• *Further information from: Stock Nutrition, Station Road, Yaxham, Norfolk NR19 1RD. Tel: 01362 694957. Fax: 01362 699067.*

▶ *The Garden Watcher from Stock Nutrition.*

BOOK REVIEWS

The recent aquatic book releases contain something for everyone — from an all-round guide to aquarium beginners, via the underwater world of our Channel Islands to the exotic fishkeeping houses of the Far East.

Pet Owner's Guide to Tropical Fishkeeping

Author: **Mary Bailey**
Publisher: **Ringpress Books**
Price: **£4.99**
ISBN: **1 86054 067 8**

With the bewildering display of tropical fish likely to be found in today's pet emporia, the would-be fishkeeper could be forgiven for both knowing where to start or for making any ill-judged choices. Fortunately, with this small book at their disposal, anyone aspiring to keep fish will not go wrong at all thanks to Mary Bailey's commonsense approach to it all.

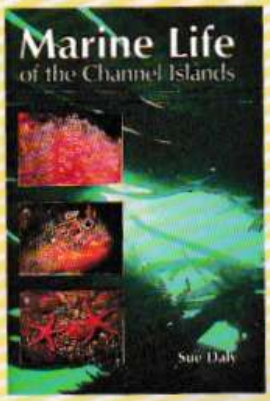
The opening section sets the tone, emphasising both the responsibilities involved but also giving excellent advice about finding out where help (when needed) can be obtained — a most effective confidence-bu ilding introduction if ever one was needed.

Planning the Aquarium discusses sizes and where to put it, but also looks forward to the wide choice of fishes likely to inhabit it. Subsequent sections include The Aquatic Environment, Equipment, Aquarium Decor, Setting Up the Aquarium, Aquarium Maintenance, Diseases and Other Problems.

Well produced, extremely clear colour photographs and filled with many a hint and trick passed on from the author's experiences as a long estab lished fishkeeper this book will stand any newcomer (or junior for that matter) in good stead for a successful fishkeeping career.

Only one slight niggle, the Neon Tetra isn't — it's a Cardinal!

DICK MILLS



Marine Life of the Channel Islands

Author: **Sue Daly**
Publisher: **TFH/Kingdom Books**
Price: **£13.95**
ISBN: **1 85279 108 X**

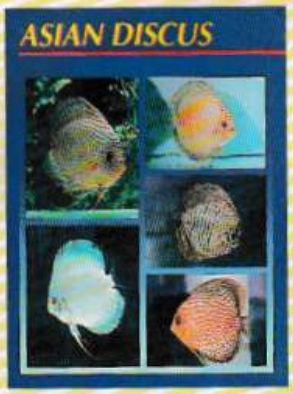
If asked most people would reason that there is not much point in any undersea activity in waters around the UK coasts as it's usually too murky and too cold!

Sue Daly's book immediately disproves this long-held myth; logic points out that at 100 miles further south than the mainland coast the water is much warmer and therefore likely to hold more interesting (and colourful) aquatic life. With a tidal level difference that can be up to 40ft a times, there is also a much extended rockpool area for both inhabitants and observers alike.

Divided into nine chapters, the book includes Sponges, Hydroids, Anemones and Corals, Worms, Crustaceans, Molluscs, Bryozoans, Echinoderms, Sea Squirts and, finally, Fishes.

All have been photographed in their natural habitats and again provide excellent evidence to the colourful lives being led underneath the waves. The book would make an excellent companion to a rockpool hunt and will add a much needed informative dimension to a day on or around the beach.

DICK MILLS



Asian Discus

Author: **Johnny Yip**
Publisher: **Ad Asia Pacific (HK) Ltd**
Price: **£39.99 from Friends & Discus, 32 The Spinney, Gilmerton, Edinburgh EH17 7LD. Tel: 09732 11218**
ISBN: **N/A**

For a surefire winner of a book all you need to do is get together a collection of experts, and collate all their practical experiences into a colourful book and fill with with the most gorgeous pictures of the most beautiful fishes. Simple, isn't it?

Despite all the obvious hard work involved that's exactly what Johnny Yip has done and the book is filled with both the expected and unexpected.

Just to give you an idea of what to expect the first section entitled "Best of Asia" presents a stunning gallery of superb varieties of Discus whose names almost defy description so it's best to let the camera do the talking.

Subsequent chapters follow Discus production in the following areas — China, Hong Kong, Indonesia, Japan, Korea, Malaysia, Singapore, Taiwan, Thailand and Vietnam — each with their photographs of fish production lines and, of course, the results of their labours.

However, it's not all just "travelogue and pictures" for there are several thought-provoking and practical articles, too, including Digital Definition of Discus, Reverse Osmosis Regulation against 86 Discus Disease and Step-by-Step Approach to Discus Breeding.

One feature that becomes apparent is that of the willingness of the contributing authors to impart their knowledge especially considering that they are all in competition with each other!

Needless to say, there is plenty of advertising material to browse through, so the reader is left with plenty of alternative choices to compare quality and production methods. For the Discus keeper there is much here of interest — and plenty to make you envious!

DICK MILLS

Blue Limia: A Livebearing Fish

FOCUS ON TROPICAL BREEDING

Iggy Tavares, PhD, looks at a colourful but peaceful livebearing fish

PHOTOGRAPHS BY THE AUTHOR USING A PENTAX Z-20 CAMERA

I ventured into fish keeping more than 30 years ago when I caught some wild Guppies in a stream in Nairobi, Kenya. Then there were no books or magazines that I had access to, but soon realised that Guppies were livebearers, when the extra large females produced lots of free swimming fry.

Since then I have kept many cultivated varieties of Guppies but also other livebearers such as Swordtails, Platies and Mollies.

More recently I have started becoming interested in other livebearers. These are wild-type fish which have not been artificially manipulated. They are less colourful than the man-made Guppies and Swordtails but are still beautiful in their own right.

Moreover, many of them are becoming endangered in their natural habitat and therefore warrant keeping and studying by hobbyist.

One of my local fish shops has started carrying a range of these livebearers and I will therefore write about them from time to time. Recently I came across the Blue Limia, which is colourful yet, peaceful. I therefore purchased a pair (£5) to study.

Blue Limia, *Limia melanogaster*, belongs to the family Poeciliidae that currently includes 26 genera and 138 species. The Blue Limia, also called the Blue-bellied Limia and the Black-bellied Limia, derives its common name from the blue sheen that

◀ Blue Bellied Limia male, *Limia melanogaster*.

FOCUS ON

TROPICAL BREEDING

The Blue Limia: A Livebearing Fish

overlays an olive green body colour which is particularly noticeable in males.

A faint vertical black barring pattern is found along the length of the fish. Males are generally more colourful with some orange and black in the caudal and dorsal fins.

Males grow to just under 2in and remain slim fish while females grow larger to 2½in and can get quite rotund during pregnancy when carrying young.

A feature of this fish is the very large and prominent black gravid spot in the females.

Aquarium Set-up

The Blue Limia in its natural habitat of Haiti and Jamaica is found in both slow and fast flowing waters, which explains why it adapts so easily to aquarium life.

This livebearer can be kept in either a community tank or a species tank and I tried this fish in both types of set-ups.

When I placed my newly acquired pair in an established 3ft community aquarium they immediately settled down and within minutes were pecking on the algae which coated one side of the aquarium. The aquarium had undergravel filtration and was maintained at a temperature of 26-28°F by a heater-thermostat.

Java moss, Java Fern and bogwood offered a natural looking home with places to hide and swim through. The other fish included a dozen half grown Swordtails, a trio of Hump-backed Limia, a pair of Zoonectes livebearers and some shell-dwelling dwarf cichlids.

The Blue Limia thrived on a diet of TetraMin and also voraciously nibbled DoroMin sticks. All the fish also got an occasional treat of live Whiteworm and Daphnia.

Breeding

Blue Limia are livebearers and, like other members of the Poecilidae family, the males have a gonopodium, which is made up from the third, fourth and fifth rays of the anal fin. The long pointed gonopodium is used to place packets of sperm internally into the oviduct of the female.

Here the sperm can be used immediately to fertilise the large-yolked eggs, which sustain the young as they grow within the mother. Packets of sperm can also be stored for several months for subsequent fertilisation of eggs.

The mating sequence of the Blue Limia is very different from that of other livebearers. At the fish shop when I first attempted to catch a pair there was wild commotion with the fish diving about madly. I did wonder whether this was just blind panic or whether there was more going on than first met my eye.

Later on in my tanks I noticed that unlike many livebearers the male did not relentlessly try to mate with the female. The female for the most part stayed near the bottom of the tank.

At feeding time she came to the surface to feed. This seemed to act as a trigger for the male who came up from nowhere to try to mate. There then followed a short but wild, very fast, almost blind chase downwards with the male in hot pursuit of the female but too fast for me to observe closely.

The male was probably successful at least some of the time in inseminating the female with his sperm using his gonopodium as the female did bear young.

This mating behaviour took place almost every time I put food in the tank or created any other small disturbance, which brought the female to the surface. This mating ritual was rather different from that of Guppies or Swordtails where the male does ritualistic dances in front of

▼ Blue Bellied Limia female, *Limia melanogaster*.

the female and is forever pursuing her.

The female Blue Limia produced live fry approximately every four or five weeks and is said to produce 40 to 60 fry. When heavily gravid I carefully moved the female to a small tank heavily planted with Java Moss and Java Fern. Here I managed to save about 20 fry, which were dropped over a few hours.

The fry were Guppy-sized and coloured except that a faint vertical barring on their bodies was visible from day one. The female, who still had a very prominent gravid spot, was removed. The fry were fed on powdered flake and Microworm. They ate readily and grew well.

Conclusions

There is more to livebearers than just cultivated Swordtails and Guppies: sure they add colour to a community tank but there are, however, many other wild type livebearers which are pretty.

Some of them are losing habitats in the wild and are becoming endangered. A pair of these livebearers hardly take up any space in a community tank yet can be very interesting.

The Blue Limia is easy to maintain and it has been fun watching them breed while the fry are very easy to raise.

Further Reading

An Interpet Guide to Livebearing Fishes, Peter W. Scott. Salamander Books Ltd., 1987.

Atlas of Livebearers of the World, Lothar Wischnath. T.F.H., 1993.

Aquarium Care

Aquarium Size: 36x15x12in (90x37x30cm)
Aquarium Decoration: Well planted tank
Water Temperature: 26-28°C
Water: Not too fussy, pH 6.5-7.5, 5-10°DH approximately
Diet: Flake, some live or frozen food

Fact File

Scientific Name: *Limia melanogaster*
Common Name: Blue Limia, Black Limia, Blue-bellied Limia or the Black-bellied Limia
Distribution: Rivers in Haiti and Jamaica
Size: Males 2in, females 2.5in (5-6cm)

A to Z of plants

By
DICK MILLS

PHOTOGRAPH BY A&P LIBRARY

U FOR *UVULARIA*

This moisture loving bog garden suitable plant is making an appearance here in its appropriate alphabetical slot but information on it is quite sparse. (For those avid readers wanting, or expecting, a more pertinent entry on say, *Utricularia*, should refer to the December 1997 issue of *A&P* where this carnivorous species was given comprehensive coverage). So back, for a brief time, to *Uvularia*. Also known as Merrybells, members of the genus light green leaves but the distinguishing feature is the rather drooping, bell-shaped flowers, generally of a yellow colouration. Propagation is by simple division of the rhizome rootstock. The three species usually described are *U. grandiflora* which grows to around 2ft in height with 2in lemon-yellow flowers and 5in leaves. 'Pallida', a variety, grows slightly smaller; *U. perfiolata* is much smaller again having pale yellow flowers; *U. sessiflora* is around the same size as the previous species, perhaps just a little smaller, and has narrow greenish yellow flowers.

V FOR *VALLISNERIA*

Now we come to a truly long established favourite amongst aquarists. Where would we be without its long, strap-like leaves to fill up those sides and walls of our aquariums, and where would Angelfish and Discus find equally suitable leaves to swim between? Adaptable for both warm water and coldwater aquariums good old 'Vallis' has few competitors. The generic name is in honour of the Italian botanist Antonio Vallisneri. Although similar in appearance to *Sagittaria*, *Vallisneria* belongs to the Hydrocharitaceae whilst *Sagittaria* is found in the Alismaticaea.

