

WIN
PRIZES!

AQUARIS I AND PONDKEEPER

SEPTEMBER 2001

TODAY'S FISHKEEPER

Beginners

Why's and wherefore's
of water testing

Big Eyes

We explore
the world of
fish vision

What pondfish?

Different alternatives
to Koi and Goldfish

NEWS Genetic Modification

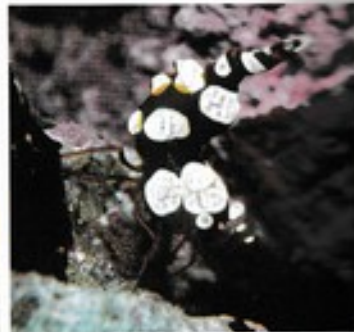
Glowing Zebra Danios at Aquarama



MARINE · PONDS · PLANTS · AMPHIBIANS
TROPICAL · DISCUS · COLDWATER · KOI

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PONDS & COLDWATER

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for you

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look at the
Koi world



KEY TO SYMBOLS:

Keep an eye out for these handy
symbols to help you with your fishkeeping.

	COMMUNITY		MID-WATER
	NON-COMMUNITY		BOTTOM
	CARNIVORE		TEMP.
	OMNIVORE		SIZE
	HERBIVORE		NOT SUITABLE FOR KEEPING IN CAPTIVITY
	SURFACE		



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Changing times

Aquarist and Pondkeeper started life in 1924. Over the years she has changed and evolved in the same way society has changed - she had to for the magazine to thrive. Reading those early issues the difference in the English language used then, compared with now, is very dramatic. Words and phrases in common usage then have all but disappeared from people's vocabulary now and others have developed totally different meanings. Throughout the 1/4 of a century the 'grand old lady of fishkeeping' has been in continuous publication she has changed titles four times, each change reflecting the ever changing society we live in. This month we are announcing her fifth change in name.

For the last five months we have added 'For Today's Fishkeeper' right across the cover. This was in preparation for October's issue when the next phase in *Aquarist and Pondkeeper's* life kicks in, this time with the bright new title **Today's Fishkeeper**. What else will change? Very little I am pleased to say. Our expert panel will have a new name (Ask A&P won't work any more!) but otherwise fish and fishkeeping will still be at the heart of the magazine.

Until next month and our first issue as Today's Fishkeeper, Happy fishkeeping from Derek and the team at TRMG.

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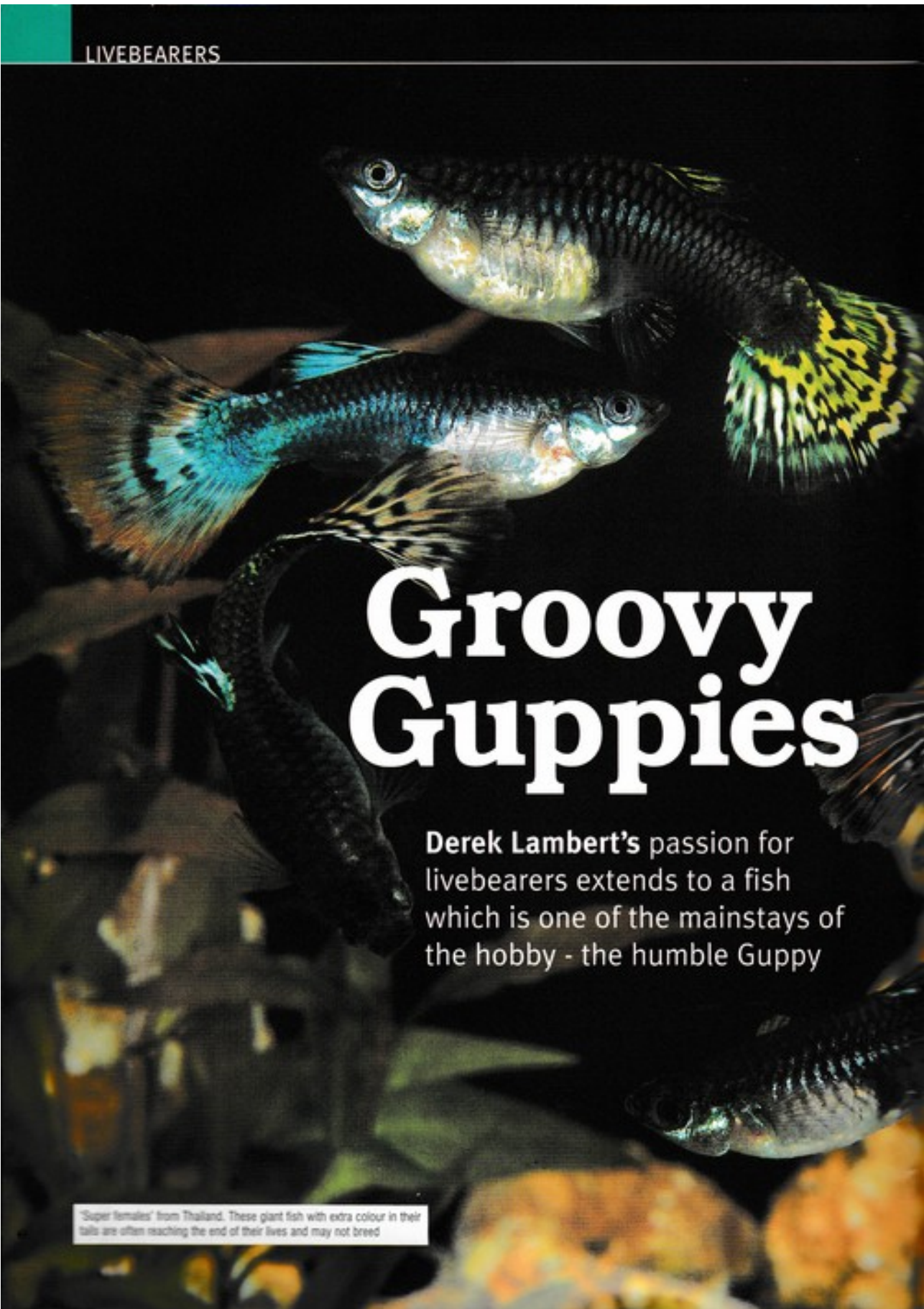


Aqualife

28th & 29th July

2001

FIRST OF ALL it was great to see so many readers at Aqualife 2001 and have the opportunity to talk to you all. The show was a tremendous success for everyone who took part, but what did the ordinary visitor make of it? In October issue, we will be publishing a special feature on the show and would like to include some of your comments. Write, phone or e-mail them to me over the next couple of weeks and I will include as many of them as possible. In the meantime, do you think this gentleman is aware he is being sold a new thermofilter by Interpet's Aquatic Group Brand Manager, Adrian Excell?



LIVEBEARERS

Groovy Guppies

Derek Lambert's passion for livebearers extends to a fish which is one of the mainstays of the hobby - the humble Guppy

'Super females' from Thailand. These giant fish with extra colour in their tails are often reaching the end of their lives and may not breed



Pair - male lower fish. His anal fin is modified into a gonopodium

Humble Guppy?! More like groovy Guppy. Guppies have been, and still are, the most popular aquarium fish of all time. Why is that? It's because they are beautiful, hardy well behaved and have interesting sex lives!

Ditch the myths

First of all we have to ditch some myths about this lovely fish, (all livebearers seem to be surrounded by them) if you are going to make the most of them. Number one myth is that they need salt in their water. A quick look at the Guppies original distribution shows it comes from mostly freshwater habitats that are predominantly soft and acidic in nature. Look a little further and you will find brackish, hard, alkaline water habitats as well. In fact Guppies can happily adapt to virtually any normal water conditions and have done so all over the world.

Next we have the vegetarian myth. Yes, Guppies will eat vegetable matter, but they will eat anything else as well. Looking at the distribution of Guppies throughout the world today and overlay a map of the old British Empire and you will see a close resemblance. The reason for this is that the Guppy was posted all →

Sex changing

Well we are back to sex, and let's face it male guppies think about this more than they do about food. You will often find articles or books that say if you remove all the male guppies from an aquarium, one of the 'females' will turn into a male. Absolute rubbish! These fish are just late sexing out males or old females that develop male characteristics. The late sexing out males seem to wait until the dominant male in an aquarium has died or been removed before developing into a fully functional male. Whilst old females may well develop a gonopodium they don't produce sperm.

While on the subject of sex, we may as well mention sperm. Guppies, in common with many other Poeciliids, can store sperm for many months. This means a female can produce brood after brood without ever seeing another male. This having been said, they tend to use new sperm in preference to old stored sperm. So, if you want to get babies from a female mated with a particular male, wait until she drops a brood of fry and place her with the male you want to father the next brood. He will do his duty and most of the fry from the next brood will be his.



Flamingo male guppies

Breeding guppies

Breeding guppies presents no real problem - they just do it all by themselves. Breeding good quality guppies, however, is a whole different ball game. Ideally you need a pair from the same strain to breed from. That way they will produce a brood of fry that closely resembles them. This, however, can be difficult to find because most shops have a tank of mixed males and another tank of females. Which male belongs to which female can be difficult to determine. While that might be a problem for the person wanting to breed show winners (they should buy their stock from a specialist breeder), the average aquarist need not be so picky. Unrelated fish will produce a wide selection of types within their offspring that can then be selected from to create a strain of guppy all of your own.

What you do need to look closely at is the body shape and carriage of the

tail. Fish that have difficulty swimming properly are likely to pass this weakness on to their offspring. So look for fish with a deep caudal peduncle. They usually hold their tail much more upright and will still be able to swim properly when their finnage has developed to its maximum size.

Once you have your initial stock wait until the female has given birth once before saving your first brood. This is best done by carefully moving the gravid female into an aquarium with plenty of cover in it. Once she has given birth she should be moved back to the main aquarium and the fry reared up in the nursery tank.

This tank should be about 24"x12"x12" in size. Poor feeding, water quality or over crowding will all stunt young guppies. For this reason

The Statistics

Average brood interval - 28 days

Average brood size - 30

Average age at sexual maturity -

three months

the fry should be fed 4-6 times a day using a mixture of live baby Brine shrimp and commercial fry foods. Water quality should be maintained by 20% water changes every other day and some form of gentle filtration. Over crowding is a problem that tends to creep up on you. As small fry a whole brood can be accommodated in a tank this size but later you need to split them out in two or possibly three tanks. I usually do this as they become sexable with males being moved to their own tank so next generation I have virgin females to select from.



Female guppy just giving birth. Sadly females will often eat their own fry so plenty of cover must be provided for the babies to hide in

→ over the Empire to help combat malaria by eating mosquito larvae. Would a vegetarian be used for that purpose? Obviously not.

So its captive diet should contain the variety of things Guppies eat in the wild and that includes vegetable matter but also meaty foods like small insects which fall on the water's surface. Apart from variety in a guppy's diet, the most important factor to remember when feeding this fish is its internal structure. Guppies have no pouch-like stomach, so food passes along its very long gut in little clumps. These are eaten in the same way, so if a lot of food is offered all at once, the guppies can only swallow a few bites at a time. A couple of minutes later they will be ready to grab some more but by this time most of the food will have been eaten by the other fish or have lost much of its nutritional value. So feed a little several times a day and, despite being given the same amount of food as before, your guppies will grow bigger.

Ideal water conditions

PH 7, 10'dGH, temperature 75°F (23.9°C)

A gem really worth keeping

For the average community aquarium you really can't do any better than including a few guppies. They bring life and colour to the tank in a way almost no other fish can. So hats off to the glamorous, gorgeous, groovy guppy - be it ever so humble. ■



Blue Delta males



A beautiful gold female

Ask A&P about Tropical

Our team of experts answer your tropical questions

Starting with CO₂

Q I am currently setting up a Juwel 250lt tank basically to house my rather large plec (Brian) which has so far out-grown two smaller tanks. I would really like to add a decent carbon dioxide unit for plant growth, however, I am having trouble finding a retailer who stocks these systems - could you recommend anyone? I would also appreciate any advice you may have - I have only used the small disposable 'floramat' system in the past.

Can you foresee any problems housing a large plec in a planted aquaria - I have had Brian a long time and don't want to make a stupid mistake and suffocate him? Many thanks in anticipation.

Jill Schofield, Spalding via e-mail

A There are a few guidelines that you should follow to get the most out of a CO₂ system.

1. **Substrate:** Choose a lime-free substrate, and mix in an inorganic source of iron. This will help to keep your pH at a suitable level and add a longterm supply of iron that is required for photosynthesis.

2. **Aeration:** Do not add any additional aeration as this will reduce CO₂ levels in the aquarium.

3. Use some form of undergravel heating.

4. Add a regular supply of supplements and minerals.

5. Let the planted aquarium mature for four weeks prior to adding the main stock of fish. However, browsing algae eaters (not Brian at this stage) can be introduced earlier.

Once the plants have become established, and Brian is suitably fed, I cannot foresee any real problems in a well-maintained planted aquarium that has vibrant growth.

CO₂ contacts

Dennerle: 01423 869800
Sera: 020 8781 0556
JBL: 01284 755051
Juwel: 01953 606363



The addition of a CO₂ system to an aquarium like this will greatly enhance plant growth

Can aquariums spread diseases?

Q I have been a fishkeeper for many years and have several aquariums in my home. I have now read a book that says cleaning out these tanks can make you ill. Is this true? I have three children and a young baby, are they at risk?

A. Roddy, Decon

A One of the joys of fishkeeping is that it is relatively risk-free to the aquarist, at least from a disease point of view. Most disease producing organisms cannot make the leap from an aquatic 'cold-blooded' creature to a dry-land living human ticking over at 37°C. This makes fish extremely safe compared with dogs, cats, horses, parrots - and even other people!

There is one well-recognised exception to this, and that is with the bacteria called Mycobacteria, that cause a condition known as Fish Tuberculosis. Classic signs in fish are marked weight-loss, bent spines and ulceration. In people these bacteria are unable to cross the barrier made by healthy skin, but they can invade cuts. Here they trigger an inflamed raised swelling called a granuloma, usually on the fingers or hand (this is where the temperature is lower than in the body core). Once diagnosed by a GP or dermatologist, these infections usually clear up with antibiotics.

Basic hygienic precautions should prevent any infection - if you have cuts on your hands or arms then cover them with waterproof band-aids or wear gloves. Do not allow young children or other high risk groups to place their hands in the tanks. My other tip is not to start a siphon by sucking the lower end with your mouth. Either submerge the tube fully first and keep water in the tube by placing your thumbs over each end until the siphon is started, or use a commercial self-starting siphon kit.

Lance Jepson

HAVING PROBLEMS? THEN LET OUR PANEL OF EXPERTS COME UP WITH THE ANSWERS...

ASK A&P GOES ONLINE

Every query receives a personal answer and in addition, we will publish a selection of the most interesting questions and responses each month.

From this month onwards most of our Ask A&P team will be available to answer your questions online.

This should speed up the process, however, since not all the team are online yet some questions will still have to be replied to via snail mail. You can of course still send your letters in by post

in the normal way to Ask A&P TRMG Magazines Ltd., Winchester Court, 1 Forum Place,

Hatfield, Herts. AL10 0RN. Please indicate clearly on the top left hand corner of your envelope

which department you wish your query to go to. All letters must be accompanied by an S.A.E.

Our Ask A&P E-mail address is: askap@btinternet.com



Ask A&P about Tropical

Q I have only recently ventured in to the realm of freshwater tropical fish keeping, and have only, very recently, set up my new tank (small tropicarium 68).

Thus far I have had, amongst others, Golden Gouramis, Red Eyed Swordtails and Neon Tetras. In relation to the Gouramis and Swordtails, I had a ratio of one male to every two females; but was a little concerned to see constant bullying by the males (both Gouramis and Swordtails) on their female contemporaries, as well as the other fish.

Despite being a very patient person, I eventually decided to remove all the males and place them into my long standing aquarium (eleven years or so now) containing fancy goldfish of many varieties (I naturally have a thermostatically controlled heater and so on), that has left the remaining female-only tropical aquarium peaceful and happy.

Is it perhaps reasonable to have a female-only community tropical tank set-up; or indeed am I being a little naive?

By the way, the Gourami and Swordtail males are all doing very well in the fancy goldfish aquarium and are at home with the soft mannered Twintails, Veiltails, Moors, Ranchus and so on!

No bullying whatsoever...mind you, if I were a small Swordtail, I would not wish to confront, in any way, shape nor form, a large bumbling Ranchu!

With my best wishes, and well done on your superb magazine.

Richard Byrne via e-mail

Bullying by males of both Gouramis and Swordtails is not uncommon - particularly in a new setup while the fish are getting to know each other. The best way to reduce it is to include plenty of areas of plant cover for the females to retire to when their respective mates become too boisterous. Swordtail males will always be chasing females around because they are trying to mate with them, which is why it is a good idea to have two females to each male.

Bully boys



Male Gold Gouramis will often bully their mates when first introduced into an aquarium.

Male Gouramis on the other hand will be trying to establish their own territory and if you have a few plant thickets they will usually take up residence near one of these and the females will be left alone unless they venture near.

Personally I would reintroduce the males and see how things go for a few weeks. If the females seem stressed or harmed in any way then you can always move them back to the goldfish aquarium. Female only communities do exist, in fact this is the way many Gouramis spend their time in nature. Males are only sorted out when a female wishes to breed. So if you wish to have a female only tank then go right ahead. The only problem that might occur is if the male swordtail tries to mate with the goldfish. Huge they may be, but sex will drive a male to do the strangest things! If this does happen the goldfish may well become distressed at his constantly chasing them about. Otherwise all should be well.

Derek Lambert

Which filter media?

Q I am in the process of setting up a Discus tank. I will be filtering the tank (48"x 24" x 18") using an under the tank sump. Please could you tell me the best filter media to use for these fish and what water conditions am I looking for?

At the moment I cannot afford reverse osmosis so which of the heavy metal axe filters would I benefit from the most? Which sump pump should I use?

Graham Stafford via e-mail

A As the pH and GH need to be maintained carefully, you need to make sure that all filter media in your sump is inert. I have used filter media that is typically found in a pond filter in a sump filter to very good effect. The graduated bio-foam acts as a renewable and easy-to-clean primary filter, retaining solid matter and keeping the biological chamber free. If you are able to incorporate a trickle filter, perforated plastic media can be used effectively as a biological media. As you will be using tapwater (which is buffered) you

will need to treat it with either a pH buffer or add a number of pieces of bogwood into the aquarium to make the pH suitably acidic.

