Today's Fishkeeper

MAY 2002 $2.95

The sharp truth
All about Piranhas

Koi Virus
Is the end in sight?

PONDS
Choosing and using a filter

TROPICAL
Four new Catfish discovered

JUST ADD WATER
Instant aquarium set-ups

FROM BEGINNER TO ADVANCED

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Welcome

PHOTO: DAREN CHEEK

THIS HAS BEEN a particularly hectic month here at the *Today's Fishkeeper* office. First of all we have updated our e-mail addresses, so you need to change your address book now. The old addresses will still work for the next few months but if you change it now you won't forget.

Editorial contact: derek@trmg.co.uk
Questions: fishkeepinganswers@trmg.co.uk

On March 24th we had our presentation lunch for the Show league winners. Thanks to everyone who attended that event and made it a great success. In particular I would like to thank Dr Peter Burgess of *Aquarian* who travelled a long way to bring a large bucket of *Aquarian* fish food for each of the top 5 winners. Hagen also kindly donated Fluval external power filters and of course the winners had keepsake trophies. The overall winner was presented with a stunning new perpetual trophy with which to weigh down his display unit. As expected, Tony Tyson won the award amassing 970 points which makes him a worthy winner. However, Brian and Steven Critch and Ian Wright gave them a really good run for their money with a final tally of 913. Since a first is only worth 3 points this means these exhibitors amassed the equivalent of more than 300 firsts each. As an enthusiastic exhibitor in the past, I know what hard work it is to achieve such results. Well done everyone!

Last month *Today's Fishkeeper* went all metric. To those of us used to feet, inches, and gallons it is difficult to think of tanks as anything other than 2ft long or 10 gallons in volume. However, since most aquarium and pond equipment comes rated in litres and aquarium sizes (particularly complete units) are often linked to the name it is sold under, Fluval's Duo 800 is 800mm long, it makes sense to standardise everything into metric.

Until next month,
Happy fish keeping

Derek

Genetically Modified Zebra danios set to arrive in the UK

Eight months ago we reported on the development of transgenetic Zebra danios and predicted they would almost certainly be bred up for the aquarium market. That prediction looks like coming true in the very near future. Whilst hybrid fish have been a mainstay of the aquatic market ever since there was an aquatic hobby (cultivated Platies and Swordtails are hybrids between at least 3 wild species of *Xiphophorus*) this is a very new departure. These GM Fish have been developed using genes from a Jellyfish or a Sea anemone to create fish that are luminous green or red. As with our food, many people are deeply uneasy by this use of science. Just because we can create something - should we? Certainly with food you can argue that it could help feed the world. With aquarium fish, however, you don't have that excuse. It is purely and simply a way of making money whilst ignoring the ethics of the situation.

Join the campaign

So, *Today's Fishkeeper*, while supporting aquarists everywhere in their right to keep and breed cultivated fish of all types, is launching a new campaign to persuade the industry not to even start stocking these GM Fish. To do this we need your help. Take your copy of *Today's Fishkeeper* into your local aquatic shops and show them this editorial. Tell them you are supporting us in this campaign and if they want to do the same to phone (01673 885352) or e-mail me (derek@trmg.co.uk) and I will send them a form to fill in pledging their support. In return they will receive a certificate showing their support for this campaign and have their shop's name and contact details listed in the magazine.

Join the campaign now to help stop GM fish from even going on sale in the U.K..

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TROPICAL/MARINE/COLDWATER

TROPICAL

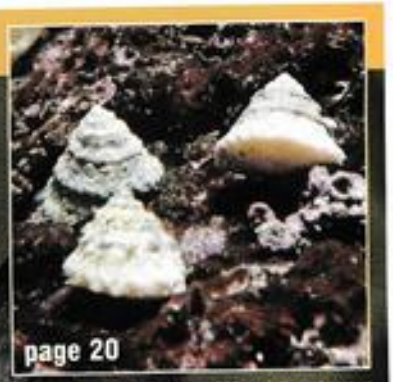
MARINE

PLANTS

ssue of Today's Fishkeeper

PONDS & COLDWATER

BEGINNERS



REGULARS

NEWS & VIEWS

KEY TO SYMBOLS:

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

Starting Point...

Just beginning in the hobby? **Pat Lambert** writes especially for you...

I have been keeping fish for more years than I care to remember. I've kept and bred hundreds of species, founded a specialist livebearer group, travelled down jungle tracks in search of fish and given lectures at home and abroad but I still think there's nothing like those first exciting, heady days of keeping fish.

IN MARCH I SUGGESTED THINGS TO LOOK FOR when you visit the aquarium shops to buy fish. I was looking at it from the point of view of a customer. So, let's take a look at the customer from the shopkeepers' point of view. If it is your intention to stay in the hobby for a while, the relationship you set up with the shop or shops you deal with is very important. The shopkeeper needs your custom but you need his/her help and advice.

Many of you work all week, so the weekend will be the time when you are most likely to go shopping for fish. This is also the shopkeepers' busiest time. If you have particular worries, try to see the dealer at a less busy time when he can give you some undivided attention. It is unreasonable to expect in-depth help and advice when the shop is crowded. If fish become sick when you take them home, don't be in a hurry to blame the shopkeeper, no dealer worth his salt will guarantee the continued health of his stock. You can't guarantee that you stay healthy even with the best diet and living conditions and the same applies to all living things. Some people are always looking for someone else to blame if things go wrong - it couldn't possibly be their own fault. If your fish are in trouble don't go rushing round to the shop to complain, take a sample of tank water with you, for this is one of the first questions the shopkeeper will ask you. Working together with a good shopkeeper means that when things go wrong you can try to solve the problems together.

Believe me, a good relationship with the shopkeepers you visit to buy fish from is worth its weight in gold.

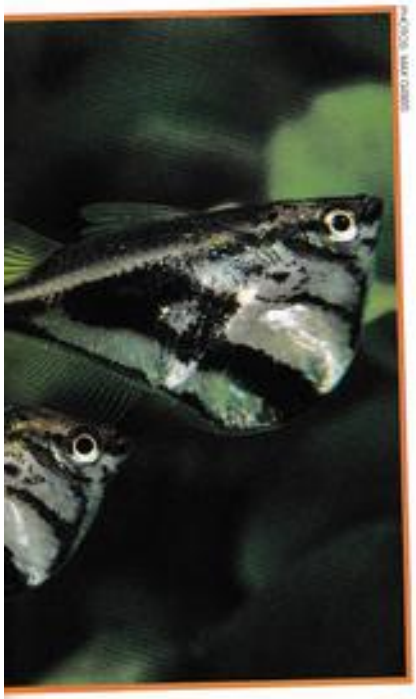
A good relationship with the shopkeepers you visit to buy fish from is worth its weight in gold. Alan Hinds of Mr Fish, in common with most shopkeepers, spends much of his time helping his customers out.

Marbled hatchet fish are excellent top dwellers for a community

Here's a good top dweller for you

If you like something a little different from the more usual fish shape, how about a Hatchet fish?

The deep body with forward thrust chest and the high lateral line make this fish quite easy to identify. These interesting fish take up space in an area of the tank that is not too heavily occupied. They are happiest in a school of four to six. They can produce bursts of speed that culminates, in the wild, in a take off and flight through the air. Make sure that this does not happen in the aquarium by keeping a tight lid on the tank. The Marbled hatchetfish is a good choice for a community of small fishes as it only grows to 4cm. It takes up a little more room if you allow for its body depth. This fish has a greenish body with a silvery sheen. There are three black lines running obliquely across the body and the fins are clear. Just look at the large pectoral fins which are made for flight. If this fish is kept in bright light the colours tend to fade. So, it will be at its best in less bright conditions. This is a great little fish to have in your tank if you like the unusual and are fascinated by the way fish move. I really like this fish. It's quite a while since I kept them but, after writing about them, I think I'll go out and buy myself some more!



Pat's tip

Do some research before purchasing a fish you know little about

Clown knife fish will eat anything they can fit in their mouths.

Oh dear! What can the matter be?

Let's talk about the Clown knifefish shall we. You might well be attracted to this fish with its silvery metallic coloration and body lined with large, black, white rimmed spots most frequently seen as a row from mid body to the small pointed tail. These spots become more intense with age. You could easily be tempted by this one and at a size of 5cm you could release it into your community tank of similarly sized fishes. This 'shy! retiring!' species would disappear into a thicket of plants or hide behind a piece of bogwood. However, there would soon be few of your community left. This 'shy! retiring!' fish lies in wait until nightfall (lights out), at which time it will emerge from its hiding place and go foraging for food which means fish! At 5cm this nocturnal predator can eat fish of almost its own size and, believe me, it will. In the light of day you might wonder where all your fish are disappearing and who the culprit might be. Look no further than this small baby Knifefish.

Clown knifefish will grow and grow at a phenomenal rate living on a diet of worms, insects, molluscs, FISH, for this is a greedy predator. It has been known to attain a length of 100cm. So, if you want to keep this fish, you will need a very large tank(180cm) where it will live in splendid isolation. If you keep it with anything else (which will have to be of comparable size) your tank will need to be even bigger. It is quarrelsome when young with its own species as well as any other and is a loner.

Put a young Clown knifefish in your general community tank and you will find out exactly what the matter is.

Lost for Words

Buffering Action Helps the water to maintain its pH value. Some calcareous substrates are used to keep the water sufficiently alkaline for certain fish.

Daphnia Tiny crustacea also known as Water fleas. This food is enjoyed by fishes but when it is collected from ponds there is a risk of introducing disease and unwelcome pests. Many people use cultivated Daphnia to avoid the risk.

Habitat The area or type of environment in which a fish population normally lives. In the wild, fish might live in a small part of the habitat which is quite different from the surrounding area. This is known as a micro-habitat. This micro-habitat is very important when considering a fish's needs in the aquarium.

Hand stripping Sometimes fish cannot be left to finish a natural spawning and fish eggs and sperm have to be manually removed. Hand stripped fertilised eggs should be treated in the normal manner for the species.

Nitrate This is a product of the Nitrogen cycle that will be used by the plants as a fertiliser. Regular water changes are necessary to keep nitrate levels down in an aquarium. Heavily planted tanks, lightly stocked with fish, need fewer water changes as more nitrate is used up by the plants and less fish waste is produced.

Osmoregulation Method by which a fish regulates, or balances its internal salt content against that of the surrounding water

Scales Small platelets that cover the skin of the fish. These overlap each other and form a solid shield which protects the fish from damage by sharp objects or other fish. The front scale overlaps the scale behind it and so on. This produces a streamlined surface which cuts down on friction. The scales are covered with a mucus coat which helps the fish swim through the water more easily and protects it from parasitic infestation. Not all fish have scales.

Nitrate will build up in an aquarium without enough plant life in it or if enough water changes are not carried out

Shoal A large number of a single species of fish swimming together. Many species locate the shoal through vibrations picked up by nerves in the lateral line. When danger approaches the shoal gathers together more closely for protection.


The various forms of *Sagittaria* make excellent aquarium plants.

A versatile undemanding plant

There are several species of *Sagittaria* that are undemanding, easy plants for furnished aquaria. The two plants I've chosen are Needle sagittaria (*Sagittaria subulata*) which is a tall, background cover plant growing to 40cm and quickly forming a dense mass.
It serves the same purpose as Vallisneria but does not grow so tall. Dwarf sagittaria (*Sagittaria pusilla*) only grows to 10-15cm and forms a carpet for the foreground of the tank. When purchasing these plants ensure that you buy the right species of Sagittaria for where you want to position it in the tank.

LET'S TAKE A QUICK LOOK AT DRIED FOODS

The fishkeeper is spoilt for choice with the many prepared fish foods that are available nowadays. There are good quality fish foods on the market which contain all the nutrients a general community fish will need. Flake food is probably the most widely used in aquaria. It softens quickly and does not fall apart in the water. Fish bite at it as it drops slowly through the water column, so fishes at all levels have the opportunity to eat as it passes. Fish also like granules but they sink faster than flake and can become lodged in the gravel, but they're good foods. Pellets that sink rapidly are ideal for bottom dwellers like Catfish. Floating sticks and pellets are my cichlids' favourite food and they come to the surface and snatch it as soon as it lands.

Do not feed powdered, crushed or broken up adult foods to fry or young fish. There are specially prepared foods for them which are high in protein, essential for growing youngsters. Adults do not need the high protein diet that the young do, so their food has a much lower protein content.

A good quality fish food will contain all the nutrients a general community fish will need.

Pat's tip

Feed young fish the high protein foods that are specially prepared for them.

The ten golden rules of fishkeeping

Read all about it

Take the first steps in fish keeping by finding out all you can about caring for your fish.

a) Manufacturers often provide free booklets about fish care.

b) Inexpensive books provide information on setting up.

c) *Today's Fishkeeper* experts are on hand with help & advice and sections of the magazine are devoted to beginners.

THE WATER

1 **Testing:** Before introducing any fish to your new tank test the water for Ammonia, Nitrite and Nitrate. Safe water ready to receive fish should have zero readings of Ammonia & Nitrite and almost Zero nitrate. Test the pH, pH7 is neutral, above this is more alkaline and below 7 is more acidic. Read up on pH requirements for any fish you intend to purchase.

2 **Temperature norms:**
Freshwater tropicals 21-27°C
Marines 26°C
Coldwater 13.5-21°C
Some delicate species have very specific requirements, read up on them before you purchase.

3 Filtration cleans the water in your tank. Choose the filtration most suitable for the fish you intend to keep. Some species do not appreciate being blown around the tank, others that come from fast flowing waters like more turbulence. Large tropicals, coldwater and marines require larger filtration systems.

THE FISH

4 **Stocking levels:** For freshwater tropical we recommend 12cm² of surface area per 1cm of fish.
Marines: For a fish only setup we recommend 2.5cm of fish for 9l of water and for Reef only setups we recommend 2.5cm of fish per 27l of water.
Ponds to a maximum of 250cm of fish per 4500l of water.
Measurements should be based on the optimum adult size of the species not the size at the time of purchase. **NEVER OVERSTOCK**

5 **Knowledge:** Find out as much as you can about any fish you hope to buy before purchase.

6 **Introducing fish:** Fish should be added a few at a time over a period of several weeks to new setups. This allows the filter system to mature.

7 **Quarantine:** All new purchases should be quarantined for established tanks for at least two weeks.

THE ROUTINES

8 **Feeding:** Twice daily feeds are the norm for most adult fish. Try to feed at the same time each day as this establishes a routine. Only offer as much as the fish can eat in a few minutes.

9 **Water changes:** Freshwater tropicals 10-20% weekly
Marines no more than 20% every two weeks.
Pond fish also appreciate an occasional water change. Keep an eye on ammonia, nitrite and nitrate levels. They should be zero in a mature pond.

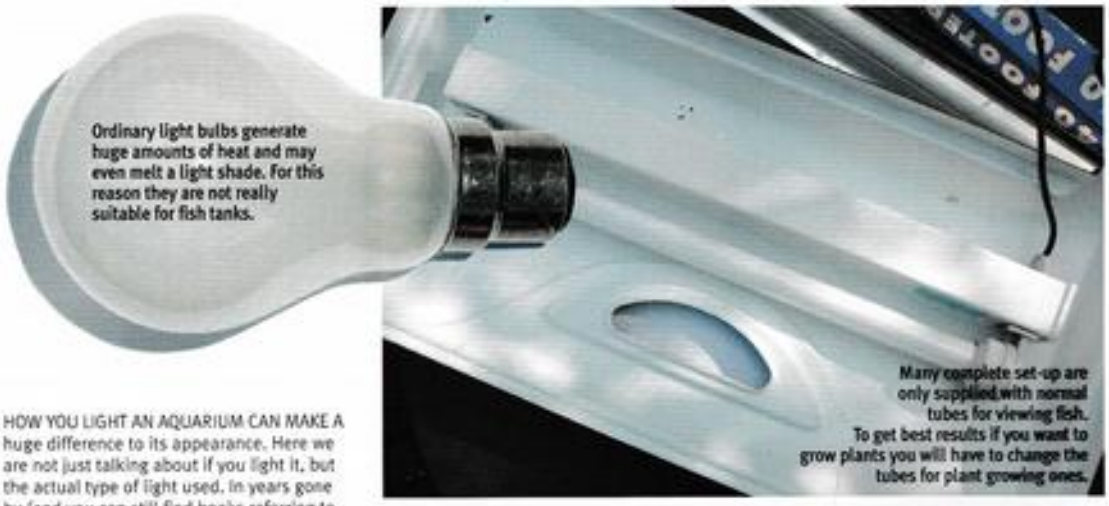
10 **Cleaning filters:** These should be cleaned once a week. If they work by biological filtration (bacteria break down the waste) and have a sponge in them, this must be cleaned in old aquarium water that is then discarded. Never use any household detergent or soap on aquarium equipment or tanks.

OBSERVATION: Daily observation is the key to successful fishkeeping. Look for any abnormal swimming patterns, bullying or listlessness. See that the fish are eating well and that all are getting their share. If fish are in difficulties test the water.

top tips

Light work

The whole appearance of an aquarium can be down to how it is lit. Here are a few of the basics you really need to know to get the best out of your aquarium



Ordinary light bulbs generate huge amounts of heat and may even melt a light shade. For this reason they are not really suitable for fish tanks.

Many complete set-up are only supplied with normal tubes for viewing fish. To get best results if you want to grow plants you will have to change the tubes for plant growing ones.

HOW YOU LIGHT AN AQUARIUM CAN MAKE A huge difference to its appearance. Here we are not just talking about if you light it, but the actual type of light used. In years gone by (and you can still find books referring to this) ordinary tungsten bulbs were used to light fish tanks. These were held in the aquarium hood where they would generate huge amounts of heat during the course of the day. This created a dangerous situation where any splash of water hitting the light bulb could cause it to explode. Cover glasses where absolutely essential to prevent this kind of accident.

Today this type of lighting is rarely used in aquaria, although you will still find the long tungsten bulbs sold with certain aquarium set-ups. These usually have a cover glass included in the hood but if not then you need to make sure the bulb is well protected from splashes.

Fluorescent lights

Most modern aquaria are lighted by fluorescent tubes. These are tailored to produce a particular spectrum which is ideal for a specific purpose. This can be a straight forward spectrum ideal for showing off fishes colours. Alternatively it may be designed with plant growing specifically in mind. Aquatic plants have particular light requirements which normal tubes fail to meet. So, when you buy a complete set-up check to see which bulbs you have been supplied with. If you want to grow plants, in most cases you will have to change the tubes to those suitable for plant growing. ■

Increasing light without changing the bulb

There are various ways to increase the amount of light which actually reaches the bottom of your tank. A light colour under you tank hood will reflect more light back into the aquarium.

One cheap way of increasing the light is to use silver foil behind your tube. Despite often being cited in books and magazine articles as a good way of increasing the light it actually puts your fish in danger. Condensation which builds up on the foil will cause it to deteriorate and pollutants may enter the water as this drips back in the tank.

A much better system is to use a special reflector. These cost a few pounds and will increase the light output entering the aquarium by almost double.

LEFT: Silver foil should never be used in the hood of an aquarium because it can leech poisonous substances into the water.

BELOW: A reflector like this will double the amount of light reaching the bottom of your aquarium and significantly increase plant growth.

tropical marine coldwater & ponds plants regulars

Fishkeeping Answers: Tropical

Plenum's a "Black art"

Star Letter

I've been keeping fish for a few months now, so I've still got a lot to learn! I've certainly made some mistakes, which is why I am writing to you. The problem that I'm having is with high nitrates despite only feeding a pinch of flake food a day. I'm thinking of setting up a plenum filtration system (like the Jaubert Plenum for Marine fish), with some modifications.

The plenum itself would be constructed from eggcrate and either covered on top with gravel tidy, or something impermeable (in which case the sides/overhang would be covered with gravel tidy to allow water into the void-space). The reasoning for suggesting an impermeable top cover is that I understand plant roots will actually oxygenate the substrate, I don't know how much they would oxygenate it or whether they would disturb the anoxic conditions required for denitrification.

There would be a length of airline tubing running into the plenum so that I could extract water from the plenum if required (in case of Hydrogen sulphide production). I was also planning on having an undergravel heating cable either above or below the plenum (I'm unsure which is better, because I assume there must be some water movement in the plenum so that low-oxygen water can enter and so that waste does not build up).

The final addition would be CO2 injection into the aquarium (not into the plenum), to assist the plants. For this I would plan on stopping the CO2 overnight, and possibly switching on the airpump during the hours of darkness (since both plants and fish consume oxygen in the dark - or so I've been told).

I'm hoping that the combined approach (encouraging plants, and using a plenum) will assist in keeping the nitrates lower. This in turn should result in happier fish, and a better overall look for the aquaria.

Dominic Large, *Richmond-Upon-Thames, Surrey.*

Even marine Plenums are considered a "Black art" by many marine experts. Trying a freshwater version could well prove lethal to the fish.

Conventional filtration does an excellent job at processing the immediate threats of ammonia and nitrite. Problems arise, as you have discovered, when trying to address the accumulation of nitrates. The bacteria responsible for their breakdown require slightly anaerobic conditions - something that is difficult to control and provide via conventional off-the-shelf filtration.

Marinists have tried to use the plenum, which by many is regarded as a 'black art' in that it's performance can be unreliable and reliant on a number of variables. They must be constructed to tight specifications and will take months to mature into action, relying on benthic organisms turning over the substrate. These beneficial organisms abound in a marine system, but are rare in a freshwater system, suggesting that a freshwater plenum will be even more difficult to perfect than in a marine system.

