

Today's Fishkeeper

MARCH 2002 \$2.95

ADVICE

All your aquatic problems solved

TROPICAL

Creating a Community

PONDS

Banish green water for good

EQUIPMENT

The best filter for your tank

FROM BEGINNER TO ADVANCED



MARCH 2002

Today's Fishkeeper

inside this month

BEGINNERS

6 Starting point

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

10 Fishkeeping answers

All your questions answered.

COVER STORY

18 Creating a Community **COVER STORY**

Kathy Jenkins suggests a group of community fish ideal for you to mix and match in your own aquarium.

52 Sea View

Andrew Caine reviews Aqua-Medic's TurboFloater Protein Skimmers and has another fish and invertebrate for you.

TROPICAL/MARINE/COLDWATER

6 Starting point

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

30 Today's Surgery

Our resident vet, Lance Jepson, deals with Skin Flukes (*Gyrodactylus*).

TROPICAL

10 Fishkeeping answers

All your tropical questions answered.

18 Creating a Community **COVER STORY**

Kathy Jenkins suggests a group of community fish ideal for you to mix and match in your own aquarium.

26 Bangka Bettas and Belitung belles

David Armitage goes in search of the first Liguorice gourami.

32 Discus problem solver

Tony Sault solves some of your problems.

41 Fish profile

Richard Friend profiles the White cloud mountain minnow.

48 Cutting Edge

Pete Liprot reports on the 'other' Chequerboard cichlid.

50 Seeing double

Ian Fuller, chairman of the Catfish Study Group (U.K.), takes a close look at *Corydoras* look-a-likes.

56 Black and white beauties

A beautiful Cichlid really caught Pat's eye when on a trip to Mexico.

64 Breeding the One-sided Livebearers

Denik Lambert reports on how to breed the unique One-sided livebearer.

82 End Point

Everyone knows and loves the Neon tetra, but have you heard about the Neon Rasbora? We have all you need to know about this little gem.

MARINE

14 Fishkeeping answers

All your marine questions answered.

22 "Impossible" animals

All Nilsen focusses on some of the more difficult marine creatures to keep in captivity.

52 Sea View

Andrew Caine reviews Aqua-Medic's TurboFloater Protein Skimmers and has another fish and invertebrate for you.

60 Consequences of Nutrient Flow in Aquaria

Dr Ronald L. Shimek continues his look at nutrition in reef tanks.

PONDS & COLDWATER

16 Fishkeeping answers

All your coldwater questions answered.

66 Ponderings **COVER STORY**

Dave Bevan banishes green water for good.

71 Koi World

Is disease resistance in koi linked to black pigmentation? Bernice Brewster has been doing a little light reading which suggests it might.

REGULARS

5 Editorial

38 Out & About

Today's Fishkeeper visits one of the largest marine shops in the country.

72 Bob & Val's top tips

Bob and Val Davies have some important tips for amphibian enthusiasts.

73 Fantastic Subscription Offer.

74 Close Encounters

Mothers give more than fathers as John Dawes explains in his article on the hybridisation of two *Limia* species.

76 What's in next month's issue.

NEWS & VIEWS

36 Today's guide to choosing a filter

Confused by all the different filters available for your new tank? Here we sort out which type is best for your aquarium. **COVER STORY**

40 Letters

Share your news, views and experiences through Today's Postbag.

42 Today's Diary dates

44 Club News

45 Trade talk

All the news from around the trade

46 Product reviews

Fish Mate launch new range of pond pumps. We review the 9000 model

48 Cutting Edge

Pete Liprot reports on the 'other' Chequerboard cichlid.

PLANTS

58 Side Salad

John Tate suggests which plants work best in a vegetable filter and has another plant for you.

CUT OUT & KEEP

Today's Fishkeeper's monthly gallery builds into a collection of fabulous full-page colour photos, each with useful information.

9 Bleher's rainbowfish

70 Checkered barb

39 Competition

Win 2 Prime external filters from Interpet



KEY TO SYMBOLS:

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

| | | | |
|--|---------------|--|---------------------------------------|
| | COMMUNITY | | MID WATER |
| | NON-COMMUNITY | | BOTTOM |
| | CARNIVORE | | 78°F |
| | OMNIVORE | | 70°F |
| | HERBIVORE | | 2" |
| | SURFACE | | NOT SUITABLE FOR KEEPING IN CAPTIVITY |



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Going to Goa

Have you ever wondered what the editor of a fish keeping magazine does on his holiday? Well the answer is in the photograph – he goes looking for fish! This year I ventured into Asia for the first time and took a package tour to Goa. The day before leaving, late at night when everyone else had gone to bed, I sneaked back downstairs and packed my net and a few polythene bags into the suitcase. Whilst my family are very understanding about my obsession with fish, they draw the line at spending all holiday dabbling around in rivers.

This year they really thought they had been let off the hook (pardon the pun) and would escape with me doing nothing more than peering into the murky waters trying to see what was there. To be honest that was my

plan as well, but out of interest I dug about in my library just to see what fish did live in Goa. The result of that search seemed to indicate that not a lot was really known about Goa's fish apart from how to curry them! So, in the end I couldn't resist taking a net with just to have a look.

I will be reporting on what I found in a later issue of Today's Fishkeeper, however, one fish which appeared just about everywhere was the Striped Panchax. You can easily spot these swimming around just under the waters surface because they have a gleaming patch of scales on their head. They feed on insects, fish fry and other small animals that they capture at the surface. I always found these in small shoals and often in areas of partial shade and shadows. This is exactly the same sort of habitat and life style that the Palenque Flyer has, and guess what, this livebearer from Mexico also has a patch of iridescent scales on their head. Examples of this sort of parallel evolution can be found in many other species of fish most of which are totally unrelated to each other. By the time you read this I hope my family will have forgiven my succumbing to temptation again this holiday, but they really should know me by now!

Until next month,
Happy fish keeping

Derek

Striped Panchax were everywhere that I went in Goa



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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.



Clown Rasboras should be kept in slightly softer water conditions to appreciate their true beauty.



NOW WE ARE HEADING TOWARDS SPRING you will be rousing yourself from your winter hibernation, setting out in slightly better weather conditions to visit the aquarium shops. Some fishkeepers (myself included) go out on a pilgrimage to our favourite shops in case anything interesting turns up. There are some good shops about and it is important to purchase your fish from a good one. Not all shops offer either the same standard of service or quality of fish. You need to ask yourself the following questions on a visit.

- Are all the tanks clean and well maintained?
- Are all the fish healthy?
- Is sound advice being offered to customers?

If the answer is "Yes" to all these questions take a closer look at the fish and see if there is anything you would like to buy.

I think you'd really like this fish

Rasboras, as a group, are lovely, peaceful, community fish. Their lovely colours, which become richly enhanced in slightly softer water conditions, glow out from a well-planted tank. There are many small ones to choose from but if you like slightly larger species about 4 inches (10cm) then the Clown Rasbora is a real stunner. The body glows red and there is a dark blue black spot on the sides of the body behind the gill

Keep Clown Rasboras in slightly softer water conditions to appreciate their true beauty.

plates and another bluey black area in front of the caudal peduncle. If you live in a softer water area this really could be the fish for you. I've kept it with smaller fish and it's quite peaceful and is not a fussy feeder. If you like this kind of fish go on treat yourself.

Is this fish for you?

Scats are disc shaped fishes which are often seen in aquarium shops at a relatively small size, often these are juveniles and you need a large aquarium if you want to keep Scats. The commonly available *Scotaphogus argus* grows to about 12" (30cm) in captivity. If you only keep two, bullying can occur even leading to the death of the weaker one.

Red tiger scats (*Scatophagus argus*) are not a plant lovers fish.



PHOTO: MARK GIBBS

They can be housed with similarly sized species in a brackish water set-up, which should become more saline to marine as they mature (they are frequently listed in Marine books).

It is probably better to keep one specimen or a small shoal. The biggest problem is their partiality for vegetable matter and they are not selective as to which plants they eat - though you can guarantee they'll take the best. Scats plant eating habits and the difficulty of finding plants that are hardy in saline conditions would suggest that these are not the species for the plant loving fishkeeper. Their name means "excrement eater", as all foods and detritus are eaten hungrily. It is thought that they got their name because they followed ships to eat the waste that was thrown overboard by the sailors in earlier years. Scats do, however, make interesting pets that recognise their owner and are easy to keep and feed.

Scats would definitely not be the plant lovers choice.

the roots. My plant grows to about 5" (12.5cm) tall. I really love this plant that seems to resist any attempt by my fish to damage it. The water in this tank is slightly on the acidic side of neutral which must suit it very well as its a beautiful eye-catching plant. It's an easy plant, try it and see for yourself.

Furnishings for fish

When setting up a furnished aquarium, the furnishings (plants, rocks, gravel etc.) should be appropriate for the fish you choose to keep. You can tell by their

Anubias spec. 'Barteri'. This is a collective name for a number of different species ranging in size from 4" to 12" (10 - 30cm).



PHOTO: MARK GIBBS

Pat's tip

It is particularly important when purchasing Scats to test the salinity and pH of the water in which you bring them home and gradually acclimate them to your home tank conditions.

Here's an easy plant for you

Anubias is a lovely small plant which is a centre piece in one of my small aquaria. The broad leaves are strong and rich deep green, growing from stems shooting from

tropical marine coldwater & ponds plants regulars

Lost for Words

Commensal species: This is a species that benefits by close association with another species (usually called 'the host') without the host being affected in any way e.g. A species is carried to a feeding ground on the back of a 'host' but does not feed on the same foods. It really amounts to just being given a piggy-back.

Demersal eggs: These fish eggs are heavier than water and are laid on spawning sites as opposed to Pelagic eggs which are lighter than water and are scattered as they are laid and carried away by the current.

Detritus: Litter formed from dead material such as leaves and solid fish waste. In aquatic habitats there are detritus feeders that inhabit this litter and form part of the food chain.

Filter Feeder: A fish or invertebrate that sifts water for the microscopic food it contains.

Hydrometer: This is a measuring device that tells you the specific gravity of salt water. Useful for testing the salinity of your tank water. Helpful when changing freshwater to more saline conditions

Pectoral fins: A pair of fins situated one on each side of the fish behind the gills and used for balance and steering. Some fish, like Hatchet fish, have very large pectorals which enable them to fly above the surface of the water.

Pelvic fins: Sometimes these are called the ventral fins as they are situated on the ventral surface (underside) of the body of the fish. The pelvic fins of male Rays and Sharks are modified into claspers and are used in mating.



Black winged hatchetfish (*Carnegiella marthae*) have very large pectoral fins which enables them to fly above the water.

PHOTO: MARK GIBBS

physical and behavioural make up what kind of furnishings they will like.

If the fish have torpedo shaped bodies with streamlined finnage they like lots of swimming room. Fish, like Danios are built for speed. They enjoy swimming in a shoal with plenty of open spaces, a densely planted tank with limited open areas will →

Starting out with fishkeeping

Naturally... AQUARIAN



The Rainbow Danio (a colour variety of the Pearl Danio, *Bretydonio albolineatus*) is a torpedo shaped fish which likes plenty of open swimming room.

Pea sized gravel or a sandy substrate is best for Corydoras and other species with barbels that search the gravel for food.

around the substrate looking for food and Corydoras barbels (which play an important part in breeding activities) can be damaged if the substrate has sharp edges.

Shy species need plenty of thickets of plants in which to hide so there should be densely planted areas for them. These densely planted thickets are also a haven

for female livebearers who want to avoid amorous, over-attentive males. Nocturnal species really appreciate hollowed out tubes in which to hide from the bright lights of day. Many cichlids and other species love caves and hidey holes which become their territory or home within the aquarium in some cases. We all stress, quite rightly, the importance of water quality but the furnishings in your tank can make an important contribution to the well-being of your fish. ■

not suit them at all. Torpedo shaped fish with large finnage have short bursts of speed, planted areas from which they can dart forth into open water suits them best.

Deep bodied fish such as Angels and Discus need deeper water so tanks for these fish should be at least 15" (37.5cm) deep. Long need like plants through which they can swim suits them best. Corydoras and catfish such as *Symodontis* with their flattened underside are obviously bottom dwellers and you need to be careful in your use of a substrate. Fish with barbels sift



Articles in Today's Fishkeeper about particular species will always detail the furnishings that fishkeepers have found best for these species.

Bottom dwelling catfish, such as this *Symodontis angelicus* need rounded gravel or sand as a substrate to protect their barbels from damage.

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.

- Manufacturers often provide free booklets about fish care.
- Inexpensive books provide information on setting up.
- 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 70-80°F
Marines 75-78°F
Coldwater 55-70°F
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 12" of surface area per 1" of fish.
Marines 1" of fish for 6 gallons of water is safe for reef tanks.
Fish only systems can house more fish but safe stocking level depends on the filtration system.

For your free beginners guide please call: 0845 677 6770 or visit our website: www.aquarian.com

AQUARIAN



Ponds to a maximum of 100" of fish per 1000 gallons. Measurements should be based on the optimum adult size of the species not the size at the time of purchase. **NEVER OVERSTOCK**

- Knowledge:** Find out as much as you can about any fish you hope to buy before purchase.
- 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.
- Quarantine:** All new purchases should be quarantined for established tanks for at least two weeks.

THE ROUTINES

- 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.
- 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.
- 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.



BLEHER'S RAINBOWFISH

Chilatherina bleheri



PHOTO: M.P. & C. PIEDNOIR

TODAY'S FISHKEEPER

▶ FISH 16

▶ FISH 17

Fishkeeping Answers: Tropical

BROUGHT TO YOU BY
NUTRAFIN & FLUVAL

star letter



Ruby sharks can become territorial and cause problems with other bottom dwellers.

Are my fish choices compatible?

In the New Year I am going to be setting up a 81cm x 46cm x 36cm Tropical Aquarium and I would like to know if my choice of fish for this tank are compatible. I would like to keep 3 Marbled Hatchets, 5 Guppies, 2 Clown Loaches and a Ruby shark.

Is my tank big enough for this and would I be able to keep more than this? Also can you foresee any problems? Any help and advice that you can give me would be most appreciated.
Mark Hewitson, via e-mail.

Your tank is big enough for the fish you are suggesting although the Clown loaches may get too big for it in the end. I would be wary of

the Ruby shark because when they get big they become very territorial and may attack your Clown loaches. Instead I would add in a group of 4 Zebra, Pearl, or Leopard Danios to replace it or possibly 4 Neon, or Glowlight Tetras instead. The Danios will add a bit more movement to the midwater area and the Neons or Glowlight will inhabit the lower middle part of the aquarium. Otherwise you should

have a good mix of fish.

Good luck with your tank, and make sure you stock it slowly. Start with three Guppies (2 female and 1 male) and once the filters have matured (eg Ammonia and nitrite read zero on your test kit again) add in the other fish over a period of a month.

Derek Lambert

Week old baby Siamese fighters are just the right size for new born livebearers to eat.



Can I put my Swordtail & Betta fry together?

Is it safe to put newly-borne livebearer fry in with Betta fry? The Betta fry are only a week old and although they are free-swimming I am concerned that the larger fry might eat them. Is this likely to happen? Ideally I would like to give them a tank of their own but I'm running out of tanks! What do you suggest as first foods? Do Swordtail babies need Brine shrimp, or are they able to take finely powdered fry foods?

Jaki, via e-mail.

Week old Betta fry are an ideal first food for livebearer fry! I think that answers your question.

Use a mixture of newly hatched Brine shrimp and powdered fry food for your livebearer fry. I feed Brine shrimp once a day (usually in the evening) and powdered fry food first thing. Running out of tanks is a real problem for anyone who has a soft heart. Some broods of livebearers just have to be left in the community tank where they will be eaten. This is because a female will give birth to about 30 fry every month. It takes about 6 months to raise the fry to a size when the shops will take them. So that means you need at least six tanks per female to even attempt to raise all the fry. A big swordtail can even produce over 200 babies each brood. To rear them properly you would need about seven 2ft tanks – each month!

Derek Lambert

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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.



Cultivated Swordtails like these have been hybridised with Platies to produce bright colours.

Which species will hybridise?

I know that a lot of Livebearers are able to hybridise between themselves, but I was wondering which ones? So far I have kept Platies, Mollies, Guppies and Swordtails, all in separate tanks so that this would not happen. Can all of the above hybridise, or only certain ones? I can't picture a Guppy mating with a Swordtail because of the size, but I have done a lot of reading and can't find out for sure.

Peter, via e-mail

Only very closely related species will hybridise. In general if the genus (first name) is the same then there is a risk. So Platies and Swordtails, which belong to the *Xiphophorus* genus, will hybridise. Guppies and Mollies belong to the *Poecilia* genus and may hybridise, however, when they do they produce sterile males because they are not that closely related. A Swordtail and Guppy, however, will not produce offspring - not for the lack of trying on the male Guppy's part though!

One fact you also need to know is that just about all cultivated Platies and Swordtails (the brightly coloured fish you see in the shops) are hybrids between 3 different species of *Xiphophorus*. Mollies are hybrids of up to 4 species of wild molly. Only Guppies are a true species and the ones we have in our tanks are so far removed from the wild fish that they look nothing like them. Hybridisation only becomes a problem if you want to breed the true wild forms of these fish.

Derek Lambert

Fishkeeping Answers Expert Panel

All Stalsberg - Cichlids.

Pete Liprot - 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 Gabbott - Killifish.

Stephen Smith - Goldfish.

Bernice Brewster - Koi

and Ponds.