Vallisneria spiralis (Linneus 1753) Eel Grass, Ribbon Grass, Tape Grass

Description: The leaves, despite the specific name, are straight and strap like (it's the female flower stems that are spiralled). A variety, *V.s. tortifolia* is the species that has the twisted, corkscrew-like leaves.

Distribution: Southern Europe and North America but probably much more widespread.

Cultivation and Propagation: Best planted in clumps in a loamy substrate (although plain gravel or sand will do) and requires good light. Propagation is generally by runners which emerge at substrate level and eventually self-root bearing new plants; these can be severed once established and rerooted elsewhere. However, male flowers can develop at the base of the plant (usually unnoticed) but then they become detached to float on the surrace where they eventually pollinate the female flower which as described earlier is borne on tall spiralling stems.

Other Species: *V. americana* (which some authorities respect as being previously known as *V.s. tortifolia*) has pale green leaves reaching 3ft in length: *V. gigantea*, as its name implies, has much longer leaves (up to 6ft in length) which can be as broad as 2in.

FOCUS ON TROPICAL BREEDING

Dick Mills answers some FAQs about breeding

PHOTOGRAPHS BY A&P LIBRARY

▲ A happy family picture. *Neolamprologus brichardi* and young.

The best (and worst) thing for the newcomer faced with breeding the fish in the tropical aquarium is that the choice is so large and the possibilities apparently so endless.

But where to start, there's the rub! Some fishkeepers are guided by all they can read in books and magazines, whilst others take a chance on whatever takes their fancy with an equal mixture of both instant success and failure.

To help get aquarists on their way, we have prepared a basic guide to freshwater fish breeding — nothing too wordy and nothing too technical.

Q What is the availability in dealers?

Egglayers are plentiful. Livebearers likewise but usually the top four (Guppies, Swordtails, Platies and Mollies; species of other non-cultivated livebearers may be harder to locate).

Q Can you sex them easily?

The general guide with egglayers is that males are more colourful, slimmer, and with more developed finnage. The livebearer male has rod-shaped anal fin (applies to cultivated species only; in other species male anal fin is only partially notched). Female anal fin is fan-shaped.

Q Will they breed true?

Egglayers usually with very few inter-species hybrids produced, whose offspring would be sterile anyway. In the case of livebearers only if the various varieties of each species are kept in separate aquariums, otherwise inter-breeding is bound to occur with loss of quality and colour strains.

Q Is pre-spawning conditioning normally required?

In the case of egglayers the answer is yes; with livebearers, no.

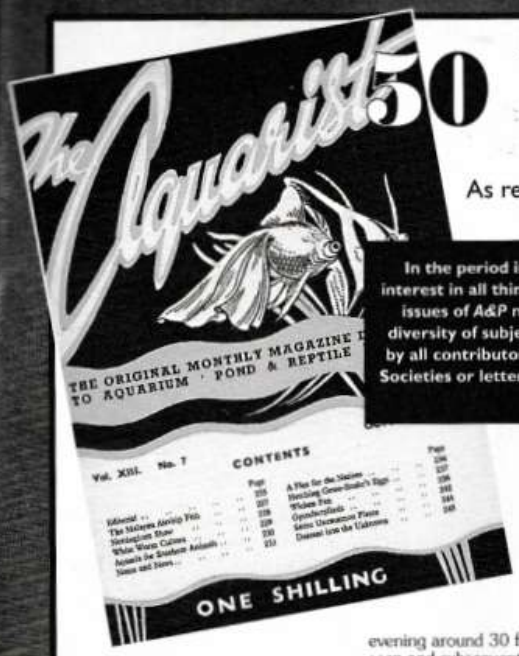
Q Will spawning occur in community aquarium?

In both instances, yes.

50 Years Ago ...

As recounted by Editor **Dick Mills**

In the period immediately after the war the increase of interest in all things aquatic was rapid. Looking through past issues of *A&P* makes interesting reading not only for the diversity of subjects raised but for the apparent enthusiasm by all contributors whether they be authors, reporters from Societies or letters from readers. October 1948 threw up this selection of topics ...



The editorial contained a two headed comment upon the conservation of fish habitats — firstly, to avoid contamination of the watercourses so vital to our native fishes and, secondly, as the previous 18 months had seen little rainfall natural watercourses were dwindling and there seemed little reprieve especially when road developers seemed to pay scant attention to their existence anyway.

OK. So here's a teaser for you. What's the species in question when given the following popular names? Malayan Airship Fish, Malay Gourami, Black and Silver Gourami. An article from Mr C. W. Allan, working in Egypt, gave further clues as he also included a drawing of the fish, a suspected *Osphronemus* species which turned out to be what we now know as the Chocolate Gourami, *Sphaerichthys osphremenoides*.

There's been criticism lately of transport services, especially the privatised sectors of the railways, but here's a different tale of endurance. Goldfish eggs laid one afternoon in Torquay were carried, still on their Myriophyllum plants, wrapped in brown paper at the bottom of a suitcase of a railway passenger travelling to London. The next day the eggs were transferred to water, with little hope of anything happening but on the third evening around 30 fry were seen and subsequently raised.

Tidal tanks are not a new thing for marinists. E. M. Atkins came up with a very simple method of creating such a thing. Two tanks were set up side by side and connected via a simple airlift, set within the top 4in of one tank (so that it would stop automatically after 4in of water had been transferred to the second tank; this left rocks partially 'high and dry' in the first tank and consequently submerged others in the second. Simply transferring the airlift device reversed the 'tidal flow' and so on, ad infinitum, although no set tidal patterns were adhered to. Bearing in mind the dry seasonal weather (mentioned earlier) heat was a problem and floating containers of ice were envisaged for future use, although Crabs and Prawns lived through the hottest periods quite satisfactorily.

The Nottingham & District A.S. Second Annual Show and Exhibition was a great event with the 140 members all contributing around 150 tanks (24in and over) of exhibits, including marines, reptiles and a 'biology stand' where the more minute water life could be viewed through provided microscopes. Visitors through the door added up to 13,900 and the receipts totalled £700.

The third Assembly of the FNAS was held with 13 societies being represented. Several guests were in attendance including Mr R. O. B. List (Secretary, FBAS), Mr Strachan Kerr (Secretary, Scottish Aquarium Society), the President and Secretary of Nottingham & D.A.S., the Deputy-President and Secretary of Newcastle-upon-Tyne & D.A.S., and Mr W. J. Page. Following lunch and the general meeting two lectures were given: Robert J. Affleck on 'Genetics and the Aquarist' and a 'racy' lecture on the 'Cult of the Goldfish' by Captain Betts. A tour of the aquarium and zoo at Belle Vue followed and after tea a film show presented a colour film of the Copenhagen Aquarium.

If things native are often neglected then the October 1948 issue of *A&P* put things to rights with a vengeance. Wilfred Bowen extolled the virtues of fishes such as the Minnow, Tench, Stone Loach and Sticklebacks whilst Iris Murray contributed a detailed study of the aquatic life of Wicken Fen which included plants, fish and invertebrates and insects too.

Dr Ben Dawes of Kings College London appealed to readers to send him 'fresh materials' such as infected fish suffering especially from Trematode parasites to further his studies. Several letters from readers containing information in respect of treatments for afflicted fish were also published. C. E. C. Cole observed hundreds of worms under the microscope feeding on gill membranes of fry; mature worms were seen to lay eggs at one every seven to 10 minutes. H. C. B. Thomas reported that badly infected fish will not stand much more than 30 seconds of the 0.2 per cent acetic acid treatment which could be repeated on alternate days. No treatment will save fry under two months of age. Precautionary treatment can include household ammonia (20 drops per pint of water) — 30 seconds bath for fish, and at least five minutes for plants.

New societies forming around this time included The Aquarium Club (of Fulham), Forest Hill & D.A.S., Oxford Aquarium & Pool Society (the second society in the area) and Streatham & District A.S.

Famous Faces in Fishkeeping

A&P meets the faces behind the names and lets them tell you of their own individual aquatic interests.

This Month:
ANDY HORTON

A&P: How long have you been in fishkeeping and what started you off?
AH: My interest goes back a long time to my first schooldays, aged nine. I walked to school, like all the kids, and with just a slight detour the walk would take me to the streams and ditches at the foot of the Downs. We did not have a pond or a tank so the sticklebacks, whirligig beetles, etc, brought home in a jam jar, went in a neighbour's pond.

A&P: Can you remember your first aquarium and what you kept in it?
AH: I came home from the fair with two goldfish in a plastic bag. A bowl was hastily set up. One of the goldfish was called Cassavooboo after an African President. The goldfish outlived him. When I left home I had a mental note that one of the first things I would do would be to have a pond in the garden. It did not work out like that as I moved on to a boat on the tidal reaches of the River Adur at Shoreham-by-Sea. Twice a day the tide would come in and bring the fishes to me, including large fish like the Grey Mullet and the Bass, and numerous fry in the surface waters. One hot summer's day in 1978 I decided to catch some of the small fry and view them closely in an aquarium. This started me off in 'Native Marine Aquaria'.

A&P: What are your special interests?
AH: My specialist interest is the coldwater marine life around the British Isles. The main problem is to keep the water cool in the summer. An adapted 'beer cooler' is used, but they have a tendency to break down.

A&P: Are you into breeding?
AH: I am fascinated by the reproductive habits of the British Sea Anemones. When they begin to mutliply and take over the tank the surplus specimens are taken back to where the originals were collected.

A&P: Do you belong to any Aquatic Society?
AH: In 1990 I founded the British Marine Life Study Society (BMLSS) to share information amongst marine life enthusiasts that live all around the United Kingdom, Ireland and Norway.

A&P: What do you think about Fish Shows?
AH: The idea of the aquarium side of the native marine hobby is to study the fish, crabs and other animals in a permanent aquarium mimicking their natural environment. Marine fish are not very good travellers and therefore not really conducive to being put on show. The BMLSS present exhibitions, with aquaria, but these temporary aquaria are not satisfactory because the fish take time to settle, and will hide.

A&P: If money was no object what aspect of the hobby would you like to follow?
AH: I would like to run a water life educational project with a public aquarium and computer resources linked together.

A&P: What fish would you never keep and why?
AH: It should be possible to keep almost any fish up to a certain size (excluding the large Sharks, Swordfish, Tuna, etc) if you have enough knowledge and sufficient resources. However, when it comes to the Coelacanth, do we really know enough about this fish to keep it successfully? I would regard it as unethical to take certain rare species from the wild. However, aquarium study also has many advantages which would result in the rescue of species threatened by the destruction of their native streams.

A&P: What's your favourite aquarium book?
AH: There is still no useful book on keeping British marine life in aquaria. However, there are plenty of books on the seashore, of which the New Naturalist 'The Seashore' by C. M. Yonge, first published in 1949, was the most influential. I recommend newcomers to marine fishkeeping the Salamander Encyclopedias of Marine Aquarium by Dick Mills and Nick Dakin. For advanced students my favourite author is Stephen Spotte.

A&P: How do you think fishkeeping is keeping up with other modern day attractions?
AH: Marine fishkeeping will always be a small, specialised niche. Otherwise it would seem that fishkeeping is holding its position compared to other attractions. This is really a guess. This is not the attitude I take when deciding to keep a particular fish. I will always research the needs of the fish, especially its water temperature amplitude.

A&P: What do you get from fishkeeping that keeps you interested?
AH: Rockpooling, going down to the shore to discover what has been left in the pools or under rocks, still holds its fascination. In the aquarium itself there are the observations of the behaviour of the fish and invertebrates, how they swim and bury themselves, etc, that still appeals. There always seems to be something new if I look hard enough.

A&P: What's next in your fishkeeping plans?
AH: The tendency is for me to stock tanks with individual species at low densities for special study. I might start on the book, although producing the journal Glaucus and the Shorewatch newsletter and other publications for the British Marine Life Study Society occupy most of my time. Then there is always the pond for the garden!

The Breeding Truth

FOCUS ON
TROPICAL BREEDING

Linda Lewis considers breeding basics

PHOTOGRAPHS BY THE AUTHOR

Have you ever felt inadequate as a fishkeeper? I certainly have. When I first began to be interested in tropical fish I relied on magazines and books to increase my knowledge.