Rather than risk a freshwater plenum (with its unpredictable performance), I would adopt a more tried and trusted route. Using the undergravel heating you have mentioned, a 5 - 7 cm bed of inert gravel, 2-3 tubes (Freshwater/Triton Mix) on a timer for 2 x 5 hours a day. Use the CO2 through a diffuser and you will achieve excellent plant growth (evidenced by the release of oxygen bubbles). Once you have plants established keep fertilisation to a minimum (using inorganic soluble fertilisers and an iron-rich clay substrate supplement) you can then stock with fish. I would be inclined to use a mix of safe rainwater with tap water (as tap water introduces an uncontrollable amount of minerals + nutrients. Once you have mastered the balance required between CO2, light and fertiliser (less is more) you can then safely introduce fish into a system that is nitrate-hungry. It works well, as I have one set up at home and offers a degree of repeatability and reliability far greater than a plenum.

Ben Helm

The Nanochromis genus contains some very beautiful fish which would thrive in this aquarium. This is Nanochromis transvestitus.

PHOTO: MAX GIBBS

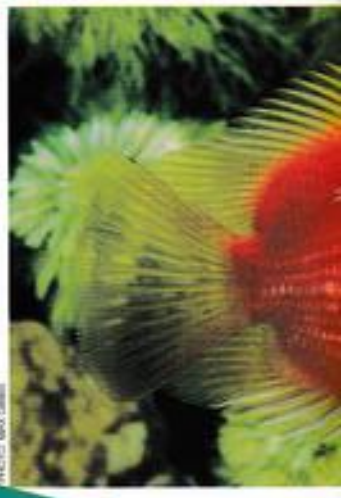


PHOTO: MAX GIBBS

Having problems? Then let our panel of experts solve them for you. *Fishkeeping Answers* is our free reader service. Just send your question by letter or e-mail and we will forward it to our panel of experts. Everyone receives a reply regardless of whether we publish them or not.

Which cichlids can I keep?

Q **I have a 60 x 30 x 37cm tank. It is set up as a community tank at present. It is quite heavily planted and has a few rocks in it. I would like to make it a Cichlid only tank. Can you recommend some colourful fish to keep and how many. I live on the west coast of Scotland. There is a Fluval 3 filter in tank at present.**
Arlene *via e-mail.*

A Firstly, there is many cichlids with nice colours. I could suggest Kribensis, (*Pelvicachromis pulcher*) or other cichlids belonging to this Genus. They have nice colours, leave the plants alone, are easy to keep, and fairly easy to breed. Other nice fish are those from the *Nanochromis* genus and of course you have the *Apistogramma's*. So, since your tank is not that big, I would suggest a pair of *Pelvichromis pulcher*, or maybe a pair of any *Apistogramma*, or two pair of *Mikrogeophagus ramirezi* which are often referred to as "Ram" cichlid. With all these fish you need to give them some caves to hide in.
Alf Stalsberg

Red parrot cichlids are very controversial fish in the hobby.

CAN WE KEEP PARROT FISH IN OUR COMMUNITY?

Q **We have an established aquarium containing Tetras, Guppies, Clown loach, Rainbows and a Golden nugget plec. We have seen a some fish in our local pet shop called Parrot fish. Could you please give us much information on these as we would like to have some in our aquarium. They are not in any of the books which we have got.**
Wayne *via e-mail*

A My personal opinion is that you should stay away from this fish. First of all, serious aquarists avoid fish of hybrid origin like Parrot cichlids. Secondly, many of your current fish would be eaten by the Parrot cichlids and those that are left would have to put up with the tank being stirred up all the time - stressing them badly. If you really want to keep this fish, I would suggest you give them their own tank. The water parameters are not so important, providing you avoid extremes. They eat most kinds of aquarium food and need a temperature of around 25°Celsius. You will not find much information on these fish in the books because they were only created recently and most authors boycott such deformed hybrids.
Alf Stalsberg

Fishkeeping Answers Expert Panel

Alf Stalsberg - Cichlids.
Pete Ligtrot - General questions on tropical fish and oddballs.
Andrew Caine - General questions on Marines.
Ben Helm - General questions on Coldwater plus equipment and technical advice.
Lance Jepson - Health.
Tony Sault - Discus.
David Armitage - Anabantids.
Derek Lambert - Livebearers, Rainbows & Breeding fish.
Ian Fuller - Catfish.
Andy Gabbutt - Killifish.
Stephen Smith - Goldfish.
Bernice Brewster - Koi and Ponds.

Questions by Post

Please indicate clearly on the top left-hand corner of your envelope which person you wish your query to go to. All letters must be accompanied by a SAE and addressed to: Fishkeeping Answers, *Today's Fishkeeper*, TRMG Ltd., Winchester Court, 1 Forum Place, Hatfield, Hertfordshire, AL10 0RN.

Internet Service

Fishkeeping Answers is also available via e-mail. Most of our experts can be contacted via the Internet. A few are still not on-line so we will have to pass your messages on to them by snail mail (we will tell you when this happens) but otherwise you should receive a reply to your questions in a few days' rather than weeks.
Send your e-mails to:-
fishkeepinganswers@trmg.co.uk

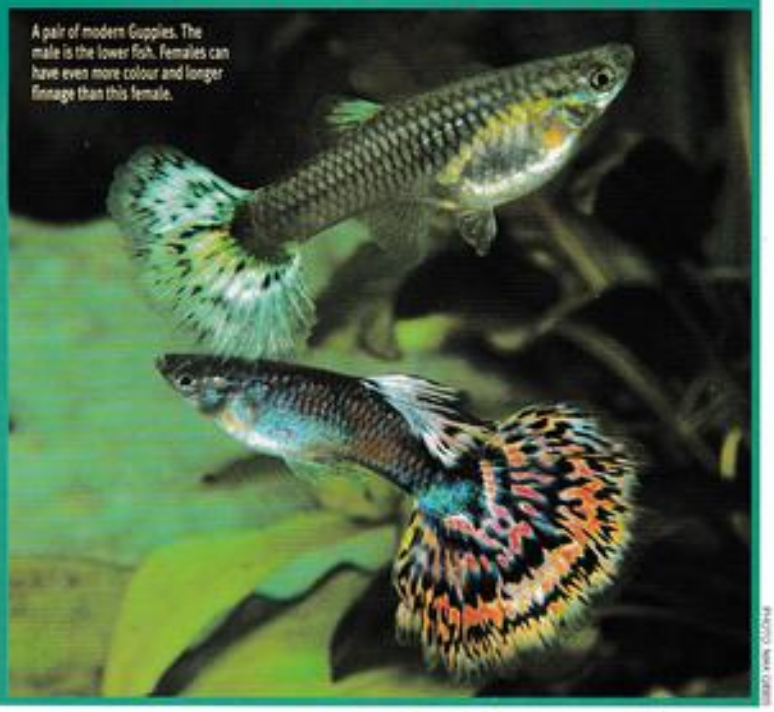
Fishkeeping Answers: Tropical

HOW DO I SEX GUPPIES?

I have just started keeping fish and have bought some Guppies from my local fish shop. I asked for two pairs and they took fish from two separate tanks. My problem is how do I tell which is a male and which is the female? A book I was looking at in the library (it was very old) said males had a gonopodium and brightly coloured fins. All my fish have brightly coloured fins and what is a gonopodium?

A male Guppie's gonopodium was originally his anal fin (the single fin by his anus). As a male becomes sexually mature this fin changes from a normal fin shape into a rod-like structure which is used to transfer sperm from the male into the female. So looking at your fish now you should be able to see two males with modified anal fins and two females with normal fins. The reason all yours have brightly coloured fins is because selective breeding has introduced a lot more colour in the fins of female Guppies than they originally had. The old book was so out of date that this fact was not known at that time.

Derek Lambert



A pair of modern Guppies. The male is the lower fish. Females can have even more colour and longer finnage than this female.

PHOTO: MAX GREEN

Sarah's Golden comet platy has red fronds protruding from its vent. Fortunately this one is perfectly healthy.

PHOTO: MAX GREEN

Worm infestation

I am new to fishkeeping and have noticed my Golden comet platy is looking very poorly and has bright red fronds protruding from the vent (I'm concerned that it may be worms), she is twitching a lot and has become thin, despite still eating. She seems off-balance and is bumping into things. All the other fish look healthy and I'm worried about putting chemicals in the tank (112 litres) to treat the platy. Will it affect the filter or could it be dangerous to the fish? On the other hand, if it's not treated will it infect the other fish?

Sarah Jones *via e-mail*

This sounds very much like an infestation with the intestinal worm Camallanus. Safest and most convenient way to treat this is to worm all of the fish in your aquarium by placing them in a levamisol bath (a wormer available from veterinary surgeons and some pharmacists) at a dose rate of 2.0mg/l. although this bath can be for up to 24 hours, I would suggest up to two hours initially, and repeat after 1 week. Use water drawn from your aquarium to make the bath. Treat all fish, plus stop feeding live foods or non-gamma irradiated frozen foods. alternatively levamisole at 10mg/L can be added to the aquarium as a single dose added to the water. This is particularly good for killing larval worms. Suspend any carbon filtration during treatment.

Other treatments such as the wormer fenbendazole are designed to be given in food, which does make treatment difficult.

Lance Jepson

Angelfish affected by pop-eye

About 3 weeks ago my best breeding pair of Angels developed skin flukes the size of golf balls, well, about 4mm in reality. They were brought in by a large Bristlenose who had been quarantined for 2 weeks and showed no signs of illness.

A large fluke made it's way onto the surface of the male's eyelid before they were completely eliminated. Treatment was stopped 2 weeks ago and despite frequent water changes and testing for ammonia, nitrite, nitrate etc., his left eye is now 3 times the size of the other. His eyelid is protruding over this eye and there is some redness. I also think that this may be affecting his eyesight as it takes a long time before he realises it's dinner time.

I have read through basically every fish book I have access to and all entries seem short and vague, offering no distinctive remedy or solution to this problem, besides keeping the tank clean. To this effect I have done all water changes with rain water and even connected the larger Fluval 203 in replacement of the standard 103 that is normally used for their tank (60cm standard tank, 75 litres).

Jaki via e-mail

In view of the fact that only one eye is affected and this seems to follow the attachment of a fluke, probably one of the *Gyrodactylid* species, I would assume that we now have a severe bacterial, or possibly fungal, infection of that eye. If the fluke managed to damage the cornea (the transparent part of the front of the eye) then an ulcer could develop. Not only does this act as a means of entry of infection, but if the ulcer is full thickness through the cornea then the eye may rupture with a loss fluid from the eye and permanent damage to the eye.

The swelling is because the infection interferes with the normal fluid drainage inside the eye and so it builds up - a condition known as glaucoma. By this stage the delicate retina at the back of the eye is usually permanently damaged, so although we can try to eliminate the infection in that eye, the sight in that eye may never recover.

Attempt treatment by:

1 - Daily swab the eye with a povidone-iodine solution (available from pharmacists or your veterinary surgeon).

2 - If possible supplement with vitamin A - check the formulation of your flake food etc. and feed that which is highest in this vitamin. You may be able to buy vitamin additives for your aquarium - consult your local retail outlet.

3 - Do what you are already doing - concentrate on keeping good water quality!

4 - Antibiotics available on prescription from your veterinary surgeon may be worth considering.

Lance Jepson

PHOTO: MARK EVANS

Star Letter Prize from Hagen

This month the writer of our star letter wins a 2 Litre bottle of Nutrafin AquaPlus and a 2 Litre bottle of Nutrafin Cycle worth over £6!

Nutrafin AquaPlus removes the chlorine, chloramine and heavy metals present in tap water which can be harmful to fish.

Nutrafin Cycle is the most powerful biological supplement currently available. Each millilitre contains 100 billion friendly bacteria, which help destroy harmful toxins such as ammonia and nitrite.

Fishkeeping Answers: Marine

Star Letter

Web warning

Q **I have a 9 month old reef aquarium which is going great apart from one aspect, in the last two weeks I have a brown discoloration of algae on my sand bed, which is about 2 cm deep. My nitrates are 10ppm and phosphates are zero. I have been on the web and have been advised to strip out my sand as it will be full of detritus and replace it with a deep sand bed of around 8cm with a very fine particle sand. They say that the animals that will colonise it will stop the algae from building up. After reading all the advise on the web I am more confused than before. Please can you advise me if I should do this or can I keep my existing sand and remove the algal problem in some other way?**

John Bradshaw *via e-mail*

A Firstly let me address the web problem, what happens is that a few good aquarists are giving advise and it is good advise, then we get a lot of shall we say very inexperienced aquarists who jump on the band wagon and start giving out poor advise. This leads to confusion and a lot of failing aquariums. The only thing you can do about this is to ask the person you are talking to about their experience and look at their tank pictures, even then you could be led up the garden path. The web is a wonderful place for information but it can be a very dangerous place as well - be careful.

To remove your sand and replace it with a deep sand bed would not be beneficial at this stage. The sand particles are so fine that you would have to be very careful placing it in, then you will have to find the little animals to colonise it. This is the problem, for if you introduced live sand to seed the bed, most of the animals will die in transit or your new sand will be too sterile for them. The population would crash leaving only a small amount of critters and these would then take 12 months to produce a viable bed. Deep sand beds are a good way to help with the filtration of a reef, but you need to set up an aquarium for this and allow a full 12 months seeding period. It is not a good idea to convert an aquarium which is already running well. All you need to do is increase your cleaning crew and get a sand sifting Starfish or sand sifting Gobies, the Star is a better animal for the job. This will eat the algae and organic content within the sand, it will also turn over the sand and create a very clean substrate.

Andrew Caine

Too much of a good thing?

Q **I also have an 802 power head to move the water in the tank. Can you have too much flow and how do you know what the ideal is?**

James Smith, *via e-mail*

A You can have too much water flow, and this is most commonly found when corals are placed in front of powerheads. The polyps can be ripped apart by too much water movement. The ideal is some turbulence within the aquarium but not so much the corals become stressed.

Andrew Caine

Blue starfish can have their feet damaged if they are pulled off the aquarium side.

STUBBORN STARFISH

Q **I have just purchased a Blue starfish for a 132 x 38 x 43 cm tank. It has mixed stock of fish and inverts. I carry out a 10% water change every week, and this is my first problem. When I bought the Starfish I read up on them like you say to do and it said that it should not be removed from the water, however, the Starfish insists on living in the top 5cm of the tank. This is OK until I go to change the water, not having a sump the level drops exposing the starfish. Does this do any harm to the starfish? If I have to remove it, how do I get it to release the tank sides without damaging it ?**

Nick Honor, *via e-mail*

A If the starfish is exposed to air it may damage its tube feet. This can lead to secondary infections causing the star to erupt along its legs. Pulling the star off the glass or rocks could do the same. Therefore try to move it away by directing a strong water flow at the beast. Failing this, perform your water changes in small amounts keeping the beast underwater. Your water changes are a bit excessive, 20% per month max, in 5% weekly or 10% every two weeks is enough.

Andrew Caine

Which tank should I buy?

Q **I intend to start a marine reef system, after an absence form the hobby of about 8 years. My intention was to buy a manufactures own system such as the AB Aquamedic Percula 90, 36 x 24 x 20 with metal halides, trickle filter, skimmer etc. Do you know of this particular system, have you any opinions? Or could you suggest any other manufactures full systems. My budget is around £1,000.**

B. Shooter, *Glasgow*

Aquamedic's Percula systemised aquarium is very good and at the right price with a halide included.

A The system you are looking at is very good and at the right price with a halide included. Other manufactures include Deltec with their mini reef which is around the same size but it comes with tube lighting and not halides. Fit Filtration also produce such systems and are well worth a look. All three are good buys, AB Aquamedic can be contacted on 0845 090 3500, Deltec 0208 501 2431 and Fit Filtration 01332 850345.

Andrew Caine

OLDEST MISTAKE IN THE BOOK!

Q **I purchased a Moray eel from a shop who did not know the name of the fish. I did some research and believe it to be *Gymnothorax vicinus* the Purple mouth moray. I currently house it in a 120 x 60 x 60cm aquarium with no water problems. However, the one problem I have is that it will live with a large fish for months without any trouble, then it will attack them. It bit a large Puffer fish during feeding time, this fish died after about two weeks as the wound would not heal no matter what I treated it with. The same happened to a large French angel. Please could you tell me what is happening and what fish I could house in the aquarium safely if any? If not can you tell me how much it is worth as it is a rare and splendid fish.**

A You have fallen for the oldest mistake in the book my friend! Never, never purchase a fish you don't know about, trouble can follow; saying that lets see what we can do with your situation. Firstly your eel will grow to about 120cm, so your tank is not big enough, and as the girth increases it will topple your rock work. Big eels should have the aquascape glued to avoid damage to the fish or tank. This beast carries bacteria in its mouth, so when your fish competed for food the resulting bite infected the animals and caused their death. With this in mind I am afraid that I cannot recommend any fish for this aquarium since the risk is too great. So it's make your mind up time, keep the eel which is a great fish, but you will have to improve his house in size and construction. You mentioned the value of the fish, firstly it will be hard to sell due to it's nature but I think you might get £200 tops for it to the right person, however you might not even be able to give it away, good luck in what ever you do.

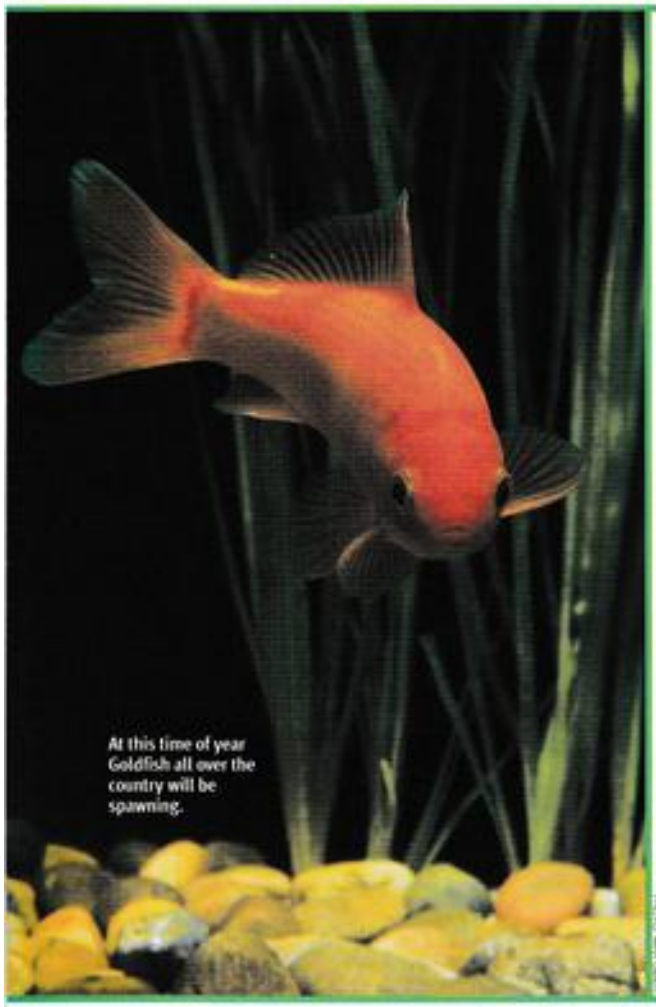
Andrew Caine

Star Letter Prize from AQUA MEDIC

***Modern Coral Reef Aquarium* books, written by Alf J Nilsen and Svein A Fossa are regarded as probably the most authoritative series of books for the marine hobbyist in years.**

ab Aqua Medic, the leaders in Marine Aquarium technology, is pleased to present whichever of the three volumes ñ normally £55.00 each - desired to this months star letter

Fishkeeping Answers: Coldwater



At this time of year Goldfish all over the country will be spawning.

Goldfish spawning

Q **Help! My Goldfish have just scattered eggs all over the tank and are busy eating them as we talk. I have a large quarantine tank up and running ready for some new fish I was going to buy this spring. The filter in this is a small internal power filter which would be fine for a few small fish but my adult Goldfish are quite large and have a large external power filter on their tank. Shall I scoop out the eggs or move the adults into the quarantine tank and what should I do about the filtration?**

James Grant, *by telephone.*

A Thank goodness for the quarantine tank. Catch the adults out now and transfer them into the other tank. The small internal power will need to be supplemented by your large external filter so transfer that over as well. You will not need a filter on the main tank for the moment.

Your Goldfish eggs will start to hatch in about 4 days at a temperature of 21˚C. The tail breaks through the egg shell first and finally the whole baby is free. New born fry are almost 5mm long at birth and looks like a glass splinter. Look closely and you will see a greenish tinge to the back and some fine black spots in this area. The belly will still be very large with a yolk-sac clearly visible. Over the next few days this will be used up and the fry eventually be seen swimming around rather than just being stuck on the side glass. Now is the time to start feeding them. A liquid fry food can be used, or better still newly hatched Brine shrimp. Aim to feed the fry at least twice a day, being careful not to over feed them and pollute the water.

Start 10% water changes when the babies are a few weeks old and make sure you use dechlorinated water of the same temperature. A gentle filter can be added when the fry are about 10mm long. A bubble-up sponge filter is good for this. Later the internal power filter can be moved back.

If you find you have several hundred babies (very possible with Goldfish) then you will need to move them into several other tanks or a small pond in the garden. This can be a kiddies paddling pool set up just for rearing your fry.

The babies will start off brown and only later turn gold in colour. Depending upon the genes involved that may take 8 months or several years to happen. Good luck with your babies.

Derek Lambert.