Questions by Post

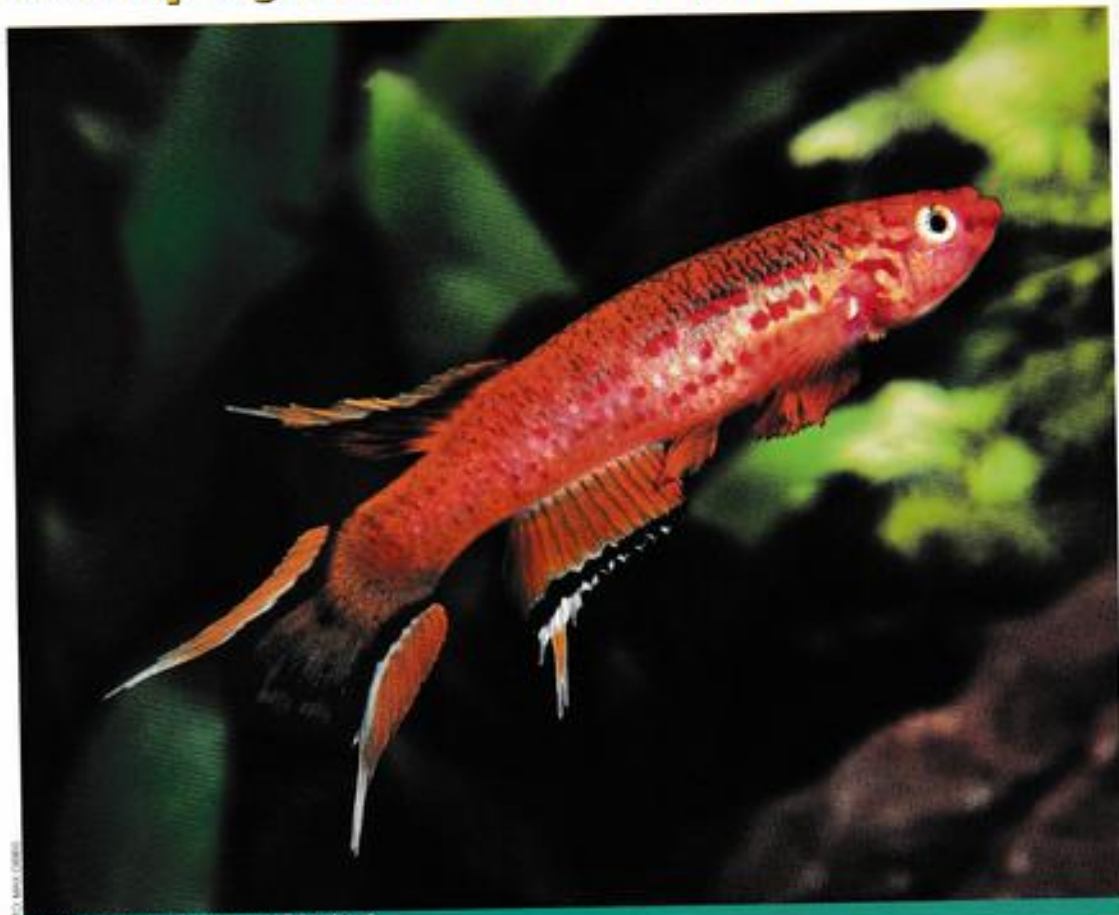
Please indicate clearly on the top left-hand corner of your envelope which person you wish your query to go to. All letters must be accompanied by a SAE and addressed to: Fishkeeping Answers, Today's Fishkeeper, TRIMG Ltd., Winchester Court, 1 Forum Place, Hatfield, Hertfordshire, AL10 0RN.

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: askap@btinternet.com

www.hagen.com

Fishkeeping Answers: Tropical



Aphyosemion australe are an easy fish to breed.

Can you tell me how to breed *Aphyosemion australe*?

I have recently been lucky enough to buy a pair of *Aphyosemion australe*. I would now like to try breeding them, how do I go about this?

Aphyosemion australe is an easy killifish to breed and an excellent starter fish for anyone to try breeding. You will need a separate breeding tank in which to house your pair (this need not be large 12" x 8" is fine for 1 pair). This should have a spawning mop

included in it or a clump of Java moss. This is where the large eggs will be laid. The water must be soft and slightly acidic for the eggs to develop properly. Check the mop or plant every day for eggs and carefully pick them off and place them in another tank to hatch. Development takes about 10 to 12 days at 72 F and the fry are free swimming straight away. They take newly hatched Brine shrimp or microworms as a first food. Some powdered fry food should also be fed to get them used to eating commercial foods. You can keep adding the eggs to your fry tank until the first babies hatch out, after that you will need another tank if you want to harvest any more.

Egg eating angels

My angels have eaten their eggs again. They are in a community tank but with small fish and a Plec. I was hoping that they would get the hang of this breeding lark and start looking after their spawn this time. Do you think that leaving the lights on in the fish tank will help the angels keep their spawn as this may reduce the stress levels of the fish? I am expecting them to breed again next week as I think they spawn every ten to fourteen days, is this true?

Max, via e-mail

Young Angel pairs will usually start off eating their eggs. Eventually

Angelfish often eat their eggs the first time



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Is there a livebearer group I can join?

I am fascinated by livebearing fish and really want to keep more than just the usual run of the mill livebearers you see in the local shops. Is there a specialist livebearer group I could join?

Alan Manser, Southport.

You will be pleased to learn there is a livebearer society you can join. The Livebearer Information Service publishes a quarterly magazine called *Viviparus* and holds regular auctions throughout the UK. Once a year it also holds a weekend convention with speakers and auction. The first auction of the year is on the 24th March at the Midland Hotel, Derby. Contact Alan Rothwell on 01782 317741 for more details about the group and auction. Membership costs £10 and cheques or postal orders should be made payable to The Livebearer Information Service and sent to Alan Rothwell, 94 Emsworth Rd., Blarnton, Stoke on Trent, Staffs., ST3 3EX.



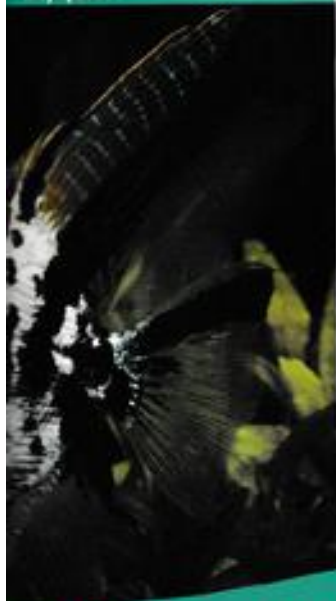
Many beautiful and rare livebearers are available through this specialist livebearer society. This is *Skiffia multipunctata*.

they seem to get the hang of it but it may take many failed broods before they rear a batch. I find some light must be left on in the room. If they fall asleep they will wake up in the morning having forgotten they are their own eggs and promptly eat them.

To rear a batch you will have to

move the other fish out of the tank. The Plec is most likely to eat the eggs. Everyone thinks they are vegetarians but in fact Angel and Discus eggs make very tasty treats for them. I suspect they eat other cichlid eggs in the wild as well.

they spawn.



Star Letter Prize from Hagen



This month the writer of our star letter wins a Nutrafin Master Test Kit from Rolf C. Hagen worth RRP £55.00.

The kit comes in a handy plastic case and comprises Ammonia, Nitrite, Nitrate, pH Low range, pH High range, Carbonate & General Hardness, Iron, Phosphate, and Calcium test kits. Each one comes with its own instruction book which explains why you need to test for each substance and what the results mean.

When keeping fish it is often necessary to adjust either the pH and/or the hardness. With this Nutrafin Master Test Kit these parameters are easy to monitor and adjust so the optimum conditions are created for the fish in your aquarium you are trying to encourage to spawn.

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Fishkeeping Answers: Marine

star letter



Royal Grammas are stunningly beautiful fish.

Can I convert a 7 gallon aquarium to marines?

I currently have a very small 7 gallon brackish water aquarium. I would like to convert this into a marine aquarium. I would like to ask what type of filtration would be the best for this little tank. I currently run an Eheim internal filter, is this O.K. to use in a marine tank or do I need to change it? Also I would like to know whether a standard tube light would be sufficient for keeping marine fish (not corals). If my current filter is O.K. to use in the marine tank, should I clean the waste out or leave it in to help mature the tank?

Sean Ridley
via e-mail

The fact your aquarium is only seven gallons really stresses the need for good equipment. If things go wrong they will do so at a very fast rate. To reduce the risk of this, invest in a small external filter, to be employed as both a chemical and biological filter, and fill it with the best media possible. Your tube light will be fine as long as it is under 12 months old. Use a good skimmer and clean it every three days. The one good thing about a small set up like this is you can aquascape it with around 3 kgs live rock so you won't have to spend a great deal of money to get a belting tank. The one thing I must stress is that with the money you save, spend it on a very good range of test kits as you will have to test every 3 days and keep a record of all results.

Andrew Caine

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for all your marine keeping answers

How much of my wish list can I have?

I recently set up a 60 gallon marine tank based on the following :

Jewel system with the internal filter being used for polishing the water with a section of denitrifying beads and a venturi. Eheim 2213 external filter packed to the gills with biological media. Fluval 204 external packed with Rowaphos, Prizm skimmer and Aquaclear powerhead for circulation around the base of the tank. I have included 40 kilos of good quality living rock and have both white and actinic tubes fitted.

I am not one of those people who rush into things and I am more than happy to take a couple of years over stocking the aquarium.....Which is where my query lies. Ideally I would like:- 3 Blue Damsels, 3 Domino Damsels, 1 Goby, 1 Royal Gramma, 2 black Clownfish and of course a good sized cleanup squad. How much of this 'wish list' could take up residence given the limits and taking into account that I intend a fish only system? After all, I would not wish to cause suffering to even a Bristleworm by inconsiderate overstocking.

Mark Hides (Sheffield).

Your set up sounds good and, coupled with your willingness to take your time, you should have few troubles, as long as you read as much about the animals you want to keep as you did about



Blood shrimps need iodine to moult successfully.

setting up the aquarium. Personally I would not introduce Damsels and the big 'no, no' is to have two different species due to the possible fighting. However, if you want a Damsel then go for six Electric blues as most of the time they calm down when in a shoal. The rest of the fish are fine and you could go to a maximum of 30' of fish if you have 60 gallons of water after rock displacement.

Mystery death

This morning I came downstairs to find a Blood shrimp cast on the sand. When I removed it from the aquarium I found that it was in fact a shrimp which had died. On examining it I found the shell had split at the point where the body turns into the tail, obviously this injury is the cause of the death but I am puzzled as to what killed it. I have a 40gallon reef system which has a high stock of cleaners, high

stock of corals but only two clown fish. Could it be possible that I have a mystery guest such as a mantis shrimp that has come in with my live rock. Also, during the last month I have noticed that some of my established corals are not performing as they previously have been doing even under halides and well fed with coral food. All my water parameters have remained stable and good for over one year, I have not had any trouble of any kind during that time. Please could you help as I am a little concerned and confused.

John Peters, Yorkshire

First may I congratulate you in your efforts, you obviously have a balanced aquarium which I think is lacking in one substance only. First let me reassure you that you have not got a mantis shrimp as the dead blood shrimp *Lyssmata debelius* would be in bits and mostly

consumed. Without doing a full analysis of your water the two clues you have given, the way the shrimp perished and coral deterioration point to an iodine deficiency in your water. Shrimps need iodine to moult, your shrimp tried to moult but the skin tissues could not detach from the old cuticle (skin) resulting in it's death, also your corals need this element to behave themselves. As you have live rock and large amounts of corals and cleaners if you add iodine it is being absorbed rapidly from your system. Get a test kit, Salifert produce a good one for around £19.99 and increase your iodine dosage until you reach an iodine level of 0.06 ppm and keep it at this level. You will find that your calcareous algae and corals will bloom. Also when you add the iodine you will find that 90% of your crustaceans will moult overnight.



Electric-blue Damsels can be kept in a shoal and tend to be less aggressive

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Star Letter Prize from



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Fishkeeping Answers: Coldwater

Why won't my Shubunkins breed?

I have been a reader of A & P for very many years and would like to congratulate you and your colleagues on moving to a new modern format with high quality content.

My experience, since 1938, is with pond Goldfish outdoors and freshwater tropicals indoors and since 1972 also Marines. With advancing years I decided to change to a less demanding work load. So last year I stopped stocking the outdoor pond and gave away the indoor tropicals & marines and started a tank of Goldfish. These are London shubunkins. I had grown them in the pond and selected the six best for my indoor tank with a view to breeding. They are all about six years old and a hand's width long - may be eight inches without the caudal fin.

Alas, after nearly eighteen months indoors there has been no sign of the fish wanting to breed! I find it unlikely that they are all the same sex. A friend of my son, who raises Koi, has told me that the fish need an artificial winter/summer seasons to be encouraged to breed. I could do this by varying lighting and temperature seasonally, however, I am not sure that what is right for Koi is right for goldfish. Do you think his suggestion is sound?

John Butler via e-mail



London shubunkins, in common with most temperate fish require a fallow period over winter where they can experience a 'freeze' to reset their biological clock.

Your shubunkins require the same environmental stimuli as koi (increase in day length, water temperature) but will require a fallow period over winter where they can experience a 'freeze'. This appears to re-set their biological clock, which is necessary when wishing to breed these temperate cyprinids. This is the approach that professional breeders/farmers use reliably. A pond is virtually essential to achieve these desired results as you simply leave the natural seasonal cues to work on

the physiology of the mature fish. Even though fancy Goldfish will spawn in an aquarium, it is usually after they have been conditioned in 'natural' conditions that only a pond can provide, and a repeated spawn is very rare. Unfortunately, it sounds as though you may have filled in your pond too soon, as it would have proved invaluable in bringing your shubunkins into condition for spawning.

Ben Helm

Is my setup correct for Goldfish?

I have a group of Goldfish in a 4' x 1.5' x 1.5' foot all glass tank. The tank has 2" layer of rounded silicon sealed pebbles on the bottom and three decorative rocks and about two dozen artificial plants [screening the filter connections at the back]. I calculate the free water volume in the tank as seventy gallons and that there are 2.5 gallons outside between the two Eheim 2026 Pro canister filters [output 150 gph each]. One filter has activated carbon and the other Eheim bio substrate [sintered quartz I think]. Aeration is from Ventura induction by the power filters and also three large air stones at the back of the tank driven by a Rena 600 air pump. The water is derived from an R.O. unit delivering a trickle feed of twenty five gallons per day with open 1/2" overflow to the

main drains. The mains water here is very low quality and high in nitrate. Each filter output is passed through a 30 watt UV filter. Water quality seems fine, no nitrates or nitrite, pH 6.9 - 7.0, temperature 20C, dissolved solids 60 parts per million. The tank has indirect North daylight and 30 watt high colour fluorescent tube for viewing which is on for one hour daily. I feed proprietary dried pellets six days a week and deep freeze blood worms on the other day. The fish have shown a small growth since being moved into the tank. Do you think this setup is correct for my fish? A friend has suggested my pH is too low and that I should load one filter with limestone sand. The water would of course then be much harder and therefore less easy to manage - probably there would be algae blooms. I do want to keep the maintenance to a minimum.

Peter Radcliffe, Bridlington.

Regarding your water quality, I agree with your friend in that your pH is too low (and probably liable to a rapid crash in the future). This has come about by using RO water and an inert substrate. I suggest you add a source of calcium carbonate to your system (filter or aquarium) to bring the pH up to 8.0 - 8.5. This will reduce the risk of rapid pH swings and provide a more comfortable environment for your Shubunkins.

Ben Helm



In very soft water, such as that produced by an R.O. Unit, the pH is prone to suddenly drop which will kill even hardy fancy Goldfish such as this Sarasa comet.

Creating a Community

Most aquarists keep communities of fish rather than specialist set-ups. Here **Kathy Jinkings** suggests another group of community fish ideal for you to mix and match in your own aquarium

A COMMUNITY TANK IS THE STARTING POINT for most fishkeepers, and although their interests in different species of fish may grow and fade throughout their fish keeping careers, many retain at least one community throughout their lives. The community tank has much to recommend it; by careful choice of fish you can ensure that there will always be at least one species out and about, and fish can be combined to achieve a balance

between beauty and interesting behaviour.

A successful community gives the owner a window on to the natural world in which the fish can be observed behaving in much the same way as they would in their natural environments. Of course, the tank must be a compromise — few fishkeepers would consider introducing a predator every few days to watch the little fish frantically try to get out of the way, and most do not feel the need to drain all the water out once a year, leaving their fish to flap in a rancid

puddle to simulate a dry season. Although you may choose to have fish and plants all from the same natural habitat, many fish that would never meet in nature can be combined in a community. This will provide a display that, while not a perfect representation of a real river somewhere, nonetheless allows you to watch many aspects of relatively peaceful fish behaviour. Provided you select species that have the same requirements for water chemistry, a wide variety of fishes can be kept together healthily and happily.

Winking catfish

The catfishes are a wide ranging family that have representatives native to most parts of the world, and no community is complete

A successful community gives the owner a window on to the natural world in which the fish can be observed behaving in much the same way as they would in their natural environments

without one or more species. Immediately attractive to the new fishkeeper's eye are the Corydoras; although none are brilliant in their coloration, these endearing little fish justify their place in a tank by constant



Corydoras panda is a personal favourite of Kathy's.

activity. Many an aquarist has bought some of these after being sure that they saw one wink at them in the shop. This impression is given by their articulated eyes, and is only one of their charming characteristics. They are very sociable fishes, and will be sad and stressed if kept alone. To see them at their best keep a group of about six. *Corydoras panda* is a personal favourite. These small beige coloured fish have black 'panda' markings around their eyes, and are always bustling around the tank looking for food or anything of interest.

Whiptail catfish are peaceful and quiet. They like nothing better than to stretch along a piece of bogwood, where their long thin bodies blend in surprisingly well. Although at first sight the novice might think that they may as well keep sticks, these fish grow in interest as the fishkeeper becomes more familiar with them. Once they have



Pelvicachromis pulcher. Pulcher is Latin for beautiful, and its is exceptionally beautiful.

and should not be kept with anything too boisterous.

Troublesome Cichlids

Cichlid fishes are at their best when looking after fry; they are usually diligent parents and will shepherd their young carefully around the tank until they are old enough to look out for themselves.

Unfortunately, it is this same interesting behaviour that can cause trouble in the community tank. Normally shy and peaceful fish can become absolute terrors when they think that their new family might be threatened. This is not to say that you



Bolivian Rams (Microgeophagus otispinoso) are ideal for a community tank.

settled in, when the males are ready to spawn, they grow a bushy 'beard' at the sides of the head. Algae and vegetable feeders, these fish will be out and about looking for food at dawn and dusk, and will often come out if the tank lights are switched off. You can then watch them going about their business by the light from the room.

Although many aquarium catfishes are bottom-dwellers, the ghost catfish, *Kryptopterus bicirrhus*, is an active midwater shoaling fish. The interest of these fishes lies in their transparency; each fish is completely see-through, except for the skull and digestive organs. These ethereal fish prefer a strong current, and eat live food or flakes carried on the current. They are a little sensitive,



The Crescent Zoe, *Zoogoneticus tequila*, will live and breed happily in a quiet community tank.



The five inch (12.5cm) Lake Kutuba Rainbowfish (*Melanotaenia lacustris*) is liveried in shimmering blue as adults.

cannot add a pair of cichlids to your community, but the best choice is a single pair of a small species, in a tank of three foot (1m) or longer. This will give the parents room to set up a small territory when spawning, and will give the other members of the community room to get out of the way. Lots of plants and décor which break up the line of sight will also help maintain peace and harmony.

Kribis are often seen in the aquarium shop as rather boring greyish fish with a black line; these shy juveniles will live up to their Latin name of *Pelvicachromis pulcher* as soon as a pair has settled in. Pulcher is Latin for beautiful, and kribis are exceptionally beautiful once they feel secure. In three to

Lots of plants and décor which break up the line of sight will also help maintain peace and harmony

four inch adult fish the female can be identified by her red belly, and the colours intensify as they become interested in starting a family. The fish become shimmering wonders of black, gold, red and blue as they display to one another before finally depositing a batch of eggs in a small cave. Although not as beautiful as the kribis, the African blackhead, *Steatocentrus casuarius*, is similar in its habits. These fish

are brown with a pronounced bulge on the top of the head, especially in the male. However their somewhat drab appearance is redeemed by beautiful blue eyes. The males can grow up to four inches (10cm), with the females a little smaller.