Almost without exception, whenever it came to the subject of breeding fish, they made it sound so simple. You just moved a pair of fish to a breeding tank, let them get on with it, returned the adults to their home tank and then raised the fry. Anyone could do it.

Of course, this did not apply to all the various species available, and as we know, some popular species still resist everyone's attempts to get them to spawn, but on the whole, it made it appear that the majority of commonly-kept species could be bred without difficulty.

It was no wonder that I felt inadequate. The truth is rather different, as I hope this article will make clear. Raising a good quality fish, even a livebearer, is an achievement.

Fishkeeping in a Big Way

The first thing to realise is that most people that breed fish are into fishkeeping in a big way.

The majority of fishkeepers have one, maybe two, sometimes

◀ Fancy Goldfish like this Black and Gold Oranda, *Carassius auratus*, started with chance mutations.

FOCUS ON

TROPICAL BREEDING

The Breeding Truth

fry food. All you need to do is be ready with the right food at the right time. An easy mistake is to begin feeding as soon as the eggs hatch.

For the first day, sometimes even two or three days, fry live off the remains of the egg yolk. They will not take other food. All that will happen is that the water will be polluted, lowering water quality and endangering the fry.

Consult a decent book (anything by our own Dick Mills will do) and check when feeding should begin.

It is hard to gauge just how much to feed very young fish. Give them too little and growth will be impaired. Feed too much and the water quality will fall. The trick is to feed little and often and to carry out lots of partial water changes, taking care at all times to top up the tank with water of similar pH and temperature.

As the fry grow, check them over, cull any weaklings, and make sure the fish have enough space. If you find you're running out of room you could try offering some fry to the local shop, or better still to a member of the local fishkeeping Society.

Don't be Disappointed when you Fail

Once again, different fish need different conditions. Sometimes eggs hatch best in the dark, sometimes when held in a current of water. It is important that you are not disappointed when you fail. All the experts out there have experienced failures themselves, even if the last time was many years ago.

There are some kinds of fish that really ARE easy to breed. Of the egglayers the two that first spring to mind are Zebra Danios and White Cloud Mountain Minnows.

Both of these have bred in community tanks of mine, and fry have managed to grow to full size without any supplementary feeding from me. On such occasions the tanks have been established for a number of years and were heavily planted with dense clumps of fine leaved plants both at the surface and on the substrate. This provides cover, essential if fry are to get through the first weeks of life.

Naturally, only a very few fish do manage to survive in such conditions, but they are guaranteed to be the fittest, and healthiest of the batch.

Besides lack of space and difficulties of providing the correct food in the right amounts other "accidents" can occur. Each year the fish in my pond breed. Few young make it through without help, so I always trawl the edges to catch a few young, which I then grow on indoors.

Of course, what I didn't think to do the first time I tried this, was to check whether I had also caught any Dragonfly larvae. These insects are wonderfully camouflaged, and are also extremely efficient predators.

The Cause of the Problem

One by one my precious baby fish disappeared. I didn't find the cause of the problem until there were just two fish left. For fun (yes, I am slightly mad) I took a bucket of water from the pond, along with the weed it contained and sifted through, counting the number of larvae it contained. There were more than 90 Damselfly and Dragonfly larvae in that one bucket!

Things may also go wrong for no apparent reason. I once had a lovely female Guppy that produced batches of beautiful young on a regular basis but then a problem developed. The babies were all born dead. It could have been just a question of age. I maybe should have stopped breeding from her sooner, but how do you stop a Guppy breeding?

Of course, one of the joys of breeding fish is the knowledge that you might, just possibly, come up with a new variety. I used to think that such mutations would only occur when thousands of offspring were involved; that is until it happened right under my nose.

As I mentioned earlier, each year I take a few fry from the pond to raise. Last year these numbered five Shubunkins and one Goldfish. Over the following months the Goldfish began to develop telescopic eyes, yet there are only two Goldfish in my pond, both of which have normal eyes. Now I have living proof of how all those fancy varieties of Goldfish came about.

I hope I haven't put anyone off trying to breed their fish. My aim has been to highlight the fact that it is not as easy as some people would make out and to encourage a sense of pride in every fishkeeper who manages to raise to maturity a high quality fish, whether it be a Guppy or one of the difficult egg layers.

Indeed, the fish of which I am most proud is just a Red Swordtail. — but he's the best I've ever seen!

from the pond water, and are something that the average UK Koi keeper appears not to bother with.

I find that this is one area in which we could improve our practices in the UK by emulating the USA and the continent.

Very few UK ponds are known to utilise fractionators, in spite of several articles that have appeared about them.

In Germany fractionation is taken very seriously, and the KLAN magazine features comprehensive articles on the subject, which include some practical designs. The Dutch Koi Society, 'The Nishikigoi Society of the Netherlands', produces its magazine 'Koi' on a quarterly basis and this magazine also has, currently, a big article on foam fractionation with three different designs featured.

This periodical is also very good, and ranks second only to Germany's 'KLAN' publication. A Belgian magazine is also produced, 'Koi Kurier', and this is a commercial magazine printed in Belgian and German, but relying a lot on UK sources for its content.

KOI KEEPING OVER THE WORLD ... are we doing it all the same way?

Koi health

The health of Koi in the UK also comes under much scrutiny, and to this end there are a number of specialist consultants dealing in Koi health.

There is a plethora of medications both for the pond and for the Koi themselves on the market, so much so that it is sometimes difficult to decide what treatment is best to apply for which ailment!

It is also true to say that some of the remedies on offer are not as effective as they should be, for the active ingredients that used to be available have been withdrawn for human health reasons.

Unfortunately, the names of the remedies have not been changed, the claims of what they will do have not altered, but they are not as effective as they once were.

In the USA and on the continent there are different regulations in force, and a wider range of drugs is freely-available.

By 'surfing' the Internet, many web sites can be found that have a lot of recommendations to try with Koi. A lot of these are illegal in the UK and you run a risk by taking such advice, a lot of which is dubious anyway.

Currently we have difficulty in obtaining anaesthetic, which can now only be sold by pharmacists if they can satisfy themselves that you are putting it to correct use. In the past it was openly on sale at dealers' premises.

Currently, MS 222 from Thompson & Joseph is the only licensed anaesthetic for Koi in the UK. You may read on the Internet that Eugenol and others are just as good, but this is not true. They have not been researched properly for UK use and are known to have undesirable side effects.

There is also a problem area in the misuse of antibiotics, and to quote one consultant on the subject: "The frontiers of Koi health are being pushed further and further away as this problem grows."

I know from conversations held with American and European hobbyists that the problem is prevalent there also. There has certainly been a tightening up of procedures, but it is very hard to stamp out the practice of a lifetime for some people.

A very useful pond treatment, organo-phosphorus, has been withdrawn from sale by legislation and, therefore, the treatment of certain parasites proves somewhat difficult for Koi keepers at present.

New treatments are about to be released during 1998 which should considerably ease the situation. In certain ways the lack of effective treatment has forced us to improve our husbandry, preventing problems occurring rather than waiting until they happen and then finding a cure.

The largest UK Koi Society, the BKKS, have instituted a 'Koi Health Forum', where members can get 'informed amateur advice' on health matters. Germany has done the same, and guess what they have called it — you guessed it — The

Foam fractionation in the UK is not taken seriously, but we must be the only ones with our heads buried in the sand. The photograph shows a venturi driven fractionator.

Koi Health Forum!

Quarantine, perhaps the best preventative measure of all against parasites and disease, is currently being promoted, both in the UK and Europe, and some hobbyists now have a suitable system set up and running. These systems can also double as treatment quarters for a sick fish, and are used by some for growing on small fish before they go into the main pond.

KOI KEEPING OVER THE WORLD ... are we doing it all the same way?

So, to answer the questions we started with, there IS a right and wrong way to keep Koi, but this is defined more by climatic conditions than it is by national boundaries.

It is also regulated by what is available to purchase over the counter, both in equipment, and in treatments or medication.

Provided that your Koi are happy, your water is good, and you are getting your enjoyment — good luck to all the others, you will be just as successful as they are!

Fractionation by accident! This foam was created by a gravity skimmer into the settlement chamber. It is scooped off daily and disposed of.

BUY LINES *Extra*

NEW PRODUCT REVIEW

BIO PLAST

The importance of continual attention to maintaining optimum water quality in the aquarium cannot be over-emphasised and a vital part of this process is the various media available for use in the filtration system.

The Bio Plast range includes several media which each play their own individual part in the treatment of water.

VarioFill G is a traditional mesh-type pre-filter medium but can also be used with great efficiency in another important facet of fishkeeping as a spawning receptacle for egg-scattering species.

VarioFill follows up next and is the suspended material trapping floss medium for the main body of any canister-type internal or external power filter.

Biological action is the cornerstone of high quality water maintenance and CeraFoam blocks provide excellent accommodation for colonies of nitrifying bacteria. These should be cleaned on a rotational basis so that there is always a "seed" of bacteria available to recolonise any cleaned blocks as soon as they are placed back into the filter.

Many fish react positively to any water conditions which simulate those of their natural habitat. Moro-Pur and Hum-Active will especially benefit those species appreciating soft acidic water conditions.

Moro-Pur is a filter peat medium whilst Hum-Active is also peat-based but in granular form.

Either can be placed in a fine mesh bag and used in any aquarium filtration system or perhaps buried in the substrate if so desired.

• *Full details of all Bio Plast products from: Bio Plast Pet Ltd, 16 Bronte Close, Rugby, Warwickshire CV21 3PD. Tel/Fax: 01788 544298.*

You Write ...

Dear Sir,

I am writing to you, first to congratulate you and your staff for the great improvements to *Aquarist & Pondkeeper* — keep up the good work, and, secondly, I would like to voice my agreement with the comments and ideas expressed by Alex Stephenson in April's edition.

I have been interested in Tropicals for some 20 years now and have been lucky to have some of the, what many people consider, more difficult fish spawn for me, but never have I had so much satisfaction from spawning a fish as I have had from Goldfish.

Given the correct water conditions most fish will reward the aquarist with young and, by and large, all of the young will resemble the parents.

When breeding Goldfish, however, it would take a brave person to predict the outcome of a spawning; there are so many factors influencing the outcome and development of the fry.

This is where the pleasure lies for me. Never before have I felt so involved with the fish; previously, I was keeping water, now, I feel that I am actually keeping and breeding fish.

In my opinion, forget Discus, Killies and Apistogrammas ... they're easy. If you want a challenge, give Goldfish a go! Try them, then try and tell me that I'm wrong.

Mr. A. D. Race,
Washington, Tyne & Wear.

Dear Sir,

I had some Red Ramshorn Snails for some time but a few years ago I lost them but thought they would be simple to replace. Having tried many pet shops, aquatic and garden centres, Edinburgh Zoo and even Stapeley Water Gardens (whilst on holiday) without success I am turning to readers of *Aquarist & Pondkeeper* for help.

If anyone could let me know of a source of Coldwater Red Ramshorns (my indoor aquarium ones don't appear to overwinter successfully) I would be grateful.

J. Halyburton, Edinburgh.
Tel: 0131-334 4420.

FASCINATING FISH FACT

By LINDA LEWIS

You Can Teach a Goldfish New Tricks

Have you ever argued with anyone that fish can remember things for longer than a few seconds? I certainly have. Now scientists have provided concrete evidence. They have managed to teach that most humble of fish, the goldfish, to recognise and remember landmarks in their tanks, from one day to the next.

Two dishes, one full of food, and the other empty, were placed in the tank. The position of each dish was marked by a brightly coloured column. The goldfish found the food more quickly when landmarks were used, and often went straight to the correct dish. The researchers then sneakily swapped the food from one dish to the other. At first the goldfish continued to visit the now empty container, but very quickly learnt to go to the other one.

Not so dumb after all!

Derek Lambert *concentrates on Mollies and uncovers some surprising information*

PHOTOGRAPHS BY THE AUTHOR

The A&P Costa Rican Quest

River near Los Chiles, a soft, acidic water location where *Poecilia gillii* is a very common fish.

Throughout our Costa Rican field trip Mollies were just about a constant companion. Almost every habitat we caught fish in had its population of Mollies. Many of these looked dramatically different and it would be easy to believe each one was a unique species.