Mysterious Tadpole deaths

Q **Please can you help us solve a problem we have experienced for the first time this year with regard to frogs. My boyfriend and I have ponds in both our gardens, every year we get lots of frog spawn. To make sure the spawn isn't eaten by Newts we remove it from the ponds and raise the tadpoles in a large fish tank in the garden. We have had a great success rate. Last year I was first to have spawn in my pond and so moved it to the tank, everything seemed OK, nothing unusual. The spawn hatched but after a couple of weeks all the tadpoles had died suddenly. We thought that maybe it was one of those things that happen in nature until the same thing happened with the spawn from my boyfriend's pond. The tadpoles hatched and survived for about two weeks then they all died at the same time. This really has puzzled us. The water we put into the fish tank was from a water butt, we did a water test on it and it came up as neutral. A friend of ours gave us some spawn from her pond, this time we put the spawn into a different tank, the same thing happened. In each case we did exactly the same thing we do every year but for some reason the tadpoles didn't live for more than two/three weeks after hatching. Please could you help us solve this problem. I have written to many fish magazines but they either don't reply or have no idea what the problem is, maybe you could help us. We are hoping to raise some tadpoles this year and so would really appreciate an answer as soon as possible. Any advice would be greatly appreciated.**

Ms Penlver, *London*

A I'm sorry to say the experience you have had with the frog spawn hatching and then the tadpoles dying would seem to be quite commonplace. It is with deep regret that I have to say that the common frog populations of the UK are in decline. Over the last century we have last almost 50 % of natural ponds to development, roads and urbanisation, which has impacted on the numbers of these charming creatures. The world wide amphibian populations are also declining, the reason is not clear and some have quoted global warming but at this stage I would suggest that is speculation. Most certainly it is human interference but more likely through habitat degradation and pollution.

Returning to the problem of the tadpoles which die, to my knowledge, there has not been any cause identified. I would be grateful if you would report your findings to: Froglife, Triton House, Bramfield, Halesworth, Suffolk IP9 9AE, a charity which has been set up to study the frog populations in the UK. I know they would be interested in your comments.

Bernice Brewster

Frog numbers have dwindled.

Top of the Pops the Barbs

In this new series on popular aquarium fish we will be featuring all the most popular aquarium fish in the trade and some of their lesser known cousins who are the "Wannabes" of the fish world

PHOTOS: MAX GIBBS

Tiger barb

Name	Tiger barb
Scientific name	*Barbus tetrazona*
Aquarium type	100 x 30 x 30cm
Distribution	Borneo, Indonesia, Sumatra, & Thailand
Diet	Not fussy. Flake, small pellet, frozen and live foods.

Companion species This fish is a fin-nipper and will often turn into a bully if kept with smaller, slow moving, long finned or timid fish. Always keep a group of at least 6 Tiger barbs and house them with other medium sized, lively, robust fish.

Golden barb

Name	Golden barb
Scientific name	*Barbus semifasciolatus*
Aquarium type	90 x 30 x 30cm
Distribution	China
Diet	All foods.
Companion species	Other medium sized lively species.

Checker barb

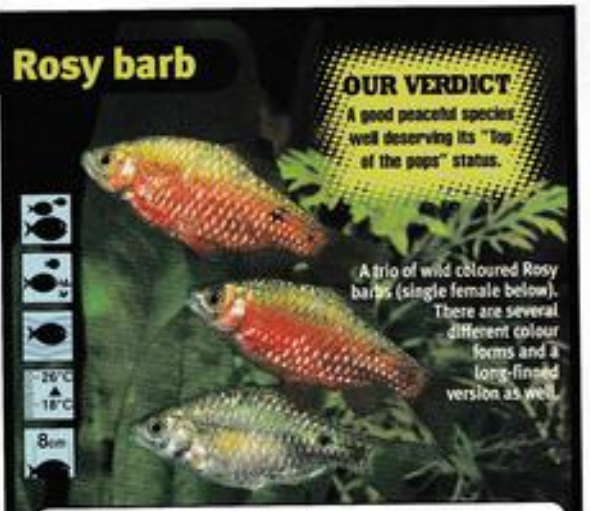
Name	Checker barb
Scientific name	*Barbus oligolepis*
Aquarium type	60 x 30 x 30cm
Distribution	Indonesia and Sumatra
Diet	All foods including commercial flake and granular.
Companion species	Other small to medium sized community species.

Cherry barb

OUR VERDICT
Generally deserving of being "Top of the Pops". A good all round fish, although once again they can cause havoc if they turn nasty.

Name	Cherry barb
Scientific name	*Barbus titteya*
Aquarium type	60 x 30 x 30cm
Distribution	Sri Lanka
Diet	Flake, granular, frozen and live foods. Easy to feed.
Companion species	Other small to medium sized fish. Occasionally males may become aggressive if kept by themselves. If this happens introduce a group of 5 or more Cherry barbs and after a little while the male will settle down again.

Rosy barb



Name	Rosy barb
Scientific name	*Barbus conchonius*
Aquarium type	90 x 30 x 30cm
Distribution	India, Bengal & Assam.
Diet	All commercial foods, plus any live foods they can get hold of.
Companion species	Other medium sized, lively fish.

Ember barb

Name	Ember or Melon barb
Scientific name	*Barbus fasciatus*
Aquarium type	90 x 30 x 30cm
Distribution	India and Southeastern Asia.
Diet	All foods.
Companion species	Other small to medium sized community fish.

Black-ruby barb

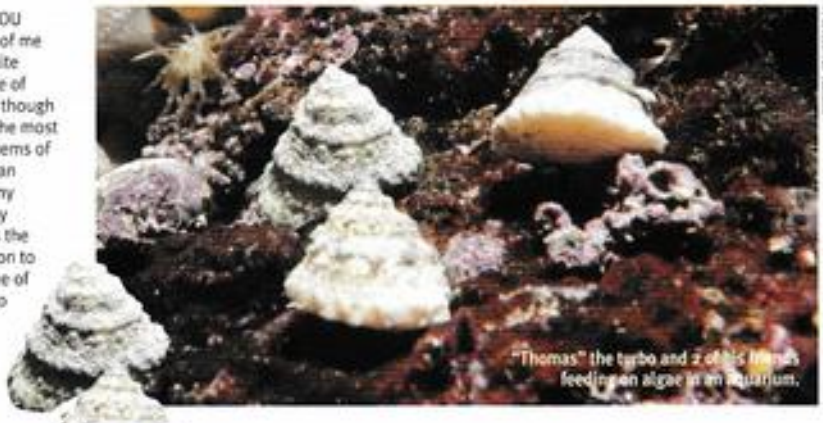
Name	Black-ruby barb
Scientific name	*Barbus nigrofasciatus*
Aquarium type	60 x 30 x 30cm
Distribution	Sri Lanka
Diet	All foods including commercial flake and granular foods.
Companion species	Other small to medium sized community fish.

tropical | marine | coldwater & ponds | plants | regulars

Sea view

Andrew Caine has some very intelligent animals in his tanks. In a *Today's* exclusive, Thomas has kindly agreed to write about himself and tell you why you should add some of his relatives to your aquarium. Andrew also suggests an invertebrate and fish for you to keep.

HELLO THERE, YOU humans think of me as boring, quite often a waste of money even though I am one of the most inexpensive items of live stock you can have, a fact I and my friends find quite insulting. Many of my relations you seem to cherish, such as the giant clams. Others pack enough poison to kill any of you in a matter of hours. One of the funniest things is that humans who are so clever have never seen my relative the Giant squid alive, not so clever now, are you! We even have a TV personality in our midst the one and only Brian the Snail of Magic Roundabout fame. Who am I? if you have not already guessed, I am a Turbo snail, I am quite amazing really, and if you would take the time I would like to introduce myself.



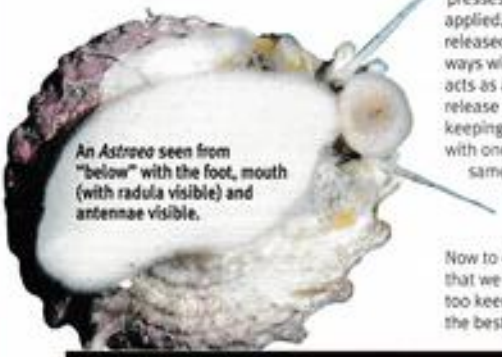
"Thomas" the turbo and 2 of his friends feeding on algae in an aquarium.

PHOTOS: ALF BALDEN

How can I walk with only one foot?

Please amuse me and get a partner, each of you stand on one foot, then try to push each other over whilst moving forward, without putting your other foot on the floor. That is what we snails have to do. How can we walk with only one foot? Not only do we have to walk but also hold on to rocks for dear life against the effects of water movement. If we get dislodged and fall off I am afraid we will be going to the great aquarium in the sky as we cannot right ourselves and are consumed by nasty predators.

We have developed a rather special mucus, you know the stuff my land friends leave behind, and in molecular terms it is quite unique. We produce this mucus composed of 4% proteins 96% water, we secrete it all over our foot, and here it starts to act in a weird way. How we move forward is to send a muscular wave down our foot, many at one time. As a single wave presses down on the mucus, pressure is applied, as it moves off that point, pressure is released. The mucus behaves in different ways with this pressure. Apply pressure and it acts as a lubricant allowing movement, release pressure and it acts like a glue keeping myself firmly attached to the rock. So with one foot we can move and stick at the same time.



An *Astraea* seen from "below" with the foot, mouth (with radula visible) and antennae visible.

What do we eat?

Now to our feeding habits, most of you know that we like a bit of the green stuff, we are not too keen on long strands of algae as it is not the best. What we really go for is the short nutrious new growth, it's like frying steak verses the best fillet steak. You think sharks have lots of teeth? Well they are like toothless wonders compared to our armoury. What we proudly display is what is known as a radular. This is like an endless roll of sand paper with thousands of teeth attached. I personally have 68 teeth across the front width of mine with thousands lined up behind. The total length of my radular is twice the length of my body and as long as I breathe it is being produced. We eat by pressing the edge of our radular on the rock surface and then dragging it back towards our mouths. The algae is scrapped off and trapped in between our teeth like paint on course sandpaper, and bon appetit. Lovely.

There are more wondrous things about myself, like my shell production which needs lots of calcium (so add it to your aquarium), how we reproduce, and try looking at my many different friends in the snail world. All are worth checking out, but hunger is forcing me to leave you at this point. For the aquarium we are good workers, sand living Snails will clean your substrate as well, so please don't turn your nose up at us, we are far more interesting than you think. Out with my tooth file for a quick sharpen, and a rasping we will go. Thank you for your time and I hope to see you soon.

An invertebrate for you

Sea view

Kenya tree or colt coral (*Cladiella sp*)

Lets go for easy, lets go for sexy, lets go for good times in the tank, lets go for one of the best of the soft corals for the aquarium. Yes lets get a Kenya Tree.

Okay you fussy people, they are not often brightly coloured being fawn and darker brown, however, the jewel in the stone is dark purple and pink. Commonly they have a central stalk which breaks out in many branches often tufted with aggregations of polyps hence the common name. When in the aquarium they make what must be one of the most stunning sights, branches swaying in the water with the polyps extended, fantastic just fantastic.

So, if it is an easy coral to keep lets examine why, and a clue can be found in their location on the reefs. Here we have a soft coral that is found quite deep on the reef, this indicates that it is tolerant of low light levels and has a relatively low symbiotic algal population. It relies, therefore, quite heavily on prey capture for its nutritional requirements. The water flow at this depth is often sporadic with surges from low to high velocity, so the coral is able to cope with all manners of flow. Here we have the perfect coral, able to not only withstand a wide variation of climatic conditions but able to thrive as long as it is being fed.

Another great bonus with this beast is that it is a fast grower (if fed well), so within a short while your small Kenya tree will be a big Kenya tree. This rapid size increase brings us to another aspect of reef keeping, you will be able to observe asexual reproduction and you could even take the plunge into propagation. Firstly bits will drop off, no it is not rotting but spreading as the bits fall onto rocks and attach themselves, growing into a new coral. If your animal is too big starting at the tips follow the branch down and then slice taking a good sized cutting. It is best to cut down a natural break in the body, or you can just cut off the branches, always use a fresh scalpel blade. Attach the cutting with cotton or fishing line **NOT** elastic bands. So, go forth my friends and slice.

Identification of *Cladiella* species if difficult without proper scientific examination of the sclerites.

PROFILE

Phylum	**Cnidaria**
Name	***Cladiella sp.* (it is impossible to name any species by looking at the external appearance)**
Location	**Global tropical distribution**
Feeding	**Moderate light levels and liquid suspension food**
Size	**over 1 metre**
Water flow	**Moderate**
Lighting	**Metal halide or tubes**
Difficulty	**An easy coral to keep great starter, but water quality has to be good, watch the polyps they will tell you if there is a problem**

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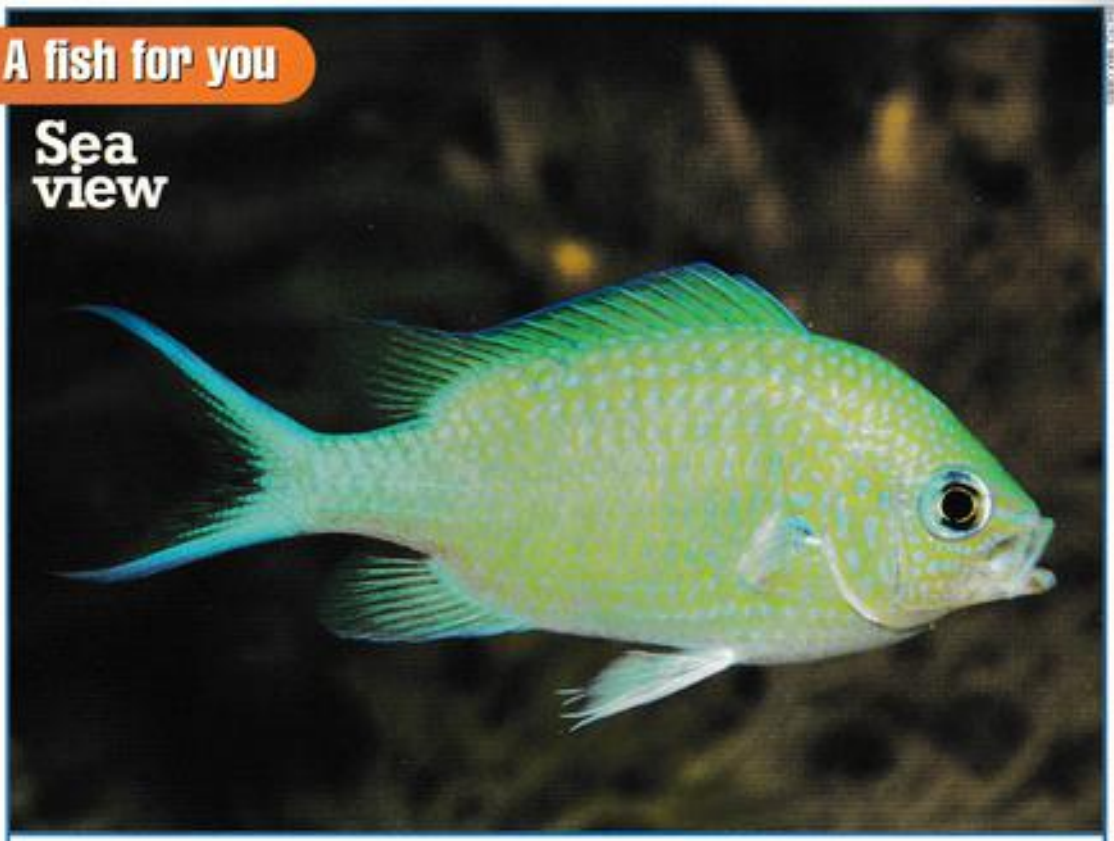
A fish for you

Sea view



Blue green chromis (*Chromis viridis*)

Oh how boring can we get? Blooming Chromis, the most common ordinary fish, and to add insult to injury they are cheep as well.

How dare you think of these beautiful fish as boring? OK. they are not as brightly coloured as most, but they make one on the most stunning displays in any aquarium, if you treat them right. That is exactly what doesn't happen though, they are not treated in the correct manner in some shops or in the home aquarium. People seem to think that because of their cost they can be abused, which results in their slow death and a poor display. Chromis, so boring Chromis, they must be one of the best shoaling fish you can have.

So how can we get the best out of them? It is easy, make them healthy, give them a stress free life with plenty of good food and that is it. Lets talk about the feeding first. Frozen Brine shrimp mixed with a bit of flake is not good enough. We must provide an *d la carte* menu for these little beasts. You must feed at least twice a day, with a mixture of frozen foods such as, Brine shrimp, Mysis shrimp, chopped Cockle, and chopped Mussel. These must be thawed out in aquarium water with liquid vitamins added two hours before to feeding. Give them live Brine shrimp at least once a week, and colour enhancing flake food as well. OK, so now we have fat Chromis swimming around, what else can we do?

They are a shoaling fish and as such if you introduce a single animal it will hide and pine away, eventually dying from stress. Add in groups of at least six - the more the better for the display. This will provide safety in numbers for them and they will display swimming predominantly in the upper regions of the aquarium, having a great time. They will also give you more benefit than you think, not only do they provide visual pleasure but something else can happen. As they shoal around the surface this enhanced behaviour will normally provide cover for any shy species of fish to venture out into the open.

What a sight it is to behold? A shoal of healthy Chromis, swimming with flashes of iridescent colour shooting out of the group as they turn and dive around the corals are the best display you can dream of. ■

PROFILE

Family	*Pomacentridae*
Name	*Chromis viridis*
Location	Indo-Pacific
Feeding	Very important, a wide variety of foods
Reef compatibility	Excellent
Tank mates	Peaceful fish
Size	9 cm
Difficulty	Easy, if treated well

Angelfish are deep bodied fish perfectly adapted to living in heavily vegetated areas such as the flooded amazon forest.

A dee movi exper

GAZING THROUGH THE FRONT GLASS OF A crystal clear aquarium at the fascinating antics of the brightly coloured inhabitants within, or peering down from above at the living jewels majestically cruising around wax-like lily pads in an ornamental pond. It is very easy to overlook, and thus perhaps lose appreciation of, the actual physical exertion and superb design characteristics that are an integral part of the seemingly effortless fashion by which the fishes propel and manoeuvre themselves through the water.

A recent visit to the swimming pool of my local health and leisure club provided me with a practical reminder that this is so! Whilst laboriously hauling my frame through the water and at the same time comparing my swimming technique with that of some other far more accomplished performers around me, I started to consider more carefully the full implications of locomotion through this medium.

Even though we humans are not fundamentally designed for life in the water, with practice we can become proficient movers through it. At least some of us can!

By making land-orientated bodies as aqua dynamic as possible and using limbs to both propel and stabilise, competent swimmers cut through the water with apparently miraculous ease.

In any event swimming is a wonderful form of exercise for almost anyone no matter how masterly or otherwise the technique. In doing so a vast array of muscles in every part of the body are brought into use and large quantities of energy/calories burned up. All this achieved whilst the frame is totally supported by a medium many hundreds of times denser than that of atmospheric air.

This denseness is highly significant, for not only does it have the effect of supporting body weight but also creates considerable resistance against forward movement, hence the energy burn up.

Fishes also obviously experience this same resistance and they are not just concerned with propelling themselves along the surface. Many species live at, or visit,

Main shape and habit categories

1. **Rover predators** - fishes that seek out prey and chase to capture, e.g. Tuna, Mackerel, Swordfish, Bass.
2. **Ambush predators** - Fishes that lie in wait for prey to come close before attacking, e.g. Pike, Pike Cichlids, Barracuda.
3. **Bottom dwellers** - e.g. Catfishes (predators and browsers). Flatfishes such as flounders. Plaice, Sole. Diggers like Gobies and Clingfish.
4. **Surface dwellers** - e.g. Guppies, Hatchet fish. Mosquito fish.
5. **Deep bodied fishes** - e.g. Discus, Angelfish, Black Widows.
6. **Long bodied fishes** - e.g. Eels, Loaches, Knifefishes.

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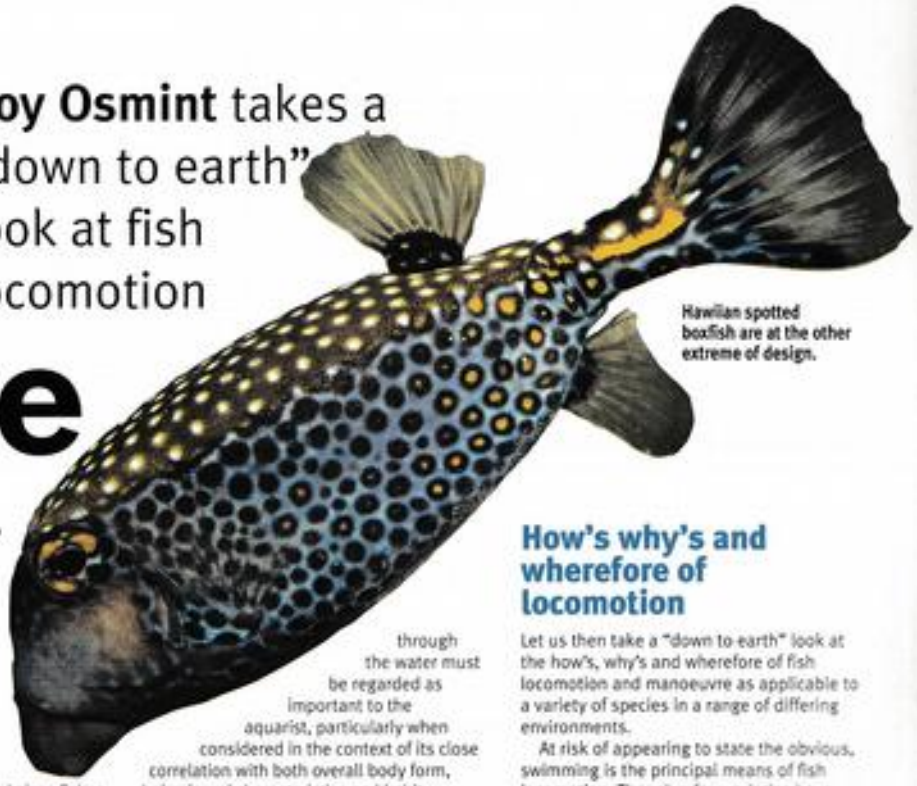
Roy Osmint takes a "down to earth" look at fish locomotion



Hawiian spotted boxfish are at the other extreme of design.