Aequidens curviceps is not seen that often in aquarium shops, but is well worth another look if you do find it. One of its common names is the Flag cichlid, but since this name is shared by various other, less tolerant, cichlids, it is best to check its Latin name, or refer to it by its other common name of Sheepshead acara. Plain brown when nervous, when settled in these fish have dark shades of green and blue, and appear to be constantly smiling due to black markings on the face. These relatively peaceful cichlids are shy when not spawning, and at a length of 3 inches (7.5cm) make a good addition to a large community tank. When the time comes to spawn, they will clean a flat surface and deposit their eggs there, although this is unlikely unless you can provide them with soft water.

The Ram, *Mikrogeophagus ramirezi*, is a beautiful but shy and delicate fish. Less well known is its cousin, the Bolivian Ram (*Mikrogeophagus altispinosus*). Although not quite as beautiful, it is nonetheless attractively patterned with a black eye stripe and brilliant red edges to the fins, and is considerably hardier. A pair of these three inch (7.5cm) fish are ideal for a community, but they are quite hard to sex. You may have to buy a group and wait until a pair forms before taking the rejects back to the shop. These attractive cichlids prefer softer water, with low hardness, but adapt

much better to harder water than the ordinary Rams.

Loveable livebearers

Livebearers, in many of their forms, are staple inhabitants of the community aquarium. There can be few fishkeepers who have never owned Guppies, Platies or Swordtails, all of which are excellent community fish. The small Guppies, with their long flowing fins, are suited to a quiet tank where there are no lurking fin nippers, while Platies and the larger Swordtails are less tempting to harass and ideal for a more active community. All of these fish will reward their owner with regular broods of live fry. In the community tank most will get eaten, but there are usually a few survivors from each brood. Care must be taken that the aquarium does not become overstocked from these regular new additions.

Some of the goodeids are less suitable for communities, being pugnacious and prone to harass anything that catches their eye. The Crescent Zee, *Zoogoneticus tequila*, however, make an excellent addition. These will live and breed happily in a quiet community, and their bright yellow tails make them attractive inhabitants. They relish live food, but will quite happily eat anything that passes their way. Most of the livebearers prefer harder water, and all those mentioned here, while adaptable, are no exception.

Bounding Gobies

Gobies are always fascinating inhabitants of the community, and one that is occasionally available is the Striated River Goby, *Awaous strigatus*. This is a silvery grey fish, with bright purplish-red stripes banding the body and fins. Like all gobies,

They require a staple diet of meat; bloodworms are particularly enjoyed. On occasion they will take flakes, but to keep them successfully they do need regular feedings of either live, or frozen live, food. It is unusual for these fish to spawn in the aquarium, but if they do you will find the male guarding what appears to be fine dust on a flat surface. This dust is composed of the incredibly tiny eggs, and unfortunately the fry are so small when they hatch that, to my knowledge, nobody has successfully reared them. This should not be allowed to detract from their value as aquarium inhabitants, however — not only are they attractive, but their bounding gait as they move around the aquarium gravel, occasionally burying themselves with just their eyes sticking out, will entertain the aquarium keeper for long periods. At about four inches (10cm), these gobies are suitable for most community tanks.

Over the Rainbow

Rainbowfishes are ideal for those who find that most of the prettiest fish seem to need softer water. These fishes are all

exceptionally beautiful, thrive in hard water areas, and come in a range of sizes and colours to suit every taste. The five inch (12.5cm) Lake Kutubu Rainbowfish (*Melanotaenia lacustris*) is liveried in shimmering blue, while the six inch (15cm) *Glossolepis incisus* is a bright metallic red.

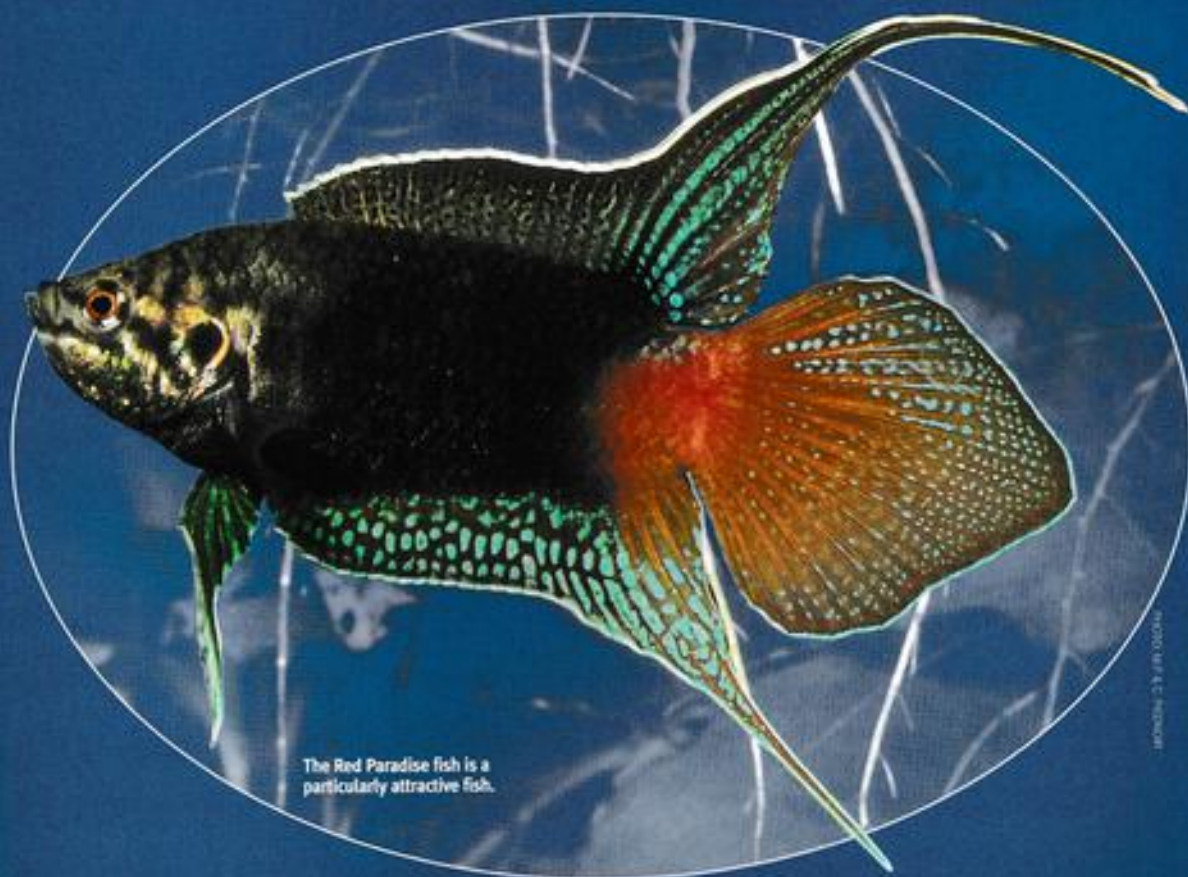
For those who can't make up their minds about colours, there is the four inch Boesemani Rainbow (*Melanotaenia boesemani*). The males of this species have front halves that are bluish-grey, and back halves that are a striking orange. All these fish are active, but gentle, and a group will provide a display bright enough to satisfy the most demanding fishkeeper. Like most fish, live foods are preferred, but they also enjoy flake food.

Alternative Paradise

The Paradise fish (*Macropodus opercularis*) is a beautiful but aggressive fish unsuited to community tanks — however it has some less well-known cousins whose habits are more suited to a peaceful tank. The Black Paradise fish and Red Paradise fish are striking animals, whose careful bubble-nest

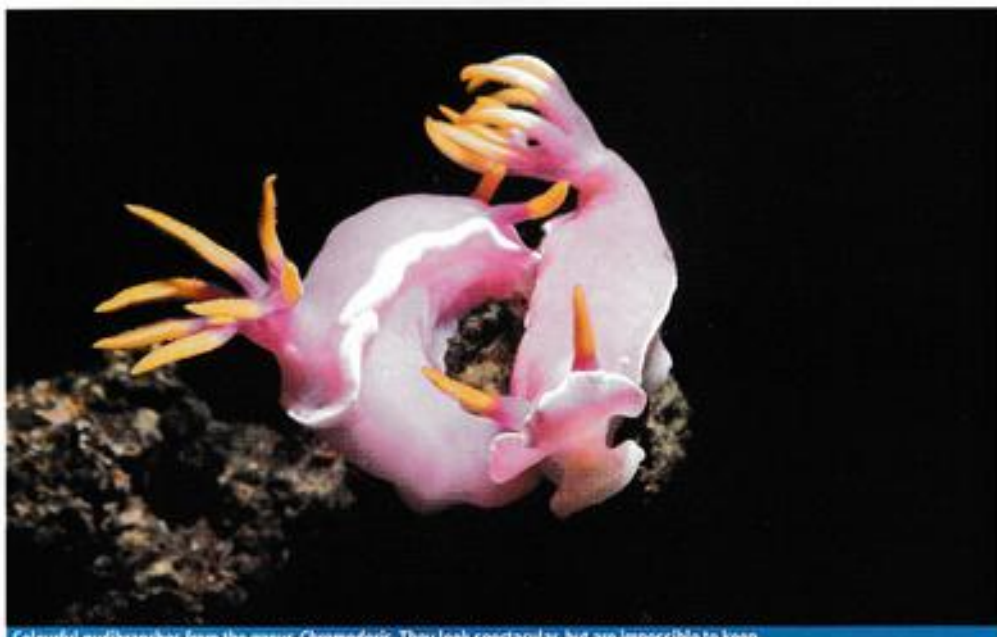
building practices will provide a great deal of interest in the aquarium. Although the male becomes aggressive when guarding his nest, his depredations will be restricted to the area of the nest and in a reasonable size tank the other inhabitants will be able to avoid him easily. Paradise fish are air breathers, and if you want to raise the fry of these four-inch (10cm) fish, you will need to move the nest to shallow water with warm humid air above the water surface. This allows the tiny fry to take their first breaths. They do prefer soft water, especially for spawning, but can be acclimatised to neutral water.

There are many hundreds more species of fish which can be kept together in a community, and there has been room to discuss only a few of them here. Ideally your community should be stocked with peaceful fish of roughly the same size, and there should be enough room and décor for the fish to avoid each other if they want to — even in the most peaceful group disputes do occasionally break out. With these provisions in mind you will be able to maintain an aquarium which will provide you with endless hours of fascination. ■



The Red Paradise fish is a particularly attractive fish.

PHOTO BY A.C. ANDREWS



Colourful nudibranches from the genus *Chromodoris*. They look spectacular, but are impossible to keep.

“Impossible” animals

Part One

HAVE YOU EVER SEEN A DELIGHTFUL Nudibranch at your local pet-shop, taken it home with you only to see it vanish in a day or two? Have you ever bought a Butterfly fish only to find out that it will not eat? Have you ever seen a Feather star losing all its “feathers” and end up like a rosette of crawling legs?

I believe many of you will respond “yes” to at least one of these questions.

The heading of this article indicates that we are dealing with something “impossible”. In this context “impossible animals” mean animals that under normal circumstances will not survive for more than maximum a few weeks in a reef aquarium. Or... buy these animals and you will end up with a dead animal in a few weeks - for sure!

This does not mean that the “impossible” animals are impossible to keep under all circumstances. It means that the average aquarists cannot keep them alive. It means that they require very special care and treatment from advanced and very serious enthusiasts who build set ups specially designed for these animals’ needs.

In this part of my column, which is the

Alf Nilsen focusses on some of the more difficult marine creatures to keep in captivity

first in a series of several dealing with selected animals, I shall present a small selection of “impossible” animals that are common or occasionally seen in the trade. If some of you have experiences with the keeping of these animals that differs from mine, please let me know.

Why are some animals “impossible”?

In most cases the “impossible” has to do with food, either food preferences or amount of food available. When an organism does not eat, it gradually weakens, which in turn makes it vulnerable to parasites and sicknesses. The result is death, either from malnutrition or from lack

of nutrition directly or from sickness or parasites indirectly. In other cases the causes for being “impossible to keep” can be linked to size or environmental requirements, such as water quality, amount of space available or to the combination of organisms kept together.

Which animals are to be regarded as “impossible”?

Several in this part we are dealing with only a few.

Colourful Nudibranches are certainly attractive with their bright and diverse coloration. The vast majority of the colourful



The Lettuce Sea Slug (*Elysia crispata*) feeds on several groups of algae. It is by far more durable than other sea slugs and has even been raised in captivity.



Chelidonura varians, a beautiful sea slug feeding on tiny invertebrates. Sometimes seen in the trade, but very hard to keep alive for a longer period of time.

species are, however, food specialists that feed on other invertebrates - often even on a single or a few selected species of sponges, hydrozoans or bryozoans, in nature the Nudibranchs are often located and captured on their prey, and never or rarely voluntarily leave their host. Their fantastic colours make them irresistible for customers, but are in fact signals to the predators saying "I am poisonous, don't try to eat me". In all circumstances - in the reef aquarium they will die after only a short time, they should never have been caught and removed from their natural habitat. There are exceptions, but they are few. Parasitic Nudibranchs, such as small species feeding on corals, enter the aquariums as hitch-hikers on their hosts. These will survive and often even reproduce, as there is plenty of food available, but are not at all loved by the aquarist! The Aiptasia-eating Nudibranch (*Berghia verrucicornis*, see my column in the September issue of this magazine) will survive as long as there are Aiptasia available. That's about it!



Stay away from the colourful Nudibranchs, they are "impossible" food specialists.

Sea slugs

Sea slugs resemble nudibranchs and are closely related to them. Both groups are molluscs belonging to the class Gastropoda and to the subclass Opisthobranchia, but while the true nudibranchs are grouped in the Order Nudibranchia, the "Sea slugs" are →

spread over several orders showing a range of morphological specialities, not least when it comes to food uptake. One group of the Sea slugs is the "sacoglossans", which have highly modified feeding apparatus that is designed for sucking plant fluids out of algae. (This matter is complex, but the next volume of our book-series "The Modern Coral Reef Aquarium" - volume 4 to be published in May 2002 - deals with it in detail).

Not many species of sea slugs are available in the trade, and this is all to the good, as they truly belong to the "impossible" animals. One species - the Green Sea Slug (*Elysia ornata*) - is, however, relatively commonly seen in aquarium shops. The species is beautiful and just like the true Nudibranchs, almost irresistible when it comes to coloration, but, like them, the Green Sea Slug is also a food specialist feeding exclusively on green algae from the genus *Bryopsis*. Many reef tanks contain *Bryopsis* in their early stages, but these filamentous green algae usually disappear during the first year.

Another sea slug is the "Cauliflower Sea Slug" (*Elysia crispata*, formerly known as *Tridachna crispata*) which is found in the Caribbean. This species is somewhat simpler to keep in captivity than the Green Sea Slug as it seems to feed on a broader range of algae. Such species as green algae of genera *Caulerpa* and *Halimeda*, as well as on *Sargassum* and green filamentous algae. Like some other sea



The Orange Cup Coral, *Tubastrea* sp., is a non-photosynthetic coral that gets all its nutrient from capturing plankton.

tropical marine coldwater & ponds plants regulars



Typical appearance of a Feather star (*Oryzomachus bennetti*) on a tropical coral reef. The cirri ("feet") anchor the animal to a coral and hold fast in heavy current while the feather-like arms capture passing food particles.

slugs it utilises the plant pigments (chloroplasts), which are taken in and structured in to the body, and are responsible for variable colour patterns in the species. Although the Cauliflower Sea Slug has been kept successfully many times, and even successfully raised in captivity, it needs algae food and special care to survive.

Some Sea slugs are carnivorous, feeding on other animals. Among these are the *Chelodanura* species in the family Aglajidae. These are often found on sandy bottoms where they hunt for tiny invertebrates living buried in the substratum. Some species feed on parasitic flatworms living on corals, but all species are in principle "impossible" to keep in captivity.

Feather Stars

Divers of the tropical coral reefs cannot avoid seeing the Crinoids or Feather stars, as many prefer to call them. With their colourful arms exposed into the open ocean they cling to corals and gorgonians on the reef edges and in the reef slopes. Here they feed continuously, but most are active during night. What do they feed on? Well, their food regime is not fully understood, but vast quantities of minute plankton (both zooplankton and phytoplankton) is probably a major part of their diet. Personally, I believe the Feather stars belong to the truly "impossible" animals. I have yet to see a feather star surviving more than a few weeks (at the most!) in a reef aquarium. Please let me know if anyone have seen or done better!

The crinoids are a primitive group of Echinoderms that contains about 600 known species, but has a record of more than 5000 extinct species known from fossils. The animals are fragile, built with

mouth-plate (calyx) containing a number of "feet" (cirri) and from five to 200 feather-shaped arms. The complete structure is mainly designed for doing two things, which are holding fast in heavy current and capturing minute live food and organic particles. In captivity, both the amount of current and the amount and quality of food is insufficient. The result is that crinoids kept in captivity lose their fragile arms and degenerate to a ring of feet (cirri) with pieces of broken arms sticking up - a disastrous sight!

Corals

There are many "impossible" animals among the corals, and we shall return to more of these in a later part of this column. Let us finish this part by looking at one of the most common genera of stony corals found on tropical reefs, the Orange Cup Corals from the genus *Tubastrea*. Should these really be included in the term "impossible animals"? "No" and "Yes", which requires some explanation.

The Orange Cup Corals belong to the ahermatypic- or non-reef building corals that lack symbiotic algae. This means that they cannot utilise energy from the sun through host's photosynthesis, but depend completely upon capturing plankton for filling their nutrient budget. The individual polyps are large and the colonies have yellow or orange colours, characters that underline this. In the wild the *Tubastrea* species are normally found on vertical slopes or under overhangs and in caves, away from the most intense light, often growing with their polyps hanging down rather than pointing upwards.

The Orange Cup Corals, which include several species, but with *Tubastrea coccinea* being by far the most common one in the

trade. Most often they are offered as small, round colonies, which have a red colour when retracted and beautiful yellow colours from the polyps when expanded. If kept in a community tank, either placed in the shade or in moderate light among other corals, the Orange Cup Coral will most likely fade after a few months. That is why we can justify adding them to the "impossible animal" group. On the other hand, if given special care and kept in an aquarium with plenty of water movement and moderate light and fed regularly with live and frozen plankton, the Orange Cup Corals can live for long and even grow. This is why we can also say that it is false to name them "impossible".

Why not try to build a small selected tank where these corals play first violin? The tank can be small, 50 litres should do. A small internal skimmer and maybe a small filter with activated carbon. Weak fluorescent light, a powerful circulation pump and a few pieces of live rock forming an overhanging slope are other parts of the system. Take your time to let the calcareous algae settle and dominate. After a few months you can add the first pieces of Orange Cup Corals. Drill a hole in their base and anchor them with plastic screws. Do not forget to add Brittle stars that can act as vacuum cleaners. Keep a small Goby or two and maybe a Pistol shrimp to go along with them, but do not add many other animals. Gradually increase the number of Cup Corals and learn how to take good care of them. Experiment with various live foods and try to feed each colony directly by pouring live plankton into their polyps. Perhaps you will find the Orange Cup Corals to be not at all "impossible"? ■



Write to Alf

Alf would love to hear from any readers who disagree with his views on which animals are impossible to keep in captivity. Don't just write in with the comment you keep this or that animal Alf has said should be included in the "impossible" category, but include details of how you managed to keep them alive and for how long. Aquarists who share information in this way are pushing back the barriers in marine husbandry all the time.