I suggest you research which water purifier specification is most suitable to your water supply (your water company will provide you with a detailed report). When selecting a sump pump, check the pipe and turn over specifications you require and choose accordingly. Eheim pumps have a reputation for being well engineered and reliable.

Ben Helm

Ask A&P about Marine

Andrew Caine answers
your questions on marines

Can I use pond water in my marine aquarium?

Q I have a fish pond in my garden, is it OK to use the water from it for my marine tank, as it has low chlorine levels? Also I have been reading up on filtration for my tank. At the moment I have a FLUVAL filter that sits inside my tropical tank, would this be OK to use a similar filter in a small fish only marine aquarium, of about 15 gallons?

Sean Ridley, via e-mail



Using polluted water to make up your marine water can seriously harm invertebrates and fish. This Anemone has collapsed and may never recover.

A I am afraid that even your low chlorine levels are not low enough, you will also have many other compounds present that will be toxic in a marine aquarium. You must use purified water for all water changes. I am sorry to say that a fluval internal filter or any internal sponge filter is no good for a marine aquarium. You must use external canister filters, the filter baskets allow you to add different filter media so you can address chemical filtration as well as the biological.

Andrew Caine

Are UV's dangerous?

Q Having kept tropical fish for years I have decided to try my hand at marines. I have heard UV's can be harmful, is this true and are there any other potential health hazards with a marine setup?

A. Roddy, Decon

A A UV in an aquarium setup in my opinion is great, however some people say that it kills plankton that corals feed on and inhibits bacterial

colonisation of the filter. I do agree with this train of thought, however if you actively feed the corals then all will be OK.

There are no health hazards in your set up, the only item I can recommend care with is the UV, just do not look directly at the bulb, in other words when working with it turn it off. Accidents can happen with anything so read the instructions for all your equipment, and use cable ties on flexible pipe connections.

Andrew Caine

Q I recently visited a shop and wanted to buy a Flame Angel (*Centropyge loricatus*). I was quoted £70.00, despite another shop nearby selling them at £45.00. I told the shop keeper I would never pay £70.00 for one and had bought two previously at £45.00 but both had died. I decided to return to the previous shop and purchase another from there. Sadly that has also died now. What am I doing wrong and why are some shops charging so much more than others?

J. Johnston

A As most reef keepers know, £70 is the normal price for a Flame Angel. So why does one shop charge £70 for an animal, when another shop around the corner can charge £45.00? The answer is quite simple - the more expensive shop is selling fully quarantined fish. So what was happening, the other shop was directly importing live stock and offering it for sale the day it arrived without quarantine facilities.

To quarantine marine fish correctly costs money. This then is duly passed on to the retailer, the charges being then duly passed on to the customer. The bottom line is, if you want high quality stock, go to a good retailer. If you see cheap animals, ask yourself why.

However this is only the tip of the iceberg. Quarantining of stock is only a small part. To go back to the beginning we have to fly half way round the world, and we shall land at two hypothetical catching and holding facilities.

The first, shall we say, collects legally and also performs some illegal collection. I am sad to report, dynamite and cyanide fishing still occurs, as well as removing protected corals. We look at their collection tanks and filtration that is under par for the job. Most of the animals are held for a very short period of time before being shipped to England often via Europe. A lot of these animals are offered direct to retailers at cheaper-than-average prices and so seem attractive to purchase. They then collect the fish from the airports, open the bags and plonk them in the sale tanks at vastly reduced prices to get rid of them quickly. The unknowing customer sees a bargain and let's face it, we all love bargains, buys the fish, takes it home

Ask A&P about Marine

Why are some shops selling fish a lot cheaper than others?



£70 is a reasonable price to pay for such a beauty.

and 90% of the time the animal dies.

We then move across our island to the other catching facility. This is a good one. The holding tanks are kept in very good condition, with high quality filtration. The fish are collected from the reef via divers with hand nets and the corals are collected in the correct manner as well. The cost of hand netting a fish, the high tech filtration and holding facilities reflects the higher price for the same animal as our not-so-legal friend. The animals are then bagged correctly with all the correct documentation and flown direct to the UK.

Good wholesalers will have spent many thousands of pounds on high-tech filtration and holding facilities, giving optimum water conditions for the new arrivals. The animals are then unboxed in reduced-light conditions. When the unboxing procedure is finished, the animals are left in total darkness for a period of time. This is known as acclimation.

The fish then either follow two routes. More commonly, they are offered direct for sale to the retailers. Where is the quarantine? I hear you all scream. Well sadly for us retailers there is none. What the wholesalers have gone through

this procedure is de-stress the animals and condition them to a certain extent ready for sale. The really good wholesalers will take their acclimated animals and then treat them in various ways if needed, get them feeding and then offer them for sale. Acclimated animals cost less than quarantined animals, however an acclimated animal is a million times better than a bargain.

Ask A&P about Coldwater

Tea coloured water

Q Recently my pond of about 450 gallons, seemingly overnight produced a heavy deposit of filamentous algae. As much algae as possible has been removed by hand and NT Laboratories Pond Booster placed in the 16W PetMate filter. Belt and braces dictates that a barley straw pack also had to go in! Is there anything other than the above I can do to help alleviate the algae problem in the long term?

In parallel with the above, the action of the fountain produces an unsightly foam which collects round plant stems. I understand a contributory cause of this could well be highish phosphate levels but phosphate, ammonia, nitrate and nitrite are all at zero; pH is a constant 7.5. Could you please advise me on what I should do to stop this foaming.

The pond water is quite clear but the colour of tea which, I presume, is suspended something or other. The

system has operated over its three year life quite happily with water remaining crystal clear till now. Water changes of about 100 gallons are made at approximately six week intervals.

Alex Rodger, via e-mail

A Your observation of the water appearing 'tea coloured' is most likely to be at the root of the problem. Discoloured water arises through a build up of soluble organic matter (introduced through food, planted baskets, or other organic material) and will lead to a proliferation in algae growth as well as causing the water to foam. The best strategy is to address the causes in the hope that by improving the water quality, counter measures against algae will not be required.

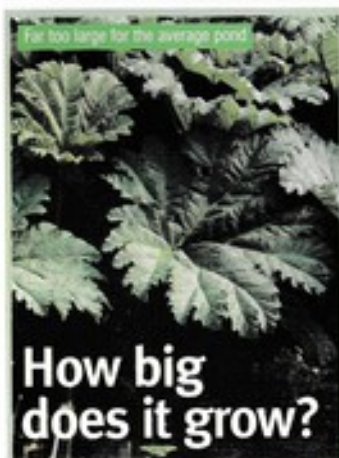
The leaching of organic compounds into pond water will encourage algae to thrive and while there is a constant



A blanket weed bloom and 'tea' coloured water indicate too much organic matter in the water.

source of nutrients, the algae will thrive. I am surprised that the phosphate reading is zero as the two phenomena are linked. Check back to see whether you have introduced any new plants (and soil) or fish (that may be rooting around in the soil). In the mean time, carry out further water changes with rain water if possible (nutrient-free water) and try a phosphate or nitrate removing treatment such as Phos-kit.

Ben Helm



How big does it grow?

Q This year I purchased several new marginals for my small garden pond. One, a Gunnera, has shot up out of all proportion to the pond. How big does this plant grow?

A Far too large for your pond! Gunnera grow very big and should only be considered for planting by large ponds where they will be in scale with the other plants.

Diatom problem

Q My koi filters are riddled with diatoms as diagnosed by a friend who has 30 years experience keeping marines. The diatomaceous algae takes over the brush chamber that follows after the vortex, clogging the brushes to the point where they are useless in less than a month. Also they colorised the next chamber in line that was furnished with Bachalls. Realising there was a build up of algae I was flushing it through with pond water every weekend but things came to a head when the chamber became totally blocked inside two days and the pump ran dry. I had to replace the Bachalls with Floco but after scrubbing out both the brush chamber and the first biological chamber and replacing brushes and filter media the diatoms persist.

Firstly what causes them, as no one I have spoken to has heard of them in a koi system, and secondly how do I get rid of them? I applied Clarosan to clear up my ordinary blanketweed but that has no effect. They have now started to migrate further along the filters and with a pond full of hungry fish I would not like to discard any more media and lose vital bacteria at this time of year.

Steve Orton via e-mail

A Diatoms in a koi system does indeed sound different, as most will think of diatoms in the marine environment, however, they are just as common in freshwater as you have found out. These little lovelies are all single celled algae that have ridged cell walls constructed out of silicate. Now if certain factors all line up at the same time we have optimal growth conditions, this results in an algal bloom. Cell concentrations can exceed 5 million cells per litre of water. This is what you have in your filter. Their removal from a system is easier said than done.

Algae live by the law of limiting factors, that is if a compound is a nutrient source (food) then this is a limiting factor, if a limiting factor falls below a certain concentration then growth stops, the algae is limited. All you have to do is remove a food source, high on the menu for this little beast are phosphate, silicates and nitrogenous compounds. So total removal of any one of these nutrients will stop the algal bloom. Silicate and phosphate sponges are available to do this job, however this may take time as often the nutrient source may only be needed in small concentrations to allow growth, also the use of a water purifier is essential.

Andrew Calne

A Surprising

Max Gibbs makes a surprising discovery of

The Banggai Cardinalfish (*Pterapogon kauderni*) is only known from a very restricted habitat off the island of Banggai in the central-east lower part of the oddly shaped large Indonesian island of Sulawesi. Although described by Koumans as far back as 1933 it is a comparatively recent introduction to the aquarium hobby, and has proved to be a very popular and successful aquarium fish. The male mouthbroods the eggs and babies, resulting in a good survival rate of the juveniles when they are released and left to fend for themselves. The Emperor Cardinal, as the British hobby knows it, takes shelter within the dense array of Black Longspine Sea Urchin's (*Diadema setosum*) wicked spines, or less usually in close association with Sea Anemones (Usually *Heteractis crispata*) armed with their waving tentacles loaded with nematocysts ready to fire into the tissue of any interfering would-be predator.

Both habitats afford highly effective protection from predation. So, with the ability to breed freely and seek out such fortified territories it might be thought this fish would spread rapidly outward from its one known environment off Banggai Island and colonise other suitable adjacent areas, but it has never happened that way. It seems inevitable that during stormy weather at times some specimens would be swept away from their chosen habitat and be forced to adapt elsewhere, wherever the angry sea might have carried them to. But this does not appear to have happened as yet, or if it has the discovery of any new site has yet to be made.

Important discovery

So imagine my delight and complete surprise to drop down from a boat into a shallow area just off Kungkungan Bay in the Lembah Strait recently, far, far away from Banggai, to find a small colony of Emperor Cardinalfish sheltering within a patch of longspine urchins!

The protection afforded by the urchins proved to be entirely effective in keeping me and my camera at bay, denying the desired clear view of at least one adult fish for the record. A longish wait for one nicely marked fish to be sufficiently clear of the obtrusive screen of black spines was eventually rewarded with a reasonable shot. I have seen many wonderful and rare creatures within the Lembah Strait during my nine visits and many dives there over the past five years, but this was amazing. Not only is the

Breeding Emperor Cardinalfish

Aquarium breeding of the species is both a very interesting exercise as well as being potentially financially rewarding. No other member of the Apogonidae family is known to breed in the same way as the Emperor Cardinalfish.

The female deposits a batch of large eggs, numbering some 20 or so, which the male then takes into a specially formed cavity within his mouth. Here he will brood the eggs for the 2 or more weeks it takes for them to hatch. The eggs will be momentarily puffed out and rapidly recovered in order to aerate them from time to time. He will retain the young for about a week to ten days before releasing them to search out shelter and fend for themselves. He will not, as mouthbrooding cichlids mostly do, release the young for feeding forays, and accept them back into his care again. Once they are "evicted" they will be left to their own devices. Growth is quite rapid from the initial 6mm length of the newly hatched embryos with sexual maturity being attained within one year.



The Banggai cardinalfish, can also be found living in close association with Sea Anemones (usually *Heteractis crispata*) among with their waving tentacles loaded with nematocysts ready to fire into the tissue of any interfering would-be predator.

Discovery

Banggai Cardinalfish in Lembeh Strait



Banggai cardinalfish are known as Emperor cardinals in the U.K.

"I mentioned this important 'discovery' to one of the local dive guides, who seemed quite unmoved by this important and exciting news. 'There are more' he announced"

strait dived regularly and extensively by noted ichthyologists, but also by experienced and well informed diver/photographers, yet these special fish were right here under everyone's nose who would dive this site, close to the boat mooring point, and in very shallow water. How could they have been overlooked?

I mentioned this important "discovery" to one of the local dive guides, who seemed quite unmoved by this important and exciting news. "There are more", he announced. So the next dive took us to another site close to the shore and a little further along the shoreline. This mucky site is well known for turning up such species as frogfish, unusual scorpionfish, and an interesting selection of colourful *Cirrhitilabrus* and *Paracheilinus* species of wrasse, as well as nudibranchs (sea slugs) and many other fascinating invertebrate and fish species. And there I was shown the second community of Emperor Cardinalfish, just like the guide had described. This time the fish were less well developed and I assumed the adults must be elsewhere in the vicinity.

These younger and less boldly marked juveniles had chosen to keep close to the protective tentacles of sea anemones instead of urchins. Species of symbiotic Clown fish (or anemone fish) nestling into the anemone's tentacles appeared to entirely ignore the presence of the cardinalfish. It is said that Emperor Cardinalfish at Banggai have been seen to dive into the tentacles without appearing to be burned, but I did not witness this behaviour with these particular specimens in Lembah Strait.

Winners and losers

Introducing a species into a new environment can have dire results where predation or competition for an exclusive food source is in question, but this peaceful little fish seemed to present no threat to any other species in its new adopted home. Prior to the arrival of the Banggai cardinalfish in the shallows of "Crittter Hunt", however, the Orange marked goby (*Amblygobius decussatus*) was seen in large numbers there. When I looked for it following the arrival of the Banggai "refugees" I could not find even one.



It looks like the Orange marked goby (*Amblygobius decussatus*) has lost out to the Cardinalfish.

Predator on the prowl



Devil scorpion fish are a serious threat to most species of cardinalfish.

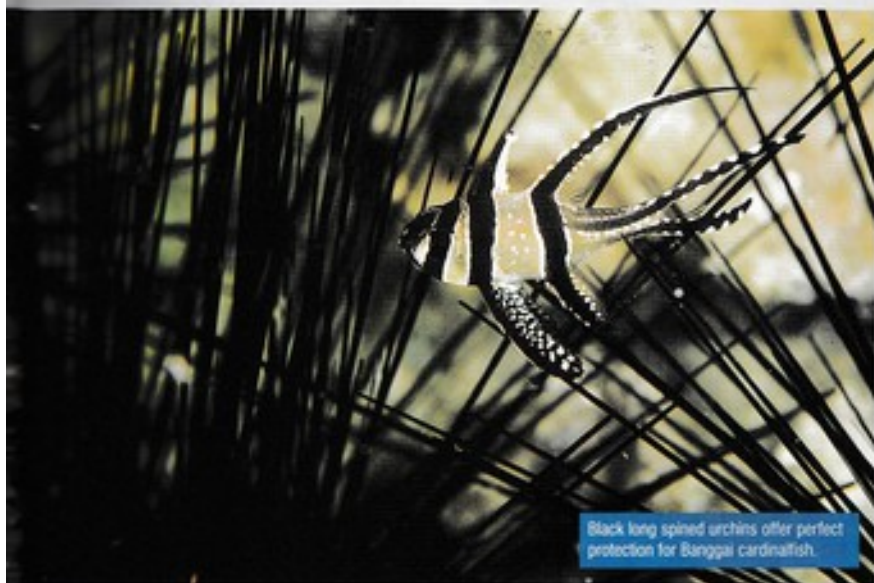
How did they get there?

Back at the resort and over dinner that night, I talked about this strange experience with other guests. Denise Tackett, a well-known American aquatic photo-journalist who sometimes works at the resort, was one of my fellow diners. She volunteered information which explained how these fish came to be established in Lembah Strait so far

away from their acknowledged single natural habitat area at Banggai. It seems there was a stock of the fish which had been collected and brought up to a fish dealer for export from Manado, the main town in the north of Sulawesi which has an international airport. There followed two possible versions of how the fish got into the strait. The given story of how this happened was that the holding tank for these fish from Banggai was accidentally broken and the fish were liberated - either by being washed into the sea or gathered up and put there rather than being left to die. Another version suggested, which perhaps seems more likely, is that the fish dealer released a few pairs where he hoped they would breed successfully and give him a local source for collection on a sustainable basis and save the expense and inconvenience of having them transported up from Banggai. Whichever story is true, it is certainly a fact that the fish seem to have established themselves in this "foreign" environment, and were breeding successfully there.

Threatened species

It has proved to be very fortunate that this stylish fish is easily persuaded to breed successfully in aquarium conditions, because intensive fishing to acquire stock for commercial purposes would soon render the species extinct. It is considered a "threatened species" and listed as such by Dr. Gerald Allen, the distinguished ichthyologist, author, and underwater photographer, of the Department of Aquatic Zoology at the Western Australian Museum in Perth. The threat to their continued existence is both



Black long spined urchins offer perfect protection for Banggai cardinalfish.

The hideously ugly "Devil scorpion fish" (*Inimicus didactylus*) is a predator on Cardinalfishes and other small fish which it can hunt down at night. There are many of these ugly, venomous fish lurking just beneath the silt and sandy bottom of the site where Banggai cardinalfish are now established within the protection of the urchins at "Crittter Hunt".

As daylight fades into twilight so the Devil fish emerge to hunt, with silt still clinging to much of their rough bodies. Some rays of their pectoral fins are modified into "clawed toes" they can use to crawl surreptitiously towards their prey. Most cardinalfish are highly vulnerable to predation by these hunters, but the Banggai cardinalfish will remain largely untroubled as long as they remain within the protection of the urchins spines.

PHOTO: MAIA CORDES

from collection for the aquarium trade and from loss of habitat due to bad fishing practices by food fishermen. So this new population which has been established in the Lembeh Strait could serve an invaluable service by providing an alternative habitat for their continued existence should their original stock at Banggai become extinct. Their ability to be bred commercially for the aquarium should hopefully satisfy the demands of the aquarium hobby for this delightful fish.

Regrettably it is no simple matter to persuade the Indonesian authorities to take action to prevent the over exploitation of this delicately poised species within its endangered environment. Dr. Allen contends that *P. kumodera* should be placed in the IUCN Red List of Threatened Animals, an aim being supported by Conservation International.