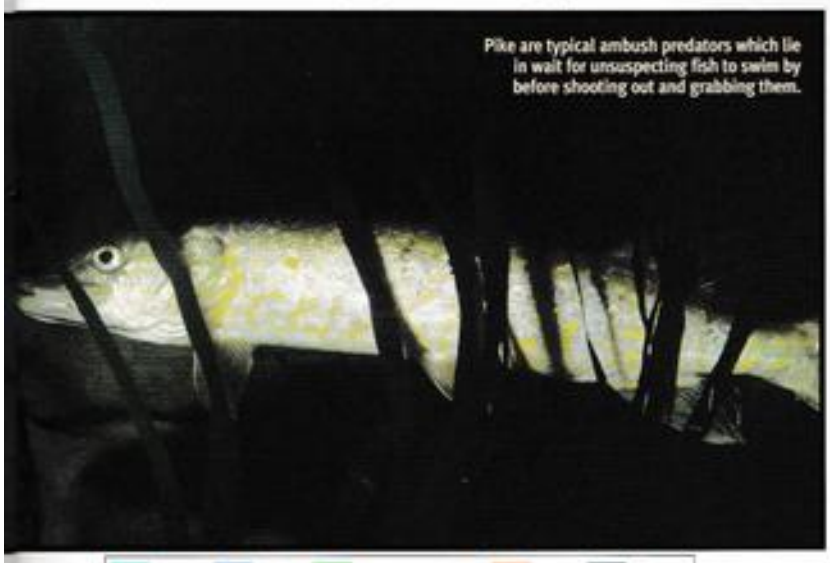
great depths and consequently additionally have to contend swiftly with enormous pressure changes. Remember that a dive from the surface to a depth of just 10 metres involves an approximate doubling of water pressure!

Perfect design

In their innumerable shapes and sizes fishes are clearly perfectly designed in every respect for life in their own particular habitats. One cannot, however, help but marvel at the way in which they have, through enormous physical evolutionary adaptation and modification overcome the many hugely complex problems associated with underwater existence to become such incredibly successful animals.

A basic appreciation and understanding of the way in which fishes achieve propulsion through the water must be regarded as important to the aquarist, particularly when considered in the context of its close correlation with both overall body form, behavioural characteristics and habit.

Not only is this fundamental to the subject of our interest, but also with experience enables us to recognise through simple observation a great deal about a particular fish's nature, even though it may not be possible to positively identify its species. Such knowledge can clearly prove extremely advantageous to the hobbyist in a whole range of areas and certainly for the newcomer it is an ability well worth developing.



Pike are typical ambush predators which lie in wait for unsuspecting fish to swim by before shooting out and grabbing them.

How's why's and wherefore of locomotion

Let us then take a "down to earth" look at the how's, why's and wherefore of fish locomotion and manoeuvre as applicable to a variety of species in a range of differing environments.

At risk of appearing to state the obvious, swimming is the principal means of fish locomotion. Though a few varieties have evolved physical adaptations allowing brief excursions onto land or into the air. But not all fishes swim in the same way or with the same degree of apparent proficiency. Considerable variation exists among species in technique, strength, speed and dexterity. But one crucial factor shared by all, no matter what the swimming method or performance, is that it is ideally suited to every aspect of life in it's own particular habitat. If this were not so the species could never have survived and would rapidly have become extinct.

Although fishes are found in a seemingly limitless variety of shapes and sizes there are in fact a relatively few typical body shape groupings into which most can be placed. Some are quite specific in this respect, others are combination creatures that fall into two or more particular categories. Hence some weird and wonderful configurations!

As mentioned earlier, shape is inseparably linked to both environment and habit. Primary among these are the nature of the water conditions with which a fish must contend, and its principal means of obtaining food. If a fish in its natural habitat, for example, has to continually battle against tide or torrent, and/or requires to swim at great speed in order to capture, or avoid prey, it will have a suitably streamlined aqua dynamic body perfectly designed for the purpose. This enables it to slice through the water with an absolute minimum of resistance.

Conversely, the inhabitant of a deep still →

pond perhaps containing tall reed-like vegetation may not have any great need for huge bursts of energetic speed. In such a case the fish may be equipped with a much deeper laterally compressed body shape. Ideal for blending in with and negotiating the mass of plant life.

Two basic problems to overcome

One thing is, however, absolutely fundamental. No matter what the shape, size or design of a fish in whatever water environment, it still has two basic problems to overcome to enable locomotion to be effectively achieved. These are propulsion and manoeuvre!

Propulsion in this context can be taken to mean the action of moving either forwards or backwards, or of maintaining a relatively motionless position in the face of a moving current of water. Manoeuvre fundamentally deals with the business of stabilising and "fine tuning" these actions. This includes braking, stopping, hovering, turning and of course ascending and descending.

A variety of important factors contribute to the degree of ease with which a fish is able to move through the water. Principally these are buoyancy, action of body and fins, water

Blue and yellow ribbon eels are at one extreme of design.

something between these extremes.

Good illustrations of fishes at either end of this scale can be found in Eels which continually operate a highly flexible wavelike action along its complete length, and the curious Box Fish that uses only its tail section for this purpose – the remainder of the body remaining totally rigid.

There are a few fish varieties that do not in the main utilise body action at all for the purposes of propulsion, relying entirely on fin undulation's. Examples of these include Sea horses, Cuttlefish (which technically are not true fish at all but Octopus related molluscs) and Knife fishes.

Fancy finned fish like this cultivated Guppy use their fins to manoeuvre in the same way as their wild kin.

conditions and aqua dynamic design qualities.

Other factors include body mucus secretions which can significantly reduce water friction, and swimming in shoal formation which can also influence overall water "drag".

Propulsion

The main source of propulsion in most fish species emanates from the muscle structures that extend along the length of the body and down from the backbone to the underside. These enable the body to create powerful lateral wave-like motions which drive the fish forward as pressure is exerted against the water.

This is not to say that all varieties use the same proportion of their body to achieve this objective - far from it! Whilst for some almost the complete body length is used, for others only a very small section is brought into play. Most, however, utilise

Manoeuvre

This vital element of movement control is governed with remarkable effect by the subtle use of fins, both independently and in unison. These appendages are in most cases present in both single and paired structures in a wide variety of shapes, sizes and positions depending upon species. The paired fins can reasonably be compared to the forward and hind limbs of land based animals.

Fins are constructed of membranous tissue supported by rays of bone or cartilage which can be either soft or rigid. Powerful muscles located at the joints are responsible for controlling all movements. In addition to the more obvious "fine tuning" uses previously referred to, fins are also crucial for the purposes of stabilisation.

Being a relatively dense medium and almost always disturbed into motion by the on going affects of natural phenomena such as wind, rain, gravity, tides and currents, water continually presents a range of stabilisation challenges. For the purposes of clarity we can describe the most important of these as similar to the movements experienced by a boat as it rides the water surface i.e. pitch, yaw and roll.

Each fin has a role to play

The paired pectoral fins play a crucial part in controlling pitching, steadying and preventing the body from alternately dipping and raising at the anterior and posterior ends. The effects of temporarily deviating from a straight course with a rising and falling forward movement caused by yawing is largely controlled by the dorsal and caudal fins which act as keels. The former fin in conjunction with the anal fin also performs as an anchor, further helping the fish to maintain an accurate position.

Rolling, in a lateral motion, is another stabilisation problem principally controlled by the dorsal and caudal fins. Though in this case the two sets of paired fins, pectoral and pelvic, are frequently brought into play in order to correct a roll that has gone too far over to one side.

For those fishes that possess it, which is by no means all, the small adipose fin situated just forward of the tail may well act as a further stabilisation aid. This fin, however, is largely of questionable use and purpose and its benefit in this respect is likely to be limited.

It is also important to remember that although each fin, or set of fins, may have a primary function in the fishes overall manoeuvrability programme, all in fact work subtly together in a situation of perfect timing and harmony to achieve absolute mastery and control of the particular watery environment. ■

Next month Roy moves on to discuss hydrofoil swimming and buoyancy

tropical | marine | coldwater & ponds | plants | regulars

Reef Sites

Alf Nilsen visits the coral reefs of Southern Thailand

Facts about Thailand

Thailand is a large country. With an area of 513,115 square kilometres, it is more than twice the size of UK. Thailand lies within the Indochinese Peninsula, except for the southern extremity, which occupies part of the Malay Peninsula. The physiography is highly diversified, but the mountain systems are the predominant feature of the terrain. A series of parallel ranges, with a north-south trend, occupies the northern and western part of the country.

Official name	Kingdom of Thailand
Independence	1238
Type of government	Constitutional monarchy
Size	513,115 square kilometres
Population	61 million (2000 estimate)
Population density	119 persons per square kilometres
Capital	Bangkok
Capital density	5,882,000 (1990)
Life expectancy	69.4 years (2000 estimate)
Languages	Thai (official), English, Chinese, Malay, various ethnic and regional dialects
Religions	Buddhist (official) 95.0%, Muslim 3.8%, Other or none 1.2%
Ethnic divisions	Thai 75% Chinese 14% Malay 3 per cent Khmer, Miao, Karen, and other 8 per cent
Gross domestic product(US$)	111,327 million (1998)
Monetary unit	1 baht (B), consisting of 100 satangs

The climate

Thailand has a moist tropical climate, influenced primarily by monsoon winds that vary in direction according to the season. From April to October the winds are mainly from the Southwest and are moisture-laden; during the rest of the year they blow in from the Northeast. While the country is under the influence of the Southwest winds, temperatures are higher, ranging from 26° to 37°C. During the rest of the year, the range is from 13° to 33°C.

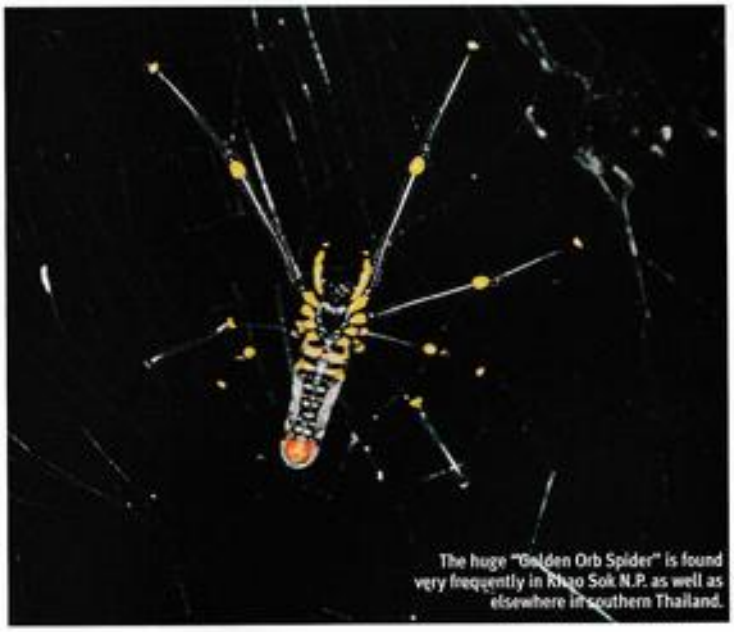
Annual rainfall is about 1,525 millimetres in the north, west, and central regions, 2,540 millimetres or more on the Thai portion of the Malay Peninsula, and 1,270 millimetres or less on the Khorat Plateau. Most rain falls from June to October.

How do you get there?

Thousands of tourists enter the country daily, and there are a number of flights daily from the major European cities. If your destination is Phuket, you might have to change planes in Kuala Lumpur (Malaysia) or in Bangkok. Take your time to explore these exotic cities on your way to your final destination. All the major travel agencies offer tours to Thailand all year round, and over all the access to this tropical paradise is relatively easy.

Khao Sok National Park can be explored by walking some of the many tracks penetrating the park.

Rock formations like this at Krabi originated more than 300 million years ago and are landmarks of Southern Thailand



The huge "Golden Orb Spider" is found very frequently in Khao Sok N.P. as well as elsewhere in southern Thailand.

IN OUR FIRST "TRAVEL SITE" (FEBRUARY 2002 issue), we visited the Maldives, a chain of atolls in the Indian Ocean. Now we move eastwards and reach southern Thailand and the island of Phuket. Nothing could be more different from the Maldives!

And nothing is more exotic than Thailand, formerly known as the "Kingdom of Siam". It is a country that really has everything; exciting and varied culture, exotic food with the spiciest of tastes, dense jungle with exotic wildlife, beautiful beaches, strange and remote islands and coral reefs. No wonder tourism has exploded and Thailand has become one of the most popular travel sites of today.

Khao Sok

Although we are going to talk about reef and aquatic highlights in Thailand, we cannot start there. First we should visit some of spectacular National Parks housing a magnificent abundance of wildlife. A stay in Thailand without visiting one or more of these locations would be a failure - even though marine life might be your main interest.

"Khao Sok" National Park is one such site, located in the central mountain range. This forms the backbone of the Thai/Malay peninsula, just south of "the Isthmus of Kra", the peninsula's narrow neck. From Phuket you can reach the park in about three hours drive northwards into the mainland.

"Khao Sok" has a complex but fascinating geological history, which dates back the Carboniferous Period (345-280 million years ago). Over millions of years, and as a result of many complex geological processes, strangely shaped mudstone and siltstone rock formations rise to elevations averaging 300-600 metres above sea level. These formations are also found on other sites in Thailand, among others in Krabi and in the National Park of "Phangnga", and can very well be said to be landmarks of southern Thailand.

At "Khao Sok" one can live fairly cheaply in simple, but clean accommodation operated by local people. They offer meals and you are situated directly on the edge of the jungle. Trips into the jungle can be done on the back of an elephant, in a canoe or simply by walking the many tracks penetrating the park. The wildlife in the park is spectacular, ranging from tiny →

The "Scooter Blenny", *Solenios fasciatus* was commonly spotted off the beaches of Phuket.


This "false stone fish" (probably *Scorpaenopsis diabolus*) was found just off Yatchclub Beach. It is poisonous, but not as dangerous as the true stone fishes.


A freshwater shrimp collected in the Tonesai Waterfall Park.

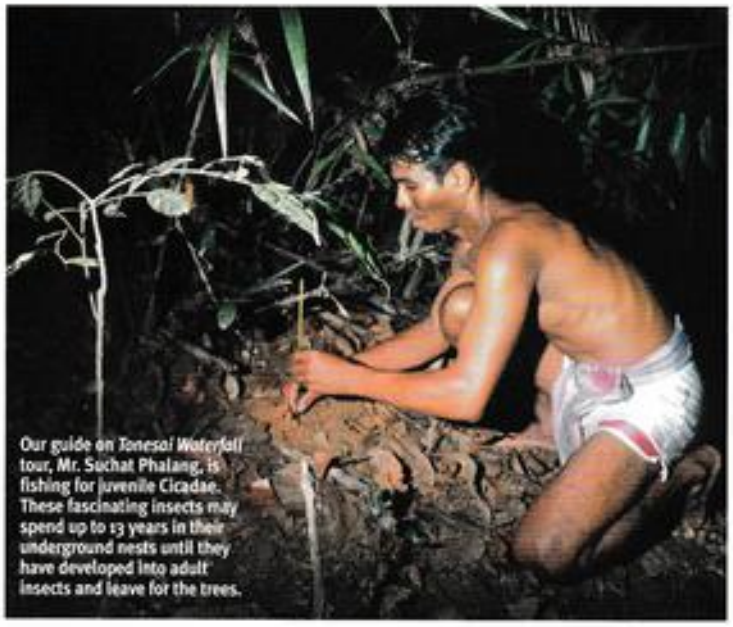
insects, huge spiders, beautiful flowers - including the world's biggest one *Rafflesia* - to bats, lizards and monkeys. Sit yourself on the edge of one of the many waterfalls in the park and listen to the calls of Gibbons and to the many exotic sounds coming from the jungle.... and if you are very lucky, may be even a tiger will come around?

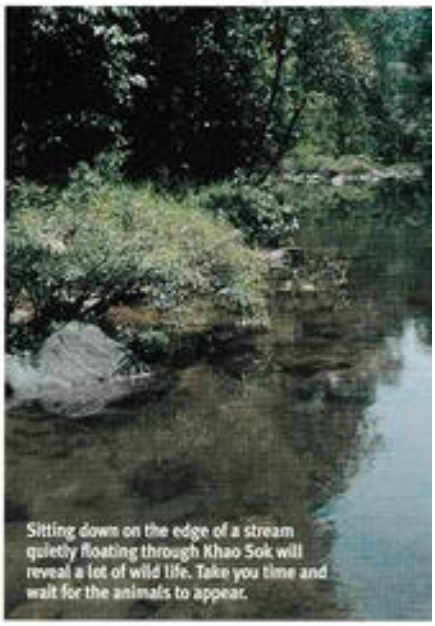
Phuket

The island of Phuket is situated in the south-western corner of the country and lies directly on the coast facing the Andaman Sea to its west. Phuket is about 750 square kilometres and has a population of about 500,000 (although no one exactly knows how many people live anywhere in Thailand). The island has become one of the most popular tourist destinations in the world today and the place is crowded with tourists. If you want to see remote jungle and well developed coral reefs, Phuket is not the place to stay. If you want to meet people, tourists, taste Thai-food, lie on the beach and have a party, Phuket would be your ideal choice. Personally I would rather pick the less spoiled beaches of "Khao Lak" on the mainland coast about 50 kilometres north of Phuket.

What can you do as an aquarist in Phuket? Well, actually a lot of things. Take your time the first day and find a local restaurant. Ask the chef to prepare a typical Thai-food-meal with 5-6 dishes and leave the rest with the chef. Be sure to have the famous sour and spicy shrimp soup "Tom Yum Goong" included. Don't be afraid of the spicy food, it is really a true sign of Thailand, and you would miss a lot leaving it out.

Then it is time to grab your mask and fins and go skin diving off the southern shores of


Our guide on *Tonesai Waterfall* tour, Mr. Suchat Phalang, is fishing for juvenile Cicadae. These fascinating insects may spend up to 13 years in their underground nests until they have developed into adult insects and leave for the trees.


Sitting down on the edge of a stream quietly floating through Khao Sok will reveal a lot of wild life. Take you time and wait for the animals to appear.

the island. Although there are few well-developed reefs close to the shore, there are still a lot of interesting marine life and several organisms that you will recognise from your experiences with marine aquariums. When I visited Phuket and took off for a swim at Yacht-club Beach, I found Stone fishes, and Scooter blennies, *Salarias fasciatus*, lot of different Echinoderms, several tiny Snails, groups of Squids, a Pizza anemone and its many symbionts, many interesting Gobies, several species of hard and soft Corals and a variety of Macro algae within a few hundred metres of the beach.

SCUBA diving is also an option when staying in Phuket. Several companies offer day- and half-day trips to locations off Phuket. You can join these or alternatively book tours to islands such as Similan Islands, which will really show you everything a coral reef has to offer.

Phuket also has an interesting jungle tour where freshwater enthusiasts can explore small ponds and lakes along the "Tonesai Waterfall Nature Trail" that penetrates the jungle on the central island. The best way to reach the spot is to arrange transportation with a local taxi driver. Start the tour with some fruit at the friendly restaurant at the beginning of the trail and hire a local guide. Follow the guide through the jungle and experience the beauty of the jungle.

Take your time the first day and find a local restaurant

You will see the very rare Kerriodoxa Palm (*Kerriodoxa elegans*). Freshwater shrimps in the stream and a number of Cicada nests in the ground. The sound of the Cicada follows you everywhere in Thailand. These beautiful insects have the most remarkable life cycle where the juvenile Cicada spends as much as 13 years under ground before crawling out from the nest and taking off to the trees. The jungle does have many remarkable stories to tell! When you return to where you started, it is a good time to relax and enjoy a Thai-beer and some spicy soup traditionally served in the restaurant. ■

Phuket attractions

Phuket Aquarium is also worth a visit. The facility, which is located on the southern tip of Phuket, has many interesting displays, among other a huge tank with Groupers and Sharks and smaller displays with various marine organisms including many beautiful Fiddler crabs. The Sea Shell Museum, located almost in the centre of the island, is from my point of view an attraction that must be visited! It has a most impressive collection of molluscs displayed in a beautiful way as well as a large collection of fossils.
For any malacologist the Sea Shell Museum is a must! Other attractions well worth visiting are the Butterfly park and one of the many Orchid gardens found on the island.

Plate with shells of 'Abalone' (*Haliotis spp.*) on display at the marvellous Sea Shell Museum located in central Phuket.

Phuket Aquarium displays a tank containing many huge groupers (*Ephinephelus lanceolatus*).

tropical | marine | coldwater & ponds | plants | regulars

Today's Surgery

IN ASSOCIATION WITH
AQUARIUM PHARMACEUTICALS (UK) LTD

Today's vet, **Lance Jepson**, opens his case book.

Baby Koi grow into big Koi and can overstock a pond given time.

THE FOLLOWING IS BASED UPON A CASE that I had to deal with recently. The case involved a smallish garden pond that had been running for several years. Initially it had been well stocked with Goldfish, but around three years ago some small Koi had been added. Now they had around 20 fish in total with no new additions in over two years.

This spring they had lost three of their (now much larger) Koi, which had basically shown signs of lethargy, lying on the bottom and turning on their sides before finally succumbing. No Goldfish as yet were affected.

One Koi and one Goldfish were brought for me to examine. The Koi had a standard length of around 25cm, whilst the Goldfish was around 17cm. The owners considered these to be representative of the size of their fish. The Koi appeared sluggish and took some time to right itself following its examination, but on close inspection of both of these fish failed to reveal anything remarkable except that they both appeared to be producing an excess of mucus on their skin and gills. No parasites were obvious on microscopy.