The Modern Coral Reef Aquarium

The Book by Alf Jacob Nilsen & Svein A. Fosså

Available from
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Bangka Bettas and Belitung Belles

The Burgundy fighting fish, *Betta burdigala* grows to about 5cm and is a bubble nesting species.

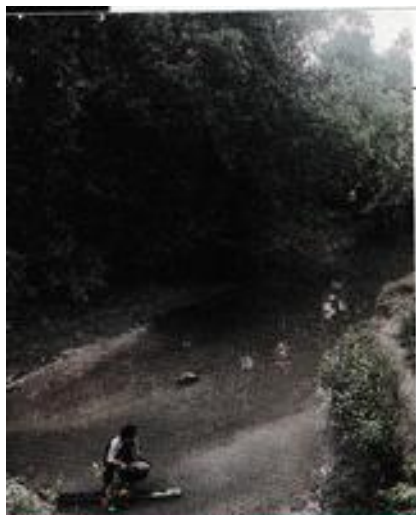


David Armitage
goes in search of
the first Liquorice
gourami

BANGKA AND BELITUNG ARE TWO SMALL Indonesian islands just off the coast of south Sumatra. Their ichthyological importance lies largely in the fact that the first Liquorice gourami, *Parosphromenus deissneri* was described from Bangka by the Dutchman, Bleeker, although the specimen was a female and thus undiagnosable, so not until recently was the species re-collected and re-described. For fellow AAGB member Allan



Habitat 1, in the piddles on the flooded forest floor Dennis caught the first specimens of *Betta burdigala*.



Site 12 near Rengan was a broad river with clear water and a base of sand and red gravel where we Allan and David found their first Belitung Paros and Chocolate gouramis.

Brown and I, the variety of labyrinth fish likely to be encountered there would be an interesting contrast with Malaysia and a gentle introduction to Indonesia.

On arrival at the domestic Merpati terminal at Jakarta, we had a real taste of Indonesia as our names weren't on the flight list, so Allan practised the gentle art of polite insistence which saw us safely on our way. We had been befriended by Nouveanty Bahar, a lady who worked at one of the beach resort hotels and she made sure we were fixed up with a taxi drive to Pangkalpinang where we booked into the Hotel Sabrina, at the princely sum of 200,000 Rupiah (£7) per night for a room.

Fortunately, we were adopted by one of the hotel managers; Darwin, named after the north Australian town. Darwin took us in his old jeep, to the locals' beach in the afternoon, where we enjoyed a coconut in a local bar, surrounded by chickens and cats and we treated Darwin to a sample of our hobby as we stopped to fish a small creek not far from the sea and found Pufferfish and Panchax. It became clear that Europeans were a novelty here as everyone greeted us with broad grins and a shouted 'Hello Meestair'.

Next day we were joined by Tony Pinto from Boston and Dennis Yong from KL, and by that evening, we had arranged hire of a Toyota Kijang which Darwin was keen to drive for us. With Dennis on board, language was no longer a problem as Malay and Indonesian are largely interchangeable.

On Tuesday at 0630, after a breakfast of gritty coffee and Nasi Goreng sandwiches, we departed on our first field trip. We headed south toward Tobali, passing all the hallmarks of the island: fields of peppers, mats of peppers drying on doorsteps plus abandoned and working tin mines. We found that the houses were strung along the main roads in an almost continuous chain. Usually there was a stream at each end of the village, which provided the water for bathing and washing.

Our first location

We stopped near Bihang, with a co-ordinated



sight of appreciation when we found pools of beautiful blackwater by the roadside, which was the type locality of *Betta burdigola* in a tiny fragment of peat swamp forest, barely a km long (Site 1). As always, this water was being used for bathing and washing cars although in this case, it was far enough from any village so that soapy clothes-washing operations were not going on. This does prove a bit of a hindrance to fishing operations in the peak washing hours of the morning and early evening as it's hardly etiquette to climb, with waders and nets, into the midst of housewives washing clothes or bathing beauties.

I started to fish in the deep, black water, so just wore trunks and a shirt, catching a couple of *Parosphromenus* (Liquorice gouramis) before moving into the shade of the forest and shallower water. Here I was enthusiastically greeted by swarms of biting horse flies so, by the time I got out into the sun again, it looked as though I'd contracted a rare tropical pox. I found Chocolate gouramis (*Sphaerichthys osphromenoides*) in the ditches along with the small mouthbrooding *Betta edithae*. In the puddles on the flooded forest floor Dennis caught the first specimens of *Betta burdigola* announcing that he'd 'hit the motherload!'. Wading through puddles, sometimes only

caught on this site was *Betta chloropharynx*, a 'big yellow' mouthbrooding species. These peat-swamp habitats are not stagnant and a flow of water constantly runs through them.

The next day, we took the remnants of the Air-Bara to Paejong road. Our first site of the day (2) was a big river with quickly-flowing milky water. Here we found small 'Paros' in floating islands of *Ambulia* like weed, presumably refugees washed out by the night's rain. Our second site (3) was a little washing place with clear water over leaf litter where we found Paros in the roots and baby *B. chloropharynx* in puddles on the forest floor. Finally, close to the type locality of *Betta schalleri* (site 4), we found young *B. chloropharynx*, I thought mixed with *B. schalleri*, near an illegal tin-mining site.

On the third day, we took the Mentok road to Pudubesar, where we turned right toward Sungkat but first headed just north of the capital to look at habitats near the capital



This blind catfish, *Ngichthys* sp. was also found at Habitat 1.



A rare find on the island was *Sphaerichthys selanotensis*. This species in good condition is bright red with a red eye. This one was caught at site 12.

ankle deep, sometimes thigh deep, occasionally breaking through the leaf-litter crust and plunging up to my chest in water proved exhausting, but at least we were in the shade and rewarded additionally with immature *Betta bellica*. The other *Betta* we

where *P.deissneri* was first caught. Allan fished a stagnant lily pond by the side of the road in full sun, not far from the tell-tale estuarine habitat of mangroves and found *Betta edithae* and Panchax before we continued with our original itinerary. →

Break down

Darwin was experiencing obvious trouble changing gears and eventually we ground to a halt and discovered we had no clutch fluid. While Darwin took a lift into the next town to purchase some, Allan and Dennis placed branches in front and behind the car as a warning to other traffic and we directed the flow around our breakdown. Finding we were close to a bridged stream (site 6), Dennis decided not to waste the opportunity and was soon catching *Paros* and we joined him. Dennis and I each caught large *B.pugnax* /*schalleri* here, and Allan concentrated on the baby *B.chloropharynx*, once more in the puddles on the forest floor. A little further along the road, Allan explored two smaller streams (sites 7 and 8) and found a different *Parosphenomenus*. This one had a definite filamentose tail and a red flush on its flanks. Allan had to work hard in the overgrown stream to catch specimens, so at the last habitat (site 9) of the day, it was down to Tony and I to join the bathers and catch the *Paros*, both in the main bathing area and in little side branches off the main flow.

Saturday we chose to travel north to the resort of Sungaikat and beyond. We decided to divert at Riau and take a road branch leading back to the Mentok road near Kelapa and here found a wide and deep blackwater stream in heath forest (site 10) where we found juveniles of *B.schalleri/pugnax* mixed with *B.chloropharynx* sheltering between roots.

The island of Belitung

On Sunday, Darwin drove Allan and I down to the harbour to catch the jetfoil. As the land slipped away with the light, we passed fleets of small fishing boats and then, apparently in mid-ocean, small wooden platforms. After 4 hours we squeezed into the port of Tanjungpandan, and allowed

ourselves to be kidnapped by one of the taxis and driven to the Hotel Martani. The hotel's greatest assets were the staff, a delightful collection of unaffected young ladies who just had to look at us to burst into fits of giggles and watched us with wide eyes from behind the bar, like a little clutch of red nestlings in their uniforms.

Allan and I were now on our own, and had to lean heavily on our Indonesian phrase book. I developed the technique of



The first Ligoorice gourami, *Parosphenomenus deissneri* was described from Bangka by the Dutchman, Bleeker. This specimen was found at site 9.

composing a sentence from individual words and writing it down in my notebook. I would then give a recital of what I'd written and if all else failed, could hold up my writing if my accent proved too incomprehensible. Thus, "Besok - sewa mobil - apakah anda bisa menguraskan ini untuk kami" (tomorrow-car hire- can you arrange it for me?). This proved successful because in the afternoon, Yanto turned up with his Toyota Jantan and was our driver for the next three days. We briefed him on his mission (should he accept it). "Kami-mencari -air hitam -sungai- kecil - hutan-ikan" (we - look for - blackwater - streams - rivers-forest-fish) and he seemed unperturbed at the prospect.

First days journey

Our first day's circuit saw us taking in the north of the island, to Mangar via Sijuk and Buding, returning home via Rengan. Somewhere near Singpongopot, we found a nice stream in open scrub with colourful *Betto edithae* in the grasses and reeds and a baby *Belonia hasselti*. There were also Blue Panchax and Rasboras.

Our spirits rose in the afternoon when we found a most rewarding site (12) near Rengan. It was a broad river with clear

pleasant atmospheric forest and nice brown water in this region but our sampling produced few fish other than *Betto edithae*. Finally near Ruso, we found another deep and quite fast stream, fringed with rushes, with large Barbs and Rasboras clearly visible in the clean water among upright stands of 'Ambulia' (site 13). Once again, we were able to catch *Paros* in quantity.

A rare find

Our final day's fishing took us to the south east of the island, taking a circuit via Badau and back home via Rengang. We stopped for lunch, near Lilangan by another deep stream with shoals of large Barbs and Rasboras (Site 14). As I got in, I noticed a large Chocolate gourami swimming past and shoals of tiny, transparent Rasboras, so small that they passed straight through the net. Soon I was collecting Chocolate gouramis again and Allan was collecting *Paros*, untypically in floating banks of *Ambulia* in fairly shallow water until he gave a shout. He'd caught a large Chocolate, but it was bright red with a red eye - clearly different. I looked in my pot of Chocolates and, while none quite had the splendour of Allan's specimen, many undoubtedly had the same tendency and these were

Water conditions in Bangka and Belitung, July 17-26 2001

| Location | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|------------------|-----|-----|------|------|------|-----|------|------|------|------|----|------|----|-----|
| pH | 4.8 | 6.6 | 5.7 | 6.1 | 6.5 | 6.4 | 5.5 | <6 | <5 | 5 | 6 | 5.5 | 5 | 5.5 |
| Water temp. (°C) | 28 | 28 | 24.7 | 24.6 | 26.5 | 25 | 25.5 | 24.5 | 26.6 | 24.5 | 28 | 24.9 | 25 | 26 |

water and a base of sand and red gravel (possibly only laterite from the road) we found our first Belitung *Paros* and Chocolate gouramis - I caught some in densely-growing banks of *Cryptocorynes*. But these looked a little different to me. They had a grey-green sheen and the striations varied from those I had previously encountered in Malaysia or on Bangka.

The following day our plan was to travel south toward Membalong. There was some

unequivocally, *Sphaerichthys selonotensis*.

Yanto looked dismayed when we told him it was our last day's fishing - even though we tipped him for an extra day. It would be nice to think the Belitung bellies of the Hotel Martani were equally distressed at our departure after our last wander round the town for photos and an afternoon occupied by repacking and 'consolidation' of the fish in their small bottles for the return plane trip. ■

Today's Surgery

IN ASSOCIATION WITH
AQUARIUM PHARMACEUTICALS (UK) LTD



Our resident vet, **Lance Jepson**, deals with Skin flukes (*Gyrodactylus* sp).



What causes the disease?

Skin flukes are flat worms of the genus *Gyrodactylus*. Members of this genus are found in both fresh and salt waters. They are Monogenean worms, which means that they have a direct life cycle, that is to say that an intermediate host is not needed for completion of the life cycle to adulthood.

Generally they reach up to 0.8mm in body length but I have seen some very large (several millimetres long), highly pigmented ones on African fishes such as Reed fish

(*Erpetoichthys calabaricus*) and Fahaka puffers (*Tetraodon fahaka*).

Gyrodactylids generally have at one end some characteristic large hooks, often easily recognisable by the rough H-shape that the hooks form. *Gyrodactylus* are livebearers, and often the next generation of skin fluke can be seen inside the adult fluke. This mode of reproduction also means that numbers can build up rapidly if conditions suit them.

They live on the skin of fish and graze upon epidermal cells and blood. They can cause direct damage to the skin of fish. They also directly allow secondary bacterial

infections in (the common fish bacterial pathogen *Aeromonas hydrophila* has been isolated from *gyrodactylids*), as well as indirectly by irritating the fish - causing it to scratch and make abrasions with loss of the protective mucus layer and underlying epithelial layers. In heavy infestations they can invade the gills. Often transmitted by direct contact between fish, this is not essential - contact with the bottom and sides of aquaria and ponds also contribute to rapid spread.

Predisposing Factors

High stocking densities allow rapid spread of the infestation. Poor water quality and other stressors and illnesses lower the fishes' immunity allowing infestations to establish.

Diagnosis

Species susceptibility. As members of this genus are found in both freshwater and marine environments, all fish species are potentially susceptible.

Recognisable signs of disease. Look for the classic signs of an ectoparasitic infestation - including irritation (the fish may be flashing and scratching), reddened areas or a dullness of the skin associated with excess mucus production. Ulceration may occur. Fins may look ragged due alternating areas of loss of tissue and localised reactive thickening of the skin.

Microscopy. These flukes are relatively

Fahaka Puffers have arrived in the U.K. with some very large (several millimetres long), highly pigmented Skin flukes on them.

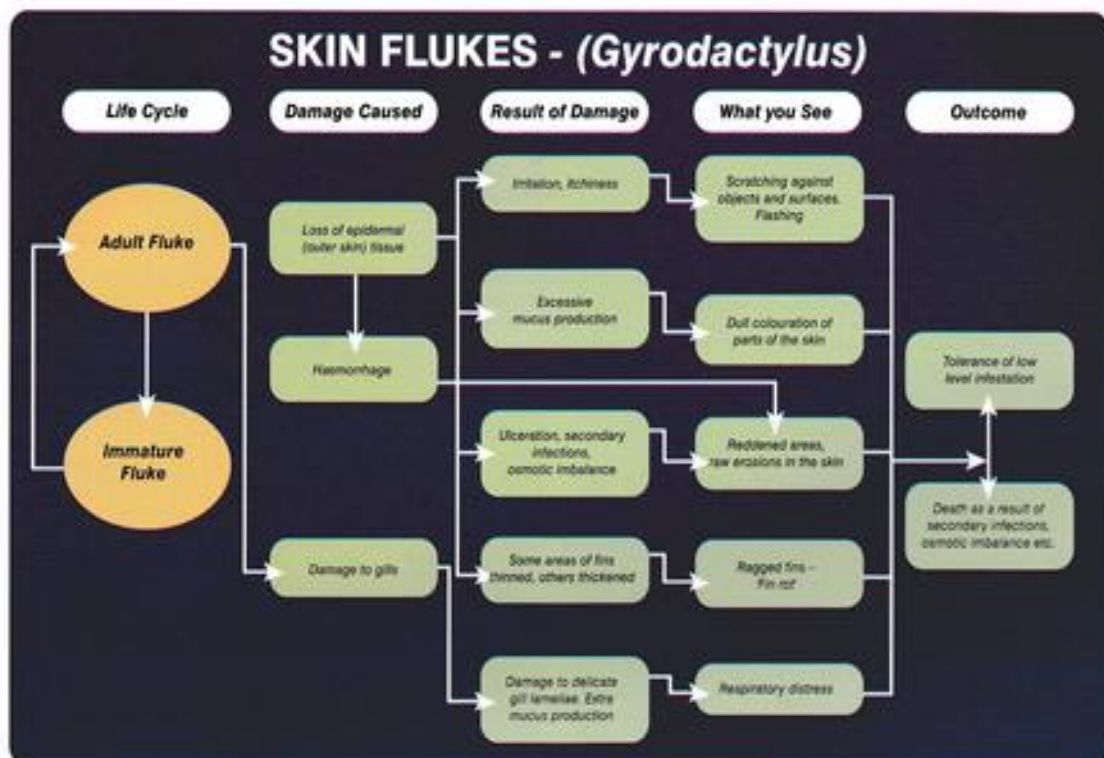


PHOTO: M.P. & C. HEDGECOCK

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SKIN FLUKES - (*Gyrodactylus*)



large and can be seen easily on low power light microscopy of a skin scrape. Often they can be seen stretching and trying to move about. Look for the hooks - following treatment these may be all that is visible. These and the lack of black "eye-spots" help to distinguish skin flukes from Gill flukes.

Treatment

Formalin-based medication using a proprietary treatment from your local aquatics outlet is to be recommended. Because they are livebearers there is no resistant egg stage, which means

Notes

My experience suggests that most healthy fish are able to tolerate a very low level of infestation with *Gyrodactylus* spp. With most of the sick fish that I see these flukes on, I believe that they are a secondary problem. This applies particularly to livebearers such as Guppies and Platies where those individuals that are so sick that they lie on the bottom are easy targets for these parasites whilst other "happier" fish carry more "normal" parasitic loads.

that potentially one treatment can eliminate an infestation. Freshwater baths of 5-minute duration daily for five days may be beneficial for tropical marines, whilst saltwater baths may be useful for freshwater fish. Other treatments include praziquantel (Droncit, Bayer), available on prescription from your veterinary surgeon. For Discus and smaller tropicals, a suggested dosage method with praziquantel is a one to two hour bath at 15-20mg/L. With larger fish such as koi, infeed medication at a rate of 400mg/100g food daily for seven days would be more appropriate. Generally effective, it has not been so successful with the larger flukes mentioned above. Other drugs that have proven useful include mebendazole and levamisole. Organophosphates can also be used but these are very tightly controlled in the UK - if used these must be used at the correct dose rates as resistance to organophosphates has been recorded in some populations.

Disease Lookalikes

Other external parasites including protozoa and gill flukes (*Dactylogyrus* sp.). Water quality problems may trigger an excessive mucus production that mimics an ectoparasitic problem. Haemorrhagic skins resulting from bacterial infections may resemble an infestation.

Prevention

Small numbers are usually well tolerated. Routine treatment during a quarantine-period may be useful. ■

WIN 120ml bottles of Stress Coat and Stress Zyme when you write to Today's Fishkeeper and tell them when and why you would use these popular water conditioners.