I was sort-of sorry to learn how it was that this lovely fish had been introduced into Lembeh Strait, having thought I had made a significant find when I first saw the colony occupying the urchin patch at the dive site known as "Crittter Hunt". As the colonies in its native Banggai habitat are usually restricted to about 20 fish there seems to be some limiting factor which is not obvious but keeps the populations within a controlled size, and might well have everything to do with the fact that they have naturally kept within such a small area. It will be interesting to watch the progress of these two starter colonies in Lembeh Strait over a period of time. Now there's a good excuse for going back to that amazing place on a regular basis! ■

New homes

A view of Lembeh Straits looking towards the harbour town of Bitung. Lembeh Island is on the left of the picture, and the main island of Sulawesi is on the right. The two sites where the Banggai cardinalfish have so far been located are nearby to one another in this general area. Both the

sites are quite different in their nature, and the habitats of the cardinalfish are also entirely different. The larger population is at "Crittter Hunt" and the smaller one at "Petting Zoo". It will be interesting to see if these two populations will thrive and spread significantly within the Straits, unlike the contained nature of the original population at Banggai Island.

"Now there's a good excuse for going back to that amazing place on a regular basis!"



Sight and Light

Jack Jackson opens a window on how fish see

With mainly blue light available, clear tropical waters appear blue, but inshore waters contain decaying plants. Mostly yellow these absorb some of the blue light so inshore waters appear green.

For most animals, vision is their most important link with the outside world. Primitive creatures can perceive light but may be more dependent on their sense of smell, touch or taste. Those higher up the evolutionary scale can perceive patterns of light and rely more on their eyes. What is perceived are not the objects seen themselves but the light that they reflect or, in the case of bioluminescent creatures, emit.

In the beginning

There are limits to vision. Life on Earth began in the oceans, which filtered out infrared and ultraviolet radiation so most creatures can only detect the spectral transmission of light in water. A few animals can perceive infrared and flying insects, ultraviolet.

Human vision perceives electromagnetic radiation at wavelengths from red through orange, yellow, green and blue to violet. However, with increasing depth, water first filters out red and orange, then yellow, then green and violet, only blue light continues any distance, penetrating weakly beyond 200m.

How does light travel?

For all practical purposes, light travels in straight lines unless it encounters a medium of different density in which it has a different velocity. As it penetrates a denser medium it is slowed, if it hits the interface between the two mediums at an angle, it bends (refraction).

Photons from the sun meet little opposition until they reach the Earth's atmosphere where some are scattered by moisture and dust causing blue skies and red sunsets, but most continue unimpeded.

Photons penetrating water must pass through its larger molecules, losing energy and changing direction. They are also scattered by sediment. The most immediate consequence is degradation of contrast. At any real distance, the clarity of vision is reduced and the edges of objects blurred.



The Bigeye, *Priacanthus hamrur*, changes colour at night. This is its daytime coloration.

With mainly blue light available, clear tropical waters appear blue, but inshore waters contain decaying plants, mostly yellow these absorb some of the blue light so inshore waters appear green.

Sight, sound and electric images

Over aeons of time, nature's creatures evolved light sensitive photoreceptors and then the eye, an organ that uses its own physical structure to refract light. First the cornea and then the lens, refract photons to strike the retina, where individual photoreceptors convert the radiation received into signals from which the brain constructs an image. In other ways, mammals with echolocation can construct images from sound and sharks and rays from Ampullae de Lorenzini, their electroreceptors.

PHOTO: J. JACKSON

Land creatures require curved corneas to achieve the initial refraction before lenses achieve the final fine focusing. However, corneas have a molecular structure and refractive index similar to water, so those of fish and sea mammals are flattened, they have no light refracting function, only a protective one.

Without masks, land animals become long-sighted underwater. Only a few diving birds can adjust their vision to see almost as well underwater as on land. Apart from sharks and rays, most fish are short-sighted. To achieve focus, fish move the entire lens towards or away from the retina, whereas land animals change the shape of the lens.

All round vision

Most fish are prey as well as predator and apart from sea horses, have no neck to turn so having eyes set well back on either side of the body helps them to perceive trouble coming from behind.



Different kinds of receptors

The photoreceptors of the vertebrate eye are separated into rods, which function in dim light and are important for peripheral vision, and cones, which react to bright light and are responsible for colour vision. Both contain colour visual pigments sensitive to different wavelengths.

Most fish have some colour vision, generally dichromatic, having two types of visual pigment in their photoreceptors or like humans, trichromatic, with three types of visual pigment, increasing the range of colours perceived.

With only short wavelength light penetrating deep into the ocean, saltwater fish have a golden visual pigment that is most sensitive to blue. Freshwater fish that live in shallower streams and lakes are more sensitive to longer wavelengths,

the reds. Some very shallow freshwater dwellers such as perch can see into the near infrared, more than is accessible by the human eye.

Camouflage

During daylight the human eye is most sensitive to yellow-green, the colour of forest canopy, a reminder of our forest-dwelling past. At night we are most sensitive to blue-green and like many fish, cannot see red. Being red helps to camouflage those fish that feed at night and many can vary the hue and/or pattern of their skin as extra camouflage though this fails when divers arrive with dive-lights that make red conspicuous.

Most light in water is polarised, travelling vertically in shallow water and horizontally in deep water. Polarised light increases contrast, making distant objects

Vision in poor lighting

Nocturnal creatures have an additional mirror like layer of reflective cells called the tapetum, which give the photoreceptors a second chance to receive scattered photons, thus increasing light gathering capacity. This is the layer that causes cats eyes to shine like a mirror when struck by lights. Sharks have the most efficient tapetum in the animal kingdom, deep-sea sharks are able to mask off the reflecting crystals of their tapetum when there is too much light.

more visible, and reduces scattering, forcing the light to travel in one direction. Many crustaceans and cephalopods can detect which direction the light is coming from, even if fish cannot do this they benefit from reduced glare.

Controlling light

Apart from sharks and rays most fish do not have an iris to control the amount of light entering the eye. With the absence of pupillary response, their adaptation to light intensity can take several hours. Adapting to brighter light involves moving



The night time colour of *Priacanthus hamrur* is much darker than its daytime coloration.

Window of opportunity

Fish also have a window of vision above the surface, due to the way that light refracts (Snell's window). A few fish make use of this to hunt insects in air, despite the change in refractive index that means the prey is not actually where it appears to be.

screening pigment around the sensitive photoreceptors to protect them and at the same time the photoreceptors themselves, rods and cones, shrink in size. When adapting to dim light, the screening pigment draws back and the photoreceptors expand.

Fish have a memory for the daylight changes occurring in water, this, combined with temperature, may be one reason why some fish remain in a specific layer of water during the day, only rising =>



Vision plays an important role in the life of a fish. Here two male *Apistogramma biteniata* display to each other.

2.5"
MALE
1.5"
FEMALE
75°F
70°F

Freshwater fish that live in shallower streams and lakes are more sensitive to longer wavelengths, (reds) and often exhibit colour patterns which include these colours. Deep water fish may be red but use this colour as a camouflage because it cannot be seen in their natural habitat. This is a male *Nothobranchius guentheri*.



2" 75°F 70°F

Practical tip



As bony fish cannot close their eyes, fish kept in darkened tanks and then suddenly exposed to light, are stunned and blinded. For this reason it is important to gradually increase light levels in an aquarium by opening a room's curtains first or turning on the room light 30 minutes before switching on the aquarium lights.

→ to feed at twilight.

Sharks and rays do have pupillary response. The iris opens and closes according to the intensity of the light, but the process occurs far more slowly than in land animals. Some, particularly bottom dwellers, have an operculum, a filigree-like protective flap over the pupil that they share with members of the flounder family and crocodilefish, this protects their eyes from debris as well as glare.

Some sharks, birds and camels have nictitating membranes, opaque eyelids that both protect the eyes and decrease the amount of light entering them.

Bottom dwelling fish and those living in shallow water, have an additional protective covering over the cornea that often has a yellow filter, to filter out light's shorter wavelengths.

As with insects, many diurnal bony fish have iridescent corneas. Iridescence occurs when light passes between two transparent materials with varying refractive indexes. Some wavelengths of light are reinforced, producing a rainbow of colours, while others are cancelled out. Iridescent corneas 'take advantage of this cancellation effect, preventing glare.

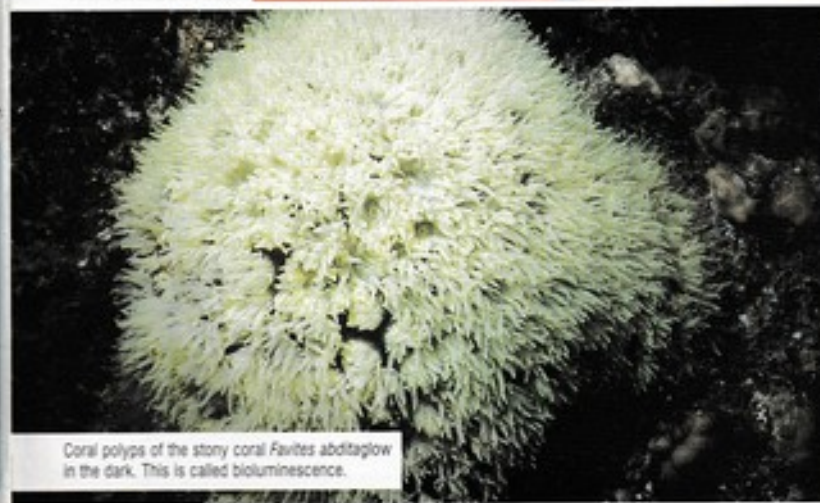
Do fish sleep?

Experiments have shown that some fish do sleep, but without eyelids, they sleep with their eyes open.

Their own flashlight

Some corals and sea anemones fluoresce, having pigments that absorb short wavelength blue light they re-emit it as longer wavelength yellow-green, green, orange or red light, but light underwater is not totally dependent on light from above water.

Flashlight fish, *Asomaloptilidae*, have glands under their cheekbones in which they culture bioluminescent bacteria. The bacteria feed on chemicals from the fish and produce enzymes that emit light, this bioluminescence occurs when luciferin is oxidised by the enzyme luciferase, the same as in fireflies. Flashlight fish can shut off the light by using an eyelid-like structure raised from below. They use the light to attract and illuminate their Zooplankton prey, confuse predators and communicate with one another. ■



Coral polyps of the stony coral *Favites abdita* glow in the dark. This is called bioluminescence.

Perfect Pizza

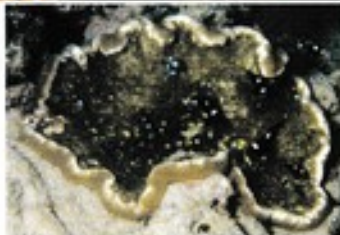


Alf Nilsen suggests a special anemone for a special aquarium

ALL PHOTOS BY BIOQUATIC PHOTO - A. J. NILSEN



above: A green Pizza Anemone with *Amphiprion clarkii* and *Dascyllus trimaculatus* photographed in the Maldives
right: The Pizza Anemone, *Cryptodendrum adhaesivum*, with juvenile *Dascyllus trimaculatus* anemone shrimps and anemone crabs. Photo from Thailand



The trend today is to have a community tank where a mixture of all sorts of invertebrates and fishes are kept on a platform of live rocks. These are surely beautiful, but there are other ways to build a coral reef aquarium and there are some animals that definitely need a special aquarium. One of these is the 'Pizza Anemone', *Cryptodendrum adhaesivum* and its interesting symbionts.

Pizza Anemones

The Pizza Anemone belongs to the host sea anemones that serve as hosts for clown fishes from the genera *Amphiprion* and *Premnas*.

Only one species of clown fish, *Amphiprion clarkii*, has, however, been observed to live in association with this anemone.

The anemone has a wide distribution in the Indo-Pacific and is found in the Red Sea, Maldives and the Seychelles in the west to Polynesia, Melanesia and Micronesia in the east. Northwards the distribution stretches to southern Japan and southwards to northern Australia. I have observed the species several times in different reefs on different locations, but always in very shallow water (normally less than 2-3 metres depth) and in places where the illumination is very strong. This is definitely a species for a brightly illuminated aquarium.

Two types of tentacles

The oral disk is flat and up to 30cm across and typically spreads over the substratum, and is normally undulating. The tentacles are very short, less than 5mm long and of two types. Centrally on the disk the tentacles are branched with five or more branchlets on a short stalk. On the outer part of the disk the tentacles lack branches, but end in a small bulb.



Male anemone shrimp
Periclimenes brevicarpalis
in a *Pymanthus* anemone

Along the very rim of the disk the tentacles are like those found at the central disk, but these have fewer branches. The two tentacle forms usually have different colours.

It is the colours that really make the Pizza Anemone attractive. I have found bright green specimens in the Maldives, purplish specimens in Indonesia and yellow and brown specimens in Thailand. These bright colours are a signal to other animals and says 'stay off!'.

Separate aquarium needed

Cryptodendrum adhaesivum is extremely sticky! This is the main reason why the Pizza Anemone needs a special aquarium. If placed in a normal reef community tank, this species will severely burn any animals that venture close and probably also harm even distant living sessile invertebrates.

The sticky environment is to the benefit of some animals, though. Several small symbiotic animals are found living in →



Close up of the Sexy Shrimp, *Thor ambolensis*,
in typical position wiggling its tail

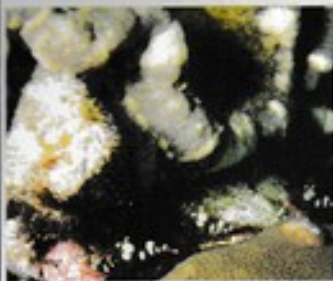
Creating the setup

What do we need? Obviously an aquarium, but not a very big one. 100 litres should be enough. A small protein skimmer and rather powerful illumination from a few daylight tubes as well as a heater and moderate internal water motion are also necessary to install. Perhaps the best way is to use a sump below the aquarium and install much of the technical equipment here? The decoration should be composed of a few live rocks arranged in order to place one or more anemones in between them. There should also be a layer of coral gravel mixed with some crushed live rocks. When this is completed, the usual period of at least 12 weeks with natural light rhythm and all the filtration running should be allowed before adding any animals.

For a 100 litres tank I would recommend the following animal composition:

- 2 specimens of Pizza Anemones, different colour forms if possible
- 20 specimens of Sexy Shrimps
- 2 pairs of Anemone shrimps (*P. brevicarpalis*)
- 2-4 pairs of Anemone crabs (I recommend one of the species mentioned above)
- 10 specimens of juvenile Three Spotted Damselfishes

In addition some algae grazing Hermit crabs as well as some Brittle stars for removing detritus could very well be added. It is wise to add the two anemones first and let them acclimatise and adapted well to the captive environment. Then, after a few weeks or months, the fishes and crustaceans could be added gradually, but all specimens of the individual species should be added simultaneously. Adding more specimens of the same species later on might very well interrupt the harmony in the flock and cause attacks and deaths.





The anemone crab *Pterolisthes maculatus* on the stalk of a soft coral

→ association with this anemone. I have yet to see a specimen of Pizza Anemone without one or more Anemone shrimps (*Ptericlimenes brevicarpalis*). Usually the shrimps live in pairs inside the oral disk. The male is bigger and has more white patches than the female. As far as I have been able to verify, this is the only species of anemone shrimp that is associated with this anemone.

Sexy ones

Another shrimp commonly associated with this anemone is the Sexy Shrimp, *Thor amboinensis*, a tiny circum tropical species. Unlike Anemone shrimps, Sexy shrimps are usually found just outside the rim of the oral disk, often clinging to algae or to the rocks. They can also sit on the underside of the disk. The Sexy Shrimps are so tiny, that they are sometimes hard to detect, but if you observe the anemone closely for some minutes, you will often discover a whole bunch of sexy ones...

There are a third group of crustaceans commonly associated with *Cryptodendron adhaesivum* - these are Anemone crabs from the genus *Pterolisthes*. An unknown number of species of Anemone crabs, but by far the two most common species of the Indo-Pacific are *Pterolisthes maculatus* and *Pterolisthes ashimae*, that have larger and fewer red to orange-red dots on the carapace. Both species are frequently seen in the Pizza Anemone where they usually sit still on the oral disc or on the stem waving their strongly modified third pair of maxillipeds catching minute plankton.

Add a few fish

Host sea anemones and their symbiotic crustaceans kept in a special aquarium can be both interesting and attractive, but there is not so much movement in such a set-up. However, with the Pizza Anemone, we have the opportunity to add fish, not only Clarkii's Clownfish, but also the Three Spotted Damselfish, *Dascyllus trimaculatus*. Juvenile specimens of this Damselfish are very commonly associated with *Cryptodendron adhaesivum*. Often as many as 20-30 specimens, ranging in size from a few millimetres to several centimetres will be found swimming just over the oral disk. I have several times spotted how the juvenile fishes - and most frequently the smallest of the juveniles - rub themselves on the anemone's tentacles obviously in order to get use to the strong netting poison from the anemone. They do in this way display a similar behaviour as the clown fishes, and probably produce a mucus that protects them against the anemone's sting.

The behaviour and the biology of the juvenile *D. trimaculatus* in association with the Pizza Anemone, seems to be poorly investigated. The modern coral reef aquarium can be used as a tool to study this and other aspects of the biology of the anemone and it's symbiots. I feel quite confident that you will discover many interesting sets of behaviours and see things never before observed. Keep your camera ready!

Principally such a special aquarium outlines a way of practising the reef aquarium hobby not so often seen and done today. Perhaps a small, really 'special aquarium' is something just for you? Good luck! ■

Possible problems

Amphiprion clarkii is the only known clown fish naturally found associated with the Pizza Anemone. I am, however, not sure if this fish will fit into the set-up. Although I have personally seen both fish species living together with the same anemone there is obviously a fair chance that the clown might fit into the scene. However, I also believe there is a chance that the clown fish might be a very dominant and aggressive part of the tank community causing problems and disturbing the natural interactions among the rest of the animals that we want to study.

This might all sound like a piece of cake. There are, however, some potential problems with the set up. First; juvenile damselfish are not common in the trade. We are talking of very small specimens, ideally smaller than 2cm in length, and it is not common that such specimens are caught. Perhaps the group could be specially ordered for such an aquarium? Secondly; the Sexy shrimps are not very common in the trade either and they are usually expensive. (However, the number can be reduced, although it would be most interesting to see a natural sized group of sexy shrimps playing around the anemones.)

Another problem might be the acclimatisation, especially of the shrimps. Do add them very carefully to the tank using a drop by drop acclimatisation process that continues for many hours. If the Sexy shrimps are added after the fishes, introduce them during the night in order to be sure that the fishes do not look upon the newcomers as potential prey and attack them. A PVC-tube can be used for leading the shrimps to the bottom of the aquarium.