So we had to look elsewhere for a problem. Fortunately the owners had also provided a separate water sample for water quality analysis.

Water quality results were:

pH	6.0
Ammonia	0.25 ppm
Nitrite	0.0 ppm
Nitrate	80 ppm
Hardness	4.0 odH = 71.6 mg calcium carbonate ($CaCO_3$)/l

On questioning the owners I was told that the temperature of their pond was around 10°C that day.

Obvious problems are first of all that the pH was too low for these fish (which have a preference for a pH between 7.0 and 8.0). Secondly ammonia levels were ten times too high at 0.25ppm - they should be below 0.02ppm. Thirdly the hardness was on the low side - a range of 50 to 100mg $CaCO_3$/l would be considered as moderately soft water.

Now we needed more information about the pond. Their pond was roughly circular and had a diameter of 2.4m. It had marginal shelves and was around 1.2m deep in the middle. The pond was filtered by a small pond filter. Unusually this year they had not switched off the filter, allowing it to run continuously throughout the winter. Also they had a water butt set up so as to collect rainwater from their shed roof, which then overflowed into the pond.

Now I felt things were coming together, but we needed to check their stocking density. For pond fish, the recommended

Goldfish are extremely hardy fish but even so can be pushed beyond their limits if things go too far.

stocking density is 2.5cm of fish (excluding tail) to 45 lt of water.

The volume of a pond was approximately 434 lt which means it could hold a maximum of 23.7cm of fish, say 25cm. It actually held 20 fish of an assumed average size around 17cm, which gives a total of 340cm of fish - **serious overstocking**.

My main concerns fell into two categories:-

1 I believe that the Koi losses were a combination of exposure to excessively low hardness, pH and temperature. Keeping the pond water circulating in such a small volume of water may well have caused such a mixing of the deeper water layers with the colder surface layers, preventing any water stratification at 4 °C so that the overall temperature may on occasion have dropped to only 1 or 2°C - a bit too low for Koi. A pH of 6 is low - at 5.5 and below acidosis can occur where there is a fall in the pH of the body fluids of the fish with dire consequences. It is possible that the pH may have dropped to these levels at points during the winter. The cause of this low pH and the low hardness is an excess of rainwater progressively diluting the pond water, in this case not only by rain falling on to the surface but also redirected from the shed roof.

2 The high ammonia levels are a concern. They would result from a combination of the high stocking levels (even metabolically resting fish will produce significant amounts of ammonia if there are enough of them) and the low ambient temperatures and pH which will affect the activity of *Nitrosomonas* bacteria present in the filter beds. Fortunately the low temperatures and pH would tend to keep most of the dissolved ammonia present in the relatively non-toxic ionic form, but it is a potential problem for later in the year as temperatures rise. Nitrite levels were zero - which either meant that no nitrite was being produced at all i.e. the *nitrosomonas* bacteria were not producing any at all, or that it was being converted to nitrate as quickly as it was produced.

I recommended starting partial water changes (no more than 10 to 20% every two weeks) with dechlorinated tap water to improve the hardness and pH, and most importantly to dramatically reduce the stocking density, and we'll have to see how it goes....

The above illustrates some important points. Small fish grow into large fish and as they do so their needs and the impact on their surroundings change and must be accommodated for. Koi, and especially Goldfish, are incredibly hardy and can be pushed to surprising extremes before succumbing, allowing them to survive in poorly managed ponds despite everything else. It also shows how the monitoring of basic water quality parameters can help not only to identify problems, but how they could also be used to spot a potentially dangerous trend.

The devil, as ever, is in the detail! ■

There are Rainbows over my Catfish

Last month **Ian Fuller** purchased three species of Rainbowfish -Boeseman's, Lake Kotubu and Neon rainbowfish. Here he explains how he set about breeding them

ONCE MY FISH REACHED MATURITY I found them relatively easy to spawn. The first of the Rainbows to start spawning were the *Melanotaenia boesemani*, they scattered their eggs into the floating mops. Spawning would occur almost daily and usually just after the lights came on, the most prolific time of all would be the morning following a water change. It is from this point on that things get more difficult.

Compared to the size of the fish the eggs are quite small, 1mm in diameter or less, they are colourless, looking like tiny

When buying young immature fish the main initial difficulty is determining the sexes, some species are easy to sex, others are not. My recommendation would be to buy at least six fish or even more if they are affordable. Some species like *Melanotaenia praecox* can be sexed by the colour of their fins, with other species the males have more intense brighter colouring. Generally the main sexing feature in adult fish is the shape and size of the dorsal and anal fins, the male's fins tending to be more elongated and pointed, the front dorsal fin when laid back overlapping the front edge of the rear dorsal fin. If you are buying sexable fish it is a good idea to buy two females for each male. Males can be quite physical when in breeding mode and this should avoid the possibility of a female being driven to exhaustion by an amorous male.

Boeseman's rainbowfish was the first species to start spawning for Ian.

Rainbowfish eggs take about 10 days to hatch. This one is 7 days old and not far off hatching.

droplets of water, and can only be seen clearly when the mops have been removed from the tank and the water gently squeezed out. The eggs are quite resilient and can be picked from the mops easily. I had placed 2 small shallow tanks of approximately 45cm x 15cm x 15cm on top of each of the main Rainbow tanks, filled them with water from the main tanks below, fitted each with a sponge filter setting the outlet level with the surface and set the air to give a gentle surface flow. These tanks were originally set up to raise Whiptail catfish fry for the first 2 months after hatching, but were also ideal for the second stage with growing on the rainbow fry.

I removed the mops from the main tank, then after squeezing out most of the water, carefully picked off all the eggs I could find putting them into a small hatching container. For this purpose, as with *Corydoras* eggs, I use 1 litre ice cream tubs with an air supply fitted to give the water some movement. Altogether more than sixty eggs were collected, which took ten days to start hatching. Once all the fry had hatched they looked like a cloud of tiny dark grey splinters just below the surface of the water.

Feeding the fry

The next problem would be how to feed such tiny creatures. The initial method I used for these tiny Rainbow fry is the same one I used many years ago when breeding Siamese fighters. The basic ingredient is green water from an old tank kept outside in a sunny spot, (what sun I hear you say!). I took an old plastic lemonade bottle and glued a plastic airline valve into it about 25mm up from the base, three quarters filled it with the green water, to which I added 2 drops of egglayer liquifry, making sure to thoroughly stir it in. The bottle was then placed in a position above the fry container, and the air valve opened just enough to allow a droplet of liquid to form, which would then drop into the container. This is a great method of feeding especially for those of us that are out at work for most of the day. Gauging the rate of drops is a matter of trial and error but the longer the time between each drop the better. I managed to regulate the drops to one every ten minutes.

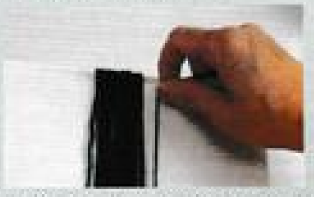
After 4 days of the drip-feeding I started to add small amounts of Micro worm, alternated with a very fine powdered fry food, taking care not to add too much at a time. This feeding regime continued for two weeks. To avoid any pollution from uneaten foods daily 20% water changes were made using water of exactly the same chemistry and temperature. After 2 weeks the fry were carefully moved to one of the larger tanks above the main stock tanks. At this stage they were now large enough to start introducing newly hatched Brine shrimp. As the fry grew larger foods were introduced and by the time they were 3 months old they were taking live Daphnia, frozen as well as live Bloodworm, but the food that really made them shine was finely chopped Earthworm. Whenever the adult breeding stock was conditioned using Earthworms the volume of eggs was always higher.

The same breeding and rearing regime was used for both *Melanotaenia lacustris* and *Melanotaenia praecox*. The *Melanotaenia praecox* fry proved the most difficult of the 3 to raise. Out of a batch of 60 eggs 10 - 12 fry would be raised, suggesting to me that larger tanks would be required to ensure a better survival rate. ■

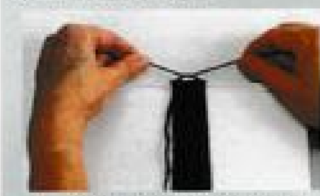
Ian's Rainbows lived and bred right alongside his catfish.

Making a spawning mop

For each of the three tanks I made up 2 floating spawning mops, these were made using green four ply synthetic wool. Each one, was made by winding the wool thirty times around a piece of card approximately 20 cm long, then tying off at one end of the loop and cutting through the other end. All the mops were then soaked in boiling water for a few minutes. This does two things, firstly it will remove any excess dye and secondly it makes the wool go a little curly giving it a more plant like appearance. The tied off ends are then attached to pieces of floating sponge material.



1. Wind green nylon wool around a piece of card or the short side of a book until you have about 30 strands. Cut off the surplus.



2. Cut another piece of wool about 20cm (8in) long from the ball and thread it under the strands. Secure the strands with a tight knot.

3. Turn over the card or book and cut the wool strands at a point opposite your knot. You now have your spawning mop.

N.B. DO NOT CUT OFF THE LONG ENDS OF THE WOOL SECURING THE STRANDS.

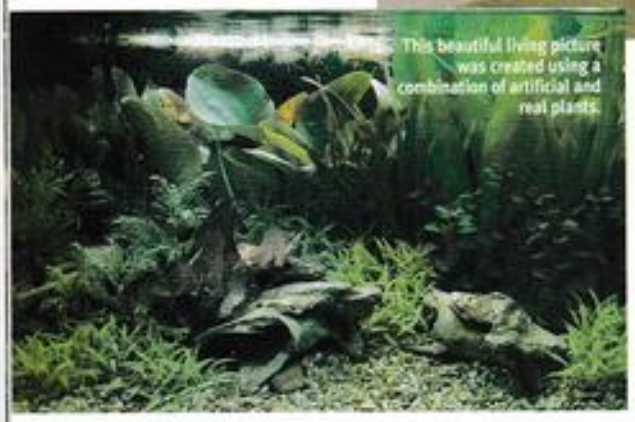
4. The long ends of wool securing the mop strands can be used to tie the mop to a cork or to suspend it from the surface of the aquarium.

Just add water

More aquarists than ever before are buying a complete system rather than trying to put together separate pieces of equipment to set up their own aquarium.

In this new series we shall be looking at a selection of these tanks and giving them away to lucky readers. However, not only will you win the aquarium set-up, but you will actually have it installed in your home by *Today's* team of aquarists!

Our first *Just add water* aquarium is the new Fluval Duo 800 from Hagen. Not only does this set-up come complete with all the equipment but the package also includes a selection of artificial plants. The tank size is 80 X 35 X 40cm and the canopy contains 2 bulbs. Malcolm Goss used one of these complete set-ups to create the beautiful living picture shown here. This is how he did it.



This beautiful living picture was created using a combination of artificial and real plants.

Mix and Match

How many times have we seen plants and flowers, either in a friend's house or in a restaurant, that we just have to feel, just to see if they are real, they look that good? Yet, only a short time ago we would not have considered buying artificial house plants

Well, this is now the case with artificial aquatic plants. Hagen say that in the last 12 months both silk and plastic plants have become their top selling product. This runs into thousands of plants being used in all types of aquarium set-ups. Many of us, however, like to have natural plants in our community aquarium, but furnishing a 1m aquarium with these can be quite daunting as well as costly. More so if we would like to use rooted plants such as those within the plant genera, *Aponogeton*, *Cryptocoryne* or

Echinodorus. Too often we purchase so called "bunch plants" like *Cabomba* and the *Hygrophila* species, because they are more cost effective. These plants require plenty of strong light, often in excess of twelve hours a day. When they do not receive these conditions, they grow stringy in their fight to reach the water's surface for more and better light and ,eventually, die back altogether. With this in mind, why not take advantage of what can be achieved with quality artificial plants? Even better, a mixture of both artificial and natural plants.

Gravel

Gravel is sold in a strong plastic bag making it easy ,although still heavy, to transport to the car boot. These are normally marked "washed gravel". Don't take that for granted, washed it might be, but clean enough for your aquarium it certainly is not. Wash your gravel under running water, a small quantity at a time, whilst in a bucket, and continuously turn over the gravel till the water eventually runs clear. Place the gravel in your aquarium, building up these small quantities until they reach the desired level. Gently push and sweep the gravel so it remains higher at the rear of the tank, a gentle rise from a layer of 2cm at the front glass to approximately 10cm at the back. A slight sweep upwards at both outer corners of the aquarium gives the desired affect of focusing one's eyes centrally into the furnished tank when complete.

Planting up

When planting up a furnished aquarium, I always start with the foreground planting first. This is often the most difficult and critical part of your set- up. In fact, it is the first part of the aquarium that catches the eye. Natural plants for the foreground are often hard to choose or obtain in either quality or, more important, size. It was now time to put artificial plants to the test, right in this most critical part of our set- up. I used three boxed quantities of the Dwarf Amazon sword plant (*Echinodorus tenellus*). These are mounted on a plastic grating that can be divided into three smaller amounts so you don't have to use the whole plant in one area. You will find these really easy to work with, you can shape them, divide them up, and ,when you are satisfied with their position, you just cover the grating that mounts the plant by gently covering with gravel using one or two planting sticks or your fingers.

To make your eye drift towards the background of your set-up, I have planted a natural plant, Water wisteria (*Synnema triflorum*). By cutting the plants to the desired height, starting with the short pieces, and increasing their height towards the back, I landscaped the plants to give a natural effect. To the left-hand side of our aquarium at the rear, I placed the internal power filter and the heater/thermostat unit. I selected a natural plant in the form of Amazon swords (*Echinodorus major*), to plant in front of these. I could have used Vallisneria instead, but the larger Amazon sword plant has more impact and gives better cover.

Rockwork

These days it is not regarded as environmentally friendly to bring home natural rock or slate from our country side, although there may seem to be mountains of the stuff where you live. So, in our set-up I have used artificial rock made of a type of substance like porcelain which can well pass for Cornish slate. Because I was restricted to one design, I placed four pieces in an "S" formation midway horizontally across the gravel, clustering three of them together, with the remaining piece somewhat isolated. Height was gained by placing the three pieces in close proximity and digging them into the rising sweep of the gravel.

Gravel and rocks form the bones of any set-up. Once positioned correctly they can be fleshed out with the plants.

Balancing the set-up

To balance the set up I added more Amazon plants to the right-hand side of the aquarium. Next to these and ,to the left, I planted two magnificent examples of the Radican sword plant (*Echinodorus cordifolius*). Its broad leaves contrast against the much narrower leaves of the normal Amazon sword plant. We still had a gap in the middle to left of our background plants, so I put the artificial plants really to the test by using artificial Amazon sword plants. Can you tell the difference?

We now had vacant areas just to the front of the Amazon sword plants, both to the left, and to the right-hand sides of the set up, directly behind the rocks. Here, once again, was our chance to use artificial plants, which cannot grow and cut out the view of those plants that form our background. To the left I have used Red Ludwigia (*Ludwigia mullertii*) giving both contrast in their leaves and colour. To the right is Green Lobelia (*Lobelia*), shame on me, I am sure you all know this is a summer time bog plant that we grow round our ponds. This is a classic type set-up for a community aquarium in our home, so why not "picture frame" it, with both artificial Dwarf Hairgrass (*Eleocharis acicularis*) to the right at the front, and Dwarf Anubias (*Anubias nana*) to the left at the front. Finally, two growing corms (bulbs) of the Water lily (*Nymphaea stellata*) were placed just in front of the middle to left rock, and just starting to shoot new leaves. As these plants grow they will give you many months of pleasure, combining the non-maintenance of the artificial plants and the low maintenance of the natural ones. ■

Artificial Dwarf Amazon swords make excellent foreground plants.

Want to win this complete set-up?

Write to:- Today's Fishkeeper, Just add water feature, TRMG Magazines Ltd., Winchester Court, 1 Forum Place, Hatfield, Herts. Include your name, address, telephone number and why you would like to have this complete set-up installed in your home.

What the Fluval Duo 800 contains

- Aquarium
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- 10cm Dwarf nubias - silk
- Echinodorus (3 pack) -plastic
- 12.5cm Dwarf Hairgrass

Ember Tetra

Hyphessobrycon amandae

Copy for Today's Diary Dates

Copy for Today's Diary Dates should be sent to Today's Fishkeeper, Winchester Court, 1 Forum Place, Hatfield, Hertfordshire, AL10 0RN Telephone 01673 885352, fax 01707 269333 or e.mail aandpeditor@btinternet.com copy deadline 6 weeks before publication date.

Today's Diary Dates

May's show, auction and club meeting dates

Wed 1st

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
Portsmouth A.S. meeting. Contact 01673 885352
Bracknell A.S. meeting. Contact 01344 485287

Thurs 2nd

Faircity A.S. meeting. Contact 01738 561291
Sandgrounders A.S. Contact 01704 541177

Fri 3rd

Northwest Cichlid Group meeting. Contact 019422 707 593

Sat 4th

Southend Leigh & Dist A.S. Open show. Contact 01702 305740
Sutton A.S. meeting. Contact 01302 702181

Sun 5th

Tyne Tees Area Association Open show and auction. Contact 01325 466630

Mon 6th

Kirkcaldy A.S. meeting. Contact 01738 634689
Solway A.S. meeting. Contact 01387 750606
St Helens A.S. meeting. Contact 0151 42604213
Ayrshire Fishkeepers Association meeting. Contact 01294 605272

Tues 7th

Paisley & District A. S. Contact helenburns@thefreeinternet.co.uk.
Dunstable & D.A.S. meeting. Contact 01582 707280
Greenock D.A.S. meeting. Contact 01475 704219
York & Dist. A.S. meeting. Contact 01904 414272
Telford & D.A.S. meeting. Contact 01952 409721 or 01952 616410
The Irish Tropical Fish Society meeting. Contact 01 4561836
Preston A.S. meeting. Contact 01772 321145
Halton A.S. meeting. Contact 0151 2898190
Northern Goldfish and Pondkeepers meeting. Contact 0161 9697567
North Bucks A.S. meeting. Contact 01908 377333
Oldham A.S. meeting. Contact 0161 281 3725

Wed 8th

Linlithgow Aquarist Society meeting. Contact 01506 510558
Halifax A.S. Contact 01274 880471
Tameside A.S. Contact 0161 339 6593
Workington A.S. meeting. Contact 01900 67951
Bradford A.S. Contact (01274) 652542 or (0113) 257 7709

Thurs 9th

Mid- Sussex AS meeting. Contact 01273 602407
Kings Lynn Fish Club meeting. Contact 01553 769522 or 01553 763743

Fri 10th

Yorkshire Cichlid Group meeting. Contact 01924
Basingstoke A.S. meeting. Contact 0118 970 1461
West Cornwall Fishkeepers meeting. Contact 01209 717880

Sat 11th

Sutton A.S. meeting. Contact 01302 702181

Sun 12th

Corby Open show. Contact 01536 790932
Ryedale A.S. Open Show. Contact 01751 472715
F.N.A.S. Auction. Contact 0161 652 6207

Mon 13th

Kirkcaldy A.S. meeting. Contact 01738 634689
Bristol Aquarist Society (Goldfish) meeting. Contact 01792 207467
Ilford & D A&P Society meeting. Contact 020 85507329
Grimsby & Cleethorpes meeting. Contact 01472 349178
St Helens A.S. meeting. Contact 0151 42604213
Merseyside Aquarist Society meeting. Contact 0151 201 6005
Otley A.S. meeting. Contact 01274 531418

Tues 14th

Southend Leigh & Dist A.S. Contact 01702 305740
Darwin A.S. meeting. Contact 01254 701975
Northwich A.S. meeting. Contact 01606 882966
Caer Urfa A.S. meeting. Contact 0191 5237464

Wed 15th

West Yorkshire Marine Aquarist Group meeting. Contact 01924 420101
Clacton Fish Keeping Club meeting. Contact 01255
Tongham Aquarists Society meeting. Contact 01252 25686
Portsmouth A.S. meeting. Contact Gill Utting 9, Inverness Rd., Gosport, Hants.
Perth A.S. meeting. Contact 01 738 621704
Bracknell A.S. meeting. Contact 01344 485287

Thurs 16th

JUNE 2002 TODAY'S FISHKEEPER on sale
Bristol Tropical Fish Club meeting. Contact 0117 973 2145
Faircity A.S. meeting. Contact 01738 651291
Sandgrounders A.S. Contact 01704 541177
Croydon A.S. meeting. Contact 0208 654 0984

Fri 17th

Crocklemania Isle of Wight A.S. Weekend convention. Contact 01983 721246

Sat 18th

Sutton A.S. meeting. Contact 01302 702181

Crocklemania Isle of Wight A.S. Weekend convention. Contact 01983 721246

Sun 19th

Musselburgh A.S. Open Show. Contact 01875 613918
Wyke Open Show. Contact 01482 445543
Crocklemania Isle of Wight A.S. Weekend convention and Open show. Contact 01983 721246

Mon 20th

Kirkcaldy A.S. meeting. Contact 01738 634689
Thorpe & D.A.S. meeting. Contact 01953 605394
Solway A.S. meeting. Contact 01387 750606

Tues 21st

Greenock D.A.S. meeting. Contact 01475 704219
Greater Manchester Cichlid Society meeting. Contact 01422 942 155
Midlands Marine Aquarists Society. Contact 0121 359 4469
Oldham A.S. meeting. Contact 0161 281 3725

Wed 22nd

Workington A.S. Contact 01900 67951
Halifax A.S. Contact 01274 880471
Tameside A.S. meeting. Contact 0161 339 6593

Thurs 23rd

Mid Sussex A.S. meeting. Contact 01273 602407

Fri 24th

Eastbourne & District Pondkeeping. Contact 01323731369
Discus Ireland meeting. Contact (061) 318593
West Cornwall Fishkeepers meeting. Contact 01209 717880

Sat 25th

Sutton A.S. meeting. Contact 01302 702181
The Irish Tropical Fish Society Open show. Contact 01 4561836

Sun 26th

The Irish Tropical Fish Society Open show. Contact 01 4561836
Castleford Open Show. Contact 01977 731511

Mon 27th

Kirkcaldy A.S. meeting. Contact 01738 634689
Ayrshire Fishkeepers Association meeting. Contact 01294 605272
Merseyside Aquarist Society meeting. Contact 0151 201 6005

Tues 28th

Northwich A.S. meeting. Contact 01606 882966
Clyde Aquarist Society meeting. Contact john@farnand.freeserve.co.uk

Wed 29th

Thurs 30th

Fri 31st

2001 National Show league winners announced

Tony and his wife Brenda with the new National Show League trophy and Dr Peter Burgess of Aquarian with their little bucket of fish food. They also won a Fluval external power filter donated by Hagen.