When I first started going out to Central America, on field trips, I thought just about every population of Molly I came across was a different species because they all seemed to vary in colour, pattern, size and, to a certain extent, body form.

When I first started going out to Central America on field trips I thought just about every population of Molly I came across was a different species

As time has gone by and I have seen more and more of these fascinating creatures I have come to sympathise with any ichthyologist who has tried to sort this group out. Many have started to look at the group but so far no-one has been brave enough to finish a major work on them.

The real problem with them is that most species are polymorphic. This means there are several different forms of each species occurring in the wild. If each of these were just confined to a certain area then they could be described as separate species in their own right. This has happened many times in the past. Better sampling in the wild, however, has shown that most of

these different forms live together and a single female will produce several different types in a brood.

In Costa Rica just about all the Mollies are lumped together under the species name of *Poecilia gillii*. This is an average sized Molly growing to about 8cm for males and 10cm for females. There are, however, several different male size morphs known and it is possible for a population to have males fully mature at only 4cm.

These fish tend to be slimmer, smaller finned and less colourful than their large morph siblings and they sex out at only three months of age. From then on their main interest in life is to mate with any available females.

Opportunist matings

Since the females are more interested in the large morph males these small morph fish have to forego courtship and concentrate their efforts on opportunist matings when the female is not looking. This works very well and a good proportion of small morph males are born in every brood.

Apart from the different size morphs many Mollies have different fin colours present in the gene pool. In *Poecilia gillii* some have black blotches and/or orange in their fins whilst others have yellowish or almost totally black fins. Some of this colour patterning is only displayed by the alpha males which are the dominant fish in any group.

As youngsters they will display very little fin colour and mimic the females so they are not attacked and bullied by the alpha fish. When they are fully mature the fins will develop

THE A&P COSTA RICAN QUEST ... surprising information on Mollies

their colour (usually black or bright orangey-red) and they will challenge the old alpha males for supremacy or more likely replace the alpha males which have fallen prey to predators. Being a brightly coloured fish in the wild might help your mate find you but other less welcome attentions increase as well.

In larger rivers with permanent populations of Mollies which can move up and down its length with ease all these forms are likely to be found. In small rivers, which often stop flowing in the dry season and become a series of isolated pools, it is common to find only one size morph and fin colour.

Fairly uniform in appearance

This is because most of the extensive gene pool is lost each year when the river stops flowing. Over the generations these populations end up fairly uniform in appearance and unless an ichthyologist has extensive wild caught material to compare them with he may think it is a new species.

Indeed, if a population of any fish is isolated from the ancestral species for a long period of time it is possible for a new characteristic to mutate and become established in all members of that population. This is called a derived characteristic. If it can be proven that the characteristic only occurs in that population and is common to all fish from that population then it can be used to describe it as a new species.

What we have with most of these Molly populations, however, are not unique derived characteristics but just a small part of the large gene pool which is represented in the species *Poecilia gillii*.

Moving on to the habitats Mollies are found in we come to the most surprising aspect of the Costa Rican trip. If you read nearly all the books which include Mollies in them you will find out that these fish live in brackish or marine habitats in very warm water.

Huge range of habitats

To keep them content in captivity you must, according to the books, keep them in very hard water, preferably with some salt added and at a minimum temperature of 78°F. Over the years I have been studying Central American fish in the field I have found them in a huge range of habitats which included cold mountain streams and many freshwater habitats, so I knew this common description of their wild habitats was seriously flawed.

What I had never found until the Costa Rican trip was Mollies living not only in cool freshwater but actually perfectly happy in soft, acidic water as well. We recorded several Molly habitats with a pH as low as 6.5 and zero hardness. Looking at the distribution of other Mollies it is

Poecilia gillii.

clear that this is not unusual, in fact lower pHs might be found south of Costa Rica in Panama.

With this data firmly in mind it now becomes obvious we have to rethink much of what we thought we knew about Mollies. Whilst the Costa Rican species *Poecilia gillii* is not the same as that found in the trade there are still many similarities.

What this could mean is that the cultivated forms might well be able to adapt to the soft water conditions found in Costa Rica, which would mean they could be included in soft water tanks or kept in soft water areas where many shops refuse to stock them.

Perfectly feasible to cross them

Alternatively, since all the cultivated fish are hybrids already it would be perfectly feasible to cross them to one of the Costa Rican Mollies and breed in the ability to cope with soft acidic water conditions. Basically we could design a fish to suit the local conditions.

Another common piece of misinformation in the literature is the diet that Mollies feed on in the wild. According to the books these are vegetarians who must have large amounts of vegetable matter in their diet to do well.

Looking at the various habitats we found Mollies in very few of them had growing aquatic plants in them. Algae was even missing from most of them. So what were these 'vegetarian' fish feeding on? Sitting by the river bank and watching the shoals of Mollies swim by it soon became clear to even a casual observer ... they eat anything at all.

True omnivores

Mollies are not herbivores at all but true omnivores. Watching them pick away at algae covered rocks tends to back up the vegetarian theory but seeing a 'pack' of Mollies attack a brood of young Cichlids, whilst the adult parents try desperately to protect them, blows this theory right out of the water. Even large pairs of Cichlids found it impossible to keep a shoal of 20 ravenous Mollies at bay. Darting in from all sides they managed to gobble down a significant number of babies even while I stood there watching them.

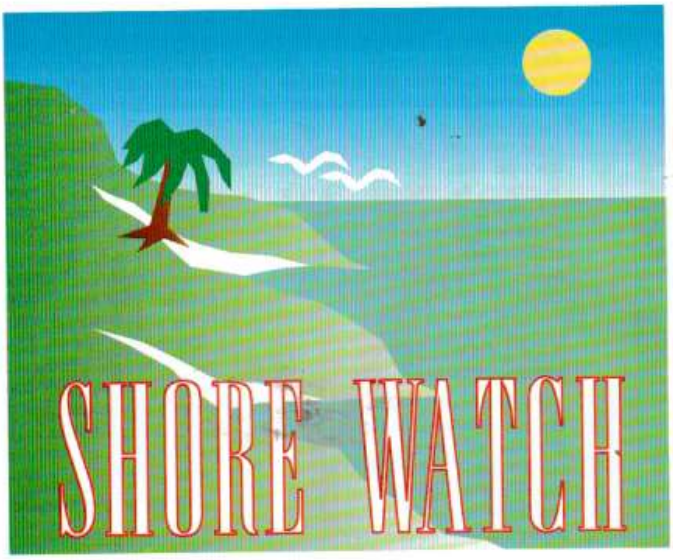
Having worked with Mollies extensively in captivity I adapted my fishes' diet years ago to that of a typical omnivore. This includes a good quality flake food combined with plenty of live food. Other foods I feed include pieces of liquidised meat and fish.

As for algae filled aquaria and extra vegetable matter in the diet, like many of the books say, I honestly believe they are a waste of time. Give them a large aquarium with power filtration, regular partial water changes and lots of nutritious food and your Mollies should be able to reach their full potential.

Obviously if you are unlucky enough to have a strain which only has the genes for early sexing out males then you will never be able to produce large Mollies but otherwise you should be able to produce good quality fish.

LEVAMISOLE DOSAGE

Derek Lambert replies: "We have had a couple of enquiries asking whether the recommended dosage of a 7.5 per cent standard solution of Levamisole (see The Brachys, *A&P*, August 1998) was correct. Despite its apparent "homeopathic" dilution — 1ml in 75 litres — I have found this strength to work perfectly for my purposes.



BY
ANDY HORTON

In the column for the year I will examine some aspects of the biology and behaviour of the rock pool fish and marine invertebrates that are both interesting and useful knowledge for aquarists.

What fish has the strangest common name? And how did it get it? Did someone just think up the name?

There are a few contenders for unusual names of the fish living in the seas around the British Isles. Many of the common names have been in existence for a very long time, so there is always a certain amount of guesswork in the origins.

SEAHORSE

An unusual fish befits an unusual name and the Seahorse must be a strong contender in both categories. A certain resemblance between the shape of its head and that of a horse ensured that the name was retained for popular use.

Its scientific name, *Hippocampus*, is Latin for a horse sea monster but the name Seahorse has been in use since the 18th century and probably before, when the fish was captured occasionally off the Dorset coast.

JOHN DORY

The John Dory, *Zeus faber*, is a distinctive fish that has been known from the time of the Ancient Greeks.

In the Christian days of old[1] the two distinctive spots in the middle of the body of this fish were reputed to be the marks of St Peter. This gave rise to fanciful origins of the name 'doree' from the word 'adore'.

However, the name most likely originated from the French 'doree' meaning 'gild' (overlay in gold) referring to the yellowish colour of the fish. The John was added on afterwards.

Another dory, the Sail-finned Dory, *Zenopsis conchifer*, has been caught as a rare vagrant off the Atlantic coast of Ireland.

COMMON FISH

Perhaps, more fascinating, are the origins of the common names of well known fish.

Starting with the name 'fish' itself for any underwater vertebrate that has fins instead of gills has certainly been pronounced the same way since Saxon times and probably before.

Later, when the whales and dolphins were discovered to be mammals, these were excluded in the definition. The Latin name for fish is piscis.

The origins of the name of edible fish like the Cod and Haddock are not known[2] but like the Herring, Eel, Saithe, Torsk and other northern fish probably originated from the early Dane and Saxon settlers in Britain, who brought the names with them.

The names of the southern fish like Mackerel and Turbot have French origins, but fish that were well known to the ancient Greeks in the Mediterranean like Red Mullet and Conger, have Greek origins.

Others like the Flounder, Plaice and Salmon (from salmo, salmire = to leap) acquired their name from the Latin.

Cuckoo Wrasse, Labrus bimaculatus (female). The name 'wrasse' probably came from the Cornish word wrach. Cuckoo is possibly derived from 'Cook', one of many alternative names for wrasse.
PHOTOGRAPH: ANDY HORTON

ROCK POOL FISHES

Small fishes of the world like the tropical Guppy (look up the origin in a dictionary) have been named only recently.

However, the commoner of the small sea fishes found in pools and shallow seas around the British Isles have names of great antiquity and are fascinating because of this.

Blennies (family: Blennidae) are very common fish of the intertidal pools. They are distinguished by a mucus-covered skin without scales. The name arises from the Greek blennos meaning 'mucus'.

Gobies (family: Gobiidae) another small family of fishes acquired their name from the Latin gobio, probably referring to any small fish including the freshwater Gudgeon, *Gobio gobio*.

Gurnards (family: Triglidae) are able to make a grunting sound with muscles attached to their swim-bladder, and their name has its origin in the Latin grunnire to grunt.

Tompot Blenny, Parablennius gattorugine. Tompot is the book name and has been reported to arise from the name 'tompot' referring to name of the pots put down by fishermen in which these fish are sometimes caught. This is an attractive explanation but none of the fishermen I know call either the fish or the pots by this name.

PHOTOGRAPH: ANDY HORTON

SCIENTIFIC NAMES

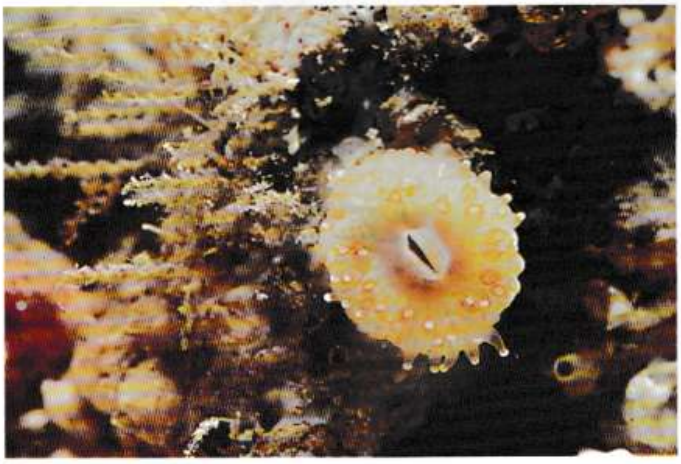
The common names for most of the common fish in different languages together with the scientific names are included in the Fishfinder Database, which can be found through the BMLSS (England) Web Site (see the footnote at the bottom of this page).

However, the use of different names is unsuitable for the scientific community, which needs to have a name that is the same for all researchers.