Contact Alf

Alf would be very happy to hear from aquarists trying out this set up or aquarists having experiences with the Pizza Anemone and some of its symbiots. Write to Alf at Aquarist and Pondkeeper, TRMG, Winchester Court, 1 Forum Place, Hatfield, Herts. AL10 0RN or E-mail aandpeditor@btinternet.com with Alf in the subject line.

The Modern Coral Reef Aquarium

The Book by Alf Jacob Nilsen & Svein A. Fosså

available from
AQUA MEDIC
 Tel 0845 090 3500

The Water primrose, *Ludwigia repens* originates from tropical parts of both North and South America, and belongs to the diverse family 'Onagraceae'. It's another 'golden oddie', well known to experienced aquarists, and available from most aquatic retailers.

The description is slightly variable, as within the species there seems to be various colour and leaf forms, although they are not considered to be subspecies. The rounded/ovate leaves are arranged in opposite pairs up central stems, and are olive green on top and a deep red below, measuring up to 3cm in length and up to 1.5cm in width.

When displayed in a retail system, customers have confused it with newly stocked *Hygrophila polysperma*. If you need to tell them apart, look for the fine stems joining the leaves to the central stems. *H. polysperma* leaves appear to join directly to the stem.

This species is also sold as rooted stem cuttings secured in a pot by rock wool or foam. The rooted stems should be carefully removed from the pot and foam. After removing some of the lower leaves, plant each stem deep into the substrate, using your forefinger as a dibber. Leave approx. a leaf's distance between each stem, to allow good light penetration. It's best grown as a background or mid-ground plant.

L. repens is a hardy, tolerant plant and should quickly establish itself. As the plant grows to the surface, trim back. This will encourage it to bush out. Provide good light as inadequate lighting can cause the plant to become pale. Feed regularly with a liquid plant feed

There's no alternative

Alternanthera reineckii (Bronze) is an attractive variety originating from the tropics of South America, and one of a few colour morphs of 'reineckii' available. It belongs to the Amaranthaceae family.

It is generally a fast growing and adaptable plant, with lanceolate leaves that are bronze-red top-side, and a violet-red underside. The leaves get to approx. 8-10cm in length, by 1cm in width, and are joined in opposite pairs by fine leaf stems to a central growing stem, which in turn grows to the surface of the aquarium.

Tate's Gallery

John Tate has three more plants for his gallery

Getting too much of a good thing

Plants in general use masses of red light to photosynthesise. But in areas in which red plant species grow, the light is so intense that too much proves a problem. So these plants have modified their chlorophyll to reflect the red light they don't need, and this is why they appear red to us. Removed from this environment the plants are at an immediate disadvantage as they are reflecting needed red light in a deficient situation. This is why higher levels of light are needed.

Alternanthera reineckii (Bronze) is an attractive variety originating from the tropics of South America, and one of a few colour morphs of 'reineckii' available.

John's tip

Lowering marginal plants in stages, so that the leaves aren't totally submerged at one time, will help acclimatise the plant to a 'deep marginal' situation.

Keeping this plant is relatively easy, but it does like good light quality and intensity – three watts per gallon, with a spectrum rating around 700-720nm. Lower light ratings tend to result in green leaf growth rather than the distinctive copper red.

A. reineckii is usually sold as a pot of rooted cuttings secured by foam or rock wool. Choose a pot with plenty of stems and good leaf, and avoid pots where the leaves seem to shed easily. Also, be careful not to buy *A. sessilis*, a similar looking species, but unlikely to do well in the aquarium. Once home remove the plant from its pot and tease away the foam or rock wool. Then plant each stem separately, deep into the substrate allowing 5-10cm between each stem so that light can reach all of leaves. This can be done in an ascending order, creating a stepped effect. Feed regularly with a liquid feed, and keep algae from covering the leaves.

Flowering rush, *Butomus umbrellatus*

Butomus umbrellatus is a native plant found mainly growing in southern parts of Great Britain, and as far as I'm aware, is the only member in its Genus. It inhabits

natural ponds and slower moving streams, rivers, growing in a variety of depths from 30cm-100cm of water.

Despite it being a river species it fares well in the garden pond. You might find that it's not available from every aquatic retailer, so it's best to ring first.

A multitude of upright, bright green blades, with triangular cross sections and a stiff spine form the plant's foliage, which grows from adventitious rhizome growth below the substrate surface. Around July, green cylindrical stems support what look like inverted skeletal umbrellas. These are flushed with a canopy of buds and rose pink, six petalled flowers, with crimson stigma surrounded by a ring of golden stamens. Each head can have up to 30 flowers and last for approx. four weeks. Choose a healthy specimen with plenty of growth and a good root system. Then when you get home place it in the pond in a sunny position.

As this plant is happy in a variety of depths it can be used in a 'marginal' or 'deep marginal' position. Established plants can be propagated in May by the division of the rhizome growth and growing nodes, that look like roundish blobs with little horns. This amazing plant is a bit different, and generates attention from people and wildlife alike. ■

"A multitude of upright, bright green blades, with triangular cross sections and a stiff spine form the plant's foliage"



The Water primrose, *Ludwigia repens* another 'golden oldie', well known to experienced aquarists, cheap and available from most aquatic retailers.

A pair of Buffalohead cichlids (S. caeruleus) swimming in a dark, rocky environment. The fish are dark blue with prominent scales and large, prominent eyes. The background is dark with some yellowish-brown highlights on the rocks.

CICHLIDS

Buffalohead

West Africa is home to a group of Cichlids which are ideal for beginners. **Dr Peter Lewis** has all the details

A pair of *S. caeruleus*



Steatocranus tinanti cannot hover mid-water and moves about the aquarium in short leaps or hops, reminiscent of a goby or mudskipper.

Over the last two years I have been fortunate to keep and observe three different species of "Humphead" or "Buffalobead" cichlids. These belong to the genus *Steatocranus* and grow no larger than four inches and all of which are quite easily maintained in a 30-gallon (135 litre) aquarium. All are available commercially and any of which can be recommended to the beginning cichlid keeper. Each is a typical, small or dwarf cichlid, territorial in nature and aggressive to a fault when it comes time to breed or when caring for their young.

Distribution

S. casuarinus Poll 1939, is a tilapine, cave spawning, cichlid that belongs to a genus native to the Zaire and Volta drainage basins. Most collected specimens are found throughout the lower and middle reaches of the River Zaire and are caught for the hobby along the mainstream between Kinshasa and Matadi. The popular dwarf cichlid known as *Nanochromis parilus* is found in the same collecting locality. Possibly the most commonly available within our hobby, *S. casuarinus* occurs in the wild in the company of *S. gibbiceps* and is synonymous with *S. elongatus*.

S. tinanti (Poll 1939) is found inhabiting the lower reaches of the Zaire River, between Matadi and Malebo Pool (formerly known as Stanley Pool), preferring to occupy caves along the river bank in fast-running shallow waters. *S. tinanti* is synonymous with *Gobiocromis tinanti* and *Leptotilapia tinanti*. In Europe this cichlid has been sold under the common name of Slender Lionhead cichlid.

S. irvinei (Trewavas 1943) is a native of West Africa's Volta River drainage basin, specifically through Ghana and Burkina Faso. The type specimens were collected in the area of the Senchi ferry on the River Volta in Ghana. This species is the only member of the genus identified to date that occurs outside the River Zaire drainage system, in fact *S. irvinei* inhabits a region more than one thousand miles north of the Zaire basin. Again this cichlid is found in fast flowing, well-oxygenated rock filled, shallow rapid systems. *S. irvinei* is synonymous with *Gobiocromis irvinei* and *Leptotilapia irvinei*.

Description

S. casuarinus has a dark brown to blue-grey coloured body covered with small scales which are dark coloured in the centre with a light margin. The body is crossed with several vertical bars that are variably present. The scales have a →



Steatocranus irvinei female. Females have more rounded fins and a smaller hump than males.

Classification

The type species is *Steatocranus gibbiceps* Boulenger 1899, and this species is the most common in nature. The genus name comes from the obvious presence of head humps that develop between the eyes, on the forehead, of both sexes as they mature, but which is far more prominent in the males of each species. *S. irvinei*, introduced to our hobby in 1983, was originally classified in the genus *Gobiocromis* and even spent a short time as a *Leptotilapia*, which has now been placed in synonymy with *Steatocranus*. There is also ongoing discussion as to whether *S. tinanti* should be more correctly known as *Gobiocichla tinanti*.

Natural Habitat

These cichlids can each be described as "rheophilic," preferring to inhabit swift moving riffles as found at the approach to rapids, as the river becomes shallow and flows through a constricted area over a rock covered gravel bed. The reduced free swimming habit, apparent from the manner in which these Humpheads remain close to the floor of an aquarium or as each "hops" from rock to rock within the aquarium decor, is perhaps the only evidence of these cichlid's adaptation to their natural habitat. All are omnivorous feeders, browsing upon aquatic plants and algal growth and feeding upon the minute animal life found amongst the vegetation.

Water conditions

Well aerated, clean, neutral to slightly acidic water is preferred. A pH between 6.0 and 7.5 with a TDS around 175 ppm is ideal. Like many rapid dwelling cichlids the Humpheads are sensitive to any marked increase of metabolic wastes in the aquarium and routine water changes are essential to their well being in captivity. Each is found within a wide range of temperatures in the wild from a low of 70°F to a high of 80°F (21-26.5°C). In the aquarium a temperature from 74 to 78°F (23 to 25.5°C) is satisfactory. Mandatory to the well being of these cichlids is a well-aerated aquarium, achieved by means of an air operated sponge filter, air stone or external filter that vigorously aerates the water around the return point.

These Crinoids were photographed on a night dive in the Philippines

Sea View

In his new monthly column Andrew Caine has a warning for all those planning to buy overseas via the internet

One way to get hold of not so common animals is via the Internet, but beware! A friend of mine decided to buy a coral via the Internet from America because I could not get hold of the species for him. First off, his credit card was charged and he got an ordinary bog-standard coral that anybody can get because the American company was out of stock. Not a happy man. He then rang me a month later to tell me that his credit card had been charged again and another box was on its way. I then told him to cancel the credit card payment and go and collect the box from the airport and see what awaited him. What did await him was not what he expected. Instead of the coral, he

got the long arm of Her Majesty's Customs and Excise Department around his neck. He was grilled for a period of over 3 hours, the RSPCA were sent to his house to confirm that he did indeed have an aquarium and was not a trader.

Luckily, the coral that was in the box was legal to import but was illegal to take from the wild. This is via a series of loopholes in international law. The Customs released the coral into my friend's care. Thankfully it is doing very well in his reef, but Customs told him he was more than welcome to import direct again, however, he would suffer the same consequences every time if they thought there was something going on. Needless to say, he has learnt his lesson. ■

Environmental concerns

Environmentalists express concern over this trade, many saying that we are destroying reefs. Animals collected correctly, in a sustainable fishery, will not destroy any reef. In fact what it does is provide employment for people who would live in poverty often begging for a living if it were not for this income.

However illegal extraction can cause serious damage to many areas of reef, and in the process kill countless animals that if caught correctly would live. A few people profit from this illegal trade, they make a fast buck, the losers are YOU. Remember that if you buy an illegal or poorly treated animal 90% of the time you may as well throw your hard earned money away. It is YOU and the very animals you love who suffer.

PHOTO: JEFF A.C. FERNANDEZ

MARINE FISH



above: The classic orange and white form
left: They are black and white as well

Common clownfish (*Amphiprion ocellaris*)

By Andrew Caine

Ok lets not be snobbish about this but to describe such stunning fish as common is beyond belief, just look at the coloration displayed and you could be forgiven for thinking that they were the work of some artist painting a live animal. I have a pair of black and white, which I have kept for three years, and my wife says I love them more than her, she is gorgeous, they are beautiful!!

Amphiprion ocellaris displays two distinct colour morphs, the orange and white which we all know and my black and white. The coloration difference is due to a population living in very shallow waters and so have evolved the black pigment for protection from UV rays.

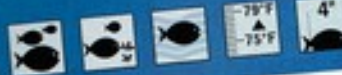
Clownfish are the staple diet of most marine fish keepers, and not many of us can say that we have not been overjoyed by the antics of a pair snuggling up to anemones in our aquariums. However, as with all pleasure there can be some pain.

Do not think for one moment that on introducing a pair to your aquarium you will be rewarded instantly by them going to your anemone. As with most things in aquatics this could take some time, mine took 30 months to go into one, after one week the b****y anemone moved into the rock work, wonderful just wonderful.

As clownfish are members of the damselfish family, we have to regard them as such, yes they do show aggressive behaviour, and this is where the common clown excels as it is by far the most peaceful of the clowns. But be warned they are capable of bounding fish until they perish. Only keep one species of clowns in an aquarium unless it is over 400 litres and houses two anemones.

PROFILE

Family	Pomacentridae
Name	<i>Amphiprion ocellaris</i>
Natural habitat	Indo Pacific
Feeding	Anything, meaty foods, a pig of a fish
Reef compatibility	Highly recommended
Tank mates	Peaceful reef compatible fish
Size	4"
Difficulty	Great for beginners, however as with all marines they must have good water quality



MARINE INVERTEBRATE



PHOTO: MARK COOPER

Red feather star (*Himerometra robustipinna*)

By Andrew Caine

The feather stars all belong to the phylum Echinodermata and as such are relations to starfish, brittlestars, and urchins. Crinoidea is the oldest surviving class of echinoderms dating back to the Paleozoic era. From our picture you can see that the beast holds onto a surface via cirri however millions of years ago the cirri joined onto a stalk up to 30m in length before the main body was evident. Evolution has reduced the vulnerable stalk in most species so the body directly joins the cirri. There are about 30 species still with stalks but these are only found at depths of more than 100m, the rest of the 550 species have lost the stalk.

Himerometra robustipinna is the most common featherstar that we see in aquarium shops and what a beauty it is. Despite calling this the Red feather star, there are other colour morphs. These are mainly yellow and black, so you may find three different colours in a selling tank all of which might be the same species.

The featherstars fulfil most reef keepers agenda, that is unusual, brightly coloured and often not too expensive \$25 or less. However, be warned this animal is only for the most experienced reef keeper with tank mates that are suitable. The reason being that the arms are incredibly brittle, most will perish quite quickly and the perplexed owner will find bits of arm strewn all over the rockwork in only a few days.

So to keep this mini beast you must have a good reef system with only a few VERY peaceful fish and NO crabs or beasts that nip and bite. With this in mind you will be rewarded with the sight of the featherstar 'flying' through the water flapping its arms, and what a sight that is.

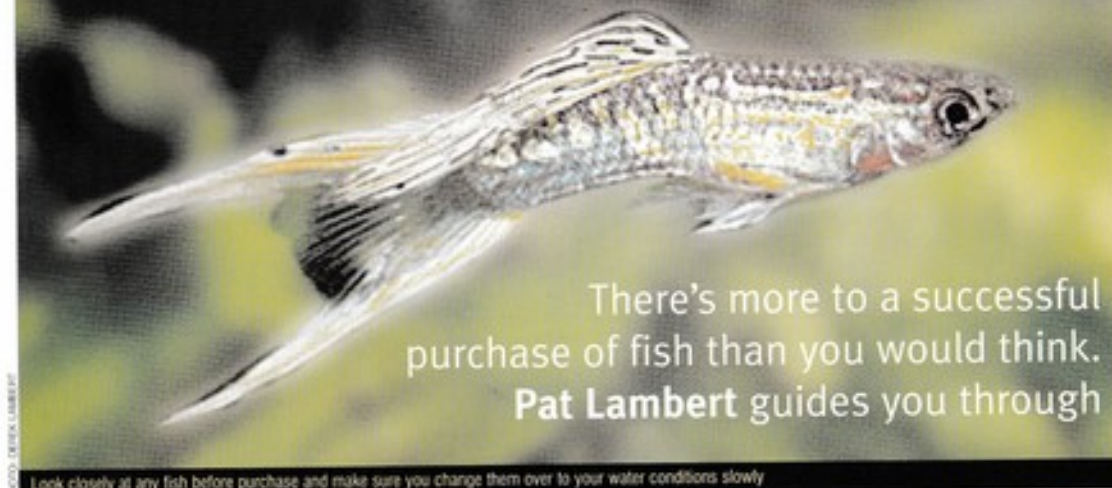
The animal will require a high degree of suspended food to filter through its arms and so good filtration is required with a high stock of filter feeders. This animal and its relatives are wonders to behold and are worth setting up an aquarium containing feather and another weird one, basket stars, fantastic animals!

PROFILE

Phylum	Echinodermata
Name	<i>Himerometra robustipinna</i>
Natural habitat	Indo-Pacific, Australia
Feeding	Suspended plankton food
Size	Up to 1.5" (35cm) between arm tips
Water flow	Moderate
Lighting	None required
Difficulty	Hard, feed well !!!!!



Good hunting



There's more to a successful purchase of fish than you would think. Pat Lambert guides you through

Look closely at any fish before purchase and make sure you change them over to your water conditions slowly

Holidays over, many of you will be looking for new fish for your established aquariums and you will be home to ensure their successful acclimation.

I am assuming that (having been a reader of this column over the past few months) you know about which fish will live happily together and how to test the water, so let's look at the pointers to success before you buy.

Preparing for new arrivals

A quarantine tank is essential. This tank should be prepared in advance of new arrivals. The tank should be unplanted and have no substrate. This makes it easy to spot any abnormal behaviour and to treat any disease should this occur.

A small corner sponge filter should be added. Half fill the quarantine tank with water taken from the eventual home tank of the new fish and top it up with conditioned tap water.

Transporting stock

A good stockist will always bag your fish carefully but you need to tell him/her if the fish are going to be travelling a long distance and are likely to be in the bags for several hours - or even overnight. Some species need to be individually bagged and some that have spines could puncture the bag and will have to be double or even triple bagged. Try to obtain a polystyrene box to carry your

fish home, filling this, newspaper surrounded by a warm blanket or woollen jumper will keep them warm. Do not leave the fish in the car for any long period, particularly in hot or sunny weather. Have some spare polythene bags in case a bag bursts. (It does happen believe me!)

Choosing stock

Visit a reputable and knowledgeable dealer. Never buy fish from a tank with dead fish in it. See that the tanks are well maintained and in sparkling condition. Look for fish swimming in a manner appropriate for their kind. Barb, tetras and other shoaling fish should be swimming in a lively manner with outspread fins. Look for fish with a robust body shape. In many species males are slimmer than females but there is a difference between slim and emaciated. In livebearers look for a strong caudal peduncle (where the tail joins the body). Ask for the pH and GH of the water in the shop tanks. (A good stockist will have these to hand.) Always examine the fish after they have been bagged to make sure you are happy with them. This is particularly important when they are coming from large shoals.