THE *TODAY'S FISHKEEPER* National Show League winners were announced at a special celebration dinner held at the Midland Hotel, Derby. The top five exhibitors were invited along to the event and the final results were not made public until the actual presentation ceremony itself. The winner was always expected to be Tony Tyson. However, the competition turned out to be a lot closer than anyone expected. Brain & Steve Critch and Ian Wright ran Tony a very close second. Gavin Cowen from Scotland managed a very creditable third (especially considering his father is a judge which limits how many shows where Gavin can exhibit). Dave and Lois Speed came in 4th and Kevin Prendagast was in 5th place.

All of these top 5 exhibitors received a keepsake trophy, large bucket of Aquarian Flake food and a Fluval external power filter. Tony also keeps the new *Today's Fishkeeper* National Show League trophy for 1 year. It remains to be seen if he manages to hold on to it next year, as other exhibitors are planning their shows like a military campaign and have been beefing up their show teams to give him a little more competition.

The final points

K. & A. Tyson	970
B&S Critch and I. Wright	913
Gavin Cowan	531
Dave & Lois Speed	218
Kevin Prendergast	161

Want to take part in 2002 National show league?

The rules are simple. For any shows results to count towards the show league it must have its date and contact number published in Today's Fishkeeper prior to the show. This means this information must be with the editor 2 months before the show. Hopefully clubs will send this information in themselves, but any exhibitor who wants a show to be included can send the details in.

To register your points (3 for a 1st, 2 for a 2nd & 1 for a 3rd) send a photocopy of your certificates or other proof of your awards to Today's Fishkeeper National Aquatic Show League, Today's Fishkeeper Magazine, Winchester Court, 1 Forum Place, Hatfield, Herts. AL10 0RN. Joint exhibitors are allowed to enter if they maintain their fish together.

Festival of Fishkeeping and Water gardening weekend 12th & 13th October

Last year people staying for the weekend received a goody bag worth a considerable sum of money.

Viviparous - the British based livebearer organisation has teamed up with the F.B.A.S. and will be holding their convention in conjunction with the Bracklesham Bay weekend. Harro Hieronimus, an expert on livebearing fish, will be attending this event and lecturing on Goodeids. Other specialist societies so far involved with this event are the Goldfish Society of Great Britain, "Jinchu Kai" Ranchu society, South Hants and Worthing Koi societies, and the Southern Catfish Society. Full board weekend packages for the Festival are available priced at £78. To book contact Grace Nethersell, 8 Acacia Avenue, Brentford, Middlesex, TW8 8NR. Tel/Fax 020 8847 3586.

Koi Herpes(?) Virus... Advance news

John Dawes is secretary of the Ornamental Fish International and has been investigating KHV in Israel

IT IS FOUR years ago that the dreaded so-called 'Koi Herpes Virus' reared its head and started wreaking havoc among Koi stocks, both in the UK and elsewhere. Since then, a great deal has been said and written about the subject...some of it accurate...some of it less so.

Widespread Virus

The disease...or what appears to be the same disease...has been reported from many countries and regions. Certainly, it rapidly became widespread, both in mainland Europe and the UK following the 1998 outbreak. However, laboratory tests and field reports have also revealed its presence in countries as widely separated geographically as South Africa, the US, Japan and Korea, as well as Israel, of course.

Some of these reports refer, either to Koi Herpes Virus Disease, or Cyprinid Herpes Virus Disease, and to the causative agent as *Herpesvirus cyprini*. Symptoms and aetiology (development) of the disease bear remarkably close similarities in all cases, providing strong evidence that they are one and the same. Also, since some of these reports go back to 1989, the existence of this virus disease apparently predates the first reports of outbreaks in Israel by about nine years.

Questions... Questions... and More Questions

Like everyone else, I have puzzled long and hard about KHV, its origin, its virulence, its spread, strategies adopted to combat/control/eradicate it, and so on. I've therefore asked many questions about it over the past four years and have uncovered some fascinating details in the process.

Then, last October, I had the opportunity of sitting down with some Israeli Koi breeders to discuss the crisis in some detail...and to ask more questions.

John Dawes saw millions of perfectly healthy Koi in Israel while researching KHV.

Where had the disease come from? How long has it been around? What, exactly, are the mortality levels? How rapidly does the disease kill? What is the optimal temperature 'window' for the disease? How long does it take for an affected farm to clear itself of the problem? What about the survivors? Are they damaged in any way? Can they breed? Are they carriers of the disease? Do they contain antibodies to the disease? Do they still carry the virus but are, somehow, resistant to it? Can they be re-infected if exposed to the virus for a second time? And what about the virus itself...do we know exactly what it is?

Request and Invitation

I was impressed at the cool, calm, collected and professional way in which my non-stop barrage of questions was received. Over a period of an hour-and-a-half, I was given masses of information and received a request...and an invitation.

I was also informed that vitally important laboratory tests and field trials were currently being carried out by the Israeli Ministry of Agriculture's Central Fish Health Laboratory, and that the results of these were likely to be of fundamental importance for, and relevance to, the in-depth programme of investigations that had been in progress since the first outbreak of the disease. In view of this, I was requested to delay publication of any material until this latest series of studies had been completed and the results known.

I was also invited to visit Israel to find out for myself at first hand. My own request that I visit the farms, as well as the Central Fish Health Laboratory and speak to as many key figures as possible, including breeders and the Director of the Central Fish Health Laboratory, Dr. Izhak Bejerano, was immediately and enthusiastically taken on board.

It was, thus, that I arrived in Israel in March - right at the peak of the spring temperature 'window' for the disease. During my four-day visit, I saw millions of Koi, spoke to numerous people, including Dr. Bejerano, requested (and was shown) masses of experimental data and learned an enormous amount about the disease, its history, its identity, its current status and much more. ■

Read the June issue of *Today's Fishkeeper* for the FULL story

Some of the information breaks completely new ground on the complex and controversial four-year story of the KHV disease and paints an optimistic picture for the future. I'm therefore itching to bring all this to our readers.

However, in strict observance of professional protocol - and as part of my personal undertaking to all parties concerned - the details I brought back with me need to be published first in the official publication of Ornamental Fish International, the OFI Journal. This will happen this month, thus opening official clearance for us to proceed with publication of the eye-opening, thought-provoking findings in next month's edition of Today's Fishkeeper.

Therefore, whatever you may have heard or read about KHV over the past four years...or whatever you may hear or read over the coming month, please make a point of joining me next month for the very latest 'hot news' about the crisis. I look forward to your company.

Product Reviews

The new Prizm Pro Skimmer from Red Sea.

Following the success of the Prizm skimmer (for aquariums up to 400 litres) Red Sea have introduced the bigger Prizm Pro Skimmer rated for aquariums up to 1200 litres.

New addition to Red Sea Prizm range

THE PRIZM PRO skimmer is based on the same, patented convergent-divergent flow technology reaction chamber with "Triple-Pass" air-flow and incorporates a quiet 18-blade turbo air injector. New features include a 1.2 litre high capacity collection cup with drainage as well as optional accessories such as an adjustable height surface skimmer (for hang-on installations) and a 600cc Filtration media basket for adding chemical (i.e. carbon) or biological media.

The Prizm Pro is designed to either "hang-on" the aquarium or stand alongside or inside a sump. Red Sea say the skimming efficiency of the Prizm Pro, combined with its user friendly set-up and operation makes it an ideal for both new and experienced marine aquarists.

The Prizm Pro is being offered in a regular and deluxe version. The regular version is supplied with the parts for either hang-on or sump installation. The deluxe version will include the adjustable height surface skimmer and filter media basket (with 300g of carbon) to provide a more complete product, in particular for hang-on installations where the surface skimmer will significantly increase performance. Both of these accessories will be available as spare parts.

Price for the Prizm Pro Skimmer incl. pump £279.99 and the Prizm Pro Skimmer Deluxe incl. pump is MRP £299.99.

ab Aqua Medic guarantee draw winner

The winner of the ab Aqua Medic guarantee draw prize for February is John Jones of Caernarfon, North Wales. He wins a set of Reef Life Calcium, Reef Life Iodine, Reef Life Strontium, and Reef Life Trace. He purchased his ab Aqua Medic product at Snowdon Aquatics.

New UV steriliser for the UK Market

Germany is the source of a lot of high quality technological products we use in our aquariums. The latest new import is a UV steriliser from HW Aquaristic which allows you to safely look directly at the bulb - impossible in conventional models. It works by passing aquarium water past a UV source emitting a wavelength of 253.7nm through an active space of 4mm. This kills all bacteria and algae cells which pass through the unit. A specially designed UV radiation control shield focuses the UV rays on the active flow gate and acts as an efficient radiation trap for absolute radiological protection and safety. The manufacturers claim the units will last 24 months before the bulb needs replacing which is twice as long as most units on the market.

The units come in 5 sizes. 10w for tanks up to 350l. (£112.50), 15w for tanks up to 500l. (£138.89), 30w for tanks up to 1000l. (£167.99), 36w for tanks up to 2000l. (£234.99), and 75w for tanks up to 4000l. (£299.99). As is so often the case the units don't come with an earthed UK plug so you will need to buy a converter plug for it.

UK distributor

The UK distributor is Aqua World partnership who can be contacted on 01925 483979.

Aqua World Partnership are the UK distributor for this unique UV steriliser.

tropical | marine | coldwater & ponds | plants | regulars

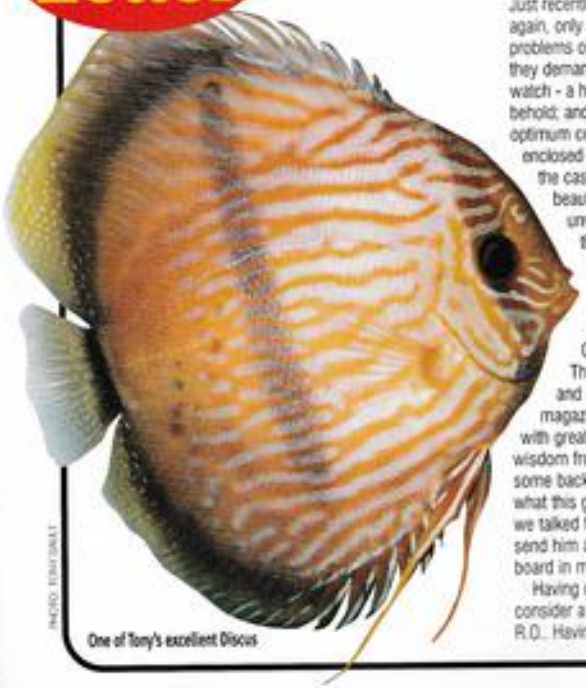
Letters in association with Tetra

Today's Postbag

Share your news, views and experiences through *Today's Postbag*. Every month the star letter wins £25 worth of Tetra fishcare products – all for the price of a 27p stamp or an e-mail.

Star Letter

Water purifier saves fishes' lives



One of Tony's excellent Discus

Just recently I have started up with Discus again, only to be faced with the same problems of water quality, which of course they demand. Discus are truly 'magical' to watch - a healthy Discus is a sight to behold; and keeping these fishes in their optimum condition has a lot to do with their enclosed ecosystem. Sadly, this was not the case with me - my four once beautiful Discus, now dark and unwell, were looking at me from their underwater dimension crying for help.

My set-up is a Jewel Vision 260L; their friends are Cardinals, Rummy nose tetras , Corydoras and two small Rams. The tank contains lots of bogwood and plants. I picked up your magazine at a friend's house, and read with great interest some words of wisdom from Tony Sault. I then ordered some back issues to read and learn about what this guy had to say. I rang him and we talked for some time. He asked me to send him a detailed report from the water board in my area.

Having done that, Tony thought I should consider a metallic filter system and not an R.O.. Having taken his advice, I set this system up and started adding 23lt of pure water every 24 hours. My four Discus, one blue-red, one wild brown and two wild green looked as if I might have left it too late- the brown had turned dark grey, had cloudy eyes and was lying on its side over a piece of bogwood, breathing very heavily. I couldn't bear to look at them, so kept the tank lights out - there was daylight coming from a side window. These fish are very hardy but I was amazed after four days (92lt.) to see recovery taking place. Another two days and the brown was at least up and moving.

I keep the temperature at a steady 28.9°C with a pH7.4, water changes 45-70lt a week. Frozen and dry foods only twice a day. The tank is now all pure water, the fishes colours have returned, their appetite has improved and the intensity of all the fishes is beyond belief.

Tony Sault, makes a lot of sense. I am very grateful for his knowledge and patience with me which, of course, reflects on your magazine- certainly of a very high standard, very informative and good team work. What a joy it is to deal with professionals- I cannot wait for the next issue.

Best wishes,

Barry Cranwell, *Fulham SW6.*

Near death experience for Bob

I would like to share a traumatic experience that occurred on a routine water change in my coldwater tank. The tank (60x30x37.5cm) is run by two internal filters at present - a Fluvel 2 plus, and a Fluvel 3 which has a spray bar attachment for directing water over the surface. The water parameters are usually within normal limits and the substrate is medium sized smooth gravel. Occupants include 2 weather loaches, affectionately known as Dilbert and Bob, whose sex I am not sure of. Bob was given to us due to 'his' owners converting to tropical fish.

The day in question was on a weekly routine water change. I was emptying the old water into a bucket using a gravel cleaner, which sucks up the waste as it empties the water. Unfortunately for me, and more traumatic for 'Bob', he had moved from under his log and was under the gravel where my cleaner had just been pushed. He was thrashing about in a frenzy for I had accidentally caught him on his flank which resulted in scale damage. I thought I had killed him, I was distraught. He had a 1cm white area where I had removed his scales, I added some 'Anti- fungus and finrot' solution to the water along with extra 'Aquaplus' and prayed that he would recover. The next day he was hanging at the side of the Fluval, in the corner of the tank. I thought he was dead because I could not see his gills moving. But, to my delight, he came up to the surface for his dinner along with everyone else. Now, a month later he appears healthy.

I am now extremely careful when I do water changes making sure the loaches are not hiding under the gravel. It has made me aware that one simple tool could have cost the life of a much loved fish. So I would like to highlight the hidden dangers of routine care. We need to be vigilant and be careful when carrying out routine maintenance.

Julie Lodge, *Barnsley.*

Have any other readers had a similar experience? Write in and let us know.

Maidenhead Aquatics @ Syon Park

What do you do after dropping one of your team of correspondents off at the airport on a cold, damp and dreary day in March? Obviously the answer is to pay a surprise visit to one of the local shops! Maidenhead Aquatics @ Syon Park is just down the road from Heathrow airport so it seemed a prime target to try and catch out.

As usual I got lost - but not until I actually arrived at the garden centre! Before then there were good signs to Syon Park even a directionally challenged editor like me could follow. No, the time I got lost was as I wandered around the garden centre trying to find the aquatic shop.

Eventually I found the shop entrance and sneaked in unannounced. Straight away I knew I had caught them on the hop! Packaging was lying on the floor as a member of staff was putting away the latest delivery. It was untidy! Well only slightly, and only where people were actually working. This is never the case when you turn up by prior arrangement. Everything then is spotless and the staff on their best behaviour. Here I could see the staff actually at work incognito, and a pleasure it was to. Good advice being given out, lots of nice healthy fish on sale and a general atmosphere that this was a well run aquarium shop. The Koi section was a bit of a mess but once I had introduced myself Jason Rainbow (the deputy manager) explained that this section was being completely cleaned out and prepared for the new season.

As I have come to expect from Maidenhead Aquatics outlets there was a good range of tropical fish on sale. Some very nice Red bellied piranha were available at £18 each or 2 for £35. Some good sized Flag porthole catfish were also on sale at £15 each or 2 for £28. For those. Plus one of the best selection of brackish fish I have seen for a while ■

Just a small selection of the aquariums.

Shop details: Maidenhead Aquatics @ Syon Park, Syon Park Garden Centre, Syon Park, Brentford, Middlesex, TW8 8JG. Tel 020 8568 7776.
Shop opening hours: Mon-Sat 9-6, Sun 10-4.30
Manager: James McEwen
Staff: 5 full time & 3 part time.
Number of tanks: 300 tropical & 60 marine
Number of vats: 22
Show tanks 6 at present but more are bing added.
Specialities: African cichlids, Marine invets & Pond plants.
Brands stocked: All major brands.
Which groups of fish do you sell?: Tropical, Marine, Coldwater & Koi.

The entrance to this Maidenhead Aquatics outlet is well signed - but only after you have walked through most of the garden centre.

Our verdict

A well run establishment with pleasant knowledgable staff who work hard to give their customers a good service. Jason is particularly enthusiastic.

tropical | marine | coldwater & ponds | plants | regulars

Scirpus angustifolia is best propagated by division.

Producing your own plants is not only self-rewarding, but can give free plants to swap with friends

Split the differe

CONVENTIONAL METHODS OF PROPAGATION associated with general gardening can be used to take cuttings, split/divide established plants, or collect and sow seed, with reasonable success. Currently you'll find few plants going to seed, so you're best trying to take cuttings or divide mature plants.

Cuttings

Cuttings are an ideal method for soft tissue plants such as Lobelia, Mimulus, Houttuynia, and Cotula etc. Lythrum, Mentha, *Mimulus ringens* and alike, can also be taken but tend to be woodier, taking longer to root.

Cuttings can also be taken from the roots of some plants. *Houttuynia* is the perfect example. Simply remove some lengths of root from a mature plant 6-10cm long, and space them evenly into a pot – full of aquatic soil, fill with more compost and firm. Water well, and keep moist. After a while shoots will nose

How to take a cutting

❶ Remove a 10cm section of healthy new shoot with at least 2-3 leaf nodes on the stem.

❷ Remove the lower leaves so that only the terminal and under leaves remain. Nip out the terminal bud between the terminal leaves, and any flower buds that might be forming, this concentrates the cuttings efforts to rooting.

❸ Prepare some small pots with multipurpose compost, don't add any fertilisers as they can damage the new root growth.

❹ Mix in sharp grit to give vital drainage. Firm compost and water.

❺ Use a dibber or pencil to create 4-5 holes spaced around the edges of the pots.

❻ Carefully plant each cutting so that the leaf nodes are covered, these will be where the roots develop. Fill round the cuttings and firm gently.

❼ Water well and place in a warm sunny position in a green house or windowsill.

❽ As the cuttings root they can be potted on into individual pots.

❾ Once well established the young plants can be potted on into larger pots using aquatic compost, gravelled and placed in the pond, or directly planted into the bog garden.

TAKING CUTTINGS OF *MIMULUS RINGENS*

Strip off flowers before using these shoots for cuttings

Right: Taking cuttings from aquatic plants can be easier and more reliable than terrestrial plants. Follow these steps and keep the cuttings moist

These are the ideal size for cuttings

Select fresh young vegetative shoots and prepare short cuttings. Remove the lower leaves, trimming back the upper foliage if necessary

Insert the cuttings in a pot of thoroughly soaked aquatic soil

Arrange four cuttings around the edge of a 7.5cm (3in) plastic pot.

nce

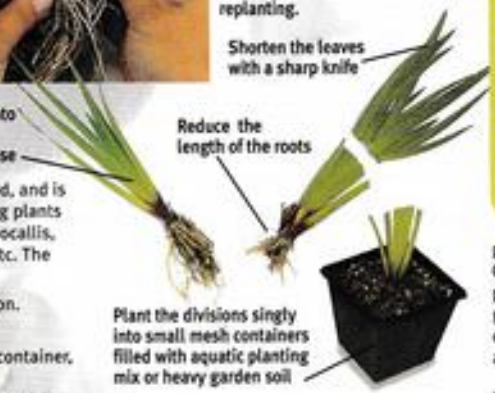
This time of year presents us with the opportunity to increase our water garden plant stock without raiding the piggy bank. **John Tate** explains how.

through at the surface, and once well established can be placed out in the pond. Surprisingly some Candelabra primula can be propagated from rootstock such as *P. beesiana*. Mature plants are lifted and some of the fresh thicker roots removed. The mother plant can be replanted. The donated roots are then divided into 2cm section and evenly spaced over a seed tray ar filled with multipurpose compost. Top the tray off and firm. Sit the tray in shallow water for a few minutes then move to a warm position. This method is best done during cooler weather, and can take a bit of time before any dormant shoots develop.

Propagating using cuttings is very rewarding, but it can only be applied to di-cotyledon's and you tend to suffer losses. A way of increasing your success rate, and the best way to propagate mono-cotyledons, is by propagating your plants by means of division.

Division

Thoroughly wash the clump and separate out individual fans of leaves. These should pull apart quite easily. Select the younger, more vigorous individuals for replanting.



Division is also straight forward, and is easily applied to clump forming plants such as Caltha's, Irises, Hemerocallis, Primula, Lobelia and Scirpus etc. The method is straightforward.

❶ Select your plant for division. Example *Iris laevigata*.

❷ Remove the plant from its container, remove soil, and tidy plant.