The scientific name must consist of two words known as the binomen, the first name is the genus and the second is the species. By convention these names are written in italics in a Latinised form. The general idea is that the name should have some relation to the characteristic of the animal, plant or fish.

Devonshire Cup Coral, Caryophyllia smithi. Scientific names are meant to describe characteristics of the species. The specific name in this case refers to the person who first described the species.

PHOTOGRAPH: ANDY HORTON



VERNACULAR OR COLLOQUIAL NAMES

Although the common food fishes have acquired standardised common names for sale in fishmongers, many of the smaller fishes are still known for a variety of different names.

One of the very common shore fishes with the scientific name of *Taurulus bubalis* is called by lots of different names like Bullhead, Rockfish and Sea Scorpion.

The larger very similar fish, *Myoxocephalus scorpius*, is often called by the same name, which can cause confusion.

Neither fish are poisonous, but both look like rocks, and in aquaria will swim around like bullies when they are hungry and swallow up any smaller fish in their expandable mouths.

OCTOBER ON THE SHORE

With the onset of winter most of the mobile animals like the rock pool fish and crabs move to deeper and warmer waters offshore during October.

However, off the southwestern coasts of Cornwall and Wales there may still be plenty of small fish in the pools and under rocks at low tide.

FOOTNOTES

[1] This fish is eloquently described in the Albion Band's rendition of Flora Thompson's book 'Lark Rise to Candleford'.

[2] The etymology, or origin, of many words are not to be found in dictionaries, but may be contained in microfiches and texts held by linguistic experts at universities and are not normally accessible to the general public.

Andy Horton, on behalf of the British Marine Life Study Society, will help readers who have any difficulties to pursue their interest in the marine life around the British Isles. The first enquiry will be answered free of charge but please enclose a return stamp and do not forget to include your address. Telephone calls should be made during office hours. For more information please write to: Andy Horton, Shore Watch, British Marine Life Study Society, Glaucus House, 14 Corbyn Crescent, Shoreham-by-Sea, Sussex. BN43 6PQ. EMail: bmlss@compuserve.com Web Site: BMLSS (England) URL= http://ourworld.compuserve.com/homepages/BMLSS/BMLSS (Scotland) URL= http://www.ed.ac.uk/~evah01/bmlss.htm The Webmaster for the Scottish site is Alan Pemberton.

Dr Keith Bannister ponders over taxonomic matters especially bearing in mind today's modern scientific advances

PHOTOGRAPHS BY MALCOLM GOSS

The Only Good Fish is a Dead One

Arius gigas — or what's left of it.

It is always the simple, intelligent questions that result in the least clear-cut answers. The only way to tackle the question posed above is in the same way that one would approach an ichthyological problem: deal with the parts that can be definitively answered and worry later about the, by then, diminished rump of the problem.

The current system, which has been formalised for over 200 years, relies on one particular corpse being preserved for ever to stand as the representative of the species. This actual dead fish was the one, or one of them, that was used in the original description of that species and glorifies in the name of 'The Holotype'. The point of having this holotype as the coat peg on which the species name hangs is that it can always be re-examined should there be uncertainty about the identity of a later specimen.

For example, the early descriptions were very brief, but adequate in the light of the small number of fish species known at that time.

PROPOSITION: Can DNA samples and computer technology provide the necessary tools of the trade for taxonomic classification? (see **Ask A&P, A&P,** July 1998)

Mixed blessing

Nowadays, the original written description may not be adequate to distinguish between that species and subsequently discovered species that rely for their distinctiveness on characters not realised as important at the time. This respect for the holotype is a mixed blessing for if it is important to know the shape of, say, the kinethmoid bone of the holotype, if it does not show up in an X-ray and the holotype must not be dissected then we are never going to know!

But without the actual holotype an X-ray could not even be taken. So the holotype is the final reference point of what is considered to be that species.

Mind you, even this simple (and would-be foolproof) system is not without its unforeseen hazardous delights. In the early days of exploration, preservation techniques were primitive. Formalin was not available in the middle of Africa during the last century (it still isn't, but that's another story), so fish were often dried, either whole or skinned, according to the size.

The dried fruits of these expeditions were subsequently handed over to the experts in the European museums (often to defray the costs of the expedition) who then identified them and described anything that was new.

Such was the state of affairs when in 1863 Dr Albert Gunther of the British Museum (Natural History) received a stuffed *Synodontis* from the Niger River, West Africa. This was a most unusual *Synodontis* in that it had a long pointed snout, like a Swordfish, and was given the name *Synodontis xiphias* (*xiphias* meaning 'sword').

No further specimens were ever found, yet it, rightly, appeared in the standard faunal works. In 1970 Max Poll was revising his catfish genus and needed to know the size of the orbit of *S. xiphias* so the staff of the fish section at the BMNH obligingly X-rayed it.

Artificial monstrosity

Oh horrors! The long snout was

the result of an overlong iron rod having been inserted to 'maintain' the shape of the stuffed fish. Poll was able to show that this artificial monstrosity was an example of the more normal species of *S. labeo* but as the latter was described after

S. xiphias the totally inappropriate 'swordfish' name must still be applied.

So perhaps the importance of having the body can be appreciated. The false nature of the long snout could never have been revealed by a picture or a photograph.

Nonetheless, both pictures and photographs have their uses. There is another sort of 'type specimen' called an iconotype. This means nothing more than a picture (usually a coloured painting) of the specimen and is important when the holotype was not preserved.

Some of the species described during Captain Cook's voyages are validated by the contemporaneous pictures. Photographs are particularly useful in supplementing the description of the species in that they record the live colours which do not survive preservation.

Yet they cannot be the whole answer. One cannot, for example, move the pectoral fin on a photograph to confirm the presence of an axial scale, should it much later be realised that such is important. Anyway, both pictures and photographs are more easily faked than dead fish. Such faking is not always malicious or for self aggrandisement.

The first ichthyologist to survey systematically the fishes of North American rivers and lakes was Constantine Rafinesque. His researches culminated in the publication of *Ichthyologia Ohiensis* in 1820.

Measurements by eye

Rafinesque was an enthusiastic, but slapdash, worker. He collected hard all summer and spent the winter writing up details of what he had collected, often from notes and sketches. (Apparently, he took most of the measurements by eye and 'without the restraint of a tape measure'). To that end, on one collecting trip, he spent time in the company of the famous naturalist and painter John James Audubon at the latter's house in Hendersonville, Kentucky.

Audubon was a tolerant man, brilliant artist and fine violinist. Rafinesque appeared to like Bats. Audubon was remarkably stoical when he found Rafinesque swatting the Bats he believed to be a new species with JJA's valuable violin.

In return Audubon presented Rafinesque with some drawings of new and remarkable fishes seen 'down the river' (real locality — Audubon's imagination) which were eagerly written up by Rafinesque. Remarkably this practical joke was not discovered for about 60 years.

While it takes an artist of

Natural History Museum — gateway to the Animal Kingdom.

Audubon's rare skill to perpetrate that smiling fraud anyone can do the same on a computer these days. Having just taken delivery of an all-singing, all-dancing computer, the man demonstrating it to be showed me how to put a colour slide in the gadget and change almost any aspect of the fish that I wanted. This could then be put on CD and be published. You can't do that with a body.

There are about 21,000 species of fishes. Therefore, there are about

THE ONLY GOOD FISH IS A DEAD ONE ... pondering on taxonomic matters

20,000 preserved holotypes. The discrepancy in number is because some have been destroyed by war, carelessness, rats or almost any other unlikely event you can think of excluding the fact that the actual specimens were not always preserved in the early days.

One can only surmise at the problems in locating a specific item amongst this lot!

These days there are new diagnostic techniques available that give us new insights into defining species. One recent example is the use of chromosome number and type in trying to understand what the hell is going on with the so-called species of *Barbus* in Lake Tana in Ethiopia.

One group of scientists are discovering all sorts of interesting phenomena in the chromosomes of freshly caught specimens. But the problem is how to relate their findings to the described species, represented by long preserved fishes from which this information is not obtainable.

So it is impossible to compare like with like. The new information cannot yet be fitted in to the system that we have inherited. In the case of karyological (chromosome studies) the comparisons are relatively simple, looking at number, shape and type.

Comparison of like with like

With DNA the situation is even more frustrating yet it is a very useful tool. But the essence of distinguishing species is comparison of like with like, to see the differences between them. Such DNA sequences as have been determined represent only a small part of the whole and it is not always the same or equivalent sequences that have been decoded in the very few species worked on.

It is possible that in a couple of hundred years technology, and an awful lot of labour, may be able to replace our current system that relies on the body. It may be better to regard genetical information as supplemental to the habeas corpus system already in use.

The two systems side by side may be more synergistic. But all of this speculation is very much for the future.

Where DNA studies are currently very useful is in establishing relationships among and between populations that are scarcely distinguishable morphologically. In other words, at below what is currently thought of as the species level.

These studies are particularly relevant in shedding light on the relationships of the puzzling cichlid morphs of the great lakes of Africa. This concern leads on to the inseparable question that is at the heart of the species naming system, what is a species?

Are there more sorts of 'species' in nature that cannot be categorised by having a dead fish as the reference point? Luckily for the reader such important considerations are outside the remit of this article but should always be borne in mind by all those interested in what 'species' they are trying to care for in their aquarium.

A somewhat undignified end for some magnificent catfishes.

No real worry

The correspondence that sparked this article (see Ask A&P, *A&P*, July 1998) referred to the concern about the numbers of specimens preserved in museums. There is no real worry over this.

Firstly, fish are not usually preserved in formalin. They are firstly 'fixed' in formalin and then preserved in alcohol. I realise that the fluid is of no consequence to a dead fish but mention it for accuracy.

The formalin has the effect of 'curling up' certain proteins making the whole body less liable to rotting and attack by bacteria, etc, but if kept in formalin the calcium would be slowly removed from the bones and, instead of a dead fish in the original shape of the living animal, there would be a pile of sludge and scales at the bottom of the jar.

As to the numbers in museums affecting the numbers in the wild, there is still no problem. The number is infinitesimally small compared with those caught for food. In one study that I carried out on a group of fishes there were 454 preserved specimens in all the European and American museums.

One net haul from one of the lakes in which they live can produce that number, all of which are eaten that day. And there are an awful lot of nets, and a good few lakes, not to mention the rivers ...

Here, of course, I refer to more than just the holotype. To understand the species it is ideal to have a whole size range of specimens as the body shape and so on can change dramatically with size.

There is also a great deal of non-human predation on the species in the wild. But the greatest threat to the number of fish in the wild is not collecting for science.

I have recently come back from two years working on Lake Tanganyika. The main food fish are becoming very scarce so the local people have taken to seine netting sandy bays. A large seine net can easily catch 30kgs of sand-dwelling cichlids in one haul.

Thirty kgs of *Xenotilapia* represents many, many times the number of individuals in all the museums in the world.

And that was from one haul, in one bay on one day. Eat and repeat and it will soon be realised how tiny the ichthyological collections of the world are compared with the number of fish eaten each day.

Everybody benefits

A surprisingly large number of fish in museum collections were not purchased from fishermen in the first place. This sophisticated collecting technique is a lot easier than doing the dirty work of setting nets and of great benefit to the local fishermen who can charge a European a lot more for a fish that he is not going to eat than a local who is going to eat it.

So everybody benefits. And that particular fish was dead anyway. Nobody pretends that the system we have is ideal, but it is all we have that is comprehensive. Were it possible to start again, now, but knowing as much as we do something different would have to be designed. A better logging or reference system would result. But for the moment we are saddled with lots of preserved fishes in museums.

I hope that this article answers the questions originally asked. It certainly does not answer a lot of questions that should have been asked. Perhaps, if the curiosity arises in the readership the fundamental questions of 'What is a species?' and 'What do we do when we've got one?' could be answered.

Weston Wonders

The Supreme Festival of Fishkeeping, sponsored by Rolf C. Hagen and organised by the Federation of British Aquatic Societies, is a long-established date in the aquatic calendar combining all that's great in fishkeeping — information, entertainment and a marvellous social scene where everyone gets together for an annual reunion.

Held at Pontins Sand Bay Holiday Chalet Centre near Weston-super-Mare over the weekend of 30 October-1 November it promises to live up to its reputation of having something for everyone.