Acclimating stock

Compare the pH and GH of your home tanks with the shop water. If you have had a long journey the water in the fish bags will be cooler than the water in your tank, so you will need to float the bags to equalise the temperatures. Provided that the pH is near enough equal to that in the bag, (a difference in pH can be a killer and it doesn't have to be that great a difference either) you should, gradually, over a couple of hours mix the water in the bag with the tank water before releasing the fish into their temporary home.

Make sure you have a tight fitting lid. Frightened fish will jump through the smallest gap. Many an experienced fishkeeper has lost fishes this way. Let them settle for a while, then give them a small feed (frozen bloodworm's a good one) and see that they eat it all up.

After a couple of days carry out a ten per cent water change twice weekly using conditioned tap water. Over the next two weeks closely observe your fishes. At this time they are most susceptible to disease.

Good hunting, I hope you find those special fish you are looking for this season. ■

Pat's WARNING

Do not introduce your new fish into their permanent home until the quarantine period is over and the fish are looking good

Stepping stones to SUCCESS

Some essential questions answered

How should I light my aquarium?

Correct lighting is vital for plants, corals and other invertebrates. All too often beginners buy set-ups that are not designed to do what they want to. Make sure you have lighting designed for plant growing and ask your local aquarium shop for advice on marines.

How many fish can I keep?

Freshwater

For freshwater aquaria it is safest to work on surface area rather than volume. We recommend 12" of surface area per 1" of adult fish. This means you must take into account how big your fish will grow to, not just how big they are when you buy them.

Marines

Marines require a different method of working out the number of fish you can house in an aquarium. You need to work on volume here and 1" of fish to every six gallons of water is a safe stocking level for a reef style aquarium. Fish only tanks can house more fish, but the exact level will depend on how good your filtration system is. Again you need to find out how big your fish grow to rather than just measure how big they are now.

Ponds

Ponds are usually calculated on volume and for a filtered pond you can house an absolute maximum of 100" of fish per 1000 gallons. It is vital to remember this only works when you calculate it on the final size of your fish - not the current size. A 6" Koi will grow to 24" long and increase its weight 50-fold. This can happen very quickly and often leads to ponds becoming over stocked with fatal results.

What is the correct temperature for my fish?

Freshwater tropicals
70-80°F

Coldwater
55-70°F

Marines
75-79°F

Some delicate species have very specific requirements, so read up on them before you purchase.

Water changes – how much & how often?

Freshwater

In freshwater aquaria you should change 10 to 20% of the water weekly. If you live in a water area where chloramine is added to your tap water it is essential to add a water conditioner to the fresh water before use.

Marines

The ideal here is 20% every two weeks. This will reduce nitrates to a safe level and replenish the vital minerals and trace elements. Never change larger volumes of water than this, however, as large water changes in a marine aquarium may cause osmotic shock or other problems that will harm fish or invertebrates.

Ponds

Pond fish also benefit from regular water changes but here it is rarely practical to change large volumes on a regular basis. Even so regular water changes should be carried out and ammonia, nitrite and nitrate levels monitored regularly or whenever the fish look in distress. With enough growing plants in the pond nitrate should be reduced naturally and providing your pond is not overstocked or over fed, ammonia and nitrite should always read zero in a mature setup.



Rams make excellent community fish

PHOTO: ANDREW VAN DEN HEUVEL/ALAMY

Are live plants essential in a freshwater aquarium?

The simple answer is no, but they are beneficial and we strongly recommend you grow some in all but exceptional circumstances. The reason for this is that they remove nitrate from the water. This pollutant is the end product of normal aerobic filtration and whilst at low levels it is unlikely to kill your fish, it will still stress them which can lead to health problems.

Two other important aspects to consider are:

1. That they provide cover for your fish and create a more natural environment.
2. Reduce the likelihood of algae becoming a problem.

Club News

All the news from around the club scene

Aquarist Festival looms large



● Last years winner of the Champion of Champions competition

THE 50TH BRITISH Aquarist Festival looms large at this time of year. This year it will held on the 3rd and 4th November at a new hall just off junction 7 on the M60. The format will be changed this year with a tropical open show being held on the Saturday together with the Champion of Champions. On the Sunday a coldwater show will be held with the Coldwater Champion of Champions. In addition to this they are running a show for breeders classes and pairs to promote the FNAS's breeders program. Specialist societies are also being invited and there will be a sales stand selling a wide range of home bred fish. For further details contact Amy Chadwick on 0161 6526207.



● Brian and Steve Chrich & Ian Wright are still in the lead, but are people holding back results?

Show league

SINCE ITS LAUNCH earlier this year the A&P Show league has attracted entries from all parts of the country. Many of the big names in the showing fraternity are taking part and amassing quite sizable numbers of points. Here are the front runners at the moment:

Brian and Steve Chrich & Ian Wright.	420 points
K.A. Tyson	273 points
Dave & Lois Speed	81 points

There is still plenty of time to get your results in and build on your total, however, it seems that one or two exhibitors are holding back their results to lull the leaders into a false sense of security. A little showmanship seems to be in the offing!

Major awards

Two shows have kindly sent their results in. The major awards at Workington went to:

Best in show	B. and S. Chrich & I. Wright	<i>Orinocodoras eigenmanni</i>
2nd Best in show	N. Dobinson	<i>Polypterus ornatipinnis</i>
3rd Best in show	Rob & Karen	<i>Ctenopoma acutirostre</i>

At Rydale Aquarist Society:-

Best in show	A. and D. White
Best exhibit	G. and J. Bell
Best Coldwater	J. Cox

Diary dates

September's show, auction and club meeting dates

Sat 1st	FBAS General assembly 0127 740747
Sun 2nd	KAAS Erith Contact 01983 613575
Mon 3rd	Kirkcaldy A.S. meeting Contact 01738 634689
Tues 4th	Gloucestershire Fishkeeping club meeting Contact Caroline 01453 824850
	Southend & Leigh meeting Contact 01702 305740
	Preston & D.A.S. meeting Contact 01772 32114
	Merseyside Aquarist Society meeting Contact 0151 201 6085
Wed 5th	Corby & DAS. meeting Contact 01536761736
	Oasis Fish Club (Sunderland) meeting Contact 0191 3841433
	Hounslow club meeting Contact 01784 259230
	Perth A.S. meeting Contact 01 738 621704
	Clacton Fish Keeping Club meeting Contact 01255 428065
	Workington A.S. meeting Contact 01900 67951
Thurs 6th	Faircity A.S. meeting Contact 01738 561291
Fri 7th	Basingstoke A.S. meeting Contact 01256 467889
	North West Cichlid Group meeting Contact 019422 707 593
Sat 8th	
Sun 9th	Alden Aquarist Show Team Open Show & Auction Contact 0161 652 6207
Mon 10th	Kirkcaldy A.S. meeting Contact 01738 634689
	Ilford & D A&P Society meeting Contact 020 8550 7329
	Bristol Aquarist Society (Goldfish) meeting Contact 01792 207467
	Grimsby & Cleethorpes meeting Contact 01472 349178
Tues 11th	Dunstable & D.A.S. meeting Contact 01582 702280
	Greenock D.A.S. meeting Contact 01475 704219
	York & D.A.S. meeting Contact 01904 414272
Wed 12th	Lilithgow Aquarist Society meeting Contact 01506 510558
Thurs 13th	Telford & DAS Club meeting Contact 01952 290624
	Mid-Sussex A.S. meeting Contact 01273 602407
Fri 14th	Yorkshire Cichlid Group meeting Contact 01924 367086
Sat 15th	Hounslow Open Show FBAS Tel 01753 645675
Sun 16th	Otley AS Open Show YAS 01274 531418

	Catfish Study Group Open Show Auction Contact 0161 652 6207
Mon 17th	Kirkcaldy A.S. meeting Contact 01738 634689
Tues 18th	Southend & Leigh Club meeting Contact 01702 305740
Wed 19th	Merseyside Aquarist Society meeting Contact 0151 201 6085
	Clacton Fish Keeping Club meeting Contact 01255 428065
	Tongham Aquarists Society meeting Contact 01252 25686
	West Yorkshire Marine Aquarist Group meeting Contact 01924 420101
Thurs 20th	Bristol Tropical Fish Club meeting Contact 0117 973 2145
	Faircity A.S. meeting Contact 01738 561291
	October TODAY'S FISHKEEPER on sale
Fri 21st	Basingstoke A.S. meeting Contact 01256 467889
Sat 22nd	
Sun 23rd	
Mon 24th	Kirkcaldy A.S. meeting Contact 01738 634689
	Thorpe & D.A.S. Club meeting Contact 01953 605394
	Grimsby & Cleethorpes meeting Contact 01472 349178
Tues 25th	Lincoln & D. A.S. Club meeting Contact 01522 880863
	Greenock D.A.S. meeting Contact 01475 704219
	Greater Manchester Cichlid Society meeting 01422 842155
Wed 26th	Workington A.S. meeting Contact 01900 67951
Thurs 27th	Mid-Sussex A.S. meeting Contact 01273 602407
Fri 28th	
Sat 29th	Goldfish Society of Gt. Britain Open Show and Auction NGS Tel 01472 353615
	Northern Goldfish & Pondkeepers Open Show Contact 0161 652 6207
Sun 30th	Mid-sussex Open Show Contact 01273 602407
	Faircity A.S. Open Show Contact 01738 561291

Federation Contacts

AcA Ian & Rhona Walker 01252 668747 FBAS Les Pierre 01983 613575
 FNAS Amy Chadwick 0161 652 6207 FSAS James Sheeky 01475 704219
 USA John Reid 01738 634689 YAS Cliff Hildred 01522 872741

Copy for Today's Fishkeeper's Diary Dates

Copy for Diary Dates should be sent to: Today's Fishkeeper, Winchester Court, 1 Forum Place, Hatfield, Herts AL10 0RN. Tel: 01673 860352 or fax 01707 276555 or e-mail aandpeditor@btinternet.com
 Copy deadline 6 weeks before publication date.

AQUARIST
AND PONDKEEPER
GALLERY
STREEK AANDEKINGEN NIEUWENTUIN

Galactical Suckermouth

Leporacanthicus galaxias SIZE 10"





Share your news, views and experiences through the A&P Postbag. Have you built a new pond, installed a new aquarium or revamped an existing set-up? Then send us the photographs and tell us how you did it. Every month the star letter wins a fantastic prize worth £25 - all for the price of a 27p stamp...

star letter

I bought some Premier Fiji live rock a couple of weeks ago by mail order. I received the rock late Friday afternoon and it was all set up by 6pm that night. On checking the tank the following morning I was horrified that the water was cloudy. I immediately did the usual water tests and found that the ammonia level had risen from a zero reading before the live rock was introduced, to a reading of over 50mg/litre.

Luckily for me Andrew Caine was only a phone call away and even though the nearest shop that stocks any range of marine products involves a round trip of 120 miles, I got some ammonia detox and everything seems to be OK now. Thanks for a great magazine.

John Leather, Dumfries



PHOTO: DEREK LAURENT
Premier Fiji live rock



Just one of many furnished aquaria on display at Aqualife 2001. Next month we will have a full report on the show.

Praise for Aqualife 2001

I would like to congratulate the organisers of Aqualife 2001 for putting on such a wonderful show. I visited the show on Saturday morning and stayed for four hours before catching the shuttle bus across to Shirley Aquatics and spending another two hours there. I was amazed at the range of products on sale at the exhibition (my local shop has only a limited selection) and purchased a whole raft of things I wanted for my marine reef tank and freshwater community aquarium. I would love to have bought a few of the fish for sale at the shop but was concerned at the length of journey they would have (I live in Devon).

Some of the furnished aquaria were truly beautiful and have inspired me to do a 'make-over' of my freshwater tank. It has looked the same for many years and I now know how much better it could be.

Only criticism

The only criticism I could find was completely out of the hands of the organisers and actually worked in my

favour. I know we shouldn't complain but the weather was so hot parts of the show were stifling. One hall I went in the people on the stands looked half dead with the heat! The only air conditioning unit I could find was right by your stand and I must admit to lingering there a while to cool off. That brings me to the second reason I am sending this e-mail. So you wouldn't think me rude and just taking advantage of your good luck (careful planning?) I looked through a few copies of *Aquarist and Pondkeeper*. To be honest I didn't expect much since I knew the magazine from years ago. How wrong can you be? I was gob-smacked. Beautiful photographs, fascinating articles and my all time favourite book author Alf Nilsen all in the same magazine.

I bought a bunch of magazines from you (you probably won't remember me as the stand seemed so crowded all the time) and spent the journey home enjoying the best read I have had in years.

Well done everyone involved with *Aquarist and Pondkeeper*, you really have revolutionised the magazine. I have already taken out a subscription.

Peter Brown via e-mail

Pretty Polly?



Pretty Polly? Well maybe not, but an interesting species none-the-less

Oliver Lucanus reports on a really strange looking fish from the Rio Xingu – Parrot Pacu, *Ossubtus xinguensis*

In truth the name Parrot Pacu is quite misleading for this fish because it assumes that the species is mostly vegetarian. The triangular sharp teeth are a clear indication that this animal from the Rio Xingu in Brazil is not really interested in plants at all but prefers to prey on insect larvae. It rakes these out of the algae cover (Aufwuchs) that is probably where people originally got the idea it was vegetarian.

Solitary creatures

In its natural habitat *Ossubtus* is a solitary species that is seen close to the bottom or among large boulders at depth of 3-10 metres. I have never seen two *Ossubtus* swimming together in nature, nor caught two in the same net in several trips to the Xingu. The Rio Xingu has warm, soft, clear and slightly acidic water

that is fast flowing.

Adult *Ossubtus* attain length of around 8 inches and do not change colour much from the pale gray of the juveniles. In the aquarium the species does require well oxygenated and filtered water. Other water parameters are not of importance but the fish easily get whitespot if kept at temperatures below 80°F (27°C).

Fin-nippers

It is not known if the fish are fin nippers in nature as well, or if this behaviour develops in the aquarium where potential victims have less chance to get out of the way. Either way it can only be kept with other fast moving species but may still bite pieces from their fins. If a group of *Ossubtus* is kept together the smaller animals often get picked on, so an aquarium with lots of hiding places,

strong current and other fish is ideal. Good community fish for these terrors are *Acnodon* and *Leporinus* and other fast fishes that will be able to outrun the relentless *Ossubtus* and make sure that they get enough food.

In the aquarium *Ossubtus* will eat any dry or frozen food offered but thrives on fresh mussels and earthworms. *Ossubtus xinguensis* is an intriguing species for specialists with larger aquariums. ■

Warning!

Most attempts to keep *Ossubtus* in the cichlid aquarium will fail because territorial cichlids (other than *Crenicichla*) will usually wind up damaged by the aggressive and fast Parrot pacu.

I saw my first live Chocolate Gouramis in a friend's Aquatic Shop and instantly fell in love with them. This was a fish that I simply had to try to keep. I left the shop determined to find out as much as I could about these lovely little fish. I started to read through as many books as I could lay my hands on, although what I read did not fill me with confidence. The words that seemed to ring out in each case were: delicate; peaceful but very shy; fussy; difficult to sex; rather touchy as to water conditions and must be fed livefoods at all times. This is just the sort of challenge that I enjoy and the more that I read about them the more determined I was to succeed with them.

Beautiful but delicate

Chocolate Gouramis are beautiful if very delicate fishes that are definitely better kept on their own where their particular requirements can be provided. The key to success with this fish is water conditions. They require soft, acidic water. The fish however have a certain charm that makes them hard to resist.

The sexes are not easy to tell apart. In the males the dorsal fin is more pointed while the females are often heavier, especially at spawning times. There is considerable controversy over just how they spawn as some are said to be mouthbrooders and some bubble-nest builders. This may be due to there being several very similar species and different ones being imported at different times. The ones that I went on to keep were mouthbrooders but I would not dismiss other reports of other methods, as I am sure that they are valid.

Natural habitat

In nature these fish come from a hot climate and are found in slowly running streams and in ponds where they do not stray far from the surface. This means that they will require a higher temperature than most of our community fishes. The waters in which they are found are heavily planted and this should be borne in mind when planning their aquarium. In the wild they feed on insect larvae and worms, which explains their preference for live foods in captivity.

Everything that I had read said that they required aged water and had a dislike of newly set up tanks. Therefore, I moved some Tetras to another tank as theirs was commandeered for the Gouramis. Filtration was going to be important as these fish require excellent water conditions but come from slow running water and would therefore not be happy with power filters due to the turbulence that these produce.

Chocolate delights

Paul Skinner continues his look at fish which are not ideal community fish but make interesting aquarium subjects none-the-less

CHOCOLATE GOURAMI

Scientific name	<i>Sphaerichthys osphronemoides osphronemoides</i>
Family	Anabantidae
Distribution	Borneo, Sumatra & Malaysian Peninsula
Size	2" (5cm)
Temperature	78-86°F
PH	6.0-6.8
GH	2-4dH

left: There are several different similar species and sub-species of Chocolate Gouramis. This may be *Sphaerichthys osphronemoides osphronemoides* like those Paul bred

below: Sexing this species can be difficult but males tend to have a longer and more pointed dorsal fin when mature



Aquarium conditions

As the fish are found in shallow water I only had 8" of water in the tank. I changed 10% of the water weekly, in order to dilute nitrates. Bogwood was used in the tank as it acidifies the water and the tank was thickly planted. The fish were incredibly shy at first, hiding in the plants and dashing out for food before vanishing again. Slowly the fish settled and could be seen swimming around in open water, although they were quite argumentative and spent a lot of time chasing each other around. I was glad that I had thickly planted the tank as it provided plenty of hiding places.

The six fish appeared remarkably similar and I thought that they might be six of the same sex. They were fed twice a day, once with live food, once with frozen and they grew quite slowly. In all the time that I kept them I never saw them accept dry food.

After about seven months, the fish had grown to a size of just under two inches and two of them had slightly more pointed dorsal fins, so I decided that these were likely to be males. Four of the fish were removed to another tank leaving what I thought was the largest female and the dominant male.