The single most important factor in maintaining the health of aquarium fish is the quality of the water in which they live. Aquarium Pharmaceuticals offers a full range of products for maintaining a healthy aquarium including water conditioners, test kits, filtration products, cleaning products and more. Look for Doc Wellfish on quality products from Aquarium Pharmaceuticals



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Tony Sault
answers your
questions

Low oxygen content problem

I have a Vision 260 which is a Juwel bow fronted 48" x 58" x 24" aquarium which holds 57 gallons. As you know these tanks come complete with their own filter. However, I have added another of the same type in the other corner of the tank. In one filter there are 3 filter pads and one white pre-filter pad. In the other the bottom is filled with Allagrog, then two filter sponges and the white pre-filter on top, surface water is moving.

Substrate is silver sand 3 - 4" deep all over and I have one large piece of bogwood. I have straight Vallis, twisted Vallis, Java Fern and other plants which are all growing vigorously and I have to cut 12" off the growth of Vallis each week.

The tank holds 5 Discus, 1 male and 4 females of about 5" in length, 10 Cardinal tetras, 10 Rummy nose tetras, 6 Corydoras about 2", 4 Clown loaches 3 - 4" in size, 2 Plecs of 3" and 2 small freshwater crabs.

All tests are within the parameters of the test kit. I do 1/2 water change each week. I keep the pH at 7.4, ammonia 0.0, and nitrite 0.0, 90% of the time. Nitrate is 0.

The temperature was set for 88°F but is now at 82°F. I know that the pH is high, but I don't want to breed and it is the same as the shops where I purchased my fish. The fish are colourful, eating well and lively, and I haven't lost any to date. My concern is that my fish all breathe too rapidly compared to others in the shops. The water was tested by the shop for me at one time for air content and was found to be only 6% so they sold me a 4" airstone and pump; this does not seem to have helped much. What else can I do to increase the air in my tank?

Peter Borgia, Yeovil

Your set up sounds excellent, particularly for your plants as testified by their growth rate, your problem certainly does seem to be low Oxygen content in the water, the air stone and pump will help as this will cause turbulence at the surface of the water and that is where the gas exchange takes place, i.e. carbon dioxide out and oxygen in. Reducing the temperature will also help as it is a fact that Oxygen content is substantially lower at higher temperatures.

To increase Oxygen content in the water the main objectives are to increase surface water movement and to this end I installed in my tanks internal power filters with the outlet breaking the surface of the water, this gives a lot of surface water movement and consequently better gas exchange, another

PROBLEM SOLVER Discus

way is through a spray bar, the end result being the same. This also allows me to slightly over stock the tanks, and without meaning to I suspect your tank may be slightly over stocked with 5x5" Discus, 10 Cardinals, 10 Rummy Nosed, 6 Corys, 4 Clown Loach, 2 Plecs and 2 fresh water crabs?? Surely not in a Discus tank I hear people cry, but after reading of the tank of Goldfish and Discus living happily together who am I to say never? I would suggest that as some of the short lived fish such as the Tetras die off that you do not replace them and lower the stocking level that way.

Advice needed by new owner of complete tank set-up

Having just 'inherited' a 600 litre tropical tank housing 10 angels, 6 Discus and 6 fish I don't know the name of as yet, but they keep the bottom of the tank clean. The tank

gravel, is making it harder, so I was thinking of changing this, but do not know to what. Would dead tree leaves be suitable, or perhaps peat?

There is also a large chunk of bogwood in this tank. I would very much appreciate your advice, I have as yet no subscription to any of the fish mags from the U.K, your address was given me by my wife who bought a mag in the U.K and found your address in I believe it was Today's Fishkeeper for which I will try and get a subscription.

Thank you for your letter, a good practical book on Discus, to quote an old Irish friend of mine "is as rare as Hens' teeth". I think a subscription to Today's Fishkeeper would certainly provide you with the information that you require as each month there is always something to engage Discus keepers old and new.

Please do not change the substrate from the misting gravel to dead leaves or peat as this will certainly upset the balance of the



Cobalt blue discus.

came from a fellow expatriate who is returning to the UK. I wonder if you could recommend a good practical book on Discus and where I might obtain this from? Although these fish are looking healthy and are feeding very well, they all get a wide variety of live foods as well as dry food specially for Discus.

I believe they also must have very specific water requirements, I believe the local tap water is fairly soft. It is desalinated sea water and I have added pH softener to it. I believe the substrate,

if your only concern is that the gravel may be making the water slightly harder, I can assure you that the Discus will not mind the hard water as long as the pH remains constant and ideally on the acid side of neutral. A good investment may be a pH tester to allow you to monitor this weekly. If the fish are healthy, in good colour and are receiving a good varied diet, then you are certainly doing your best for them. If you get to know the normal behaviour of your Discus as they are now, then you will immediately recognise abnormal behaviour should it occur.

Today's Guide to...

Choosing a filter

Confused by all the different filters available for your new tank? Here we sort out which type is best for your aquarium



Internal power filters are very popular. This is Tetra's IN600 internal model.

INTERNAL, EXTERNAL, subgravel, box or bubble-up sponge filter. What's the difference? A great deal actually, but which is best? Well that all depends on your setup and pocket.

Internal power filters

Probably the most popular type of filter today is an internal power filter. These are basically a

powerhead sitting on a box full of filter media. In most models this consists of just a sponge which bacteria can colonise and break down ammonia into nitrite, and nitrite into nitrate. Being a sponge, solid particles are trapped in it as well so the water looks crystal clear when it leaves the filter. Some models also include an area where activated carbon can be included. This is a form of chemical filtration which removes other impurities

from the water. If you choose one of these filters aim for one which has a variable flow rate and is rated for the size of aquarium you have. Also remember the dimensions of your tank and make sure the model you buy will fit comfortably in it.

Subgravel filters

These are often considered the cheapest method of filtering your

tank. They work by forcing dirty water through the gravel bed. As it passes through this medium bacteria living on the gravel break down ammonia etc. The disadvantage of this system is the gravel becomes clogged with solid fish waste and needs regular cleaning with a gravel cleaner. Also some plants hate water movement around their roots and will not thrive in a tank filtered with this type of unit. Most are air



Subgravel filters are probably the cheapest – but remember you still have to purchase an airpump or power head to run them.

powered although you can fit a powerhead on some models. They are not considered suitable for marine aquaria anymore despite being popular in the past.

Box filters

These little plastic boxes have a space for filter wool and a small amount of carbon or other chemical filter medium in them. They work by using an airlift which circulates water through the media. Whilst they are very good at 'polishing' the water, there is very little biological filtration taking place. This means your water may look clean but in fact you could be building up dangerous levels of ammonia and other pollutants in your aquarium.

Bubble-up sponge filters

Another cheap option, bubble-up sponge filters are beloved by many aquarists who breed fish. They provide a gentle form of filtration and aeration which is both biological and mechanical. The sponge is a perfect home for bacteria to live on and break down pollutants, whilst solid particles are also trapped in this medium. Rinsed out in old aquarium water every week or two they are an efficient little filter for a small tank. They are also ideal for tanks containing small fry because although the water flow through the sponge is enough to keep the bacteria alive it is not so strong that small fry are trapped in the filter medium.

RIGHT: External power filters are the "Rolls Royce" of the filter world. This is Interpet's range of external filters.

External canister filters

These are the "Rolls Royce" of the filter world. They pump water out of the aquarium and through a canister containing various filter media. You can mix and match the filter media you want, so plenty of activated carbon or other chemical media can be included, as well as biological media. They can be relatively basic units or very elaborate ones depending on the job they are going to do and come in a variety of sizes depending upon your tank size. Whilst more expensive than internals, they undoubtedly give you the option for the best possible filtration for your tank. The only downside is finding somewhere to put them. Most cabinet stands designed for fish tanks have a way of passing the tubes down into the cupboard underneath where the main canister is stored. Most are almost silent and can be used with or without a spray bar attachment.



ABOVE: Small box filters like these are useful for 'polishing' the water.

BELOW: This is one of Hagen's box filters.



Out & About: Shop Visit

U.K. Marines

Today's Fishkeeper visits one of the largest marine shops in the country



FINDING THIS SHOP can be a little difficult since its frontage is not very noticeable from the road. Parking is not the best either, with a rough car park spread around the back and side of the building. Even the sign outside the door is small and insignificant. So it was with a little trepidation that we entered the shop. Once inside it was clear that this place was far better than the outside suggested. Indeed we were walking around one of the largest marine retail outlets in the country - the place actually covers 6,000 sq. ft.

Just as you would expect from a shop called U.K. Marines the emphasis is placed on the marine fish and invertebrates, however, freshwater tropical and coldwater fish are still well represented here. A good selection of healthy tropical fish were on offer at a reasonable price but these tended to be the commoner species rather than rare or unusual fish. Likewise the coldwater section had a nice range of common fish but nothing too way out. Obviously the range of marine fish and invertebrates was outstanding and everything looked to be in the peak of health. All marine fish are properly quarantined in a 300 gallon quarantine section before being offered for sale.



The staff all seem very knowledgeable which is not very surprising since Ken has 25 years experience with fish, Andrew has 10 years and even the youngest, Danny seems to have swallowed



the book and reads just about everything he can on fish and fish keeping as well as being a keen fishkeeper.

The shop is managed by Roy Meeke who is extremely well known throughout the marine hobby and is secretary of the West Yorkshire Marine Aquatic Group. He started keeping fish 30 years ago but only started working in the aquatic industry 5 years ago. Prior to that he was a full time entertainer.

The shop has only been open a couple of years now but has already gained a reputation for high quality marine fish and invertebrates. Many of the more unusual and difficult to find species are offered for sale here from time to time so it is worth contacting them regularly to see what they have in stock. Angelfish of all sorts are a particular favourite of Roy's so these are always well represented in the shop. ■

Shop details: U.K. Marines, 507 Bradford Rd., Batley, W.Yorks. WF17 8LL Tel: 01924 420101.

Shop opening hours: 9.30am - 5.30pm, Fri 9.30am - 8.00pm, Sat 9.30am - 5.30pm and 10.00am - 5.00pm Sunday.

Manager: Roy Meeke

Staff: Ken Blackburn, Andrew Sace & Danny Helliwell

Number of tanks: 80 freshwater, 45 (1500 gal system) marine fish, 1000 gal marine invert system and 3000 gal pond system.

Show tanks and ponds: Large reef tank, Marine fish tank and ornamental pond.

Specialities: Marines.

Additional services: Complete marine tank systems made and installed.

Brands stocked: Most major brands.

Which groups of fish do you sell?: Freshwater, Marines, & Coldwater.

Our verdict

U.K. Marines is a large friendly marine shop whose staff have a wealth of knowledge.

Roy's verdict on the manufacturers

Which manufacturer has the best range of products in your opinion? Deltac
Which company gives your customers the best service? Underworld.

Today's Postbag



Share your news, views and experiences through *Today's Postbag*. Every month the star letter wins a Subscription to *Today's Fishkeeper* – all for the price of a 27p stamp or an e-mail.

Praise for Tetra

Dear Derek,

We often hear about bad service provided by companies and retailers, but rarely give praise when praise is due.

I purchased an AP 200 airpump in August of this year. The output of the pump decreased to zero over the following months. I opened the pump to check the diaphragms and noted a crack in one of the valve chambers. I returned the pump to Tetra at lunchtime on Monday 26th November. I received the pump back on Wednesday 28th November repaired and tested with a spare valve chamber and a tub of Tetramin Pro as a gesture of goodwill.

I would like to thank Rupert Bridges, Tetra's consumer support executive and the staff of Tetra for their excellent service.

Alan Smith, Newport, South Wales.

Ed note:- In Rupert's letter to Alan, he suggests that if the green flow control dials on the side of the pump are turned too far extra pressure is exerted on the valve chamber which can cause it to crack. A half turn is all that is required to fully adjust the airflow.

Dear Today's fishkeeper,

Last year you did a feature on water barrels. It was too late for me to attempt this in July but I've just acquired a large half barrel in preparation for the coming season. I've got some of the fish you suggested might be suitable indoors. Ameca splendens. They'll be going outside probably early June in my area.

I'll let you know how they get on.
Louise, Edmonton N. London.

Ed. Note: Fish suggested were White Cloud mountain minnows, Bitterling, Garmet minnows, American flag fish, Mosquito fish Gambusia holbrooki and Goodeids such as Ameca splendens.

It really is surprising where some fish can go. Wayne's Weather loach sneaked down a sub-gravel filter tube when he wasn't looking.



star letter



Down the tubes

Dear Today's Fishkeeper,

Just writing to tell you of an experience I had when cleaning my aquarium. I've got two types of filtration, an undergravel and internal Fluvel filter, in a 2' x1' x1' tank with one Black Moor, one Telescopic eyed goldfish, one Veiltail goldfish and two Weather loaches, one of which is about three years old and the other three to four months.

I did a 50% water change and cleaned the plastic plants, uplift tubes, replaced uplift airstones and put plants and uplift tubes back. I refilled with water of the correct temperature with water conditioner added. After I'd done all the necessary adjustments I noticed that I was a loach missing. I looked in the tank but couldn't see the missing loach. I looked under sides of the carpet, under settees, chairs etc. But could I find that loach (the 3-4 months old one)? It really puzzled me as to where it could be. Lying in bed that night I was thinking

about it. Where could it be? I went over all the things I had done and it suddenly hit me. There was only one place it could be... underneath the sub gravel filter.

Early next morning I took everything out of the tank, and there I found the loach. Obviously it had gone down one of the uplift tubes before I put them back. Luckily it had come to no harm.

I'll be getting a bigger tank shortly to house these fish I've got. It'll be a 3'x1'x1' and I'll only be using an internal power filter of the proper size.

Wayne Hughes, Coalville, Leics.

Ed note:- It really is surprising where some fish can go. Tight fitting lids are necessary for some species who just seem to have a death wish. Glad you found your missing fish and good luck with your new tank.

White Cloud Mountain Minnow

By Richard Friend

Tanichthys albonubes



ONE OF THE LARGEST NAMES IN THE HOBBY goes with one of the smallest fish. The White Cloud Mountain part refers to the home of this lively little beauty. The Minnow part refers to, well it's like a minnow. So where are the White Cloud Mountains? Actually this fish could wear a 'made in Hong Kong' label, it's from Southern China,

Tanichthys albonubes thrives in a small school and will mix happily with other small fish. Not truly tropical the White Cloud will live in a tank kept just at room temperature this would be 18-22°C (64-72°F). But allow the temperature to drop much below 16°C (60°F) and the White Cloud is not very happy. Keep it in a tropical community tank and the reports are that the life span seems shorter.

The White Cloud has a slender elongated body, with sides that are slightly compressed, this is all fronted by a slanting mouth, on each side of which is a nostril. There is a longer finned version in the trade, also several variations in colour. They are usually darkish brown on top with a greenish sheen, this blending gradually into the white colouring of the belly. There is a luminous stripe extending from the eye, the length of the body, to the start of the caudal fin.

A White cloud Mountain Minnow larger than 40mm (1.5in) would be a giant, size has been known to be affected by water variation, in temperature, and particularly pH which is preferred at 6.6 - 7.5. The tank should have plenty of water flow for the fish to dart about in, and be well planted with fine leafed plants.

White Clouds occupy the upper regions of the available water. They will beat most of the other tank occupants to any food that arrives, avidly devouring flake and living happily on it. In the wild they are insect eaters and will thank you for a treat of live food.

The male fish are slimmer and more brilliantly coloured than their female counterparts. They spawn readily, but if you want to do some more serious breeding give 4 - 6 adults a tank with plenty of Java Moss, to themselves, maintaining a temperature of 21°C (70°F). Supply plenty of live food and allow nature to take its course. The eggs will be scattered on the Java Moss. Have a tank of water of the same temperature and water chemistry already prepared, transfer the eggs to this where they will hatch within 24 - 36 hours. The young will be extremely lively and will take

infusoria before progressing onto newly hatched brine shrimp.

Often called "the poor man's Neon", this little character has a charm and beauty all its own, giving a great deal of pleasure to the fishkeeper looking for something a little different. ■

PROFILE

| | |
|------------------|--|
| Family | Cyprinidae |
| Name | <i>Tanichthys albonubes</i> |
| Origins | China, Canton and Hong Kong |
| Aquarium type | Small species tank, community with similar temperature tolerant fish |
| Feeding position | Top and mid water |
| Size | 4 cm (1.5") |
| Temperature | 17 - 22°C (63 - 72°F) |
| Diet | Flake and live foods |



Five Banded Barb

arbus pentazona

© 2010, V&F



A row of five icons providing care information for the Five Banded Barb. From left to right: 1. A fish icon with a checkmark, indicating it is suitable for community tanks. 2. A fish icon with a checkmark and the text 'M', indicating it is suitable for mixed tanks. 3. A fish icon with a checkmark, indicating it is suitable for home tanks. 4. A thermometer icon with a checkmark and the text '82°F' and '72°F', indicating a temperature range of 72°F to 82°F. 5. A fish icon with a checkmark and the text '2"', indicating a maximum length of 2 inches.



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 0BN Telephone: 01763 885352, Fax: 01767 269333 or e-mail: andpedition@btinternet.com copy deadline: 6 weeks before publication date.