Speakers this year include two eminent public aquarium experts, Colin Grist of the Blue Planet Aquarium, and Joe Pecorelli from the London Aquarium; add to this the knowledge of Koi keeper Ray Killham and you'll see nearly everything will be covered.

The Society Furnished Aquarium Competition (which made its debut last year) is back with Societies being asked to furnished a tropical or coldwater aquarium as expertly as possible — no time limit — that's the province of that other Furnished Aquarium Race Competition in which nearly everyone gets wet, especially in the so-called "Final!"

If the phrase a "River Runs Through It" is familiar from the film of the same name, then you won't be surprised at Weston this year for that's another feature to be built in — it's probably going to be the biggest aquascape ever!

To include everyone in fishkeeping is the aim of the organisers and juniors are not left out. They have their own Open Show alongside the Hagen Masters Open Show (Championship Classes E, Ea and Ak) and, for this the Diamond Anniversary year of the FBAS, no less than two Supreme Championships.

The usual "Supreme" will feature Championship Class Trophy winners throughout 1998 and the second is comprised of winners from the Diamond Trophy Classes held too.

Now here's something for the Juniors — Tetra are again sponsoring the Junior AquaQuiz and, in conjunction with the National Junior Fishkeepers Association, they have allowed *A&P* to feature a quickfire Competition with six pairs of Weston Weekend Tickets (one adult, one junior). All you have to do is answer, to the best of your ability the questions set out below. It doesn't matter if you can't answer all of them as it's the top six scores that matter in the end.

Each of the six junior winners will be invited to take part at the Final AquaQuiz at Weston. So, get cracking with the questions! Fill in the entry form on the next page with your answers, IN BLOCK CAPITALS PLEASE.

1. How many Fins do Barbs have?
2. What is the best-known Cyprinid?
3. What are Lake Malawi and Lake Tanganyika Cichlids often called?
4. In which African lake has the introduced Nile Perch eaten most

SHOW DATES AND FESTIVALS

(Rule Codes: A = A of A; FB = FBAS; FN = FNAS; FS = FSAS; I = International Goldfish Standards; N = NEFAS; U = USofA; Y = YAAS)

3 October Goldfish Society of G.B. (I)
4 October Basingstoke A.S. (AA); Grangemouth A.S. (FS); Halifax A.S. (FN); Littlehampton & Bognor A.S. (FB)
11 October Doncaster A.S. (Y); Washington A.S. (FB)
18 October Halifax A.S. (FN); Solway A.S. (FS)
19 October West Cornwall A.S. (FB)
24/25 October British Aquarists Festival, Manchester (FN)
30 October/1 November Supreme Festival of Fishkeeping, Weston-super-Mare (FB)
1 November Bradford A.S. (Y)

AUCTIONS & EVENTS

3 October. Goldfish Society of Great Britain. 50th Anniversary Commemorative Open Show and Auction. St. Paul's Church Hall, Chigwell Road, Woodford Bridge, Essex. Auction starts 12 noon. Details from Show Secretary, Graham Turner, 73 Chelmsford Avenue, Grimsby, South Humberside DN34 4SE. Tel: 01472 353615.
4 October. Basingstoke A.S. Open Show. Information from A. Marshall, 01256 475751.
5 October. Reigate & Redhill A.S. Bring 'n' Buy. Strawson Hall, Albert Road, Horley, Surrey. Doors open 7.30pm. Auction begins 8pm with refreshments served at about 9.30pm. Further details from Jeremy Spence, 01293 512932.
5 October Reigate & Redhill A.S.
6 October Gloucestershire A.S. Twigworth Lodge, Tewkesbury Road, Gloucester. 8pm. Annual General Meeting, Quiz and Open Forum. More information from Andy, 01452 372948.
11 October Washington Aquarist Society & Pondkeepers. Open Show and Auction at the Nissan Sports and Leisure Facility, Nissan Car Works, Washington, Tyne and Wear. Judging starts at 1pm. Booking of Lots from 10.30am. Auction starts at 12.30pm prompt. Raffle, Bar and Refreshments available. Any Lots unsold before 6pm will be returned to the vendor. For further information contact Alan Race, 0191-417 0768.
11 October Preston & D.A.S. Autumn Auction. Fish, Plants, Equipment. The Students Union Hall, Fylde Road, Preston (University of Central Lancashire). Booking in 11am. Auction starts 12 noon. Admission: Adults 50p, children free. Further information from Steve Spencer, 01772 321145.
11 October Robin Hood Aquarists. Auction of Fish and Equipment, Highbank Community Centre, Farnborough Road, Clifton, Nottingham. Refreshments and bar facilities. Pre-bookings to Gary Langley on 0115 9552686 or 01523 775889 or arrive early on the day.
18 October Dunstable & District A.S. Auction. Queensway Hall, Dunstable. For more information contact Ian Pitts, 01462 731225.
20 October South Park Aquatic Society. 8pm. Wimbledon Community Centre, St. George's Road, Wimbledon SW19. Ron Allum from Hounslow A.S. talks on his experiences in "Keeping Marine Fishes". For further information from Ken Seaton, 0181-641 2848.
23/25 October North Jersey Aquarium Society. Tropical Fish Weekend '98. Howard Johnson Convention Hotel, Saddle Brook, NJ, exit 159, Garden State Pkway (near GW Bridge). With Wayne Leibel (Pike Cichlids), Ginny Eckstein (Plecos), Bing Seto (Discus), Lee Finley (Catfish), Paul Loiselle (Dwarf Africans), Mike Schadle (Livebearers) and .... The Return of Chuck Davis! PLUS ... hands-on workshops by Ted Coletti (Plants), Ann Broadmeyer (Judging), Terry Fairfield (Diseases), Mark Broadmeyer (Filtration). PLUS ... all-species Tropical Fish Show, banquet with guest speaker, giant livestock and dry goods, auctions, trade rooms. PLUS ... freebies, quizzes, door prizes, raffles, and contests all weekend for the whole family! Come for a day or stay the weekend with special $85 room rate! For brochure e-mail ajatprez@pica.army.mil, or mail NJAS, PO Box 591, Nutley, NJ 07110, call (732) 541-1392, or surf members.tripod.com/~NJAS/NJAS.html.
25 October Clacton Fish Club. Auction at the Great Clacton Community Centre, Valley Road, Clacton, Essex. Booking in and viewing starts at 10am with the auction commencing at 12 noon. There will also be refreshments, a raffle, lucky dip and sales stalls. Car parking for visitors.
25 October Clacton F.C.
15 November FNAS
22 November Oasis F.C.

of the native Cichlids?
5. How many pairs have Corydoras got
6. What Loach has *botia* in its name but isn't from the genus *Botia*?
7. What name is given to the dark area on the belly of a pregnant livebearer?
8. The first known livebearer fish was *Jenynsia lineata*. Who, according to most text books, discovered it?
9. What do *Bedotia geayi* and the Laceplant have in common?
10. Which is the odd one out and why — Black Crappie, Purple Loosestrife, Widemouth Blindcat or Alewife?
11. How many fins has the Common Goldfish?
12. *Ichthyophthiriasis* is better known as?
13. What connects *Microsorum pteropus* and *Vesicularia dubyana*?
14. Water is the compound of oxygen and what other gas?
15. Which word is generally used to describe an inland body of water?
16. Give another common name for the Spanner Barb?
17. What is the common name for *Xiphophorus maculatus*?
18. What is the common name for *Botia macracantha*?
19. What is the common name for hydrogen hydroxide?
20. What are the two parts of a scientific name called?

British Aquarists Festival Update

Plans are progressing for this the 47th British Aquarist's Festival on 24 and 25 October 1998.

We haven't missed a year since its inception a record which supports this festival, as one of the best in the country. One of the oldest, maybe but not stuck in the past.

The first British Aquarist's Festival, sponsored by *Aquarist & Pondkeeper* was held on 2-5 May 1951 at Belle Vue, Manchester.

The opening line to the first advert was: "We invite aquarists throughout Great Britain to co-operate with us in presenting an aquarium exhibition worthy of this Festival Year."

Although this is not a Festival year the above still applies to this year's Festival, and you will all be made very welcome.

The event is organised by The Federation of Northern Aquarium Societies and is fully supported by many leading traders and Aquarist Societies, including Specialist Societies.

A number of traders and Societies have already booked their space, so please let us have your booking as soon as possible, thanks.

As most people will know by now we expect more entries on THE CHAMPION OF CHAMPIONS STAND, together with our second Champion of Champions Contest for Coldwater Fish only, which will benefit all hobbyists.

All Federations thoughout the county who are there to promote and support fishkeeping, will no doubt back to the full *Aquarist & Pondkeeper* with their innovations.

All Federations and Specialist Societies are invited to participate in the Festival, by bringing their stands, demonstrations, and to promote their own specialist side to the hobby.

But please note this is a "first come, first served" basis as we may not have the room to accommodate all who wish to attend.

The general theme of the Festival this year will again be Conservation and the Federation will be backing this Conservation theme with an exhibition of fish bred under the F.N.A.S. Breeders' Schemes, with members explaining how they were bred, water conditions, habit, etc.

We hope this will encourage more members, and "new" aquarists, to turn their hand to breeding and rearing fish.

We will be helped on this with displays put on by Bolton Aquarium and Museum and Chester Zoo.

Again this year a Habitat Tank Competition, open to individuals. Societies, and Specialist Groups. The Final of the Aquarian Aquachamp Competition will be held at this year's Festival

The venue is The George H. Carnell Leisure Centre, Kingsway Park, Urmston, Trafford, Manchester (which is only 100 yards from junction 9 off the M60 motorway)

Admission: £2.50 adults, £1.50 children and OAP. Children up to six years accompanied by an adult free. Open to the public 10am until 5pm.

For further information contact: Festival Organiser, A. Chadwick, 9 Bronville Close, Chadderton, Oldham OL1 2RH. Tel: 0161-652 6207.

SOCIETY WORLD

N.J.F.A. TETRA JUNIOR AQUAQUIZ

ANSWER SHEET

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19. .....
20. (A) .....
20. (B) .....

Fill in your answers, IN BLOCK CAPITALS PLEASE, and return them to:
N.J.F.A. TETRA JUNIOR AQUAQUIZ/A&P,
44 Lakewood Drive, Wigmore, Gillingham, Kent ME8 0NS.
Entries must not arrive any later than 16 October 1998.
Please complete the following so we know who to contact if you are successful.

NAME .....

ADDRESS .....

.....

..... POSTCODE .....

N.F.J.A. MEMBERSHIP NO. (IF ANY) .....

Signature .....

Parent/Guardian Signature .....

BG WILDLIFE PHOTOGRAPHER OF THE YEAR 1998

The results of the biggest and best competition of its kind in the world culminates in a major exhibition of stunning wildlife photography at the Natural History Museum in London from Saturday, 24 October 1998 to Saturday, 27 February 1999.

The accompanying shot by Richard Herrmann of a Blue Shark feeding on Anchovies off the Californian coast is just one of all 150 winning and commended pictures at the exhibition.

This renowned celebration of wildlife (not just fish) is now in its 15th year and over 20,000 pictures from 60 countries were entered. The competition, which aims to promote appreciation of the natural world and awareness of environmental issues, is open to both amateur and professional photographers aged 18 and over.

It consists of 12 categories and has two Special Awards — the Gerald Durrell Award for Endangered Wildlife and the Eric Hosking Award for the best portfolio of six images taken by a photographer aged 26 or under. A Junior Section also competes for the Young Wildlife Photographer of the Year with three categories, 15-17, 11-14 and 10 years and under.

This year's results will be published in a special 48-page portfolio free with the November issue of BBC Wildlife Magazine and as a commemorative book, Portfolio Eight, containing all the prizewinning and commended images.

BG has sponsored the competition for nine years. Transco, its pipeline business, supports the UK tour of the Wildlife Photographer of the Year which this year visits 35 venues. BG, operating as British Gas International, sponsors touring sets of the exhibition overseas.

The Natural History Museum is open from 10am-5.50pm Monday-Saturday and 11am-5.50pmSundays. Nearest Underground: South Kensington — Piccadilly, Circle and District Lines. Buses: 14, 49, 74, 345, C1, 209, 70 (Monday-Saturday).

Visitor Enquiries: Tel: 0171-938 9123.