Mystery solved

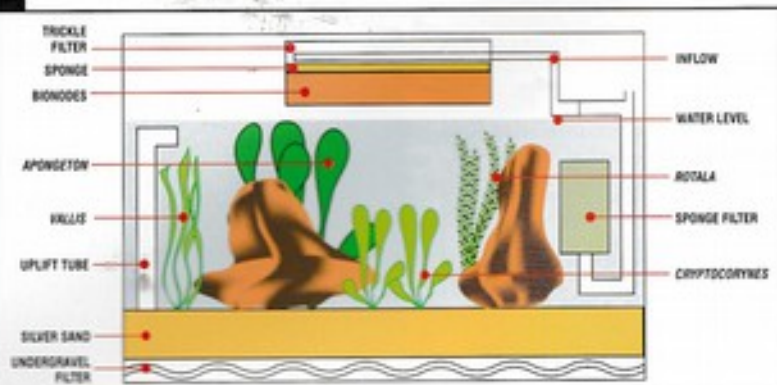
At this point I was still not sure whether they would turn out to be bubblenest builders or mouthbrooders but there was no sign of a bubble nest being built. Indeed there was no sign that the fish were paying any attention to each other except for the male chasing the female from time to time. Then one day I came home from work and was feeding the fish when I noticed that the female had a distended jaw and was carrying eggs in her mouth. One mystery had been solved, as my fish were obviously mouthbrooders, although I had not seen them spawn. I removed the male to another tank in order to give the female as much peace as possible. The eggs appeared to be quite large and the female refused to eat while she was carrying them.

Two and a half weeks later I looked into the tank to discover that the female had released her brood from her mouth and I could see one small youngster in the corner of the tank. I removed the female from the tank at this point, as I did not know if she would eat the fry or not. I started to feed the fry on brineshrimp and could count a total of five, although I hoped that there were more present in the plants. The fry fed well on Brine shrimp and after the first week I added microworms to their diet. At the end of five weeks the youngsters were nearly 1/2" long. Even though I tried to spawn the parents again I never succeeded in obtaining any more youngsters.

I obtained great pleasure from keeping this beautiful little fish and think that it is well worth giving them the special conditions that they require. I hope that this article may encourage some of you to give this most interesting fish a go. ■

TANK SET-UP

Water conditions	Soft (Birmingham tap water) pH 6.5 Temperature 84°F
Tank	18"x12"x12"
Substrate	1.5" layer of silver sand
Filtration	Undergravel filter with airstone. Sponge filter with uplift running into a trickle filter
Décor	Two pieces of bogwood
Plants	Aponogeton crispus, several Cryptocoryne species, Rotala species and Vallneria
Food	Live daphnia, white worms and bloodworm. Frozen brineshrimp and bloodworm
The fish	6 specimens - all about 1.25"



Ben Helm explains the why's and wherefore's of water testing

We live in a society that seems to be preoccupied with testing. Athletes are tested for illegal substances, would-be drivers are now tested for both theory and practice, and more recently, A-Level students have been reputedly tested to the limit and beyond. Furthermore, as research develops new testing techniques, there is an irresistible urge to make use of them. For example, ever since insurance companies recently discovered how our genes may reveal a certain disposition to specific hereditary diseases, they feel they must test our genes to discover more about their 'risk'.

As aquarists or pondkeepers we too must utilise the technology that is available to us to determine the condition of our aquatic environment and also to highlight any risk factors that we must respond to.

As water quality is at the heart of successful fishkeeping, (the majority of enquiries to Ask A&P are water quality related) we can optimise our success and the health of our fish by maintaining a suitable water quality. If we don't measure it, however, how can we manage it?

The more stable and mature the aquatic environment, the less the water will need testing, being able to use experience and the monitoring of fish behaviour as a quick way of assessing the quality of their environment. Nevertheless, when striving for better fish health, there is no substitute for providing good quality water with testing being the only definitive method of verifying its suitability for your fish.

Knowing what to test for

Water is a marvellous substance. It is essential for life and performs many different dynamic functions. It can adopt an unlimited number of characteristics, being shaped by its environment and in turn, affecting that same environment through its changing composition. Because of its seemingly endless capabilities as a solvent, water could in reality be tested for each of the myriad of compounds that can dissolve into it. This would make water testing impractical when trying to gauge a water's suitability for fish.

Consequently, we tend to rely a great deal on the assumption that our water source is empirically suitable and non-toxic to fish such that we can limit our investigations to only a handful of tests. For example, we do not test our water for mercury, arsenic, cyanide etc. as we do

Testing...



testing...

There is no substitute for providing good quality water with testing being the only definitive method of verifying its suitability for your fish.

Liquid Testing needs a steady hand to produce accurate results.

take our water to be safe. We do, however, test for the more likely and influential factors that can affect our fishes' environment on a regular basis. We could test our water each day for say, its gold content, but it would be unnecessary to do so as we know that gold levels are not likely to change and that gold does not influence our fishes' health as much as other key characteristics. So what are the parameters that we should be testing?

There are over a dozen different test kits available, each testing for a specific water parameter. This could be daunting as it suggests that testing water is likely to be expensive, lengthy and requires a degree of chemistry. Do not be alarmed as there are essentially 3 key test kits that you should consider as these give you a useful snap shot of the health and risks in your pond or aquarium. Should you wish to delve deeper into the chemistry of your pond or aquarium, then you can also test for more diverse, but less critical parameters.

a. PH

This measures the acidity or alkalinity of your water and acts as a quick and useful guide to its suitability for fish. As fish originate from different habitats across the world, they each have their own desirable pH. If the pH is unsuitable, it will cause that species stress and lead to health problems. In order to make a

judgement as to the suitability of your water, we need to know the pH requirements of your fish. Pond fish prefer a pH between 7.0 and 8.5 while marines require a steady 8.2 to 8.4. Amazonian fish require a slightly acidic pH of less than 7.0.

b. Ammonia

Where the pH of water is tested prior to introducing fish (as well as checking that it is maintaining a satisfactory level) water is tested for ammonia during the maturation of a filter or while fish are being stocked. Ammonia is the toxic substance excreted by fish that must be broken down by bacteria in a filter. If it is not broken down faster than it is released, it will accumulate and cause the fish stress. Ammonia test kits are used to check that the filter is coping with the waste produced by fish.

c. Nitrite

The bacteria responsible for breaking down ammonia act quite quickly, converting it into nitrite that is still toxic and more persistent in an aquarium or pond. A different range of bacteria break nitrite down into relatively harmless nitrates, but can take a long time to do so. Consequently, nitrite tests should be used to ensure that the filter is mature enough to cope with the current stocking and feeding regime.

Know when to test

Water should be tested regularly for pH to ensure that it is maintained at the correct level. Water used in water changes should also be tested to determine that the pH is desirable. Ammonia and nitrite are tested very frequently during the running in of a new aquarium or pond. →



EQUIPMENT

→ These tests will show how the filter is maturing and whether it is keeping pace with the rate at which waste is being produced. Once a pond or aquarium is fully stocked and has been running satisfactorily for several months, there should be little need to use ammonia or nitrite test kits.

Carrying out tests effectively

All test kits or testing equipment are made with the fishkeeper in mind and are easy to use and interpret.

A. Colourmetric Test Kits

These rely on a chemical reaction between the water and a reagent that results in a colour change that can be compared against a colour chart.

i. Liquid.

Drops of liquid reagent are added to a measured test sample of water and allowed to change.

ii. Tablet.

Instead of drops of liquid, dry tablets are crushed and dissolved in the sample water and the colour change compared to a chart.

iii. Test Strips.

Plastic strips, impregnated with reagent are dipped into the sample water and allowed to react, causing a colour change.

B. Electronic Tests

A range of pocket sized digital meters are available, giving a numerical reading. Digital meters are accurate and require regular calibration against known samples

"Nitrite tests should be used to ensure that the filter is mature enough to cope with the current stocking and feeding regime"

but are considerably more expensive than colourmetric tests.

Interpreting and acting on test results.

The time and money spent on testing water would be wasted if the results were not acted upon. If having tested your water, you discover that the water quality is not as good as it could be, appropriate remedial action should be carried out immediately.

pH

If pH is too high: Carry out a partial water change with soft, acidic water and check for sources of buffer in your pond or aquarium that could be raising the pH. Chemicals are also available from your

local aquarium shop to lower the pH.

If pH is too low: Add some treated tap water (which is artificially buffered) or use a chemical buffer available from your local aquarium shop. A source of lime such as limestone chippings or crushed shell can also be used for this purpose.

Ammonia

This tests whether the toxic waste (ammonia) that fish excrete is being broken down. The desirable ammonia reading is zero, but should a positive reading occur then carry out the following:

1. Stop feeding
2. Do not introduce any new fish
3. Carry out a 20-30% water change
4. Only start feeding when reading is back to zero (this may take a few days).

Carry out a test each day for the next week.

However, if a positive ammonia reading reappears upon daily testing, carry out steps 1-4 again. As the filter matures, an ammonia reading is less likely to occur.

Nitrite

The only desirable nitrite reading is zero, and if a nitrite reading is present, it is an indication that the filter is not coping with the amount of waste being produced. Even a low nitrite reading is undesirable and if present, the same procedure (1-4) for ammonia toxicity applies.

If you use other test kits, testing for other parameters (such as nitrate, Boron, Selenium, Silicates etc), then similar corrective action will be required if the results are undesirable. ■



Some kits include a whole range of tests so you can check all the water parameters needed.

Fun with Fry

Tony Sault suggests ways of rearing Discus fry



Young fry feeding off its parent - the natural way

I am often asked if fry can be reared other than by the parent fish and the simple answer to this is yes they can. There can be a number of reasons why the parents are not rearing the fry; the two common ones being cannibalism, which is common in young discus pairs, and parents unable to secrete the required amount of mucus as the first food. In this article I will try to cover the three ways of rearing the fry from free swimming to the stage where they can take their first solid food.

The Natural Way

The natural method is for the fry to be reared by their parents where the male and female share parental duties and secrete mucus from their own bodies as the first food for the fry. Under these circumstances the fry receive all the benefits of a good start in life which includes beneficial bacteria from the parents and a natural high protein food supply that has only to be grazed from their parents bodies.

When fry are reared by their parents they grow rapidly and can be fed an alternative food from approximately seven to ten days old. The trick is to know when to start feeding brine shrimp and more importantly when to remove the fry from the parents. Foremost in my mind has always been to protect the parents. I limit the time fry are kept with the parents to fourteen days but this can change as each pair are treated as individual entities.

Hand Rearing

When I first tried this method a few years ago the only substitute first food available was powdered egg yolk

although today foods are available that mimic the mucus secreted by the parents in as much as they are the correct blend of amino acids and proteins required by the fry.

If the fault with parents is mucus secretion, or the lack of it, the fry should be removed as soon as they are free swimming.

Prior to removal shallow trays or circular dishes approximately 12" in diameter and 2" deep should be set up and filled with water from the parents tank to a depth of 1.5". The fry are then removed and placed into the dishes. A substitute Discus fry food should then be fed several times a day according to the instructions. The water should be changed daily with fresh water from the parents tank. This food needs to be fed until the fry are large enough to take newly hatched brine shrimp, at approximately seven days of age.

Foster Parents

This is not as demanding on the breeder as hand rearing and can certainly be as rewarding as the natural method. To employ this method obviously more than one pair is required. The foster parents ideally should be a pair that have successfully reared fry or, at the very least, a matched pair that have started spawning in a regular cycle.

With this method I have successfully tried a number of approaches, the first of which entailed switching the cones with the eggs on from the natural parents' tank to the foster parents' tank. Do not be afraid to remove the cone from the water as this will not damage the eggs unless they

Discus fry food with the correct blend of amino acids and proteins required by the fry is now available

are kept out of water too long and dry out.

The second method entailed removing the cone with fry on prior to free swimming from the natural parents' tank to the foster parents' tank. Again speed is essential and foster parents will actually accept a cone with fry in exchange for a cone with eggs.

The third method tried was almost as an after thought simply to see if the foster parents would accept free swimming fry.

A pair was chosen as foster parents having one day old fry that had successfully attached to their sides. The fry from another pair that had been free swimming for only a few hours were netted and gently introduced into the foster parents' tank and immediately were herded together by the foster parents, such that within minutes they were indistinguishable from their own fry.

In conclusion the natural method is the most rewarding way to rear Discus fry; hand rearing is certainly the most tedious and time consuming with no guarantee of success and the foster parent method can certainly be a lot of fun. ■

Tony's top 3 tips



- 1 Rapidly growing fry can soon remove a lot of scales and fins from their parents if left with them too long.
- 2 Extreme care should be taken with artificial feeding as the paste will certainly foul the water if not eaten entirely.
- 3 When trying any of the foster parent methods, care should be taken to ensure the conditions and parameters of both tanks are identical as this may damage the eggs / fry if they are not.





One of the other fish Ian bought that day was a L260 with the common name of 'Queen Arabesque'



Male exploring a tube

Stars in your eyes

Ian Fuller, Chairman of the Catfish Study Group breeds the 'Stardust Plec'. *Hypancistrus* Sp. L 136a

Some time ago, in fact I think it was in the early part of last year, I decided to diversify a little with my fish breeding programme. At that time my catfish efforts were concentrated purely on Corydoras. There was a lot of talk around the hobby about the brilliant *Hypancistrus zebra*, or 'Zebra plec' as it was commonly called. I decided then that they were a must to try and breed, especially as the price of them seemed to be ever on the increase, making them a good investment. I set out to buy some potential breeding stock, so I visited my friend Neil Woodward's establishment Pier Aquatics in Wigan, where I knew I would find what I was after.

Just a few and rather small

At first I thought my visit was going to be a disappointment, there were only four quite small zebras left, which I duly bought. On further inspection around the many tanks, I came across two other species of *Hypancistrus*, both of these were, as yet, undescribed species, with only the now familiar 'L' number code, or common name to identify them. The first species was marked up as L260 with a common name of 'Queen Arabesque' and were strikingly unusual in their body markings, which were silvery white, thin,

How to sex them

The main points of difference to look for are:

- The shape of the head when looked at from above in females is more pointed.
- The pectoral fin spine tends to be thicker in males and when mature are covered with odontodes (bristles).
- Mature females in good condition are generally plumper and a little broader in the body.



Pair of Starlight plecs - female on the right.

wavy lines over a black body. I decided immediately that I must have some of these and with Neil's help we selected two pairs. I was sure at this point that I could hear the little plastic card in my wallet groan! Sexing these fish was not an easy task, especially as they were fairly recently imported and were a little out of condition.

While Neil was doing his best to select the pairs of Queen Arabesques, I caught a glimpse of another *Hypancistrus* species in the next tank, they were jockeying for hiding places under a piece of bog wood. I decided to look more closely, removing the bog wood exposed just four specimens. They were jet black with tiny

silver spots, at first sight you would have thought they were covered in white spot. I promptly decided to have these as well, not knowing whether or not both sexes were present. Now I defiantly knew that there would be some pain when I reached the till, the trick here is to close your eyes when you sign the little slip of paper and not look at it until you reach home.

Previous research

Prior to my trip up to Wigan, I thought a little research into what conditions would be best for keeping zebra's, so I contacted Ingo Seidel in Germany, who I knew had bred them and many other Ancistrine catfishes. His advice was instantly forthcoming, "What they require," he said, "is warm water, 80°F and higher for breeding. The water chemistry is not important, but it must be clean, with a good fairly strong current. Provide them with plenty of small caves.

I had set up one tank in readiness for the zebra's. This was on the top of the staging in the warmest part of the fish house. Because the normal temperature setting at that level in the fish house is only 74°F, I needed to put an additional heater into the

"The final commodity I had been told that I would need was plenty of patience as these fish are somewhat stubborn when it comes to enticing them to breed"

tank, that was adjusted to maintain a temperature of 82°F. A 10mm layer of smooth grained sand was put on the bottom and the back wall lined with shortish pieces of cut down ceramic water pipe. A small internal power filter was put in the front left hand corner, to provide the necessary water flow and a box filter in the back left hand corner, to help maintain good clean water conditions. A few pieces of bog wood and some Java Fern were added later to complete the setup.

More tanks needed

Once I had arrived home with my new charges, I realised that I needed another two tanks set up the same way. So for the first few days of their stay, all three species were kept together, my hope being that they would get on. Fortunately, there were plenty of hiding places among the pieces of cut down pipe for them all to find a place to hide.

When the other two tanks were ready all three species were moved into their permanent homes. With the fish all moved and settled it just remained to condition them up. With the exception of the zebra's, they needed to be grown on for a while. I estimated it would be at least six months or more before they would be of breeding size. Finally, I had been told that I would need plenty of patience as these fish are somewhat stubborn when it comes to

Transferring them to their new home

In the shop all three species had been kept in tanks which were on the same centralised filter system. I decided to settle them into the new water conditions together. I opened the bags and gently tipped them into a large bucket. Using a piece of airline I started siphoning water from the tank they were to be housed in. When the bucket was almost full, the siphon was stopped and an air stone put in to keep the water moving, while I topped the tank back up and allowed the temperature to return to its previous 82°F. After about an hour the fish were carefully netted and put into their new home.



Starlight plec exploring its new home

enticing them to breed.

Over the last couple of months, I have fitted outside power filters to the three tanks; this has had a dramatic effect on the water flow; that is directed at an angle across the cave walls. In the tank containing the L136a's or 'Stardust' plecs as I have named them, I put a 220 mm long

by 32mm diameter, terracotta tube that is closed at one end. These tubes are produced as watering devices for large pot plants, where they are inserted into the compost in the pot and filled with water, which leaches through the terracotta into the compost, watering the plant over a long period of time. These tubes make ideal spawning sites, especially for Whiptail catfish. I thought it would be worth trying, within ten minutes of putting the tube in the tank, one of the L136a's went in and made it his/her home, I decided it was a him, noting the bristles on the pectoral fins.

Summer arrives

Early May we had a sudden spell of summer, with lots of sunshine and some reasonably high temperatures, all resulting in the fish house air temperature rising to well over 90°F. In most of the tanks on the top level staging, the temperature rose to 88°F, which seemed to make all three species of *Hypancistrus* far more active than usual, I decided to make more frequent water changes, from twice weekly to daily as the higher temperature made the fish eat more, and produce more waste and I needed to maintain the water quality.

There was one fish however that seemed totally unmoved by all the activity and that was the 'Stardust' male. He remained in the tube and would not venture out, even for some chopped earthworm. I thought so

Conditioning fish to spawn

- 25% twice weekly water changes
- Twice weekly feeds of frozen bloodworm, with helpings of live when I can get it.
- Additional feeds of chopped earthworm.
- Twice daily feeds of Tetra Tabimin, presoaked flake, or JMC's catfish pellets. A tip here is to not get mixed up between the catfish pellets and the high protein pellets.
- The high protein pellets can cause serious problems; the fish tend to swallow them whole, then they swell up in the gut causing all sorts of problems with the fishes digestive system and very often resulting in the demise of the fish. The catfish pellets on the other hand, tend to dissolve with very little swelling and are far less likely to cause any problems.