Today's Diary Dates

March's show, auction and club meeting dates

| | |
|------------------|--|
| Fri 1st | NorthWest Cichlid Group meeting Contact 019422 707 593 |
| Sat 2nd | Sutton A.S. meeting. Contact 01302 702181 |
| Sun 3rd | Ashby Open Show. Contact 01724 347995 F.N.A.S. Annual General Meeting. Contact 0161 620 7507 |
| Mon 4th | Kirkcaldy A.S. meeting. Contact 01738 634689 Solway A.S. meeting. Contact 01387 750606 St Helens A.S. meeting. Contact 0151 42604213 |
| Tues 5th | Dunstable & D.A.S. meeting. Contact 01582 707280 Greenock D.A.S. meeting. Contact 01475 704239 York & Dist. A.S. meeting. Contact 01904 414272 Telford & D.A.S. meeting. Contact 01952 409721 or 01952 616410 Bangor Aquarists and Breeders Society meeting. Contact 028 91873539 The Irish Tropical Fish Society meeting. Contact 01 4561836 Halton A.S. Contact 0151 289 8190 Northern Goldfish and Pondkeepers meeting. Contact 0161 969 7567 North Bucks A.S. meeting. Contact 0161 281 3725 Oldham A.S. meeting. Contact 0161 281 3725 |
| Wed 6th | Conry & D.A.S. meeting. Contact 01536761736 Oasis Fish Club (Sunderland) meeting. Contact 0191 3841433 Horslow club meeting. Contact 01784 259230 Perth A.S. meeting. Contact 01738 621704 Clacton Fish Keeping Club meeting. Contact 01255 428065 Worlington A.S. meeting. Contact 01909 679951 Portsmouth A.S. meeting. Contact 01673 885352 Bracknell A.S. meeting. Contact 01344 485287 Perth A.S. meeting. Contact 0173 8621704 |
| Thurs 7th | Fairley A.S. meeting. Contact 01738 561291 Sandgrounders A.S. Contact 01704 541177 |
| Fri 8th | Basingstoke A.S. meeting. Contact 01256 4671889 Yorkshire Cichlid Group meeting. Contact 01924 367086 West Cornwall Fishkeepers meeting. Contact 01209 717880 |
| Sat 9th | West Cornwall Fishkeepers meeting. Contact 01209 717880 |
| Sun 10th | Greenock & Dist A.S. Open Show. Contact 01475 704239 |
| Mon 11th | Kirkcaldy A.S. meeting. Contact 01738 634689 Bristol Aquarist Society (Goldfish) meeting. Contact 01922 207467 Ilford & D.A.S.P. Society meeting. Contact 020 855107 319 Grimsby & Cleethorpes meeting. Contact 01472 349178 St Helens A.S. meeting. Contact 0151 42604213 Odey A.S. meeting. Contact 01274 314158 Southend Leigh & Dist A.S. Contact 01703 309240 Darwen A.S. meeting. Contact 01254 707925 |

| | |
|--|---|
| Northwich A.S. meeting. Contact 01666 883966 | |
| Caer Uria A. S. meeting. Contact 0191 5237464 | |
| Tameside A.S. meeting. Contact 0161 339 6593 | |
| Leathgow Aquarist Society meeting. Contact 01506 510558 | |
| Halifax A.S. meeting. Contact 01274 880471 | |
| Mid-Sussex AS meeting. Contact 01273 602407 | |
| Thurs 14th | Mid-Sussex AS meeting. Contact 01273 602407 |
| Fri 15th | Sutton A.S. meeting. Contact 01302 702181 |
| Sun 17th | Three Counties Group Auction, Bracknell. Contact Paul 0118 970 1461 |
| Mon 18th | Kirkcaldy A.S. meeting. Contact 01738 634689 Thorpe & D.A.S. Club meeting. Contact 01953 605 394 Solway A.S. meeting. Contact 01387 750606 |
| Tues 19th | Greenock D.A.S. meeting. Contact 01475 704239 Greater Manchester Cichlid Society meeting. Contact 01422 942555 Midlands Marine Aquarist Society meeting. Contact 0121 3594469 Oldham A.S. meeting. Contact 0161 281 3725 West Yorkshire Marine Aquarist Group meeting. Contact 01924 420201 |
| Wed 20th | Merseyside Aquarist Society meeting. Contact 0151 201 5969 Clacton Fish Keeping Club meeting. Contact 01255 Tongham Aquarists Society meeting. Contact 01252 25686 Portsmouth A.S. meeting. Contact 01673 885352 Bracknell A.S. meeting. Contact 01344 485287 Perth A.S. meeting. Contact 0173 8621704 |
| Thurs 21st | April 2002 TODAY'S FISHKEEPER on sale Fairley A.S. meeting. Contact 01738 561291 Bristol Tropical Fish Club meeting. Contact 017 973 2145 Sandgrounders A.S. meeting. Contact 01704 541177 Croydon A.S. meeting. Contact 0208 654 0984 |
| Fri 22nd | Eastbourne & District Pondkeeping. Contact 013237731969 West Cornwall Fishkeepers meeting. Contact 01209 717880 |
| Sat 23rd | Sutton A.S. meeting. Contact 01302 702181 |
| Sun 24th | Veriponus Livebearer Auction, Derby. Contact 01782 317741 Clyde A.S. Open Show. Contact 0141 647 0179 |
| Mon 25th | Merseyside Auction. Contact 0151 2809669 |
| Tues 26th | Kirkcaldy A.S. meeting. Contact 01738 634689 Northwich A.S. meeting. Contact 01606 883966 |
| Wed 27th | Worlington A.S. meeting. Contact 01909 679951 Halifax A.S. meeting. Contact 01274 880471 Tameside A.S. meeting. Contact 0161 339 6593 |
| Thurs 28th | Mid-Sussex AS meeting. Contact 01273 602407 |

Viviparous Spring Livebearer Auction

ON SUNDAY 24TH MARCH THERE should be the largest auction of livebearing fish in the U.K. for some time. With livebearer enthusiasts from around the U.K. and overseas taking part we should see an excellent range of wild species and cultivated livebearers up for grabs. Fish like the recently described *Brachyrhaphis hessfeldti* and fascinating species such as the One-sided livebearer, as well as old favourites like the Merry Widow.

Many rare and endangered livebearers will also be in the auction. These should include several species which are thought to be extinct in the wild. Some of the money raised from these will be used to help livebearer conservation projects around the world.

However, not only will there be captive bred fish for sale. It is hoped that for the first time ever wild caught livebearers from Belize will be up for grabs. These should include wild Platies, Swordtails, Mollies and at least 1 new species to the U.K. Livebearer hobby.



Viviparous has held many successful events over the years but this year's auction is expected to be something special.

Want to take part in 2002?

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.

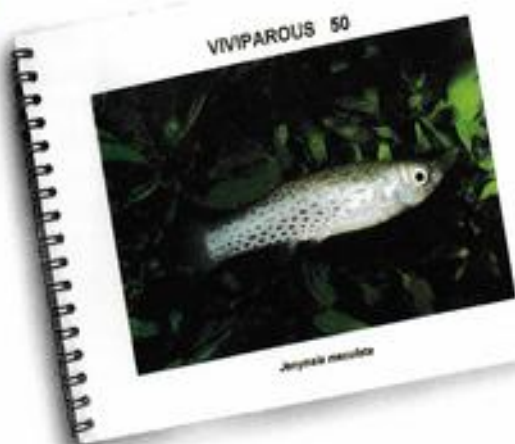
To register your points (3 for a 1st, 2 for a 2nd & 1 for a 3rd) send a photocopy of your certificates or other proof of your awards to Today's Fishkeeper National Aquatic Show League, Today's Fishkeeper Magazine, Winchester Court, 1 Forum Place, Hatfield, Herts. AL10 0RN. Joint exhibitors are allowed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

The auction will start at 1pm and will be held at the Midland Hotel, Midland Rd., Derby. This venue is easy to find, being opposite the railway station. For further details contact Alan Rothwell on 01782 317741.

wants to know who has won. The results and presentation will take place just before the start of Viviparous's Spring Livebearer Auction at the Midland Hotel, Midland Rd., Derby. A special gala Sunday lunch prior to this will be held for the top five exhibitors. Anyone wishing to join the party should contact the editor (Tel. 01673 886352 or e-mail aandpeditor@btinternet.com) who is organising the presentation. ■

Join the winners

All the points for Today's National show league, 2001, have now been added up and everyone



Many rare fish, such as the One-sided Livebearer (*Jerynsia maculata*) featured on the cover of Viviparous 50, will be for sale at this auction.

Trade talk

Create a Virtual Aquarium with the New Sera CD-ROM

Now you can avoid expensive mistakes and design the aquarium of your dreams in a virtual world first! The new Sera CD-ROM offers both beginner and experienced fish keepers more than 1000 different possibilities for experimenting with vivid images of over 120



Creating a virtual aquarium first on a computer may avoid the disappointment of real life mistakes later.

magnificent fish and 45 plants in aquarium settings. Creating a virtual aquarium first on a computer avoids the disappointment of real life mistakes later.

Designing an aquarium with the CD is not only great fun but educational and informative with excellent technical advice and tips on fish habits, water requirements, design, construction, planting and fish combination.

Nine short films showing different aquarium themes, for example colourful Tropical Rainforest and Lake Malawi fish combinations, can be adapted to create an individual aquarium. There are almost endless opportunities to change fish, plants decorations and designs and the CD even displays the design in animated form. Fish stock and check lists can be printed for creating the desired aquarium. Throughout the CD the extensive

Sera encyclopaedia for information on fish and plants can be consulted. If you're not lucky enough to have a real life aquarium in your office, many designs can even be saved as attractive and peaceful 'screen savers'! The CD is available for sale at a retail price of just £9.95.

Sera supply a range of over 450 top quality products for aquarium, pond and marine fish including, food, water conditioners, technical equipment and accessories. To find your nearest stockist of Sera product telephone Sera Partners on 020 8665 0026, or e-mail info@serapartners.com or log on to the award winning website www.aquazoo.co.uk which contains a list of retailers.

New Clear Stream Pond Filter-UV now available

The new range of Clear Stream Filter-UVs from TMC, which was launched at GLEE in September, will be in the shops for the coming pond season. These Filter-UVs offer all the benefits of TMC's Clear Stream Pressurised Pond



These filter-UVs offer all the benefits of TMC's Clear Stream Pressurised Pond Filter's combined with the company's market leading UV technology.

Filter's combined with the company's market leading UV technology. Features include:-

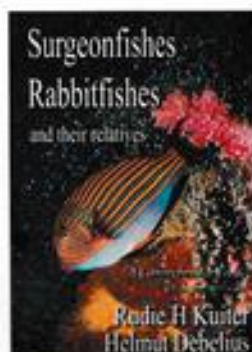
- **Effective mechanical and biological filtration as well as UV clarification in one compact unit.**
- **UV technology - using an integral compact PLS lamp - guarantees clear water all season. The Clear Stream 600 Filter-UV uses a 5W UV lamp, and the Clear Stream 1200 Filter-UV uses a 9W UV lamp.**
- **Easily accessible viewing window allows you to safely check that UV lamp is working.**
- **Pressurised filters. Units can be conveniently positioned below the level of water delivery e.g a waterfall.**
- **Compact and discreet design. Can be partially buried in the ground for minimal visual impact.**
- **Large diameter inlet and outlet ports. Suitable for use with low pressure/low wattage pumps.**
- **Servicing/maintenance can be carried out without having to disturb pipe work.**
- **Ready to use - all media and connections included.**
- **Canister design, incorporating unique filter bag, means alternative filter media can be used to suit user's specific requirements.**

There are two sizes available:-
Clear Stream 600 Filter-UV for ponds up to 600 imp. gallons (2700 litres) with a max. flow rate of 300 imp. gallons (1350 litres) per hour. RRP: £123.20

Clear Stream 1200 Filter-UV for ponds up to 1200 imp. gallons (5400 litres) with a max. flow rate of 600 imp. gallons (2700 litres) per hour. RRP: £132.00

New book from TMC

The second book in TMC Publishing's "Marine Fish Families" series has just been published. "Surgeonfishes, Rabbitfishes and their relatives - A Comprehensive Guide to Acanthuroidei" by Rüdiger H. Küller and Helmut Debelius is a stunning identification guide to the



The second book in TMC Publishing's "Marine Fish Families" is a stunning identification guide to the acanthuroidei.

acanthuroidei which include the fishes popularly known as surgeonfishes or tangs, unicorns, sawtails, the Moorish Idol, and rabbitfishes. This 208 page book includes detailed information on families, genera and more than 100 known species of the world and retails at just £19.95. Illustrated with hundreds of spectacular underwater photographs and containing information on behaviour, habitats and details of aquarium set ups for the various groups. Picture index pages and a comprehensive index ensure information is quick and easy to find.

TMC Publishing (a division of Tropical Marine Centre Ltd) is the publisher of the English language version of the "Marine Fish Families Series" of books and also distributes a range of other fish keeping and aquatic titles, for both the beginner and the more advanced aquarist. If you would like further information or would like to order a copy of the Surgeonfishes Book or any of the other books available from TMC Publishing, please look at our website - www.tmc-publishing.com - or telephone TMC on 01923 284151. ■

Product Reviews

Fish Mate launch new range of pond pumps



ponds and are ideal for running filters as well as water features. These mean Fish Mate's range of pond pumps now have an output of up to 15000 litres per hour and 8m (26' 3") head.

Maximum flow rate and head

The maximum flow rate will only apply when the pump does not have to push the water up hill. As soon as it has to do this the flow rate drops and eventually stops altogether. This is what is called the maximum head. So when selecting a pump for your pond you need to take into account the height to which water will need to be pumped and how fast you want the turnover to be.

ADDING A PUMP to your pond opens up a whole world of possibilities. Moving water can transform your stagnant pond into the focus of a beautiful water garden. A pump will enable you to run a pond filter to help keep your pond water clear and your fish healthy. Attractive fountains, cascades and other interesting water features can all be added if a pump is installed into your pond system. Whatever pond size or setting you have, a pond pump really can bring it all to life.

The original Fish Mate range

FISH MATE say their pond pumps provide all the versatility and performance you need. Their focus is on reliability at every stage of design and manufacture that they say enables them to produce superior quality pumps built to last. Ease of use and low running costs come as standard, thanks to the simple flow control and efficient, magnetically driven pump turbine. All FISH MATE pond pumps carry a 3 year guarantee, assuring you of quality and reliability.

The range originally included 3 models – 2000, 3000 & 4000. These all have Anti-clog filter design, superior wear resistance, low running costs, and side or top outlet with swivel elbow. This range of pumps come complete with 4 fountain options – Tiered, Column, Bell or Plume.

New additions

For the new season Fish mate have brought out 4 new models. These are designed for larger

powering filters) into a vertical pointing one, ideal for fountains. Armed with only a screw driver it only took him 15 minutes (5 minutes for anyone with a little DIY savvy) to modify the unit and have it ready to fit in a pond with a fountain attachment. Obviously we didn't let him loose with connecting the electrics via an R.C.D./G.F.I. circuit breaker as this sort of work must always be carried out by a competent electrician.

One of the most useful features of this range of pumps is that they are all capable of handling solids up to 12mm in size (large koi solid waste size!). To do this, a couple of the strainer's ribs need to be removed but that is a quick job using a sharp knife and a little care. Another nice touch is a hole through which a piece of string can be attached so you can lift the pump

out of the pond for easy cleaning.

Over the coming months we will put this pump to the test in a real life pond and see how it performs, however, on the face of it this seems an easy piece of equipment to install and use which should perform well in most pond situations. ■



A close look at the 9000 model

Fish Mate kindly sent us one of their 9000 models to test. Our editor (as regular readers will already know) is not the world's most practical person, so if he can fit something together and not have any real trouble then anyone can. So once the box arrived he sat down and delved into the instructions. These showed how the pump can be changed from a side fitting outlet (ideal for



The statistics

| Pump Model | 2000 | 3000 | 4000 |
|-----------------------------------|--|--------------------|--------------------|
| Maximum Flow Rate | 2200 l/h (480 GPH) | 3000 l/h (660 GPH) | 3800 l/h (835 GPH) |
| Flow Rate at 1m Head | 1610 l/h (355 GPH) | 2050 l/h (450 GPH) | 2630 l/h (580 GPH) |
| Maximum Head | 2.05m (6' 9") | 2.05m (6' 9") | 2.2m (7' 2") |
| Power Consumption (Wattage) | 25W | 28W | 40W |
| Power Cable Length | 10m (33') | 10m (33') | 10m (33') |
| Dimensions (excluding flow valve) | L x W x H = 200 x 150 x 100mm (7.75" x 5.75" x 4") | | |

The statistics

| Pump Model | 9000 | 12000 | 12000XS | 15000 |
|------------------------------|--|-------------------------|----------------------|-----------------------|
| Maximum Flow Rate | 9 450 l/h (2080 GPH) | 12 250 l/h 1 (2695 GPH) | 2 000 l/h (2040 GPH) | 15 100 l/h (3320 GPH) |
| Maximum Head | 4.0m (13' 1") | 5.5m (18' 0") | 8.0m (26' 3") | 6.5m (21' 4") |
| Power Consumption (Wattage) | 115W | 190W | 265W | 250W |
| Power Cable Length | 10m (33') | 10m (33') | 10m (33') | 10m (33') |
| Dimensions (excluding elbow) | L x W x H = 300 x 200 x 170mm (12" x 8" x 6.75") | | | |



Check-mate

Pete Liptrot reports on the 'other' Chequerboard, *Dicrossus maculatus* Steindachner 1875

WITH OVER 2000 species there is something for everyone within the family Cichlidae, from 24 inch (60cm) beasts that are only barely suitable for the home aquarium, through algae scraping bundles of energy, to delightful little fish that, while predators, pose no threat to anything much bigger than a bloodworm. There are Cichlids that reach an adult length of no more than three inches (7.5cm) from Africa and South America, but the term Dwarf Cichlid is usually reserved for both those species from West/Central Africa, and more often those from South American waters.

These South American Dwarf Cichlids are enjoying a real renaissance at the moment, with many new species appearing, mostly from the genus *Apistogramma*, but at the same time there are some real old favourites from this and other genera reappearing on the market, and this is one such fish.

It would be difficult to find a greater pedigree than that found in this species, it was described in 1875 by Steindachner (a name carried by another Dwarf Cichlid long-established in the hobby), and the original specimens were collected by Louis Agassiz (who also had a well-known Dwarf Cichlid named after him) while on the Thayer expedition to the Amazon region.

Some specimens, including the type were collected in Brazil, in the State of Para, at Tajapuru near Ilha de Marajo, but other specimens were collected near Parintins in Amazonas State, in a small lake named in the report as Lagoa Do Maximo. They apparently have quite a wide distribution across the Brazilian Amazon, having been also found in the Rios Tapajos, Madeira and the area of the Solimoes.

Many people will be more familiar with its better known relative, *Dicrossus filamentosus*, and may know of either species under the former genus name of *Crenicara* (This genus is now



The original Chequerboard, *Dicrossus filamentosus*.

restricted to two larger species quite different in appearance from these fish).

Aquarium care

For general maintenance *D. maculatus* is not particularly demanding, water conditions should be pH 6.3-6.8, temperature in the upper 70's to lower 80's Fahrenheit, and fairly soft. They do not require extremely low conductivity, and stable conditions are probably more important than aiming for precise parameters. The various buffers to create acidic water should not be used at all, these create extremely unnatural water conditions of low pH but high dissolved solids, and this is not good for the general health of fish, never mind breeding (which should always be the ultimate aim).

They will eat a wide range of good quality frozen and live foods,



The 'other' Chequerboard, *Dicrossus maculatus*.

and it is very likely that captive raised specimens will quite happily accept high quality dried foods. There are some micro-pellets on the market that I find are enthusiastically accepted by many Dwarf Cichlids.

While these fish are admirably suited to a planted aquarium, it is actually quite unlikely that there are many aquatic plants in the habitats they are found in, due to the extreme variations in water level over the course of each year (although healthy growths of hairgrass have been reported from one collection site on the Rio Tapajos). Instead, they are far more likely to be found in among leaf litter, fallen wood and among

Ammonia and Nitrite should never be at levels that can be measured by normal hobbyist test kits. Nitrate can continue to accumulate unless diluted by water changes, and there is strong evidence that this, or related conditions can cause chronic health problems in fish.

Conflicting reports of breeding

There have been conflicting reports of the conditions required for breeding, in some cases very soft and quite acidic water was necessary, from another very

They are not cave-spawners, but may lay their eggs on a horizontal plant leaf

the root systems of emergent plants over a fine sand substrate.

Lighting should be fairly subdued, fish of this size usually have a lot of predators in nature, and lighting that is too bright will make them feel exposed and vulnerable. They are not particularly susceptible to any disease, but metabolite levels should be maintained at very low levels through gentle but efficient filtration and regular partial water changes. While with a mature filter

reliable source they did not breed under these conditions, but performed quite happily once returned to more moderate conditions as given above for routine maintenance. This may not be surprising given their wide distribution.

They are not cave-spawners, but may lay their eggs on a horizontal plant leaf (whether live or dead), or a small piece of wood, at which point the female gives care to the actual eggs while the male can be expected to perform perimeter defence of the territory.