❸ Look for natural lines of division where the plant can be cut to give you sections of plant with leaf rhizome and root. With Irises and plants like Carex, you must look to see if new shoots forming from the base of the plant are suitable for division, often they might show good leaf growth but have no root.

❹ Divide the plant with a sharp clean knife or pull sections apart by hand.

❺ Some people prefer to trim the leaves back by about half to prevent wind rock with Irises.

❻ Pot the young plants into suitable sized pots using aquatic compost, and firm well. Cover with gravel and water. The young plants can then either be kept in a greenhouse until established, or placed directly into shallow water around the ponds margins.

Position the basket carefully on the marginal shelf, initially in water that just comes over the top of the basket. If the water is deeper, prop the basket up on a brick until it has become established and then lower gently.

John's top tips

❶ Dividing Irises early in the season will often mean that they won't flower in the same year, so you should try to divide them directly after the flowers have gone over.

❷ Dividing plants later in the season when the weather is hotter, is also possible but you're best removing a older leaves, or with mono-cotyledons cutting the leaves back to 8-10cm, so that the reduced root stock can support the plant.

The Sharp Truth

WHEN SOMEONE MENTIONS PIRANHA, what is the first thing that comes to mind? Ruthless killer, fierce predator, a fish with the ability to strip a carcass in seconds? Or maybe you envisage a docile sluggish fish, opportunistic omnivore that plays a vital role in the food chain. The film makers would have you believe the first angle, that a Piranha poses a violent threat to whatever it encounters. This immediately begs the question; what exactly is a Piranha and how can you identify it?

Piranhas are members of the sub-family *Serrasalminea* with most species belonging to the genus *Serrasalmus*. All Piranha have a single row of teeth in each jaw which interlock to shear and trap prey, hence their ability to tear huge chunks of flesh off much larger animals. Other fish, such as the Pacu, often try to pass themselves off as Piranha to avoid being eaten.

There have even been reports of Pacu infiltrating a shoal of Red Piranha without the other fish even noticing the impostor. Indeed, because of this similarity, some imports of "Piranha" have turned out to be Pacu.

Black-eared Piranha, *Serrasalmus nototus*, are one of the most attractive Piranha.

Masen Bell lifts the lid on the world of Piranhas

Their natural habitat and diet

In the wild, Piranha inhabit lowland lakes and rivers of South America and are exclusive to this continent. These waterways are often soiled by silt washed down from the Andes during the wet season, which makes their habitat very dark and visibility is poor. Because of this there is very little plant growth so most of the fish that share this habitat, including Piranha, are omnivorous, feeding on whatever mother nature sends down stream - this could be carrion, other fish or even fruit and berries. Piranha are opportunistic omnivores, if there's food, they'll eat it. Their diet varies with their age and the seasons. Newly hatched fry will start off eating small insects and berries, moving on to larger food such as fish and tougher plants as they grow. Some species feed exclusively on small fish all their lives whilst others, such as *Serrasalmus niger*, Black piranha, eat anything that resembles food.

On the hunt

When hunting, Piranha prove themselves a formidable enemy. Taking advantage of the murky water, they can join a shoal of similar fish who will accept them and will not worry at their presence. Then one fish will strike causing panic in the ranks until the Piranha have had enough, they carry on as normal with the prey fish being none the wiser as to the identity of the aggressor.

This mimicry is the most reliable weapon in the Piranha arsenal.

Even the formidable and very rarely imported *Serrasalmus elongatus* is no match for a River dolphin.

In this dog eat dog world of South American waterways (or should I say fish eat fish?) only the fittest survive. When stealth fails, or can't be used, the Piranha have another, unstoppable weapon, the cavalry. An injured animal in the water or the smell of blood can provoke this feeding frenzy and the victim can be rendered unrecognisable in no time, indeed a potent weapon. However, all this becomes useless when a Piranha shoal are faced with larger predators, e.g. a school of River dolphins, it may stand up against one or two individuals but the sheer numbers and size of the opposition will overwhelm them. The Piranha get no special treatment, and no matter how hard it may try, a Piranha will never look like a Dolphin.

Captive care

These fish are naturally a shoaling fish, and are easily unsettled. What's the best way to keep them in the home aquarium? Indeed, are they suitable at all? What are the requirements for successful Piranha keeping?

Most Piranha sold in aquatic stores are young and much smaller than their eventual size (most achieve 30cm in captivity), with the most commonly available species in the shops being *S. nottemi*. The recommended minimum tank size for any Piranha is 120cm (160 litres), this is assuming that you only want to keep one, any more in a cramped space is asking for trouble. A better choice would be an aquarium of 180cm, then a small shoal could be accommodated comfortably. Due to the potential size of these awesome creatures, however, many previous keepers agree that Piranha are better off in public aquaria where they have ➡

A WORD OF WARNING

Never put your hand into a Piranha tank if you have any trace of blood on it - you could lose part of it! Always wear rubber gloves when working in the tank.

Are all Piranha dangerous?

Of the known Piranha species, there are four that most often pose a real potential threat to man, these are: *Serrasalmus niger* Black piranha, *Serrasalmus natterri* Red piranha, *Serrasalmus piraya* of Brazil and *Serrasalmus ternetzi* of the Rio Paraguay, with the most dangerous being *S. Niger*.

As a general rule, these fish are no threat to the locals, indeed often they shy away from humans. Many native South Americans regularly bathe in Piranha infested waters without too much fear. A word of warning though, these fish don't have good eyesight and the sight of people dangling fingers or toes in the water might prove just too tempting.

The real danger to people comes as the pools start to dry up and the fish start to get cramped. In these conditions, we are likely to see the feeding frenzies for which they're well known, and they're not fussy what they attack.

Serrasalmus piraya is one of the four most dangerous species of Piranha

What do you feed these fish in the aquarium?

As in the wild, it may be possible to give them fruit and berries as part of their diet, but remember, although these are omnivores, they need mostly fish and a little meat in their diet. There are a few people who think that it is acceptable to feed live fish to their Piranha. This may be the case in their natural environment, where their prey sometimes has a sporting chance, but in the confines of a home aquarium, the food offered has no chance, so this practise is barbaric and is not to be encouraged. Feed whitebait and pieces of fish or meat instead. Commercial pellet foods will also be taken.

Red piranha, Serrasalmus nattereri, are the most common species in the trade.

the space and resources to look after them properly.

In the aquarium, a happy well fed Piranha will rarely incite an attack. To keep them happy, their water requirements are as follows: p.H. 5.5-7.5, DH to 20 degrees. They swim at all levels of the tank and, if they spawn, the male will practise parental care and look after the eggs and young until they are free swimming. At this time he will attack anything he thinks is a threat to his brood, so make sure the female has plenty of hiding places.

These are NOT community fish and can be very messy eaters, so make sure that your filtration is able to cope with the heavy work load. Remember too, that in the wild these fish inhabit dark and murky waters, bright light in the aquarium is contrary to what they get in the wild, and even captive bred Piranha still enjoy dim light.

As we saw at the start, the Piranha has the reputation of being a ruthless killer. The aim of this article is to portray the real Piranha, the opportunistic omnivore, that is only trying to survive. Believe it or not, these fish don't rule the waterways of South America. Instead they make a vital contribution to the local food web. They are predator and prey, a favourite food of freshwater River dolphins, Otters, Birds, Sharks and are considered as valuable food for the local people.

Next time you see or hear of Piranha remember they aren't the ruthless killers that some will have you think. Instead they are effective hunters and scavengers that are a vital part of the South American food web. They play their part in nature and make it more interesting for us. ■

Serrasalmus geryi is one of the least colourful of the Piranhas but still makes an interesting aquarium subject.

PHOTO: GARY LUCAS

Ponderings

Dave Bevan's regular column on ponds and pondlife.

FANCY GOLDFISH FACTFILE

Species Goldfish: (*Carrasus auratus*)

Other names: None

Other forms: Selective breeding has produced many forms including Shubunkins, Comets, Jikins, Bubbleeye, Celestial, Ranchu, Lionhead, Pearlscale, Moor, Redcap, Oranda, Fantail and Veiltail.

Size: Up to 45cm in length for some forms

Weight: Up to 1.36 kg

Availability: Most aquatic outlets have a good selection of the above forms to choose from.

Habitat: These fish have been bred in captivity but for the more hardy forms like the comets and some shubunkins it is similar to that of the goldfish.

Identification: Each form has very distinctive characteristics. The Celestial has eyes on top of the head, the Moor is black and the Veiltail has a large flowing tail.

Habits: Friendly fish which readily come to hand for food, like the goldfish will root amongst plants for food.

Pondfish value: Comets and Shubunkins make good pondfish and will usually settle in any pond situation. Lionheads, Jikins, Orandas, Moors and Fantails may be alright in the pond during the summer but will have to be taken in for the winter. Delicate fish like the Celestial, Bubbleeye and Veiltail are really only suited to aquarium conditions. If introducing fish with long fins to the pond watch carefully for signs of damage.

Shubunkins are excellent pond fish

PHOTO: MAX GIBBS

PHOTO: DAVE BEVAN

Male Red shiners develop very distinctive white spots on their head during the breeding season.

Fishy tales

The goldfish are chasing each other round the pond and on the face of it some of the smaller fish are being bullied. We take a closer look and are sure that we can see signs of whitespot — a disease which needs treatment.

In fact, nothing could be further from the truth. Our goldfish have moved into spawning mode. The males chase gravid (egg bearing) females, repeatedly nudging the females in the abdomen. Goldfish do not form strong pair bonds so groups often spawn together where the females release thousands of eggs. Although the females do not seem to be willing partners those which are ready to lay their eggs do lead the males into the best places in the pond to spawn where there is plenty of fine leafed vegetation at and below the water line.

And those tiny white spots — Take a closer look at your goldfish. Are they white pimple like growths mainly found on the gill cases and pectoral fins? If so they are nuptial or breeding tubercles found only on the males as they come into breeding condition. A characteristic of the Cyprinids, on other species like Red shiners they tend to be clustered on the top of the head.

Blanket weed looks unsightly but does not harm the fish although it will choke pond plants.

Pond problem

When the pond starts to wake up one of the first to kick into life is the blanket weed. A green filamentous algae it spreads quickly through the pond entangling plants and blocking pumps and filters. Like green water, mentioned last month, given warmth, food and light it will grow apace. In a balanced wildlife pond the growth may be short lived and can disappear within a few weeks as the other pond plants kick in. Floaters will starve it of light and marginals use up the available nutrient.

If the pond is well stocked with fish then it may not disappear of its own accord because the fish produce more nutrient than the plants can remove quickly and you have to look to other methods of control.

What are the options?

❶ There is nothing wrong with good old hand weeding — pull it out and lay it on the bank to let the pond creatures escape back to the pond. Indeed if you have one of the tougher varieties this can be the best method of control. An added advantage is that it brings you closer to the fish giving an opportunity to watch their health.

❷ Whilst a UV works with unicellular algae it cannot kill the filamentous ones unless they pass through the tube and once moving in the water stream they can block filters very quickly.

❸ Algaecides do work but their effect is short lived and some people have found the straw remedies or Water Wych worked for them

The sensible use of all or any of the above whilst striving to achieve a balanced pond. This will involve increasing fish stocks slowly whilst following a balanced planting regime to reduce light and nutrient levels.

Stand a red pencil in a male Three spined stickleback's territory and he will attack it.

FASCINATING Fact

As we move through into spring the Three spined stickleback switches into breeding mode and a male in full breeding colour is a match for any tropical fish in the beauty stakes. With piercing blue eyes and bright red belly he patrols his territory. Stand a red pencil in his territory and it is literally red rag to the bull as he moves in to attack the intruder.

BELOW THE SURFACE

Ammonia is a colourless gas, which is soluble in water and is produced as a waste product by any animal, including fish, living in the water. Nature has its own way of dealing with this product that is extremely poisonous to living creatures, particularly those that absorb it directly from the water. It is converted by nitrifying bacteria into nitrite, which is also harmful, and then into less harmful nitrate which is an available plant food. In a balanced natural system this is not a problem.

When we introduce fish into the pond, particularly a lot of fish into a new pond, a large imbalance is created as there are insufficient bacteria present to convert the ammonia to nitrate and it builds up in the water. It can be toxic to some species at levels as low as 0.025mg. per litre and can kill at levels of 0.2 to 0.5 mg per litre particularly at high pH levels

Water soldier is an excellent floating plant for the wildlife pond

PHOTOS: DAVE BROWN

Plant lore

Fish produce waste products that are broken down by bacteria to form nitrates. High concentrations of soluble nitrates are poisonous to the fish and in combination with sunlight is the main cause of green water.

Floating plants dangle their roots in the water, taking nutrients like nitrates out of the water, growing and dividing rapidly to cover the pond surface and shut out the light.

On the face of it — problem solved! No light and no nutrients equals no green water. But the fish continue to produce nutrients and the floaters continue to grow and divide until the pond is covered by an inches thick layer of plant material and little else.

Our native Duckweeds and the alien Azolla (a pretty red and green water fern) can both kill a pond. Once established they are extremely difficult to remove and may require weekly netting in the summer months.

Less invasive and much prettier are the alien Water hyacinth and Water lettuce but the catch here is that they cannot survive our cold winters and must be over wintered in a frost free greenhouse or replaced with new plants each spring but their extensive root systems are great for fish and wildlife.

For the wildlife pond our native Water soldier and Frogbit are both maintenance free as they sink to the bottom each autumn and resurface in the spring.

Build a ramp and save a life

IS YOUR POND HEDGEHOG FRIENDLY?

Whilst hedgehogs can swim well they cannot scramble up a steep sided pond without some help and consequently some drown every year in garden ponds. The answer is to build a hedgehog ramp. All you need is a half-metre length of 150mm x 19mm sawn soft wood, some 50mm nails, a saw, a hammer and a rule and pencil.

STEP 1 measure off approximately 200mm and mark the wood.

STEP 2 Cut along the line, angling the saw at approximately 45 degrees.

STEP 3 Fit the two pieces together and mark the second piece about 25mm below the water surface and cut through at 90 degrees.

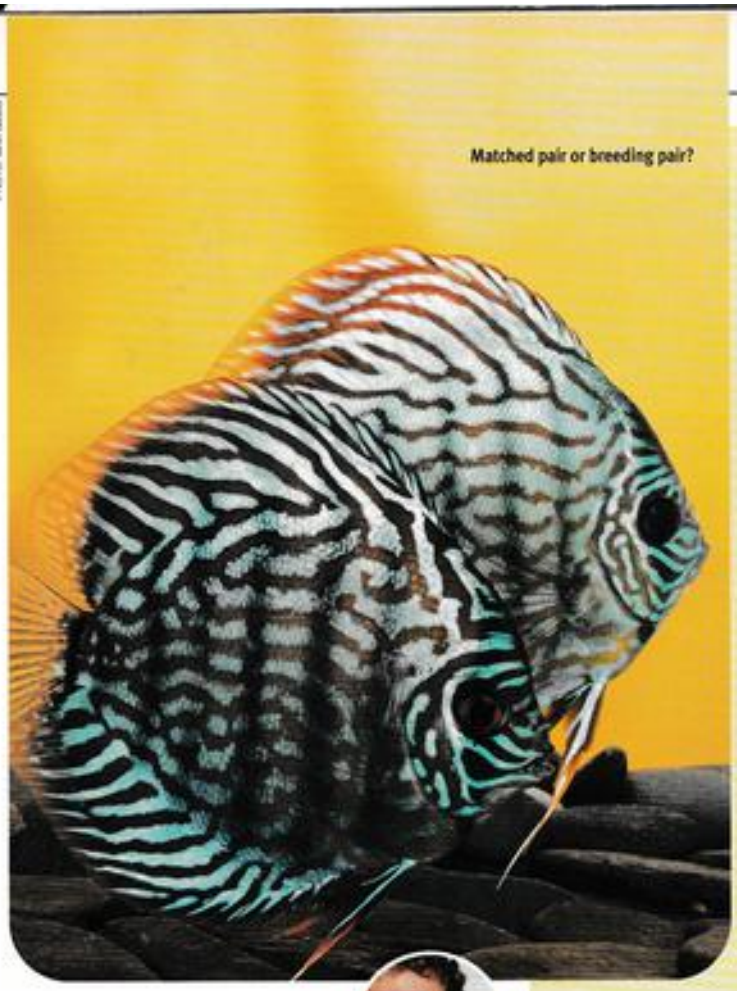
STEP 4 cut some 19mm strips from the remaining timber and nail them to the ramp to provide additional grip.

STEP 5 Using 50mm nails nail the ramp to the support.

STEP 6 fix the ramp in position.

OTHER WAYS TO SAVE A LIFE

There are other ways of making the pond more wildlife friendly. If it is relatively shallow at one point add some cobbles to allow creatures to walk out. For deeper ponds place some bricks or concrete blocks against the side until they are just above the water level or alternatively fix a piece of wire mesh to the side of the pond.



Matched pair or breeding pair?

Discus problem solver

Tony Sault answers your questions on Discus

First attempt at breeding

Q Having kept Discus for a while now I feel confident enough to have a go at breeding them. I understand that this is not easy but I would like to try, as I intend to buy a pair. My question is this. What is the difference between a matched pair and a breeding pair as I have seen both advertised for sale?

T. Roberts, *Chesterfield*

A Breeding Discus in today's highly technological world is much easier than it used to be when soft acid water was not available at the turn of a tap, but rearing them has never changed and is still the tedious job that it ever was. So, please by all means have a go and good luck. The difference between a matched pair and a breeding pair is quite simple really. A matched pair is a male and female that have paired off, preferably by natural selection, and begun to spawn but not reared a batch of fry. A breeding pair have completed the cycle by rearing fry.

Pecking order syndrome

Q I have recently introduced a new medium sized Discus into my tank and it is constantly being bullied, is there anything that I can do?

Manny, *Australia via Email*

A If I understand your situation correctly there was only previously one other Discus in the tank which would feel its territory was being invaded. Discus are a strong shoaling fish and as such should be kept in shoals of at least 6 fish. You will still encounter the pecking order syndrome but the situation will be kinder to the one that is constantly being bullied.

Health problem

Q One of my Discus has stopped feeding and developed a large swelling between the pectoral fins and ventral fin, is there any thing that I can treat this with?

Mrs Z.J. Gibbs, *Lincs.*

A The symptoms seem to indicate a blocked intestine as the swelling is equally distributed on both sides of the fish, had the swelling been on one side only then this would have indicated a growth. I am afraid that I don't know of a medication that will cure the problem but if you have a hospital tank then place the fish in there and gently tweak the temperature up to anywhere between 90-95 F, 32-35 C for 2 weeks, this very often works to flush out the fish.

What is the best way to humanly destroy a fish?

Q I recently had to destroy one of my Discus that was obviously suffering, can you tell me the best way to do this as I was not sure what to do and I have read of ways that I would not attempt.

John Wilkinson, *S. Yorks.*

A I really do appreciate your dilemma as in my opinion there is no good way to despatch a much loved pet that is suffering be it a cat or dog or tropical fish, some of the methods that I have read about over the years are absolutely appalling and will not be given space here. The kindest way, when all other avenues have been explored, is an overdose of an anaesthetic used by the veterinary surgeons. This, when added to the water in the correct dosage, gently puts the fish to sleep. ■

Betwixt & Between

Derek Lambert looks at the fish halfway between egglaying and livebearing

FISH ARE COMMONLY DIVIDED INTO marine and freshwater fish. Another simple division is that of egglayers and livebearers. Both these methods of dividing fish, however, are flawed. As rivers flow into the ocean there is an area where the water is brackish. These fish live in a habitat that is between fresh and marine water. Likewise, there are fish which are halfway between egglayers and livebearers.

To understand this we have to look at just what is a livebearer. Obviously it is a fish which gives birth to free swimming youngsters. To do this the eggs must first be fertilised inside the female's body. Here, the eggs, and possibly developing fry ,will stay inside the body until they are released by the mother. Depending upon the species, either an embryo (which hatched some time ago inside its mother and has been fed and nurtured internally) will be pushed out into the world to start its independent life, or an egg will be expelled which immediately hatches when released. These eggs may (or may not) have received extra nutrition from the mother as they were developing. Goodeids are examples of fish whose embryos hatch inside the mother and are fed by the mother until they are born. At the other extreme are Guppies. The eggs of this fish only hatch as they are pushed out into the world. No nutrition from the mother is passed on to them.

Now let's look at some egglayers! Most egglayers expel eggs and milt into the water where the eggs are fertilised. Some, however, internally fertilise their eggs. The eggs develop internally for some time and are then pushed out into the world where they complete their development. In reality these are betwixt and between egglayers and livebearers. If we go back to the Guppy we can see the only difference is how long the eggs are held within the body. A few hours or days and they are an egglayer to us, an extra few weeks and they suddenly become livebearers. ■

Some betwixt and between fish

So just which are the betwixt and between fish? Well there are a fair number of fish who fall into this category. These include some Tetras, Killifish, Ricefish and, most unusual of all, the Buntingi. All of these internally fertilise their eggs like livebearers but then release them into the world whilst still eggs.

SWORDTAIL CHARACIN

Swordtail characins look a lot like many other Tetras and yet they are an unusual species. Unlike most Tetras, which fertilise their eggs external to their body, this species has a specially adapted gill cover with a long 'paddle' at the end of which is a fleshy tip. This is bitten by the female during mating and may well be the method by which sperm is transferred from the male to the female. Fertilisation then takes place within the female's oviduct and as eggs are expelled they are fertilised without the male even being present. The fry hatch in about a day and need infusoria and other fine foods to start with.