One month old baby Starlight plec

more of it, thinking that he was just not hungry at that time and would come out and feed when I wasn't around. Because of the angle of the tube it was virtually impossible to see into it so I left him alone to do his own thing. It wasn't until nearly two weeks later, that I noticed six little fry scurrying around under the bog wood. So now I knew why the male would not venture outside of his tube, he was guarding a batch of eggs. My next move will be to slightly rearrange the piece of bog wood and tube, so that I can get a better look at what's happening inside. ■

News

John Dawes reviews all the new products on display at the most important aquatic trade exhibition in the world

AQUARAMA 2001

SINGAPORE IS A small country with a population of just three million. Yet, some 17,000 people visited Aquarama in the one-and-a-half days that it was open to the general public. To these must be added over 4,000 trade visitors from 60 countries. This is pretty much what we've come to expect over the years: an enthusiastic international response to gladden any show organiser's heart.

The overwhelming opinion of both the trade and public visitors who flocked to Aquarama 2001 - held at Singapore Expo between 31 May and 3 June - confirmed that this year's event was the best one ever. Undoubtedly, the recently-inaugurated and excellent exhibition venue opened up exciting new display opportunities which were creatively exploited. But space without content means little...and it was in the actual content, or composition, of the show that Aquarama '01 scored particularly well.

What is Aquarama?

Aquarama has a dual purpose. Certainly, one of its aims is to introduce the public to the latest products, fish, plants, etc., that form part of ornamental aquatics. However, it is also aimed at members of the aquatic industry and it is during this unique event that many of the products and livestock that will adorn and help run our aquaria and ponds, make their first appearance.



There were countless mouthwatering furnished aquaria, such as this one, at this year's Aquarama

Some personal highlights

It is, obviously, quite impossible to carry out a comprehensive review of everything that takes place, or that's new... or interesting... at a show like Aquarama. Space limitations, for example, dictate that I cannot enter into a discussion of the excellent 2nd World Conference on Ornamental Fish Aquaculture that was held in conjunction with the show and Fish Competition. Perhaps

an appropriate opportunity to do so will arise at some stage, so, for the moment, at least, I will concentrate on just a few of my own personal highlights. These will undoubtedly differ from other visitors' personal choices, but they nevertheless help to emphasise the diversity of products and livestock that one can see at Aquarama.

It may be worth mentioning here that I have absolutely no commercial interests whatsoever in any of the

products, or fish, or plants, mentioned below, or illustrated in the accompanying photographs. My references to these must therefore not be interpreted as endorsements - but purely as personal comments... nothing more... nothing less.

Aquarium Ideas

In this section, I would like to comment on aquarium 'ideas', rather than the actual physical components of aquaria, because it is the original

Food for Thought

On the fish food front, I must say that the quality and range on offer continues to expand and impress with every staging of the show. If there is a 'problem' nowadays, it's in making a choice. Some foods score on presentation, others on claims regarding improved health or coloration, others on digestibility.

One that struck me as being a little different was a range of foods from New Life International, Inc. (Florida) which claim to generate clearly visible improvements in condition and coloration of fish using totally natural products, i.e. no synthetic additives. The evidence presented at the show looked pretty convincing. I've already tried these foods on my own fish and they, quite simply, devoured it. Their coloration and condition have not shown any significant improvement, but - in all honesty - it would be unrealistic to expect this, because the fish in question are (I'm proud to say) in absolutely excellent condition anyway.

Another food attracted my attention because of its 'behaviour'. In other words, it moves. I've always felt that someday, somebody will manufacture a food that - on immersion - actually twists and turns in the water. This would, undoubtedly, prove invaluable in feeding difficult

species that, at least initially, only respond to movement. The new food from Sehwa Pet Food Co. (Korea) doesn't quite do this, but, equally interestingly, it sinks and then floats again, hence its name: Ping Pong Fish Food. It should be mentioned that the 'refloating' qualities of this food are best appreciated under moving water conditions such as those created by aeration and power filtration. Nevertheless, the mere fact that it actually moves, serves as a definite stimulus for some fish. Again, I've tried this food on my own fish and they find it - as expected - totally acceptable.

Equally impressive are the foods from Bassleer Biofish (Belgium). These very acceptable (to fish!) foods contain a wealth of highly nutritious ingredients. One formula, Biofood Forte, is enriched with immuno-stimulants designed to protect fish against infectious and other diseases and contains what is referred to by the manufacturers as 'natural anti-bacterial products to defend (fish) against bacterial attack'. Again, my own fish love this food, although since, as I mentioned earlier, they are exceptionally healthy... and have been for several years now... I cannot, of course, determine to what extent their immunological system has been stimulated by the 10-day periods of 'treatment' with the Forte formula that I have subjected them to.

ways in which these systems are being used that I found particularly interesting at Aquarama '01.

This year, more than at any other time in the past, there were many dual-purpose aquaria on display. These are aquaria that not only provide the normal underwater arrangement, but also facilities for above-water plant displays. A wide variety of such aquaria/paludaria

market which, I feel, has long been in great need of attention.

A few 'not such good ideas'

Watch out for more 'creative' aquaria over the coming months and years. However, do be aware that some ideas are not as good as others... especially those where tiny aquaria - especially those fitted with

"We are entering yet another new and exciting phase in the evolution of the aquatics industry and hobby"

were on show - all of them absolutely stunning in their effect, as one of the accompanying pictures demonstrates.

Another range of these dual-purpose aquaria was fitted with an Ultrasonic Mist Maker (manufactured by Guangdong Risheng Group Co. Ltd. of China). The overall effect is quite spectacular and is a reflection of a definite trend that began influencing the design of aquaria a few years ago. More and more manufacturers are attempting to exploit the decorative properties of aquaria and are designing tanks to appeal to an ever-wider range of potential customers, not just fishkeepers. This modern approach should help open up sections of an untapped

lamps and designed for desktops or small shelves - cannot generally cater adequately for the needs of fish. I will not show any such designs here (although some were on display at Aquarama), but I would stress that these very attractive mini-systems could easily end up as 'mega-disasters' in the hands of inexperienced aquarists. Properly managed, they can look great, though.

Finally, on the aquarium design section, I was very impressed at the high level of creativity and professionalism demonstrated by some exhibitors. The aim of these displays was to give trade and public visitors some ideas on how they, in turn, can display fish and plants. For trade visitors, these →

New Fish

The Fish Competition, as always, included some 'new' fish, both in the New Varieties/Species section, as well as the other categories. Among the latter, I was delighted to see the tiny guppy known as Ender's Livebearer making an appearance. It didn't win a prize - probably because, as a very small variety, it didn't meet the normal size criterion for judging purposes. This small guppy is a real gem and has been one of my personal favourites from the first time I set eyes on it well over ten years ago and subsequently bred it in my own aquaria. I tried to take some photos of the fish on display at Aquarama, but, having lost the extension cable for my camera flashgun, I couldn't manage to get any good-quality close-ups.

Lumbini Aquaria Wayamba Ltd. of Sri Lanka (who entered the Ender's in the Fish Competition) also had another old favourite of mine: the livebearer *Girardinus metallicus*, on display at their booth, along with a black version of the Emperor Tetra (*Nematobrycon palmeri*) - two further indications of this company's enterprising philosophy and approach to fish breeding and commercialisation.



Lumbini Aquaria Wayamba Ltd. of Sri Lanka had a black version of the Emperor Tetra (*Nematobrycon palmeri*) on display at their booth.

AQUARAMA 2001



SEAHORSE AUSTRALIA PTY LTD

Captive-bred Hippocampus abdominalis. (Love the fish...hate the decor!)

→ displays also offered new sale opportunities, even for difficult-to-sell fish, such as large Parrot Cichlids, Dragon Fish, etc. These aquaria not only provided ideas, but were brilliant examples of just how efficient modern-day equipment, such as aquarium filters, have become (all top models were also on show at Aquarama).

Seahorse break through

For me, the real highlight was a display of captive-bred seahorses. These were exhibited by Seahorse Australia Pty. Ltd., from Tasmania. Captive-bred seahorses are always exciting, but these were especially so because, unlike all other such seahorses I have come across in the past, these do not need to be fed on livefoods. As long as the food is rich in some omega oils, a wide range of commercial formulations will be found acceptable.

I spent a great deal of time talking to the scientists involved in the project and found our conversation, not just highly educational and

than in the wild. Therefore, not only can we now have captive-bred, easy-to-feed seahorses, but we could - in the process - be helping the supplying company in its conservation efforts. All animals are, further, reported to be 'robust and disease-free', capable of courting and mating at four months old and able to live for nine years.

Too good to be true?

It all sounds too good to be true... and it is... to a certain extent. For example, the species concerned is Hippocampus abdominalis, which is native to Tasmanian waters and is therefore more temperate than tropical. Most marine aquaria are, however, tropical. This could therefore pose some difficulties if the acclimatisation process is not carried out correctly... or if the fish are subjected to temperatures around 28°C or higher on a long-term basis (they are reported to be able to tolerate a range between 9-28°C). However, the species is so beautiful, variable in coloration, easy

"This year's event was
the best one ever"

interesting, but very encouraging. For example, sufficient numbers of these seahorses are already being bred on a regular basis to supply a significant percentage of the market demand. Secondly, as many as 97% of all the young fry survive to selling size - a much higher percentage

to keep and readily available that any additional bit of care and attention to detail is certainly worth undertaking.

Ideally, of course, one could install an aquarium chiller to maintain the water temperature around 24-25°C, which could still make it possible to keep other, more

The Unicorn Parrot Cichlid: a new variety on show for the first time at Aquarama



SWWORLDWIDE AQUARIUM

Things to come?

I don't think that any areas of the industry and hobby were overlooked at Aquarama '01. In fact, there were even signs of things to come our way in the foreseeable future. Among these were Genetically Modified Zebra Danios (*Brachydanio rerio*) displayed on the Agri-Food and Veterinary Authority booth (the Singapore government's department that is responsible for agriculture and aquaculture). Some of these modified fish contain a gene from a jellyfish that makes them luminous green, rather than the normal deep blue. Others contain a gene from a sea anemone and are luminous red/pink.

"Some of these modified fish contain a gene from a jellyfish that makes them luminous green"

These zebrafish were developed at the National University of Singapore as part of a research programme that - among other things - allows cell lineages to be followed during embryonic development. The colours are also sensitive to certain chemicals in the water. Genetically Modified fish can therefore be used as water quality indicators, with a change in coloration demonstrating the presence of pollutants.

Undoubtedly, such unusual fish have commercial potential...but before that aspect is embarked upon, an in-depth debate needs to be conducted, including a detailed consideration of the ethics of 'genetic engineering' with regard to the ornamental aquatic industry and hobby. I will be featuring these fish in greater detail in a forthcoming edition of Encounters. In the meantime, therefore, I will restrict my comments to an expression of immense fascination - as a biologist - at the huge advances that are being made in this field of study...and one of awareness that we are entering yet another new and exciting phase in the evolution of the aquatics industry and hobby.

Fluorescent Transgenic Zebrafish

Fluorescent transgenic zebrafish were developed by a research team, led by Dr. Z. Gong, in Department of Biological Sciences, National University of Singapore.

Fig. 1. The first procedure to produce transgenic fish. The fluorescent color genes, originally isolated from jellyfish and sea anemone, were incorporated into zebrafish eggs and these large green lines became a part of the genetic make-up of injected zebrafish. Thus the fluorescent color acquired by these transgenic zebrafish can be stably transmitted to all future generations. This technology can also be applied to other ornamental fish species.

General Procedure of Generation of Transgenic Fish

Fig. 2. Fluorescent transgenic zebrafish in a rainbow array (top to bottom: Red, GFP fish, Orange, GFP fish, Yellow, GFP fish, Green, GFP fish, and Wild Type fish). The picture on the far left was taken under a daylight and the picture on the left is in the dark with a UV light. GFP - red fluorescent protein, GFP - yellow fluorescent protein, GFP - green fluorescent protein.

Fig. 3. Living color fluorescent transgenic zebrafish in swimming water (daylight (top) and in the dark (bottom, with a UV light)).

Will Genetically Modified Zebra Danios be one of the fish of the future?



This dual-purpose aquarium includes an 'ultrasonic mist maker'

tropical, species of marine fish and invertebrates (as long as these are non-aggressive types). There were certainly a few chillers on display at this year's event... as was almost anything else one could think of.

PERSONAL NOTE Sue, Paul, Bob... perhaps we can allocate some time for a proper chat next time round?

Aquarama 2003

It is virtually certain that by the time the next Aquarama comes around in 2003, the debate about transgenics will be one of many that will take centre stage. I eagerly look forward to that exciting prospect. Why not join us in Singapore next time for a feast for the senses and a great tonic for the mind?

Ed's note Details of when the show is on and how to arrange a visit will be published in *Aquarist* and *Pondkeeper* in plenty of time for readers to arrange a visit.



A dual-purpose aquarium - one of many on show at this year's Aquarama

Penrith on parade

A&P visits North Lakes Aquatics and Calico Aquatics

The people of Penrith are lucky enough to have two local aquatic outlets. We visited both of them on the same day and found ourselves following a customer from one shop to the other!

North Lakes Aquatics

Sid Boulter started keeping fish in 1967 and was soon besotted by catfish and cichlids. In fact almost all the fish he owned were catfish at one stage! By 1992 he was ready to take the plunge and open his own aquarium shop. At the time he was

working as an Operations manager on mainframe computers. Initially his own collection of fish were moved into the shop and he tended to specialise in Catfish and Cichlids.

Today you will still see a particularly good range of these two species for sale in the shop and Catfish top Sid's list of favourite fish.

Margaret is also involved in running the business and does much of the behind the scenes work which stops Sid from disappearing under a pile of paper work.

Shop details: North Lakes Aquatics, Robinson Street, Penrith, Cumbria. CA11 9HR. Tel. 01768 891495. E-mail fish@nlag.globalnet.co.uk

Shop opening hours: 7 days
MTWFS = 10 - 6, Thurs 10 - 7,
Sun 10 - 5

Proprietors: Sid & Margaret Boulter
Manager: Dave Pullin

Staff: Chris, Dan, James,
John and Kaleigh

Number of tanks: 200

Vats & holding facilities: 8 large coldwater vats

Specialities: Catfish and Cichlids
Brands stocked: All major brands

Show tanks & ponds: 3 200 gallon displays

Which groups of fish do you sell?: Tropical, Marine, and Coldwater.

Additional services: Water testing, Pond visits and Problem solving



Sid's verdict on the manufacturers



Although Sid stopped working with computers in 1992 they now encroach on all aspects of our daily lives.

Which manufacturer has the best range of products in your opinion?
Eheim

Which company gives your customers the best service?
OASE

Our verdict

An outstanding tropical fish shop owned and run by experienced aquarists. For those on the hunt for something unusual then this is a venue for you. Here are just a few tasters: *Aplatogramma "rio mamore"*, *Apisto. sp. "Opal"*, *Cynotilapia afra*, *Ancistrus dolichopterus "gold"*, *Phallocerus caudimaculatus* and a lovely rarity for those that like cultivated varieties, some Longfin white clouds.

Calico Aquatics

David Lister originally started keeping fish by installing some display tanks in the bar area of his Club. Within a short time he was besotted with aquarium fish and set about learning all he could about them. At the time he was earning the main part of his living from marquee hire but 3 years ago decided to take the plunge and hand that side of the business over to his son and convert the club into a retail aquarium fish shop. David's personal favourite fish are Marine Angels and there are usually plenty of these on show and for sale. Despite not being a club anymore Dorothy still finds herself behind the bar but serving coffees and teas now. As with most aquarium shops it is a joint effort between the two of them.

David's verdict on the manufacturers



David has 7 large display tanks which you can sit and look at while enjoying a cup of coffee.

Which manufacturer has the best range of products in your opinion?
TMC

Which company gives your customers the best service?
B.A.S. & T.M.C.



Shop details: Calico Aquatics, Calico, Greenscres, Plumpton, Penrith, Cumbria. CA11 9PF. Tel. 01768 894366. WWW.calico-marines.co.uk

Shop opening hours: 7 days 10 - 5.30pm

Proprietors: David & Dorothy Lister

Our verdict

A very good marine aquarium shop which has built up a good reputation in a short time.

Manager: Ian Holland-Coulton

Staff: Martin Lister (part time)

Number of tanks: 58 tanks (about 3,000 gals)

Vats & holding facilities: 200 gallon system

Specialities: Marines

Brands stocked: Aqua Medic, Interpet, TMC, Red Sea, Juwel etc.

Show tanks & ponds: 7 large display tanks plus a 500 gal pond

Which groups of fish do you sell?: Marine, and Coldwater.

Additional services: Tank installation (inc made to measure) and maintenance. R.O. Water sold

Let's get fisical!

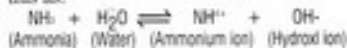
What causes the disease?

Ammonia is produced as the major waste product of most fish. It is the end product of protein metabolism - that is to say that it is how what is left once the fishes' body has finished with protein taken in as food is eliminated. Ammonia is very water-soluble and it is actively excreted by the gills and by the kidneys in urine. In both cases ammonia is released to the surrounding water where it is diluted to infinitesimal levels by the large volumes of water that most fish live in.

Other common sources of ammonia are rotting vegetation and bodies where ammonia is released because of bacteriological action. Also chloramine needs to be considered. This chemical amalgamation of ammonia and chlorine is added by some water companies as an antibacterial agent. Although more

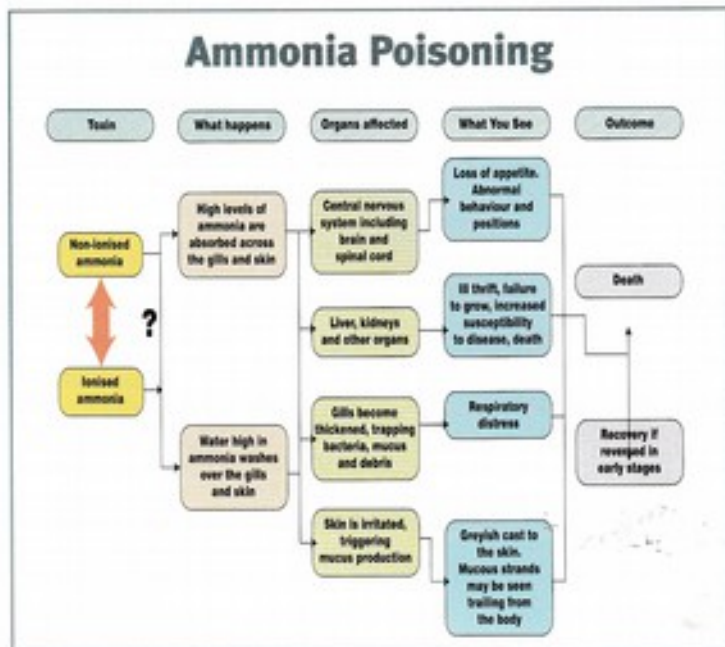
persistent than chlorine, eventually it breaks down into its constituent parts.