Males can be easily recognised by their more ornate finnage and larger size once adult, with a noticeably spade-shaped tail (compared to the lyre-shaped tail of *D. filamentosus*) and particularly elongated pelvic fins. Females may have varying degrees of orange or red to their pelvics, this can vary according to their geographic origin and reproductive status. Fry are extremely small, and may require smaller food other than artemia nauplii initially, but once onto this food they should grow reasonably quickly.

An adult group of this species would look fantastic in a medium-sized mixed Amazonian community of small non-predatory Catfish, Tetras, Pencilfish and Hatchettfish. Social interactions could then be observed, and this could lead to us having a greater understanding of the natural behaviour of this beautiful species. ■



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Seeing Double



Ian Fuller, chairman of the Catfish Study Group (U.K.), takes a close look at *Corydoras* look-a-likes



Corydoras zygatus at 2 weeks old.

TWENTY YEARS AFTER I FIRST SPAWNED AND raised the two look-alike species *Corydoras robustus* La Monte, 1943 and *Corydoras zygatus* Eigenmann & Allen, 1942, there is still a great deal of confusion and much debate has taken place to decide which one is which. Here I will attempt to eliminate all doubt.

The first point to establish is the fact that we are indeed looking at two distinct species. When the type specimens were examined, the differences between them were very small and at that time the debate was whether in fact they were one and the same species.

First spawning

I spawned *Corydoras zygatus* on 21st April 1980, which I have to admit was purely by accident. The tank they were in had inadvertently been overlooked and had become polluted. An 80% water change was made immediately before I departed for work. 50% of the water used was already pre-heated and aging in a plastic dustbin in the fish house, the rest was used straight from the tap and was quite cold at around 50°F, this reduced the overall temperature in the tank by about 7°F. On returning from work that evening I checked to see if the group of six adults were alright after their drastic water change experience. I found that they had spawned.

Second spawning

Three months later on 23rd July my *Corydoras robustus* spawned, this time by intention. I only wanted to prove that I could successfully induce *Corydoras* species to breed. I had at that time successfully spawned and raised sixteen species. I kept detailed notes on them all, especially the changing patterns of the developing fry which was something that had

Corydoras zygatus

SIZE: Mature adults males 65 mm females 70 mm

COLOUR PATTERN: Body light reddish tan, lighter on the belly. A dark broad grey band extends posteriorly, from the centre of the head just below the dorsal fin spine, along the dorsal scutes to the caudal peduncle and does not pass either into the caudal fin or onto the ventral scutes. There is a metallic green sheen covering this dark band and there is, in most specimens, a break in the band, which occurs on the scute adjacent to the dorsal fin spine. There is a light pink/orange patch below the band just above the eye.

interested me from my very first *Corydoras* spawning. The tiny fry of *Corydoras pygmaeus* were so different from the adults I thought these changes would be something well worth recording.

It soon became very obvious that these were two distinct species based on the colours of the developing fry. The fry of *Corydoras zygatus* at 6-7 weeks looked very much like many other species of *Corydoras*



Corydoras robustus at 2 weeks old.



Corydoras rabauti at 6 - 7 weeks old.

Corydoras rabauti

SIZE: Mature adults males 45 mm females 50 mm

COLOUR PATTERN: Body reddish tan, lighter on the belly, darker on the head and snout. A dark broad dark grey band extends posteriorly, from the centre of the head just below the dorsal fin spine, along the dorsal scutes to the caudal peduncle. From here it extends across and down into the ventral scutes, then into the lower lobe of the caudal fin. The band has a matt appearance with very little if any metallic overlay. There is a bright orange patch below the dark band and above the eye, positioned in line with the dorsal fin spine.

that I had spawned. It was not until the *Corydoras rabauti* had spawned that I saw a dramatic difference between the developments of the two groups of fry. The *Corydoras rabauti* fry were a stark contrast to those of *Corydoras zygatus*. Several specimens of fry from each spawning, along with an adult female from each spawning group were preserved and sent to Dr's Nijssen and Isbrücker in Amsterdam for examination. Their conclusion was that there were indeed two distinct species having almost identical adult colour patterns.

How do you tell them apart?

We now know that they are two distinct species, but how do we tell them apart? With some difficulty I must say! Now, having kept both species for more than twenty years, I have become quite adept at telling which is which. One of the biggest drawbacks for importers is that they are invariably shipped mixed together as the same species and usually under the name *Corydoras rabauti*. Both species originate from different localities from the Loreto



Corydoras zygatus at 6 - 7 weeks old.

province Peru. Because of their colour pattern similarity they are invariably kept and shipped together as one species.

Other differences

Apart from colour pattern these two species differ in the eggs that they produce. A single female *Corydoras zygatus*

can produce in excess of 600 eggs in one spawning session. A *Corydoras rabauti* female on the other hand only produces around 100 eggs. There is also a vast difference in egg size and the number laid at each mating. A *Corydoras zygatus* female lays 1.0 mm diameter eggs and produces them in groups of between 4 and 12 at each mating. A *Corydoras rabauti* female, on the other hand, will lay eggs that are almost twice the size at 1.75 mm diameter but only produce 3 to 6 at each mating.

The sites favoured to deposit their eggs by each of these species also vary. *Corydoras zygatus* prefer to deposit their eggs on solid objects fairly close to the surface of the water; *Corydoras rabauti* however, prefer to lay their eggs in a variety of places and at all depths, mostly they appear to favour fine leaf plants such as Java moss, or the fine roots of plants like Java fern.

During the late seventies and early eighties there was another species name involved in the discussion, this was *Corydoras myersi* Miranda Ribeiro, 1942 which proved to be a synonym of *Corydoras rabauti* which was described a year earlier by La Monte, 1941. It is a name that I still see in some aquatic shops today ■

Corydoras zygatus to the rear of *Corydoras rabauti* in adult colouration.



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Sea view

Andrew Caine reviews Aqua-Medic Turboflotter Protein Skimmers and has another fish and invertebrate for you



FOR THOSE NEW TO THE HOBBY MAY I introduce a German company who have been in existence since 1987, and who's philosophy in research and development (to produce high quality innovative products for the serious aquarist) has resulted in them now holding 20 patents and being represented worldwide. In this little review I will be looking at only a very small section of their portfolio, the Turboflotter protein skimmers.

Pins and Needles

Last month I introduced you to the world of "pin wheel" skimmers. The Turboflotter range operate on a different design in the impeller, the "pins" are longer and sit along a 180 degree axis through the impeller, this has resulted in an impeller termed as a needle wheel and not a pin wheel. The result is the same, in that the injected air is broken down to very fine bubbles allowing a high degree of mixing and retention time within the skimmer.

The Turboflotter range with needle wheels are produced for aquariums or systems ranging in capacity of 400 to 22,500 litres. Obviously, the smaller capacity models are of interest to me and you. What is interesting is that the company have a model to suit every application that would be required by the hobbyist. They produce internal, hang on, stand alone and sump skimmers, making needle wheel technology available for all aquarists.

Every time I look at one of these little babies one thing stands out above all else, no it is not the needle wheel, enough of that, but something else. When you go out to buy a product, you look at it, if possible hold it and examine it and just by that little examination you have a gut feeling of are we being ripped off or is it good. What I am getting at here is the quality of build. You just have to look at it, examine the precision welding, and the materials utilised in the construction, yes they are good.

The most popular skimmer in this range is the Turboflotter multi 1000, for systems between 120 - 250 gallons (500 - 1000 litres). Many people who have smaller systems have also utilised this model to cope with a high biological load. Why does this skimmer stand out from the range? The answer is quite simple, its versatility in usage and the way air is injected. To start with it is the only skimmer with a needle wheel that can be



utilised as a hang on, stand alone or within a sump, so whatever your system it should be able to fit, a testament to the thought process behind the design of this skimmer. Another big plus is that it comes complete. There are no extras, so when the retailer hits you with the price you won't hear "and you will also need this and this".

Air injection for this is termed as aspirated injection, which basically means that air enters behind the needle wheel and is forced through it not, as in most, with air entering in front, sucked into the impeller

and forced back. This aspirated injection through the needle wheel allows greater air / water mixing before it even enters the reaction column of the skimmer.

So with all this blurb, just how good is the skimmer range? Well, as a retailer, I have sold all the models except the huge one, and I have never received a complaint from a single customer and that is the testimony from your fellow aquarists, not me.

Expect to pay £230.00 for the Turboflotter 1000 multi, and your nearest stockist can be obtained from Aqua-Medic on 0845 090 3500.

Long spine urchin (*Diadema setosum*)

Well what a contentious animal we have here. Currently there are two trains of thought about this little beastie, reef safe or not. I noted in one recently published book the animal was termed "reef safe but could consume corals"! So I think it is about time the matter was settled once and for all, the question being, "Can you add this animal safely to a reef tank?"

Those who scream in horror state that the beast will consume some soft and hard corals, thrusting their sharp spines into the corals themselves and stripping calcareous algae as they roam around the reef toppling rocks. Doesn't sound too good, does it? However, the other side of the argument say they have great benefits to a reef aquarium, a great grazer, the smallest group of animals in a reef aquarium are mobile invertebrates, so it is a welcome addition, and they don't spike corals.

Let's see what really happens

It is a grazer, it has a special set of 5 jaws which have evolved over millions of years to cut algae from a rock surface. This means that along with the algae they will also consume sessile animals such as sponges as they emerge out of the live rock. They will also scavenge a dead carcass if they come across one. Yes, it is a great grazer and will control algae in a reef aquarium. In the wild, it will not actively hunt corals or rasp calcareous algae simply because it does not have to. Algae, its natural food, is always in abundance, and this fact is the crux of the whole debate.

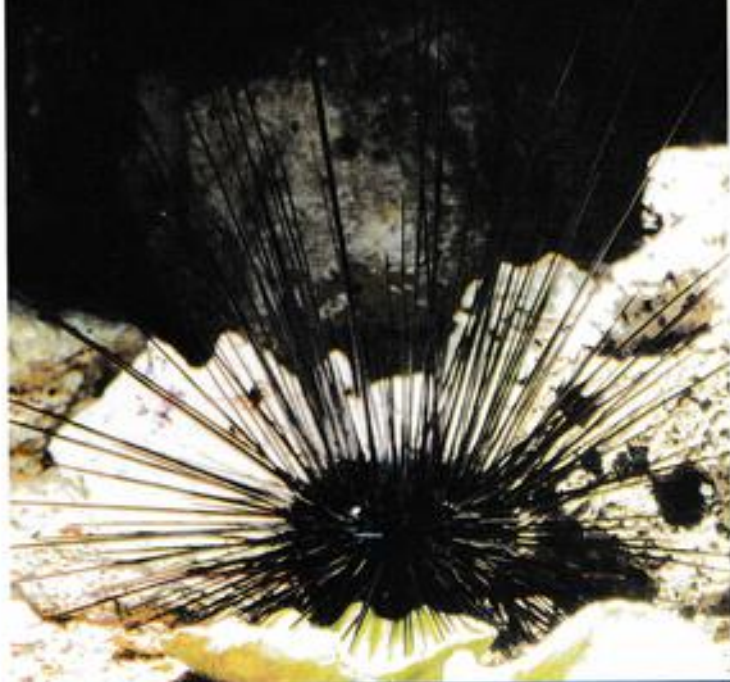
When the urchin is introduced into an aquarium which is incapable of producing algae in quantities it requires, the animal is left with no choice but to supplement its requirements with other food sources. This is how a grazer becomes a predator. It will also topple rocks if they are not secure enough. I, personally, have never seen a coral being punctured by an urchin. When you hear tales about this beast it is not the fault of the

PROFILE

| | |
|------------|---|
| Phylum | Echinodermata |
| Name | <i>Diadema setosum</i> |
| Location | Red Sea, Western Pacific |
| Feeding | Algal grazer, feed fresh or dried marine algal strips |
| Size | Body 9cm, 40cm spines |
| Water flow | Moderate |
| Lighting | None required |
| Difficulty | Easy but feed well |

An invertebrate for you

Sea
view



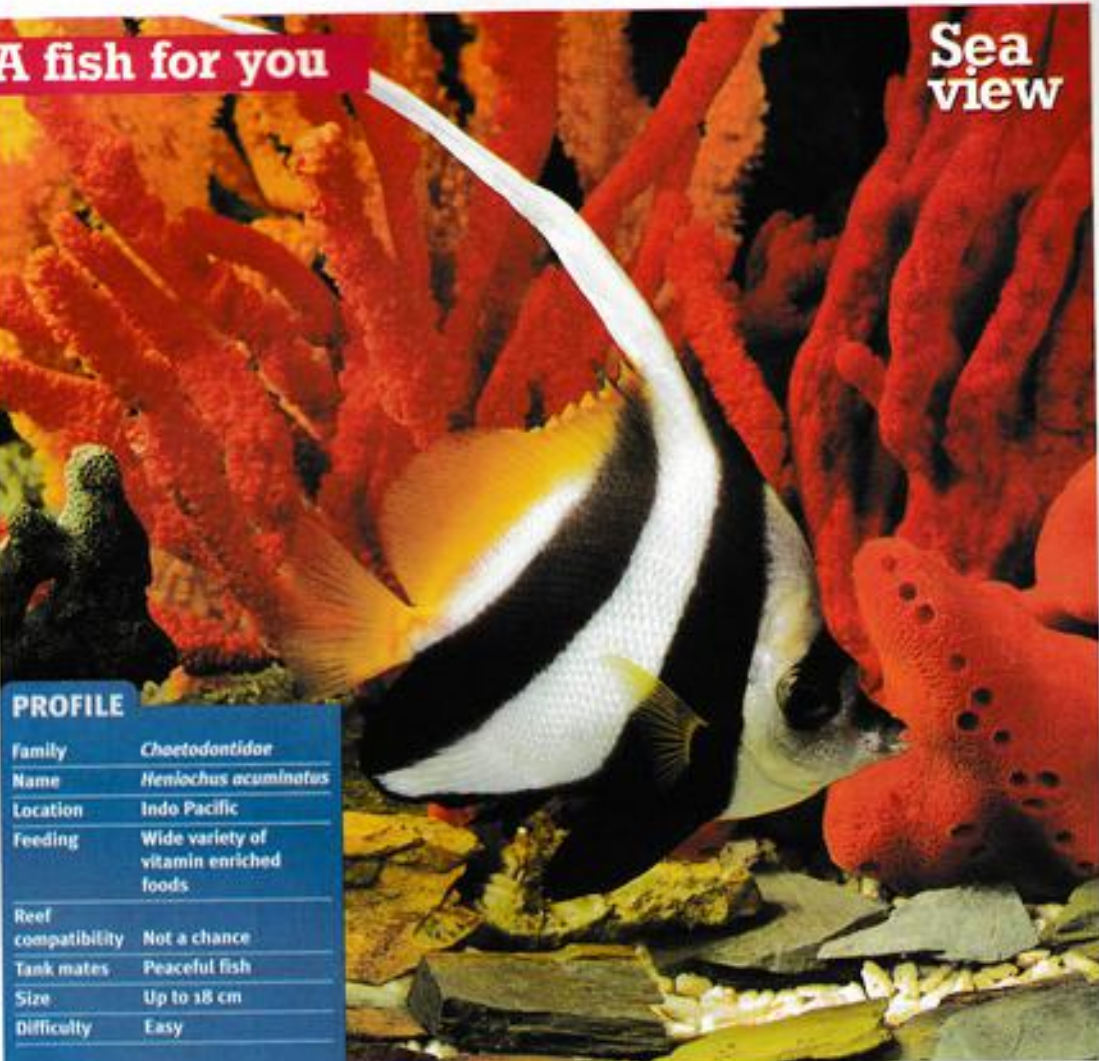
D. setosum perfectly at home in a German aquarist's reef tank.

animal, but TOTALLY the fault of the person who introduces an animal into a system which cannot cope with its requirements.

They are an easy animal to keep. Acclimate them well before introduction or

you can kill them due to damage by osmotic shock. The only other tip I can give is always, and I mean always, look for it before you put your hand in, as take it from me when you get 'spiked' it really hurts! →

A fish for you

Sea
view

PROFILE

| | |
|--------------------|--|
| Family | Cheetodontidae |
| Name | <i>Heniochus acuminatus</i> |
| Location | Indo Pacific |
| Feeding | Wide variety of vitamin enriched foods |
| Reef compatibility | Not a chance |
| Tank mates | Peaceful fish |
| Size | Up to 18 cm |
| Difficulty | Easy |

Wimple or long fin bannerfish (*Heniochus acuminatus*)

This is a weird one. With the vastly elongated dorsal filament sticking up, it always reminds me of a dodgem car at the fair ground. So how can you insult such a fish, yet some people do call this cracker a 'Poor Man's Moorish Idol'. Yet every person I have heard uttering such a phrase, did not have the skill to keep a Moorish Idol successfully. Sounds like sour grapes to me!

A word of warning, do not confuse this beast with its close relative the Schooling

bannerfish, *H. diphreutes*, which looks virtually identical. Yet two peas in a pod could not be more different if they tried. *H. acuminatus* has a longer snout, less rounded breast and the second black band terminates just behind the corner of the anal fin. In *H. diphreutes* the black band terminates at the corner of the anal fin. If you like these fish, learn the differences well or trouble will follow.

Our Wimple fish has a longer snout, great for picking out beasts from cracks in rock work and even better at pulling out small coral polyps, so a reef fish it is not. It is a very hardy butterfly fish and is easy to feed. Give it a wide variety of food ranging from meaty morsels to a vegetable diet. Enrich

frozen food with vitamins for vivid coloration and great health. They also love plenty of swimming space, so don't cram the tank with rocks, and make sure the tank is a decent size (at least 300 gallon) or you will stress the fish as it grows to a large size.

Another difference between the two species is that our boy does not like members of its own species in the tank but, as the common name suggests, its cousin the schooling bannerfish will shoal with its own members if, and ONLY if, they are introduced together. In both cases it is wise to place them in aquariums with peaceful tankmates it saddens me when I see such beauties with the long banner missing as a result of aggressive co-inhabitants. ■

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Black and white beauties

"*Cichlasoma bartoni*" really caught Pat Lambert's eye when on a trip to Mexico. Photos: Derek Lambert



"*Cichlasoma bartoni*" female in normal coloration.

CONSERVATION IS A VERY IMPORTANT ISSUE these days and we have visited numerous locations over the years, going back and checking how the fish are doing. One location in particular has attracted the attention of scientists for a long time now and this is Media luna.

Unique habitat

This is a spring fed lake shaped like a half moon- hence the name Media luna. Surrounding the edge of the lake there are water lilies and lush aquatic plant growth. From the lake, crystal clear water flows along

channels and into a man-made canal. The water is warm with a temperature of 26-28°C. GH 47 and pH 6.6. Killifish (*Cuclor tessellatus*), livebearers, characins and cichlids are abundant here. We went to look for the livebearer *Atoleobius toweri*, as this and a few other springs in this area are its only



Cuafoc tessellatus is a beautiful killifish which is often found with "*Cichlasoma*" *bortoni*

home. Then we saw "*Cichlasoma*" *bortoni*.