Photograph by Richard Herrmann, courtesy of the Natural History Museum.

MAFF MEETINGS

The Salmon and Freshwater Fisheries Group had agreed on topics on which it wishes to receive comments for discussion at future meetings.

These are: 19/20 October 1998, salmon, sea trout and wild brown trout fisheries; 16 November 1998, introductions and transfers of fish; 10/11 December 1998, factors affecting habitats; 11/12 January 1999, coarse, stillwater trout and eel fisheries; 8/9 February 1999, factors affecting fish population; 8/9 March 1999, fisheries and recreation; 21/22 April 1999, institutional arrangements for the management and regulation of fisheries; fisheries funding.

Comments on any of these topics should be sent to: Mr Alan Dell, Review Group Secretariat, Room 308, Nobel House, 17 Smith Square, London SW1P 3JR, and arrive at least three weeks before the meeting at which the topic will be discussed.

All meetings, with the exception of the 19/20 October meeting (to be held in Cardiff) will be held in London.

To accommodate the views of local organisations and individuals who may not be able to attend the London meetings the group will be arranging localised meetings in the New Year in the South West, The North, The Midlands, Wales and London (to include the South East and East Anglia).

Prospective attendees should contact the above address in respect of these local meetings by 30 September 1998.

SPARSHOLT CELEBRATES

Sparsholt College is and will be in the news. At the recent College Presentation Day Ceremony in Winchester Cathedral two people stood out for special commendation.

Neil Clarke, from Luton, recently completed the national Diploma Fishery Studies Course and not only passed with flying colours but also romped away with the O.A.T.A. Trophy for Best Performance on Course and the John Allan Ltd Prize for Best Performance in Aquarium Systems Unit.

Neil, who had placement at Interpet Ltd (Research Dept), Karobar Koi (Retail) and JMC (Wholesale) is progressing to Queen Mary's University to study Marine and Freshwater Biology.

The Principal of the College, Dr Len Norman, also came in for well-deserved tributes. Following the delivery of his last ever report on the College's academic year Dr Norman is taking retirement after 28 years in the post as principal.

Next May Sparsholt College will be the focus of a celebration to commemorate 100 Years of Agricultural Education in Hampshire. The "100 years Fair" will take place, drawing together all strands of interest in land-based industries.

The original Farm School was at Old Basing in 1899, moving to Sparsholt in 1914 with the construction of the Central College building in 1926. Renamed as the Hampshire College of Agriculture in 1967 the College became Sparsholt College, Hampshire, in the late 1980s.

Former students will be invited to return and share the celebration at a

special reception. The public, industry and local rural community interests will also be invited to an Open Day Special on Saturday, 15 May.

Those who are interested in participating, attending and contributing to the "100 Years Fair" should contact: David Alderson, Marketing Manager, Sparsholt College Hampshire, Sparsholt, Winchester SO21 2NF.

CALLING ALL POETS!

If you can write a 30-line poem about your fish then you could be in line for a prize in the "All Creatures Great and Small" regional Poetry Competition for people living in the south east.

First prize is £10, second prize £25, third prize £10.00 with three £5 runner-up prizes, too.

The winning poem will be published in the *West Sussex Gazette* and other leading local newspapers.

Poems (original and previously unpublished) should have an animal theme and be in any style, rhymed or unrhymed. The 30-line limitation does not include the title.

Write clearly or type your poem on one side of an A4 sheet of paper.

There is an entry fee of £2 per poem (three for £5). Cheques and POs made payable to Arun Poetry Club. For a list of prizewinners please send SAE marked 'Results'.

Send your entries to: The Secretary, "All Creatures Great and Small" Contest, 13 Manor Close, Storrington, West Sussex RH20 4LF.

FORD'S "CARNIVOROUS KA" AQUARIUM COMES TO THE LONDON AQUARIUM

The incredible Ford Ka Aquarium is splashing down at the London Aquarium — its final resting place after an extensive tour of Great Britain and Europe.

Designed by Rob Scott and holding 245 gallons of water the "Carnivorous Ka" Aquarium is now home to a family of tropical freshwater Red-Bellied Piranha.

Taking three months to build this fusion of art and engineering has been created by removing the car's engine, gearbox and seats, then welding a frame into place to support the water required to fill it.

Marine plywood forms the base of the aquarium which is covered with pond rubber and silicon sealer to ensure the tank is water-tight.

The Ka is illuminated from the inside and even retains some of its working features, such as the front, rear and side lights. Once the Ka Aquarium is filled with water the fish are lowered in through the sunroof, which is also how London Aquarium's aquarists feed them.

After creating a stir at The London Motor Show, Mezzo Restaurant and Selfridges, the Piranha can now really feel at home in the lobby of the London Aquarium. With one of the most panoramic views in London — across the Thames to the Houses of Parliament — we can only hope that the flesheaters will not be tempted to take the Ka for a spin!

For further information contact: Caroline Randell or Malcolm Sargeant, The London Aquarium, County Hall, Riverside Building, Westminster Bridge Road, London, SE1 7PB. Tel: 0171-967 8026. Fax: 0171-967 8029.

WHAT PRICE LOYALTY?

One of the Midland's finest aquatic centres, Ullesthorpe Garden & Aquatic Centre, holders of the Nurserymen and Garden Centre Garden Centre of the Year Award, has recently launched its own loyalty scheme in the shape of its Spend and Save Card.

The launch of this electronic system follows the highly successful trial of the manual system which ran last year and which Directors, Ian and Ruth Tallis, consider played an important part in the Centre's 37 per cent increase in turnover.

Ian Tallis said: "Whilst loyalty cards do not necessarily create customer loyalty they do give us the opportunity of offering customers discounts on purchases, which reinforces the perceived value for money we offer and improves customer satisfaction.

"Thesophisticated electronic system has also enabled us to compile a very accurate and totally unique database, whilst analysing answers to carefully targeted questions on the application form has helped us to focus our marketing strategies.

"The take-up rate of this new electronic system has already outgrown the trail manual system run last year," Ian concluded, "and, despite the bad weather, our current growth on turnover is in excess of 3 per cent."

Ullesthorpe Garden Centre Ltd., Lutterworth Road, Ullesthorpe, near Lutterworth, Leicestershire, LE17 5DR. Tel: 01455 202144. Fax: 01455 202585. E-mail: Ullesgc1@aol.com

MAFF NEWS

The Ministry of Agriculture, Fisheries and Food has confirmed an outbreak of Spring Viraemia of Carp (SVC), a contagious viral disease in fish, at Tanyard Fisheries, Tanyard Lane, Furners Green, near Uckfield, East Sussex.

SVC can have a devastating effect on fisheries, and all fisheries managers, as well as fish importers and dealers, are reminded of the need to take strict precautions against the spread of this disease.

SVC is a notifiable disease and MAFF has made an Order prohibiting movements of fish to and from the affected site.

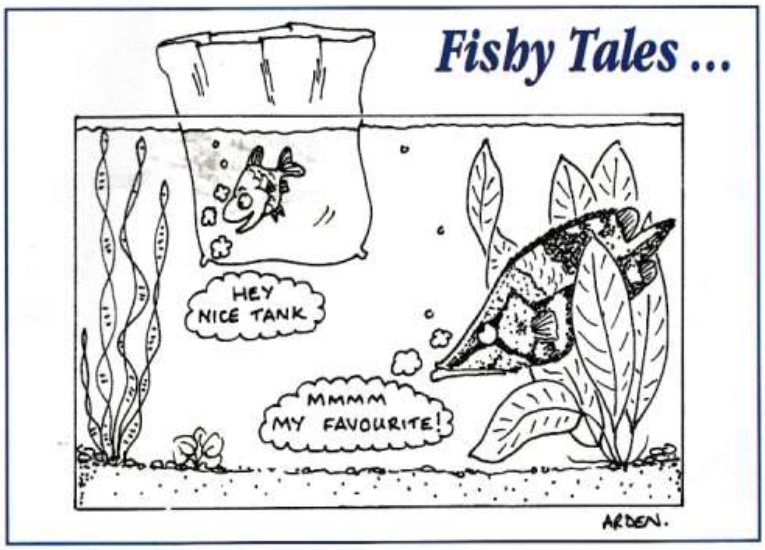
SVC is a contagious viral disease which affects common carp and its ornamental varieties, in addition to other species including goldfish, tench, pike and Wels catfish. It often results in significant death rates. The disease is widespread m cointinental Europe.

In 1988 there was a major outbreak in England and Wales, with 40 sites affected. Prior to 1988 only four cases had been recorded in Great Britain. There were two isolated cases in 1991, 22 in 1994, 14 in 1995, three cases in 1996 and seven cases in 1997.

Importers, dealers, traders and fishery managers are advised to follow the advice set out in MAFF's advisory booklet, "Combating Fish Disease", available free of charge from the CEFAS, Weymouth Laboratory, The Nothe, Barrack Road, Weymouth, Dorset DT4 8UB. Tel: 01305 206673/4. Fax: 01305 206602.

Anyone noting deaths of carp or any other species of fish susceptible to SVC should contact the CEFAS, Weymouth Laboratory.

SVC has no implications for human health.



Electrical Safety and the RCD

Dave Garratt has some shocking information

In the June issue of *Aquarist and Pondkeeper* I wrote a couple of pages relating to necessary caution when using aquarium equipment. It has been suggested that my words regarding the use of an RCD may have been misleading, although on re-reading the article I thought it to be fairly clear cut. Nevertheless, as electric shock is such an important issue I would like to reiterate the case for RCDs. To recap on the original article and illustrate the point I would like to quote from it:

Residual Circuit Breaker, a device designed to kill the power in the event of a mishap, before it kills you. Bear in mind if you have an electrical short and the water becomes live the fish will probably be swimming around looking OK. It will only be when you provide a route to earth by putting your hand in the tank that the 'bolt from the blue' will occur.

Further explanation

A RCD will NOT prevent you from receiving an electric shock. You will receive a shock but the RCD is designed to cut the power before a fatal dose of current has been received.

The fatal dose of electricity is generally accepted as 50 milliamps passing across the heart. RCDs are designed to cut the electrical supply in less than 0.4 seconds at a maximum of 30 milliamps, ie, well below the amount considered fatal. Arguments are raised that elderly people or people with a weak heart could be killed at a lower dosage, whilst others argue that the charge would have to be higher if it did not pass directly across the heart.

I do not want to become bogged down in such arguments. Suffice to say, and with the information given above being validated by an experienced electrician, with a reliable RCD the vast majority of healthy people would receive a non-fatal shock.

More sensitive RCDs, ie 10 milliamps, are also available and these offer even greater protection by further reducing the impact of an electric shock.

Finally, bear in mind that you cannot guarantee to eliminate the risk of electric shock. A RCD is a mechanical device and like all such devices it could break down. A test button is provided on a RCD — ensure your use it to check the operation of the RCD on a regular basis.

I hope this has cleared up any misunderstanding and suggested a way towards the essential requirement of an electrically safer aquarium.

Meet the Societies

PLYMOUTH AQUARISTS' SOCIETY

This year commemorates the 50th Anniversary of the Plymouth Aquarists' Society.

In 1948 the first meeting was held at Salisbury Road School in response to an advertisement placed in the local newspaper by a Sam Ryder.

Of the 24 who attended, John Stevens (now a member of the Bristol Club) is the sole surviving fishkeeper who still takes an active interest in the affairs of the Society, is an Honorary member and presented the Awards at our 1998 Open Show held in September.

It may interest readers to know that the result of a poll taken at that first meeting, to determine where people's fish interest lay, resulted in 12 votes for coldwater, nine for tropicals and three for native marines!

Over the years the Society has enjoyed consistently high membership with a strong committee of keen aquarists.

Two meetings are held each month with the first having lectures by members or guest speakers, or slide or video presentations. The second meeting has a table show and is more informal.

The Society is affiliated to the FBAS and the Aquatic Conservation network.

Members are engaged in captive breeding projects involving two endangered species, *Tilapia guinasawa* (only found in a sink hole in Namibia) and a Blind Cave Fish, *Garra barreimiae*, from Oman.

A panel of members regularly attend a phone-in programme on BBC Radio Devon Air giving advice on fishkeeping problems. Junior members are very important to the Society and even in the early years three juniors guested on the BBC Children's Hour talking "fish".