When the ammonia molecule dissolves in water it picks up an extra hydrogen atom to form ammonium. This gives it an extra positive charge such that the ammonia is said to be ionised. It is known as the ammonium ion. For the equation junkies amongst you we can illustrate this as:



To make life really interesting, this is not a one way equation. It is an equilibrium that is constantly trying to balance itself. So if we load more ammonia the equation shifts to the left producing more ammonium. If we load more ammonium, the reverse happens.

This gives us the idea of measuring the total ammonia levels, which in turn is what we get when we add the non-ionised ammonia levels to the ionised ammonium



Lance Jepson deals with ammonia poisoning



6.5"



82°F
75°F



PHOTO: OLIVER LUCAS

Treatment & Prevention

Partial water changes to dilute the ammonia levels. In freshwater aquaria and ponds the mineral zeolite will absorb quantities of ammonia. Aquarium Pharmaceuticals market Ammo-lock 2 which is an effective liquid treatment which locks the Ammonia up. Longer-term control may include addition of commercially available Nitrosomonas bacterial cultures or equivalent.

Good husbandry practices with attention to stocking levels. If you suspect that your local water company is using chloramine, use a tap-water conditioner that claims to deal with chloramine as well as chlorine.



Rift Lake aquaria with their high pH are particularly at risk. This fish is a *Placidochromis phenochilus* from Lake Malawi

What makes it worse?

Poor husbandry with left over pieces of food, dead fish and so on not removed from the tank or pond.

Rapid overstocking (especially New Tank/Pond Syndrome) or filter insufficiencies (not big enough, blocked due to poor maintenance, low temperatures, immaturity).

Marine and Rift Lake aquaria with their high pH are particularly at risk. If fish have been transported for a long while, cooling is likely to have occurred. But before you raise the temperature try to transfer them to fresh water of the same (low) temperature (and make-up) before acclimating them to the desired temperature. This is because in the original water there will be a marked build up of total ammonia, and as water temperature rises during acclimation more of this will shift to the more toxic non-ionised form

levels.

Environmental factors can cause the equation to go either way. These include:

1. Temperature. Increasing temperature favours non-ionised ammonia formation.

2. pH. Increasing pH favours non-ionised ammonia formation.

3. Salinity. There is a slight decrease in non-ionised ammonia with increasing salinity.

Ammonia in both its forms is toxic. However the extra charge on the ammonium ion stops it from crossing certain molecular barriers in the body reducing its toxicity. Not so non-ionised ammonia. This is able to cross these barriers with ease, causing damage to internal organs, especially the central nervous system where it can trigger obvious behavioural disorders. Some thickening of gill tissue can also occur, and it can be irritant to the skin.

Ammonia is controlled in most systems by cultivating large colonies of the

beneficial *Nitrosomonas* bacteria in your filters, which "feed" on ammonia, converting it to the less toxic nitrite. Safe levels of total ammonia are considered to be less than 0.02mg/l. A large variety of test kits are available for measuring ammonia levels. Some will even give a conversion table to work out the percentage of non-ionised versus ionised levels.

Diagnosis

Species susceptibility

All species are susceptible. Some may be more tolerant than others e.g. mollies, many damselfish and lionfish (*Pterois* spp.) are used to mature marine aquaria.

Recognisable signs of disease

All fish are likely to be affected. Loss of appetite. There may be obvious behavioural abnormalities often accompanied by marked respiratory distress. Excess mucus may be produced

by the fish. Unexpected deaths.

Even moderately low levels of ammonia over a period of time can cause problems such as reduced growth rate and increased disease susceptibility. Standard Ammonia test kits will register high levels of ammonia.

Disease Lookalikes

Other water quality problems as well as ectoparasitic disease.

Scientific research

In one study goldfish were unaffected by total ammonia levels of 0.025mg/l, but 10% died within 24 hours at 0.04mg/l. Affected fish stopped swimming, settled on the bottom and eventually turned on to their sides, forming a "U" shape. Breathing movements slowed progressively until death occurred. Even at a late stage some goldfish were able to recover if placed into ammonia free water.

There's more to pondfish than Koi and Goldfish

Without doubt Goldfish are the most popular pond fish of all time. Koi also dominate the market place, but what about some alternatives? Despite the many different species that could be kept in a garden pond, remarkably few are ever offered for sale and some of those which are offered should never be. A case in point are Wels Catfish. Not only

are they predators that will eat any fish small enough to fit in their mouth but they grow a little too large. How large? Well how about 9ft? Comfortably large enough to gobble up full grown Koi and certainly no goldfish could hold its own against such a monster. Channel cats fall into this category as well, although at 3ft they are not quite the problem a Wels catfish is.

Clean-up crew

Moving on to those fish which are suitable, one of the most over looked species and yet most useful are Tench. These come in several different colour morphs (gold and red are particularly attractive and can be seen much more easily in a pond). They grow to about 12" in captivity and are very hardy fish. They

Little gems

Small garden ponds, particularly the pre-moulded fibreglass type, can be difficult to find suitable fish for. Koi and anything that grows even 12" long are far too big for this type of pond. There are some smaller alternatives, however. One of my personal favourites are the gold form of Fathead or Golden Minnows (*Pimephales promelas*). These little beauties grow to about four inches and eat all foods. Tough little fish which will survive in most conditions, although they do like clean well filtered water, so the inclusion of some sort of filter system is important.

Other little gems are Bitterling. At 3" in length they fit in well with goldfish and a small shoal will buzz about the pond livening up the whole environment. Being silvery in colour they are not going to stand out from the top too well. As they cavort about the pond, however, their silvery sides reflect like mirrors from time



Three-spined sticklebacks are ideal for small wildlife ponds where they will breed and raise successive families all by themselves

to time and add an interesting dimension.

Minnows (*Phoxinus phoxinus*) come from clear flowing waters with a high oxygen content but they do well enough in a filtered pond. At about 4" in size they are not too large for a small pond but they really need to be kept in a large shoal to be happy. The other problem is diet. In the wild they feed on insects and other small live foods so they may take some time to adapt to commercial foods.

Last, but certainly not least of the little gems, is our very own Stickleback. These boisterous fish will live perfectly happily in a garden pond and make the ideal addition to a wildlife pond. Mine not only lived for many years in my wildlife pond but raised numerous families in there as well. Wonderful little critters that build a nest and care for their eggs and new born young, sticklebacks can also be kept in a coldwater aquarium indoors. Even if they normally live outside, I would bring a male and couple of females indoors during early spring just to watch them spawn. The males colours are absolutely stunning at this time.



Fathead or Golden Minnows are ideal for small to medium sized ponds

Want something a little different for your pond? We have a few suggestions for you



Wels Catfish grow far too large for garden ponds and will eat all your fish as well

Tench come in several different colours and make excellent additions to any pond

spend all their time grubbing about in the substrate looking for any food the other fish have missed, in the same way as Corydoras do in tropical tanks. The only problem which can occur with Tench these days is that, with the advent of floating pellets and other such foods, they can starve to death because no food reaches the bottom for them to eat. A few catfish tablets thrown in after floating foods have been fed will make sure that they remain well fed and healthy.

Another interesting so-called scavenger is the Gudgeon. These grow to about 8" and make good additions to smaller ponds, but not as scavengers. With their under-slung mouth and flatten lower profile you would think they spend all their time rummaging about the substrate looking for something to eat. In fact they tend to spend most of their time in the

mid-water region of the pond and only dart down to the bottom when something frightens them. They eat anything and are generally hardy but need flowing water and good filtration to do well in a pond.

Some medium sized alternatives

There are quite a number of fish that grow to about 12"-18" and make suitable subjects for medium to large ponds. Golden orfe are probably the most commonly seen of these. These are shoaling predators that feed on small fish and insect life. Despite this they are peaceful fish which will not harm anything too big to fit in their mouth. Being surface dwellers the shoal will be seen out and about all the time gliding

about looking for something to gobble up.

Roach and Rudd are another two species similar to Orfe. The golden form of Rudd look attractive but are very hard to find. Chub are another possibility, but these are rather plain coloured fish, although they eat all foods and are peaceful.

Crucian Carp are sometimes offered for sale. These are very closely related to goldfish and need the same conditions. Their plain coloration means they will rarely be seen. Likewise Bream and Carp are dull coloured fish but these have the added problem of growing 3ft long.

Hopefully this will have given you a taster of what else is out there besides Koi and Goldfish. One final word about Shubunkins and Comets just in case you were wondering why we hadn't included them in the list. These are both forms of goldfish and can be treated just the same. ■

Koi World

Bernice Brewster's regular look at the world of Koi

Firstly, a rather belated congratulations to Bill and Maureen McGurk, who are now the proud owners of the retail outlet at TMI and I wish them every success. Owning a retail outlet is probably the dream of many hobbyists but the reality is a great deal of hard work. Admiring the koi is probably confined to feeding them and briefly checking for wounds lesions and obvious parasites, before moving on to the next task.

Most koi have by now spawned and occasionally many hobbyists worry about female koi being spawn bound. It is quite common for female carp and therefore koi to carry eggs for several years, without spawning and it will not do any harm. The true definition of a spawn bound female is when spawning has commenced and is interrupted so the males no longer

entice the females to shed their eggs. At this stage the eggs have been released from the ovary wall and if the female is unable to shed them, she becomes spawn bound and often dies within a few days.

It may even be surprising to learn that in sexually mature koi the ovaries contain mature eggs in the autumn but with the onset of winter and colder temperatures the metabolism slows down and the eggs will be shed the following year. It is commonly thought that female koi utilise the eggs as a source of nutrients through the winter but it takes valuable resources and energy to produce the eggs and therefore consuming them in the winter would make little biological

sense. Just like the males, the female koi will rely on stored oils and lipids for energy in the winter and most of our pampered pets can comfortably overcome the coldest months of the year on these resources. Occasionally a sick female koi, who is either eating inadequately or not at all will utilise the nutrients available in the eggs, after all stored oil and lipid reserves have been used. ■



Well fed female koi will often hold eggs for several years without any harm

Koi society meetings & events

There are numerous koi clubs and societies throughout the UK. Here, A&P publishes contact details each month.

The British Koi-Keepers' Society

Birmingham and West Midlands:
Alan Smith - 01214 223869
Central: Christine Green - 0121 360 6601
Cheshire & District:
Keith Grainger - 01782 773592
Chilren: Bill Hone - 01582 841108
Crouch Valley: Brenda Scott - 01375 642321
East Pennine: Betty Koerner - 0114 234 1151
Essex: Margaret Spurr - 01702 292796
Ireland: Trevor Geary - 01247 466865
Isle of Wight: Mike Giddens - 01983 527520
Kennet Valley: Terry Speight - 01488 686294
Lea Valley & Harlow:
Michael Nunn - 0208 524 3681
Leicestershire Koi:
Les Hatfield - 0116 223 7670
London: J Carry - 020 8657 9036
Lower Thames Side: Val Radley - 01702 529675
Manchester & District:
Sue Ennis - 0161 480 5821
Middlesex & Surrey Border:
Jim Freeston - 020 8641 2686
Mid Lines: Val Gilbert - 01673 858354
Mid Staffs: Val Stokes - 01543 278359
Northants: S Day - 01604 407361
North Herts & District: B Blows - 01767 261135
North Wales: E Parry - 01492 580303
Plymouth & District:
Sandra Crocker - 01752 210118
Putteries & District:
Tina Burgess - 01782 617526
Scottish: J McCogray - 01259 750484

South East: Mick Wright - 01634 718943
South Hants: T Clark - 01489 573374
South Wales: Christine Worthcroft - 01443 207279
Suffolk & North Essex: Alan Carter - 01206 866011
West Wales: Basil Evans - 01554 772190
Worthing & District: K Martin - 01273 220818
Yorkshire Section:
Andrea Thornton - 01924 275749

Independent Koi Clubs

Birmingham & West Midlands Koi Club:
Alan Smith - 0121 422 3896
Black Country Koi Society:
Tony Bowcott - 01384 395299
Bristol & West Koi Club:
Larry Lewis - 01454 898207
Cambridgeshire Koi Club:
Graham Haggart - 01487 711129
Dorset Koi Keepers: Alison Allen - 01202 875437
East Coast Koi Club: Alan Wright - 01502 587116
East Midlands Koi Club:
Richard Jones - 01283 224975
Eastbourne & District Pondkeeping Club:
Brian Dale - 01323 731369
East Yorkshire Koi Society: Steve Mattinson - 01964 527863
Chris Hill - 01482 346777
Fylde & District Koi Club:
Chris Ingledew - 01772 635581
Heart of England Koi Society:
Paul Stacey - 01203 674821
Merseyside: Syl Bennett - 01942 204948
Midland Koi Association:
Keith Hanson - 01527 545230
Nishikigoi Association: Neal Keen - 01202 713000
North East Koi Club: Jean Hope - 0191 416 5794
North Lines Koi Club: Ken Bush - 01472 883377
North of England ZNA Chapter:
Yvonne Muse - 0114 289 1437
North Wales Koi Society: Keith Parry (Chairman) - 01492 583303 / Rachel Wilkinson (Secretary) - 01407 741846
Northern Koi Club (ZNA Friendship Club):
Glynis Morgan-Davies - 01706 218243
Norwich Koi Club: Jenny Allen - 01603 452932
Nottingham & District Koi Keepers:
Shirley Hind - 0115 981 0923
Oxfordshire Koi Club:
Kevin Newton - 01865 874008
Scottish Koi Club: Marc Raeburn - 01236 731908
South Devon Koi Club: Stan Morning - 01803 843109 / Christine Brackstone - 01803 833472
South of England Koi Club (ZNA Chapter):
Peter Webber - 01722 340313
South Essex Koi Club:
Mick - 01702 342460 / Barry - 01268 565739
South Kent Koi Club: Laverie Sharp - 01843 604861
South West Koi Club:
John Sprouting - 01904 822620
Wessex & Southern Koi Society:
Mrs Jenny Lenton - 01425 276885
Wirral & District Koi Society: Dave McCulloch - 0151 677 1582 / Steve Cope - 0151 327 7457
Witham Valley Koi Society:
Ray Lee - 01522 872733
York & District Koi & Pond Fish Club:
Andy Hudson - 01904 340185
Yorkshire Koi Society:
Rita Thomson - 01723 864867

Copy for Koi World

Copy for Koi World should be sent to: Aquarist & Pondkeeper, Winchester Court, 1 Forum Place, Hatfield, Herts AL10 0RN. Tel: 01673 885352 or fax 01707 276555. Copy deadline four weeks before publication date.

Trade Talk

This month's clutch of new products and trade news

Hagen launch six new varieties in the Nutrafin Max range

NUTRAFIN MAX USES high quality ingredients to ensure proper nutrition for all aquatic inhabitants. It contains a unique ingredient, P.D.P (predigested plankton) which increases digestibility, enhances fish colours and ensures optimum nutrition.

Nutrafin Max Complete Micro Granules are bite-size morsels for small community tropical fish. Retail prices start from £2.65 for a 42g tub of Micro Granules.

Nutrafin Max Spirulina Algae Tablets and Spirulina Algae Flake Food are created for herbivores, these flakes and tablets provide fish with valuable nutritional supplements. Retail prices start from £2.95 for a 25g tub of Spirulina Algae Flake Food and £3.35 for a 45g tub of

Spirulina Algae Tablets.

Nutrafin Max Colour Enhancing Flake Food for all tropical fish contains R.A.P (Red Algae Pigment), these flakes bring out vibrant colours quickly while improving digestion. Retail prices start from £1.55 for a 12g tub.

Nutrafin Max Sinking Complete Food Tablets provide a proper balanced nutrition for bottom feeders and invertebrates. Retail prices start from £3.35 for a 50g tub.

Nutrafin Max Marine Flake Food provides a complete balanced diet for saltwater fish, with fresh Krill, multi-vitamins, Omega 3 fatty acid and natural colour enhancers for brilliant fish colours. Retail prices start from £1.55 for a 12g tub.



For further information please contact Rolf C. Hagen on 01977 556622 or visit the website: www.hagen.com

Tetra launch new Nitrate remover

Tetra has introduced a new nitrate remover to its TetraAqua range of water conditioning products. **NitrateMinus** lowers nitrate levels and improves water quality and in conjunction with TetraAqua EasyBalance, reduces maintenance to a minimum.

NitrateMinus is an easy to use, fast acting and long term method of improving water quality in both salt and freshwater aquariums. It also helps control algae one of the key causes of people giving up fishkeeping, helps promote plant growth and stabilises carbonate hardness and pH.

With **NitrateMinus**, denitrification starts instantly and lasts for up to 12 months. The solid white pearls sink to the bottom of the aquarium where they naturally biodegrade, turning nitrate into harmless nitrogen. As the biodegradation process consumes low amounts of oxygen, aeration is recommended.

NitrateMinus complements the recently launched TetraAqua EasyBalance that reduces the required frequency of water changes. It is available in 100ml sizes that will treat 80L of aquarium water.

For further information, contact Tetra on 023 80 620500.



New pond clarifiers from Blagdon

One of the most effective ways of clearing green water and preventing algae from building up is by using an ultraviolet pond clarifier (UPC).

UPC's use a lamp of the correct wavelength to destroy algae cells and thus turn water crystal clear in a short period of time, usually within 14 days. Additionally, UPC's are completely harmless to plants, fish and wildlife.

Blagdon has introduced 3 new ultraviolet pond clarifiers (UPC's) to its portfolio. The UPC's are easy to install and are available in 10, 15 and 25 watt options to suit ponds up to 20,000 litres.

Features of the Blagdon UPC's include a unique lamp removal system to reduce the chance of damaging either the germicidal lamp or the surrounding quartz sleeve. The water flow around Blagdon UPC's is designed to ensure maximum contact time, which increases the efficiency of the unit and speeds up the algae removing process. A variety of reducing hoses is supplied to ensure easy fitting

to all sizes of pipework and pumps. The Blagdon UPC's can be safely mounted to a filter, wall or fence by using the sturdy quick release brackets supplied.

Retail prices from £79.99. For more information please contact your Interpet stockist