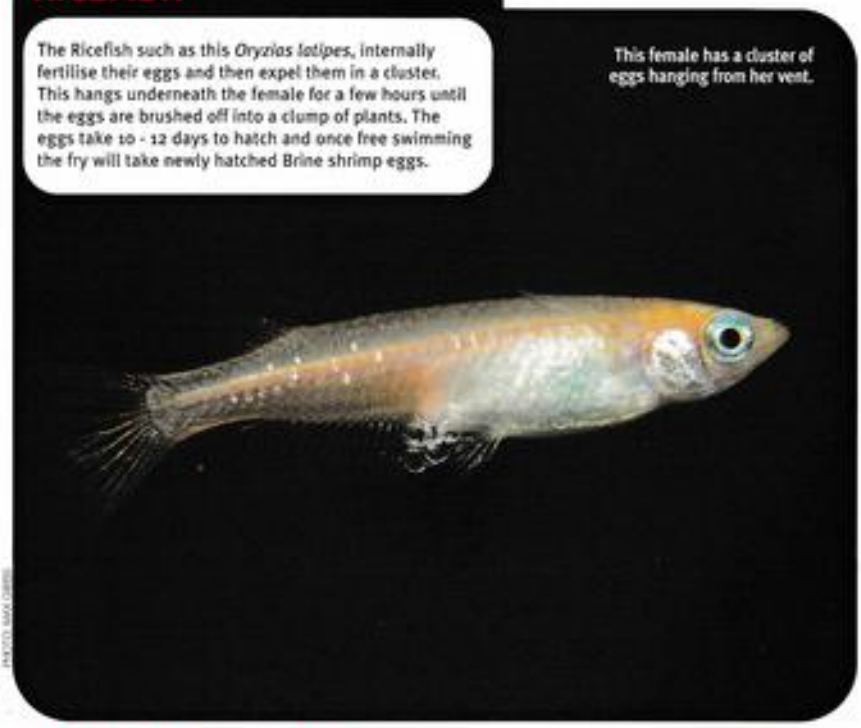
BLACK-BANDED PEARL FISH

Black-banded pearl fish used to belong to the genus *Cynoleibias*. However, unlike most Pearl fish, males have the first few rays of their anal fin thickened and clustered together. This is used to transfer sperm from the male into the female. The eggs are deposited on a peat substrate. The substrate should be collected into a polythene bag and left for 2 - 3 months before being placed back in water. The eggs should hatch within a few hours and the young can be fed on newly hatched Brine shrimp.

Swordtail characins are the most unlikely looking livebearers.

RICEFISH

The Ricefish such as this *Oryzias latipes*, internally fertilise their eggs and then expel them in a cluster. This hangs underneath the female for a few hours until the eggs are brushed off into a clump of plants. The eggs take 10 - 12 days to hatch and once free swimming the fry will take newly hatched Brine shrimp eggs.



This female has a cluster of eggs hanging from her vent.

Male *Cynopoecilus melanotaenia* have a modified anal fin which is used in sperm transfer.

CELBES BUNTINGI

Looking like a giant Ricefish, the Celebes buntingi (*Xenopoecilus sarasinorum*) is a rare fish in the aquarium trade. Just like Ricefish, males of this species internally fertilise the female which then releases a cluster of eggs. Unlike Ricefish, however, the cluster remains attached for about 16 days while the eggs develop to full term. The fry are large enough to take newly hatched Brine shrimp from birth.

Celebes buntingi are found in Lake Lindu on the island of Celebes.

tropical | marine | coldwater & ponds | plants | regulars

Koi world with Bernice Brewster

I AM BY NATURE, A LAZY INDIVIDUAL. I always put off until tomorrow something that should be done today, as the Editor will testify. If I can find an easier way to undertake a job, I will find it. When it comes to removing the sludge and sediment that can accumulate on the pond bottom most Koi keepers have bottom drains fitted, which are either plumbed directly to the filtration system or run to waste. Where the bottom drains are plumbed into the filtration system, this organic sludge requires removing frequently, otherwise it turns the filter into a bigger oxygen sink than it is normally and encourages parasites such as flukes and *Trichodina* to infect the Koi. Those Koi ponds where the bottom drains are connected to stand pipes, which can be discharged to waste, eliminate the organic waste probably on a daily basis in the summer time.

No bottom drain?

What about the ponds that don't have bottom drains? In most instances the owners of ponds where no drains are fitted must resort to vacuuming the pond. There are various pond vacuums on the market ranging from those operated by hand, with an action rather like a giant bicycle pump, sucking the sludge off the bottom into a small muslin type bag; there are the vacuums attached to swimming pool pumps but which are only suitable for those ponds with a large volume of several thousand gallons otherwise they discharge the entire pond in a matter of minutes. Finally there are the vacuums which are rather like domestic vacuum cleaners.

Bernice is very taken with the Vac-u-Pond

The wand allows you to apply some pressure to the sides and bottom of your pond.

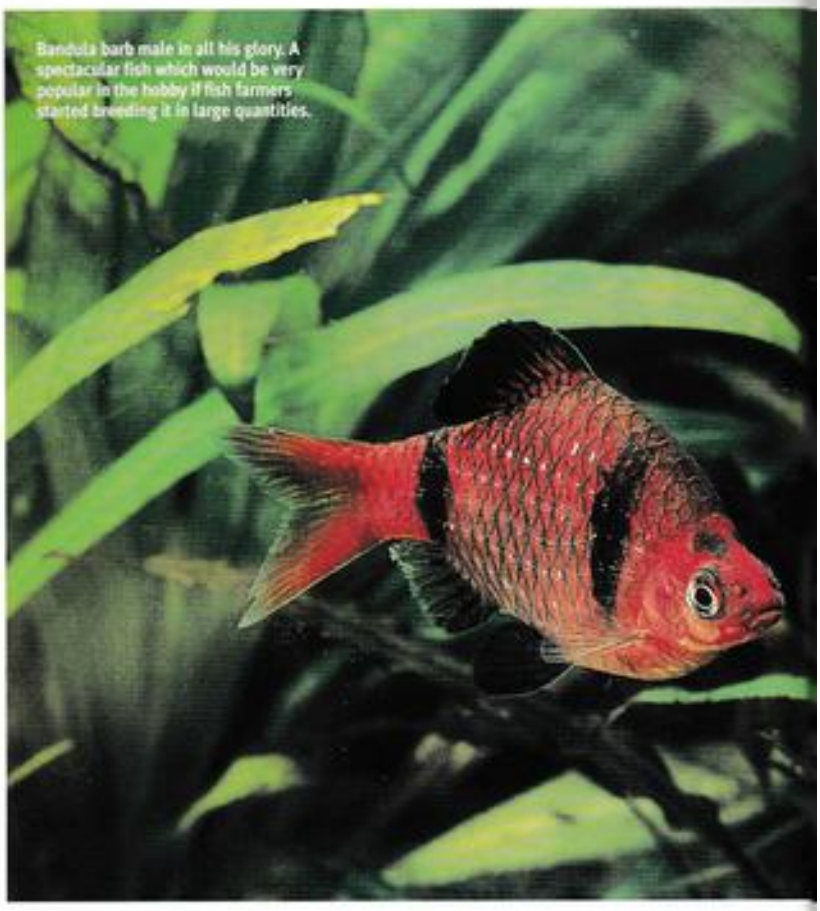
Earlier in the year, I was invited to have a trial of the Vac-u-Pond, the latest pond vacuum before its launch onto the market. On using it, my first thought was I wonder why someone didn't think of this sooner! The first innovation is the Vac-u-Pond unit that sits on wheels, so it is easy to manoeuvre the vacuum to and around the pond, but better still, when the cylinder is full of water and extremely heavy, no lifting is involved as I can simply wheel it to my flower bed and water the garden with the discharge. Discharging the water was simple. I was very impressed with the wheeled unit, it made vacuuming the pond much lighter work. The second feature I liked was the stainless steel 'business end' of the vacuum, apparently called a 'wand'. This allows you to apply some pressure to the sides and base of the pond without bending. Finally, the 'brush' attachment is on wheels to move across the surface of the pond but there is a seal at the back, so the unit sucks the rubbish up efficiently.

The cylinder of the Vac-u-Pond holds about 20 litres which some Koi hobbyists may think is a small volume of water but this is compensated for in the ease with which it can be moved around. For those with larger ponds, there is the Vac-u-Pond Pro, the bigger version with a 70 litre tank. ■

Contact details

Further details and information on stockists of the Vac-u-Pond can be obtained from Aquatic Industries Ltd., telephone 01234 352710.

TFISH 17
TFISH 16
TODAY'S FISHKEEPER
PHOTO: MAX GIBBS
PARADISE FISH
Macropodus opercularis
10cm
24°C
20°C



Bandula barb male in all his glory. A spectacular fish which would be very popular in the hobby if fish farmers started breeding it in large quantities.

Close encounters of the fish kind

John Dawes has studied Gouramis for years and has an interesting theory about how they build their bubble nest. Also in this months column he highlights conservation efforts to save the Bandula barb from extinction.

Saving the Bandula barb

Imagine a species that is restricted to a single unnamed stream. Imagine, further, a species that is restricted to a 500-metre stretch of this unnamed (and therefore minor) stretch of water. Finally, imagine this stream to be under constant threat of pollution. Such is the reality facing a small fish from Sri Lanka: the Bandula barb (*Barbus bandula*).

Sri Lanka enjoys great riches in terms of freshwater and marine fish species. Many of these are highly popular with aquarists the world over. Among the best-known of these fish are Sri Lanka's barbs, some of which, like the Black Ruby Barb (*Barbus nigrofasciatus*) have been intensively bred in captivity and been developed into a number of colour and finnage varieties. Other species include the Cherry barb (*B. titteya*) and Cuming's barb (*B. cumingii*) which are under threat in the wild. None, though, appears to be under such intense pressure as the Bandula barb.

Known (but not described) since 1980, the Bandula barb has never been collected in any significant numbers. Ranjit Bandula (after whom the species was named in 1991) reports being able to collect up to 100 specimens in one hour during his visits to the locality between 1980 and 1982. By the time five official visits to collect specimens for the scientific description were made by Rohan Pethiyagoda in 1989/90, the capture rate had plunged to between no specimens at all (during heavy rain) and a maximum of 14 "in the course of 1-2 hours."

One of the key factors leading to this dramatic decline appears to be some form of repeated pollution, probably consisting of run-off from the rice paddies that lie upstream of the type locality of the Bandula barb, as well as the rubber plantation through which the unnamed stream runs.

Captive breeding

Some time after the collections for the official description of the species were made, a number of specimens were passed on to Ananda Pathirana, one of Sri Lanka's

Ananda Pathirana - fish breeder par excellence - proudly holding up a bag with some of his precious captive-bred Bandula Barbs.

commercial ornamental fish breeders and exporters, to see if he could breed the species in captivity. This he has managed to do to the extent that there are currently several thousand specimens available for release back into the wild. I have visited Ananda on several occasions in recent years and have seen his superb stocks of captive-bred Bandulas...absolutely magnificent!

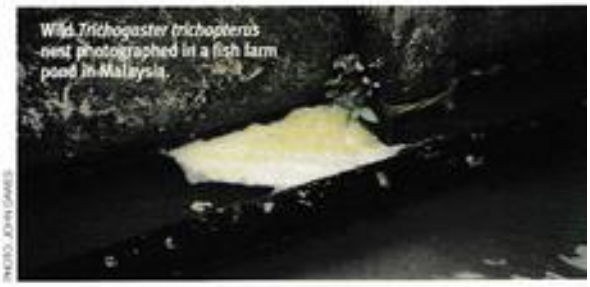
There is, however, one major problem in restocking the type locality with captive-bred specimens: the Bandula barb stream appears to be under even greater threat than it was. There is therefore little point in restocking the type locality with fish that would, as a result, be put at great risk of extinction. The search has therefore been on to find a suitable alternative location (Pathirana, personal communication). This has not proved an easy challenge, since alternative locations are always likely to have their own complement of species, whose 'balance' could be upset by the introduction of what could be termed an 'exotic' species. Nevertheless, Ananda Pathirana informs me that some suitable locations have been found recently and some controlled restocking has actually taken place. ■

Gourami bubble theory

Gouramis of the genera *Colisa* and *Trichogaster*, along with other members of the family *Belontiidae*, are deservedly popular in the aquarium hobby. Undoubtedly, their colours and relative ease of maintenance are important factors contributing to their popularity, but, to me, their most attractive feature is their reproductive behaviour.

The way in which they build their bubblenests has always fascinated me. I have lost count of the number of bubblenests which I have seen built over the years...and they still thrill me as much as ever, even today. It's wonderful to see how evolution has resulted in such an apparently fragile combination of mucus and air - sometimes with vegetation woven in for added stability - being one of the vital keys to the continued survival of all these species.

Bubbles which are incorporated into gourami nests serve several purposes, the most often quoted being that they lift the fertilised eggs above the oxygen-deficient water below into the oxygen-rich atmosphere above. The mucus with which the bubbles are coated also helps keep the topmost eggs moist and the bubbles from bursting too quickly. In addition, by restricting the eggs to the comparatively small area occupied by the bubblenest, the male is able to guard them much more effectively than he would otherwise be able to.



Wild *Trichogaster trichopterus* nest photographed in a fish farm pond in Malaysia.

PHOTO: JOHN DAWES

New discovery

These, plus other characteristics of bubblenests, make them very special structures indeed, but there's a further feature which has gone totally unreported in the aquarium literature. If you follow a male through his various nest-associated activities, you will notice that the vast majority of the bubbles produced during the nest-building phase, are all relatively large and similarly sized. Once spawning begins, however, two types of bubbles are produced. One is exactly the same as the nest-building type, i.e. quite large and blown out through the mouth.

The second type, though, consists of much smaller bubbles which are not blown out through the mouth, but emitted through the opercular (gill) slits almost as a fine mist. While producing these finer bubbles, the male will flap his gill covers and shake his head from side to side, thus spreading the mist over as wide an area of the underside of the nest as possible.

But what could possibly be the function of these tiny bubbles...and why are they produced only once actual spawning has begun? I can't claim to have scientific proof for what I am about to say, so I'll just refer to it as a theory.

If males only produced bubbles of equal size at every stage during spawning, then any new bubbles floating up from below into an already existing nest would exert considerable pressure. This pressure would be of two kinds: vertical (upwards) and horizontal (sideways). However, because these new bubbles would be of the same size as the old ones, they would tend to force themselves in between the existing bubbles, pushing them sideways in the process. The overall effect would therefore be a greater horizontal than vertical movement of the bubble layers of the nest.

If, on the other hand, the same volume of air were to be distributed among numerous tiny bubbles...and if these were spread out over as wide an area as possible, these small bubbles would tend to float into the spaces between the existing (larger) bubbles but would not have the strength to push them aside. The end result would therefore be greater vertical than horizontal movement, which would, consequently, lift the eggs, rather than spread them out over the water surface.

Further, since males produce both types of bubbles once spawning is under way, the intermingling of the two sizes would produce a structure with some solidity and considerable depth, with the eggs eventually ending up 1cm (or more) above the water surface.

INTERESTED IN GOURAMIS AND OTHER ANABANTIDS?

Why not join the Anabantoid Association of Great Britain (AAGB)? Not only do they hold some fascinating, educational and enjoyable meetings, but they also publish a great specialist journal, Labyrinth. More details from: Chris Clark, 59 Chiltern Crescent, Sprotbrough, Doncaster, DN5 7PE.

Frogs and Friends

Thinking of keeping tropical amphibians? **Bob and Val Davies** explain how to safely heat their vivarium.

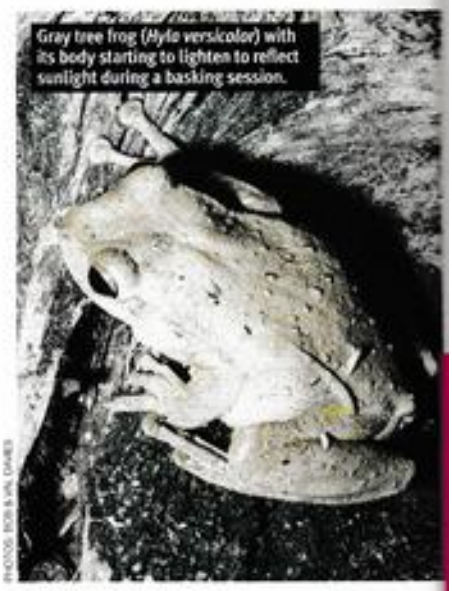
THE MAIN DIFFERENCE BETWEEN CARING for temperate species of amphibian and more tropical species is the latter's need for somewhat higher temperatures. Providing warmth for amphibians, however, is not the easiest thing as relatively few species can survive temperatures over 27C (80F). A few frogs and toads have adapted to sitting in tropical sunlight but in the confines of a vivarium too much heat can be fatal for the majority.

Practically all tailed amphibians (newts and salamanders) succumb to high temperatures so as temperatures rise they will want to hide away in a dark, moist, cooler spot. The majority of these tend not to require any additional heating and being nocturnal no additional light is required. If the vivarium is situated in a dimly lit area some external light, either to support plant growth or for viewing, may be necessary.

Of equal importance is the correct humidity as many amphibians can possibly survive an unsuitably high temperature as long as they can find a humid hiding place. Humidity requirements differ for each species and in some cases at different times of the year. A major problem with providing heat is that a heat source inside the vivarium tends to dry it out and will be too hot at close range for the inhabitants. Sources such as ceramic heaters and tubular heaters are blisteringly hot at close range and would be fatal for any amphibians that got too near.

Heat mats

Heat mats should not be used under the vivarium since anything more than a few millimetres of substrate is not recommended by the manufacturers as this can cause damage to the mat and cracking of the glass as the heat tends to build up under a thick substrate. In addition, having seen people use this method it causes a lot of evaporation which then condenses on the front glass making visibility impossible - in effect it is like a pan of water sitting on a cooker. The safest way to use a heat mat for amphibians is to tape it on the outside to the back or side of the vivarium and back it with a Styrofoam tile - this throws the heat one way. It two vivaria are placed side-by-side the heat mat, without the tile, can be slid between them. As with all heat sources a thermostat is recommended. Even a low wattage heat mat, if uncontrolled, can overheat a vivarium in warm conditions.



Gray tree frog (*Hyla versicolor*) with its body starting to lighten to reflect sunlight during a basking session.

PHOTOS: BOB & VAL DAVIES

The ideal for amphibians is if the ambient (room) temperature is at their desired levels both night and day. This makes heating individual vivaria unnecessary. The method we have found safe and useful for many years has been a thermostatically controlled spot bulb at an angle to the cover glass or the glass top of the vivarium in a 45-degree batten fitting. This is fixed so that the bulb is no nearer than 12.5cm from the glass. Because the heat source is outside there is no chance of moisture entering the fitting.

Most of our vivaria are furnished with living plants and in our view diurnal frogs such as *Dendrobatids* and *Mantellas* etc. need low percentage UVB so a 2% UVB fluorescent tube is fitted inside. For safety these must have moisture-proof, aquarium-type end caps and the starter unit placed outside the vivarium. The only problem with this is that in warm weather, even the small amount of heat provided by the tube can drive up the temperature above desired levels. Since fluorescents cannot be thermostatically controlled during heat waves they need to be switched off. ■

The highest recorded body temperature for an amphibian has been found in the Cane toad (*Bufo marinus*) - almost 40C (104F) - a temperature normally associated with desert reptiles. This species has a critical maximum temperature of 41.8C (107F).

...End Point

Stuart's livebearer is a highly sought after species which is rarely offered for sale. Recently a new population was discovered in Belize and imported to the UK

Fish from the dump

HABITAT DATA FOR STUART'S LIVEBEARER was always scarce until a few years ago when aquarists started travelling to countries like Guatemala and Belize to collect fish which are not normally seen in the trade. Over the last couple of years, however, Dave MacAllister & Brian Chittenden have been lucky enough to find this species in Guatemala and Belize. Guatemala yielded a population which was living in a small flowing stream just a metre to two wide and no more than a 10cm deep. The fish were caught under overhanging plants. In Belize, however, they were discovered in a swamp with little or no water movement. The only correlation between the two habitats was lots of overhanging plant growth where the fish were caught.

A young female Stuart's livebearer which has just sexed out.

What does it look like?

This species grows to a maximum size of 5cm for males and 6cm for females, however, in the aquarium they only achieve 3.5cm for males and 4cm for females. This can be increased if the youngsters are well fed with plenty of live foods and given plenty of space to grow.

Both sexes have similar coloration with the body being a light brown to greenish colour overlaid with up to 13 dark vertical bands. The dorsal has a dark edge to it. The very long gonopodium of the male often becomes black and the fins are edged in electric blue/green. In body form this species is similar to the better known Merry widow being almost as deep as it is long.

Aquarium conditions

Stuart's livebearer is a shy fish which does best in an aquarium by itself with plenty of plant growth. It tends to be a short lived species which usually starts reproducing when only 4 - 5 months old but most females live less than 1 year. Males tend to live longer. Since females are so short lived fry must be saved as soon as the females produce them. They are not unduly predatory on their young and if their tank is heavily planted they will flock breed. However, to be safe, it is wise to remove at least some of the fry to another tank for rearing as back up stock. Females drop young on a monthly cycle and can produce up to 100 fry in a brood, but 30 is the average. ■

Habitat data

The Belizian population occurs at a swamp next to the unusually named Dump town. The habitat is thick with submerged and emersed plants and there is almost no water flow at all. Water quality details were GH6 KH6 pH7.2 and temperature 25.6˚C. Other fish found at this location were Southern platies (*Xiphophorus maculatus*), Pike livebearers (*Belonesox belianus*), Bandit mosquitofish (*Gambusia sexradiata*), a killifish (*Rivulus* sp.) and several species of Cichlid including Salvin's Cichlid (*Cichlasoma salvini*).

Brian Chittenden happily catching Stuart's Livebearer in Belize this year.

tropical | marine | coldwater & ponds | plants | regulars