Our present young members are carrying on this tradition being active and knowledgeable in all things aquatic.

The reason the Society has lasted so long is due to the hard work that the older members have put into encouraging the youngsters into the club and then giving them all the encouragement that they need as they take more active parts in the running of the club.

I can name several active members in the club who started as junior members and are still going strong today. I am pleased to say that this tradition is still continuing and the junior members are being encouraged in every way.

Our meetings are held on the first and second Wednesdays of each month at the GWR Staff Association Social Club, Mullet Road, Laira at 7.45pm.

In addition to the activities mentioned above members enjoy a monthly newsletter, a quarterly magazine and a comprehensive Club Library. We also run various outside club activities and Inter-Club Shows.

As the Millennium approaches Plymouth A.S. is keeping up with modern times and its own website will soon be up and running on the Internet.

With the new National Marine Aquarium now proving to be a great success in our town there should be even more interest being shown in fishkeeping by local aquarists — we hope they will come and join us.

For further information about the Society please contact our Secretary, Julie Rundle, c/o 87 Crossway, Woodford, Plympton, Plymouth, PL7 4HY.

LIZ DONLAN'S KOI CALENDAR

You might be just in time to catch the annual Tri-Show being held at Koi Water Barn on October 4 — this brings the show season to an end in the UK. There are some major plans afoot for the 1999 and 2000 show seasons and these will be reported on as, and when, we receive definite information.

However, I do think it's time to reflect generally on Koi shows and their future in the *Koi Calendar*.

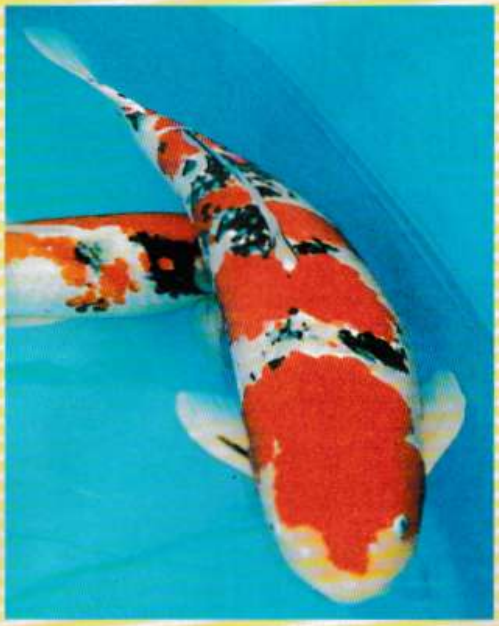
Each year more and more shows spring up but, across the board, the number of exhibitors and exhibits is becoming less and less. There is no doubt that the majority of people visit a Koi show to visit the dealers — you've only to look at the centre arena of show vats and nine times out of ten the area will be sparse of people, whereas, look at the dealers' stands and you'll find people six deep as they scramble to get near to find the bargain of the day.

So what's the solution? I think the BKKS National should remain as it is — ie, full show and dealers' stands; the International Koi Show (run by DJ's Koi) should forget the show and just have dealers' stands; and sections/clubs/societies should either have their own closed shows with no dealers or, ideally, two or three clubs join together to have a major regional or county show.

With regard to the latter, the London, Middlesex & Surrey Border and South East Sections of the BKKS have successfully run a Tri-Show for the last few years so, clearly, it can be done.

By reducing the number of shows and concentrating on larger county shows will result in better attendances overall; a wider number of exhibitors and, the dealers' trade would improve sufficiently to make it worth their while attending. In the long run this should also help show organisers to recoup their costs and put a few coppers into club funds.

It may be too late to think about the above comments for 1999 but why not think about it for the millennium and help to make it 'The Year of the Koi'.



BKKS Koi '98 Grand Champion, Sanke (fondly known as Doris), owned by Bill Oakley.
PHOTOGRAPH: LIZ DONLAN

KOI MEETINGS IN OCTOBER

7 Leicestershire Section BKKS. Les Kendrick talking on 'Bonsai'. Contact Karen Boyton (PRO & Editor) on 0116 233 0797 (home) or 01455 550550 (work).

7 North Wales Section BKKS. Mike Donlan talking on 'Koi in Israel'. Farmer's Arms, The Waen, nr St. Asaph, Clwyd, at 7.30pm. Contact Ellen Parry (Secretary) on 01492 580303.

10 Leicestershire Section BKKS. Skittles Night at Electricity Board (return match) with Charlie's Rifle Club. Contact Karen Boyton (PRO & Editor) on 0116 233 0797 (home) or 01455 550550 (work).

13 Nottinghamshire & District Section BKKS. The Western Club (off Derby Road), 357A Derby Road, Lenton, Nottingham, at 8pm. Eric Duffield will be projecting his Annual Review Slide Show. Contact Shirley Hind on 0115 981 0923.

18 Northern Koi Club. St. James' Church Hall, off Eccles Old Road (near Hope Hospital), Salford. 1.30pm. Contact Glynnis Morgan-Davies on 01706 218243.

21 The Crouch Valley Section BKKS. Contact Peter and Brenda Scott on 01375 642321.

SHOW CALENDAR

OCTOBER

4 Annual Tri-Show. Hosted by the London, Middlesex & Surrey Border and South-east Sections of the BKKS. Koi Water Barn, in Chelsfield Village, Kent. The venue is at the rear of Koi Water Barn around the picturesque lake. Admission is FREE but by buying Raffle Tickets this entitles you to the food that is provided.

(PLEASE NOTE THAT REGRETTABLY THE DATE OF THIS EVENT WAS INCORRECTLY SHOWN IN THE SEPTEMBER ISSUE OF *A&P*).

There are numerous Koi Clubs/Societies throughout the UK, and we will publish details of their meetings each month as (and when) we receive details. However, could I make one small plea to Publicity Officers — please ensure that you include a contact name and number to be used in conjunction with any Shows or Meetings whose details we may publish. Copy for Koi Calendar can be sent to me c/o MJ Publications Ltd, 20 High Street, Charing, Nr. Ashford, Kent TN27 0HX, but, if more convenient, Secretaries can also send information direct by telephone on 0161-794 8282 or by fax on 0161-793 9696.

Caught in the Net

Kathy Jinkings logs on for more Internet Fish Information

Last month we looked at some of the many Goldfish sites on the net; this month is the turn of the majestic Koi.

The logical place to start is with the homepage of the British club for Koi keepers, the BKKS, which can be found at **http://www.bkks.co.uk/.** This is not a site to visit if you are prone to migraine; the brilliant yellow background is startling to say the least.

The site contains plenty of information about the society, including benefits for members and how to join, as well as a page of Koi-related things to buy. The Koi Times magazine page consists of front covers, clicking on which results in the list of contents being displayed.

The Koi '98 show information (which has now taken place) gives contact addresses and e-mail, as well as giving information about an accommodation package.

Finally, in 'The Majesty of Koi', the fish themselves make an appearance, in an automatically loading slide-show with captions. More small pictures of Koi can be found in the Koi Gallery, and in the Koi Pond section. This latter invites owners of 'quality ponds' to send in their photos. No room for the fish keeper on a budget here!

As a site explaining what the club is about and what established Koi keepers will get out of membership, the site gets its point across well, but there is little information to keep surfers visiting the page on a regular basis.

The menu is particularly inwieldyy; it features four buttons plus 'move down' and 'move up' buttons. These reload the menu to bring another button into view. It is impossible to see from any one point all that is available at the site.

The site clearly states that it is 'optimised' for 800 x 600 screens; what it does not state is that it is unusable on anything smaller, as the menu is non-scrolling and the 'move down' button disappears off the bottom of a 600 x 480 screen.

The original home of Koi is, of course, in Japan, so it is not surprising that a Japanese site contains enough Koi information to satiate the confirmed fan, as well as enough more basic pages to whet the appetite of a possibly interested beginner.

The Nishikigoi Net of Japan, at **http://www.nishikigoi.or.jp/,** features a clearly laid out front page, with just enough graphics and animations to enliven it without being obtrusive.

At the top of the page, prominently, are the monthly headlines, where you can find out what is going on the world of Koi. The headlines when I visited led to a lengthy report on the Inter Zoo Exhibition in Hamburg, a discussion of the effects of the recession in Japan and the Ana-aki disease now prealent on the Koi business, an article on a young Taiwanese Koi keeper, and how young people are training for a career in Koi at the Sakai Yorijo Koi Farm.

Further down the page the menu offers a variety of options with a great many pages behind each. The 'What's New?' section not only shows again what's new, ie, the headlines, but also contains what's old, with an archive of all the lead stories.

These are too many to list, but are all interesting and written in a lively way, and illustrated with photographs.

Being a Japanese site the show report section features shows in Japan. The information is nonetheless interesting for that — each of the shows has its own page with photographs of the winners and the option to download short movies showing the fish.

The size of the video display is small, which means that it downloads relatively quickly. The 'Voice of Koi Lovers' is a bulletin board where you can post your Koi-related message or browse through the 700 messages already left here from all the world.

The show schedule features shows taking place globally with brief information and contact details. The links page features a variety of Koi links plus some Japanese interest ones. You can leap off from here into a site about Sumo wrestling if you need a break from Koi!

For real beginners there is the Nishikigoi Basic Story which tells you about how these beatiful fish came to be bred. On-line shopping allows you to buy CD-ROMs, books and videos with secure credit card processing, and, finally, registering your details on the site will get you in with a chance of winning a Koi CD-ROM. This is a superb site, well worth bookmarking for future visits.

For those who find the different varieties of Koi and the pronunciation of the Japanese words hopelessly confusing the Encylopedia of Koi, at **http://members.aa.net/~Koi/encyclo/encylo.html,** is an essential visit.

All the Japanese words mentioned can be clicked on to download a sound file, so that you can hear someone pronouncing it correctly. The site opens with a page explaining what Koi are and how to listen to the sound files.

You can then either click a 'Start' link to be taken through the different varieties of Koi, or click one of the specific links to jump to the variety that particularly interests you. The page for each variety includes photographs of excellent examples, plus lots of information on the colours, different sub-varieties, and any particular notes on the type such as weaknesses.

Even the development of the fish is discussed, with a description of how young fish appear that are likely to become good examples later in life. The site can be used as a quick reference or for a few hours of enjoyable and informative learning.

One of the pleasures of fish keeping of any sort is in sharing information with other fish keepers, and seeing how other people do it. Homepages are ideal for sharing knowledge (and showing off your fish) and there are plenty of home sites from Koi keepers.

Andrew and Jackie's Koi and Pond Page, at **http://www.omen.net.au/~andrews/Koi/Koi.html** features lots of information about how they constructed their pond, along with photographs. Judging from the picture gallery of their Koi and water plants the labour as well worthwhile! In addition to the information about their own swet-up there are also plenty of pages here to give advice to novice Koi keepers. Health, anatomy, diseases, varieties, history and feeding are all discussed in a comprehensive and easily understood way, with a page of breading under development.

Koi.net, at **http://www.vcnet.com/Koi_net/,** provides succinct information on Koi. The introduction starts with a question and answer format. The varieties page includes photos and descriptions of different varieties, while other pages deal with ponds and filters, breeding, and books and periodicals that are available.

The information appears deceptively simple, but is informative and easily readable. A great deal of the information in this siste has to be watched out for, as it is hidden in occasional li nks in the text. Some links lead to simple photographs, others lead into further information.

Links from the introduction page can be followed to reach, eventually, the story of Hanako, a red Koi who is 215 years old. The story includes how they established Hanako's age. Ponds and Filters includes a variety of links discussing just about everything you could ever want to know about the topic. This site needs careful reading and a willingness to follow links to get the best out of it. For such a reader there is a wealth of information lurking here.

NEXT MONTH WE SHALL CONTINUE OUR LOOK AT POND FISH WITH A SEARCH FOR INFORMATION ON THE 'FORGOTTEN FISH' — THE MANY SPECIES WHICH ARE NEITHER GOLDFISH NOR KOI, BUT ARE, NONETHELESS, INTERESTING AND ATTRACTIVE MEMBERS OF A GARDEN POND

Kathy Jinkings (British Aquatic Resource Centre — http://www.cfkc.demon.co.uk) (AquaSource International — http://www.aquasource.demon.co.uk)