This species is endemic to the upper Rio Verde system of the Rio Panuco basin in northern Mexico. The normal patterning of light greyish green with irregular black speckling above and below the lateral line is more subdued than the breeding pattern. Both sexes display the same patterning and that includes the spawning pattern. At 18cm (7ins) it is the smallest of the subgenus *Nandopsis* and definitely not a community dweller.

First sight

I first saw this species in Media Luna in January 1992. It was a wonderful sight to see the breeding pairs in their full breeding pattern of pure white above the lateral line and inky black below. Their spawning territories were hollowed out caves around the edge of the lake. These territories were robustly guarded by the parent and anything that approached that territory was dealt with very severely. The water was very clear but quite deep. We could see all the different stages from courtship to breeding and rearing of the fry as we wandered around the lake looking in sheer amazement at it all. Some of them were hollowing out their caves prior to spawning. They were extremely protective towards their young. We saw the young of several groups being escorted around in the upper layers of the lake as they foraged for food. Some of the young looked quite big too, though it was hard to tell what size they were in that depth of water. You could never see all of these stages at one time in an aquarium, Media Luna is a huge lake and a very special place.

The coloration of a light greyish green body with the black speckling is much less dramatic than the breeding colours. In fact,



Catching these Cichlids in the wild is best done using a cast net. This is Juan Miguel who caught the "*Cichlasoma*" *bortoni* which Bolton have been breeding from.

this was my first sighting of "*C.*" *bortoni* and I thought, because all the adult fish I was seeing had this pattern, that this was the normal coloration of this species. We were there for livebearers really, but we were with our friend Mike Schadle (who's into Cichlids and knew the fish).

This experience with this particular fish

made them special to us and we read up all we could about them. We obtained our first group of young "*C.*" *bortoni* in 1998 when our Mexican friend Juan Miguel caught some for us using his cast net. We acclimated the fishes for a few weeks and then took them to Bolton Metro Public Aquarium where Pete Uptrop works, as he had a lot more experience with this type of Cichlid than we had. This is a fish that needed to be bred. It only comes from the area around Media Luna which with all the agricultural activities going on makes the tenure of any life in the lake rather insecure. We had no experience with "*Cichlasoma*" cichlids at that stage and this one is so rarely available that we had to give it the best chance. We entrusted them to Pete at the Bolton (a true treasure chest of endangered species breeding) and they didn't let us down as they bred for them. They passed on fry to many people but I don't know what success they had with them. ■



"*Cichlasoma*" *bortoni* male in full breeding colour.



THE POND ENVIRONMENT like any other, produces organic waste. Decay converts the waste into inorganic materials such as Ammonia NH_3 and Nitrite NO_2^- . As you might already

know through reading previous editions of Today's Fishkeeper, these materials can become dangerous to living organisms. Fortunately "mother nature" developed an excellent mopping up system involving bacteria that utilise these waste materials, converting them successively into the less harmful product Nitrate NO_3^- . This oxidative process is known as Nitrification and is one part of the "Nitrogen Cycle". This is **Fundamental** to ponds and aquariums alike.

Nitrate NO_3^- might not be harmful in small amounts, however, in either a pond or aquarium situation it often accumulates to levels that will cause stress related problems, disease and encourage excess algae growth. It's clear to see that we need to find a way of removing the NO_3^- from the environment.

1. De-nitrification

One way involves a Natural process known as de-nitrification where *Pseudomonas* bacteria convert the NO_3^- to a venible Nitrogen gas. But the anaerobic conditions needed to do this are unstable, and the process problematic. It can't be solely relied on to remove Nitrate from the environment.

2. Dilution

Dilution by means of a regular small water change of approx. 20% fortnightly will help keep levels acceptable @ 40 - 50 mg/l. If your NO_3^- levels are very high, seek advice, do not carry out huge water changes it will often do more harm than good.

3. Assimilation

Another effective method of removal is the up take of Nitrates by plants and is known as assimilation. This method forms another major stage in the Nitrogen Cycle. Plants use nitrogen based compounds as food, removing them directly from the water.

Marginal plants are so effective at NO_3^- removal that some pond enthusiasts purposefully build "Vegetable filters" in the form of separate shallow ponds. These are filled with plants to remove the nitrates as the water runs back to the pond after leaving the biological filter. This process is also used on a mammoth scale by environmental waste bodies and water companies to clean up water before it re-enters the environment.

All plants will assist in Nitrate removal, but if you're considering this alternative filter, look out for *Nasturtium aquaticum* - Watercress, *Menyanthes trifoliata* - Bog bean, or *Typha* sp. - Reed Mace and *Phragmites australis*. All are excellent NO_3^- removers. ■

Side Salad

John Tate suggests which plants work best in a vegetable filter and has another plant for you



Push each stem deep into the aquarium substrate using your forefinger as a dibber.

A plant for you

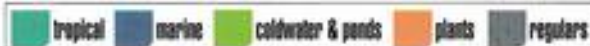
Hygrophila difformis is an unusual member of the Acanthaceae family originating from South East Asia. Its ornate looks set it apart from the other highly regarded, but more stereotypical forms within the family, such as *Hygrophila polysperma* or *H. stricta*. It is readily available from aquatic retailers, often sold under the common name "Water Wisteria". Its non-demanding nature makes it ideal for the beginner and experienced alike. The bright green leaves reach up to 10cm in length, 4-5cm in width, and are arranged in opposing pairs on open central stems. The pinnate nature of the leaves gives the plant its fluffy appearance, often contrasting well with darker more structural tank mates.

As with nearly all "stem" plants *H. difformis* is usually sold as a series of rooted cuttings secured in a pot with

rock wool or foam. Often displayed in cramped conditions, look out for plants that are starting to suffer from lack of light i.e. loss of leaves from the base of the plants, or the lower leaves turning brown and slimy. Choose a stocky plant with healthy leaves and roots.

Once home, carefully remove the individual stems from the pot and remove a few of the lower leaves ready for planting. Push each stem deep into the aquarium substrate using your forefinger as a dibber. Set the stems well apart from each other to allow good light penetration. A leaf's distance is a reasonable guide. This prevents the "stick with a bit of leaf on top" syndrome.

Once established, trim occasionally to keep the plant compact, provide good light and a liquid feed regularly. *H. difformis* kept in lower temperatures may produce chunky leaves not the preferred pinnate form.



Dr Ronald L. Shimek continues his look at nutrition in reef tanks



PHOTO: ALF HALSEN

The large fireworm, *Eurythoe complanata*, such as this individual, are very important members of the "scavenging guild" and may be the most important animals in a reef aquaria.

Consequences of Nutrient Flow in Aquaria

IN THE FIRST TWO PARTS OF THIS SERIES, I discussed the fact that coral reef animals have to feed. For many aquarists, particularly ones who have spent some time looking at some of the more out-of-date reef aquarium literature, such a concept borders on heresy. After all, as we all know from these references, these organisms get all the nutrition they need from their zooxanthellae. Out here where I am writing this, in a particularly ugly cow town on the high plains of the American West, we have a single word that should be applied to that hallowed concept. That word aptly describes a certain copious effluvial product of male bovines.

The plain and simple truth is that without feeding, corals and coral reef animals, in general, will die. As a consequence of this, aquarists by necessity must arrange to feed their livestock. Not only that, but given the inviolate physical laws of thermodynamics, we must add significantly more food to an aquarium than can be directly utilised by

the animals that food is meant for. A survey of ecological literature will show that it is a rare animal, indeed, that manages to extract and assimilate more than about thirty per cent of the nutritive value of any food. In most animals, with most foods, assimilation efficiency is closer to ten per cent.

As consequence of this, much of the food we add to our aquaria goes unused by those animals that it was meant for. By and large, this material goes to form that most wonderful of all indigenous aquarium products, "detritus." As is generally understood, detritus is a mixture of small particulate material resulting from either the biological or physical processing of food, living things, or substrata. Often this is the remains of waste material from some relatively large organism. So, "detritus" means small particulate material of uncertain and variable origin. One thing is certain, however; detritus can be considered to be "condensed nutrients". The accumulation of this nutrient-rich material

may lead to all sorts of other problems.

Aquarists need to prevent detrital accumulation in our systems to prevent nutrient overload. We have several options as to how to do this. The obvious first option would be to reduce nutrient input. However, as the nutrient comes as a necessary by-product of essential feeding, such a reduction generally would mean malnourishment of some or all of our animals. Alternatively, we can accept that our systems will have detritus formation. If we do the latter, we must either remove it, or allow our systems to live with it.

Choice 1: Allow Detritus Formation; Remove the Detritus

This labour intensive alternative actually works pretty well. To remove the detritus effectively, however, one needs to keep a bare bottom tank, without much live rock and with

good water circulation at the bottom. Mechanical filtration needs to be continuous, and the tank bottom must be frequently siphoned clean. To ensure that all the detritus is removed, the aquarist must set up a regular schedule of tank cleaning and water changes. All of this can work reasonably well, particularly for fish only tanks or invertebrate "species" tanks with only a few occupants. It requires a lot of monitoring and a lot of effort. Personally, I find it far too much work. I would rather observe my aquarium than to do maintenance on it.

Choice 2: Allow Detritus Formation; Live With It

Living with detritus is, of course, Momma Nature's way of dealing with the stuff. I am certain that if aquarists understand how detritus is dealt with in nature, they will be able to design and maintain their systems to deal with it in similar manner. The first thing to realise is that, from the aspect of a small marine organism, detritus contains a LOT of useful material.

Detritus contains all the necessary foods: carbohydrates, proteins, fats, and minerals. The carbohydrates and lipids can be converted directly into the chemical energy of metabolism. The proteins may be broken down (or digested) into amino acids and then resynthesized into the organism's own proteins. The amount of protein that may be synthesized from detritus may actually be higher than that present in some common aquarium foods. This is because the bacteria that are present in large numbers in detritus have a higher nitrogen to carbon ratio than do most multicellular animals or plants; consequently they are easily



Hermodice carunculata from Puerto Rico preying on stony corals. This close relative to *Eurothoe complanata* is definitely not an animal you would want in a reef aquarium.

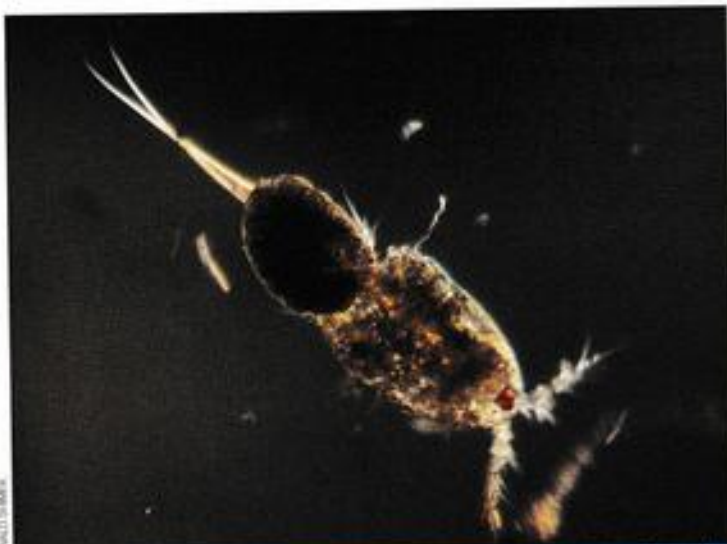
digested and converted into protein. In turn, this means that bacteria are very useful foods when it comes to building or repairing tissues. In other words, in the natural world, detritus is an exceptionally valuable resource, full of essential materials in easily captured and manipulated packages.

Given the high nutrient value and the ease of capture of detritus, it should not seem surprising that a wide variety of organisms have become adapted to eat or otherwise

utilise detritus. In natural habitats, detritus fuels an entire food web, and around coral reefs most of the animals involved with this food web are found living in the sediments of the ocean bottom. The organisms found living in or on the ocean bottoms are called "the benthos," or "benthic organisms," and most of them eat either detritus or other animals that eat detritus.

Aquarists may easily design their systems so that the whole reef aquarium construction helps to reduce the amount of stored nutrient in the form of detritus. To do this, they have to build an analogue of the natural benthos. Fortunately, this is a fairly simple process. It does require a bit of patience on the part of the aquarist, and once the process is initiated it takes the ability to resist the urge to micro manage the benthic community of organisms.

In marine habitats, one of the more interesting side effects of eating anything, including detritus, is that it creates detritus. This is due to one of the inviolate natural laws, the second law of thermodynamics, which holds that no transfer of energy or materials is one hundred per cent efficient. Some energy or material is always lost back to the environment. What this means in practical terms is simple: to reduce the energy and useful materials in a given amount of detritus to insignificance will require that that particular parcel of detritus must be eaten and digested several times. The number of these "reprocessing" events may be quite numerous. For example, it has been estimated that an average pelagic copepod fecal pellet released near the surface of the ocean is eaten and re-eaten about eight times before it makes it to the →



Harpacticoid copepods are small crustaceans commonly found in reef aquaria. They eat bacteria and detritus, and in turn are eaten by many fish species.

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A free-living bristle worm typically collected from live rock. Family Phyllocidae.

ocean bottom.

Turning the "multiple use of each detritus particle" information in the above paragraph around a bit, to completely process a given quantity of detritus can take a rather large number of animals. The quality and the consistency of the detritus changes after each organism is done with it. These changes imply that it will also take a number of different kinds of organisms, each specialised for a different type of detritus, to fully process it.

The Clean-Up Crew - A Necessary Part of the Reef Aquarium

The accumulation of nutrient-rich detritus that is a consequence of adequate feeding is like a time bomb waiting to go off in a reef aquarium. The bomb goes off when the detritus starts to become soluble or leach soluble nutrients into the water. At this time, the aquarist will typically first notice the appearance of cyanobacteria, dinoflagellates or diatoms. All of these micro algae are very good at sequestering ammonia, nitrates, and phosphates from the water. A significant algal bloom may occur with no or very little detectable dissolved nutrients. And, if not controlled it will get very much worse.

To prevent algal blooms, a way has to be in place to easily remove the nutrients in the detritus from the system. Fortunately, this is easily done by spending a bit of time and, of course, some hard-earned cash, to establish some populations of detritus-eating animals in the aquarium. Many, but not all, of these organisms live in sand and can best be maintained in a deep sand bed. A few of them will live in the rockwork. The larger of these animals are generally referred to as scavengers, the smaller ones as detritivores. Really, the only significant difference between the two categories has to do with the size of the food item eaten. Most scavengers eat food that is relatively large, often they will take normal and standard

pieces of food after it lands on the bottom. Detritivores eat tiny material and they often eat sediments to ingest the small particles of food mixed with the mineral grains.

Bristleworms are not all enemies

Most of the detritivores and scavengers fall into two groups of animals, the small crustaceans such as amphipods and harpacticoid copepods, and the various polychaete annelids such as the much (and unjustly) maligned "bristle worms." These latter animals, particularly the larger ones, are often removed from aquaria without a second thought, but this is decidedly a mistake. The large fireworm, *Eurythoe complanata*, common in many reef tanks, is probably the best scavenger that can be found in the tanks. Furthermore, it is absolutely harmless to living animals. They do not eat live animals, and do not irritate or otherwise bother Tridacnid clams, soft corals, corals or other wee beasties dear to the hearts of all reefers. These worms lack biting jaws, or any type of feeding apparatus that would allow them to bite off a chunk of food. Instead the inside of what could pass as the lower lip is ridged and roughened. The animal uses it as a "ratchet" to pull pieces of food into its mouth where they are eaten.

Animals such as the small crustaceans have good jaws, and they make their living by tearing apart and eating small pieces of food or by scraping bacteria and particulate organic material off the rocks and sediment grains. Other types of small animals such as minute flatworms, burrowing bristle worms, and protozoans live in and amongst the sediments eating progressively smaller and more minute pieces of detritus.

After these animals eat their delicious repast of detritus, they digest it and chemically use what they can from each piece. Some of the detritus is exported from the aquarium as carbon dioxide exhaled by these animals, another fraction becomes

ammonia excreted in their urine. This ammonia, in turn, enters sediments where sediment bacteria reduce it rapidly to nitrogen gas which will eventually find its way out of the system at an air/gas interface.

The scavengers and detritivores in reef aquarium ecologically function to convert excess food and organic debris into their living biomass. In the process of doing this, they release dissolved gasses which remove much of the excess material from the system. Additionally, they convert the excess leftover nutrient into their own flesh, making it unusable by algae or cyanobacteria. Even with the amount of material exported by respiration and the nitrogen cycle, a significant amount of nutrient remains in the aquarium. A way must be found to remove that material as well, and nutrient export techniques will be the subject of final article in this series. ■



Flatworms that live on and between sand grains often eat detritus and bacteria. The anterior end of this worm is the narrow end, the mouth is located in the clear region near the posterior end, and the dark material inside the animal is digestive tissue and eaten detritus.

Some Useful References:

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- Johnstone, R. W., K. Koop and A. W. D. Larkum. 1990. Physical aspects of coral reef lagoon sediments in relation to detritus processing and primary production. *Marine Ecology Progress Series*. 66:273-284.
- Tenore, K. R. 1977. Food chain pathways in detrital feeding benthic communities: A review, with new observations on sediment resuspension and detrital recycling. In: B. C. Coull. Ed. *Ecology of Marine Benthos*. University of South Carolina Press. Columbia, South Carolina. pp. 37-53.

Derek Lambert reports on how to breed the unique One sided livebearer - *Jenynsia multidentata*

Breeding the One-sided Livebearers



Pair of *Jenynsia multidentata*, Male below.

ONE SIDED LIVEBEARERS WERE FIRST imported to Europe in 1905. However, due to their rather specialised requirements they have enjoyed only spasmodic popularity and success.

One-sided livebearers are very occasionally seen in the trade and sometimes come up in livebearer auctions. They belong to a unique genus which used to belong to a family all by itself. Since then its closeness to the Four-eyed livebearer (*Anableps*) has been recognised and the two are placed in the same group. Enough of taxonomy and on to the biology.

Sex differences

Males have their anal fin modified into a copulatory organ. This hollow tube is made up of the fins rays twisted around each other and covered in a sheath. The tip of the male's gonopodium is curved either to the left or to the right. The female's gonopore is covered with a large scale called a shutter which is unattached at one side. The easiest matings occur when either a male with a left curved

gonopodium mates with a female whose gonopore shutter opens to the right, or a male with a right curved gonopodium mates with a female with a left opening shutter. Left to left and right to right can be done but

its more difficult. Females have a normal anal fin compared to males and are larger when mature. As sexually mature virgins they have an orange spot around their vent which disappears after mating.

Aquarium conditions

This is a shy, timid species which is easily frightened. It is naturally a bottom dweller which tends to skittle round the bottom of the tank in a shoal. They are jumpers which are adept at finding even the smallest of gaps in the aquarium cover.

Best kept as a long term colony. Use a 60cm x 30cm x 30cm (24" x 12" x 12") aquarium containing some plant cover and filled with hard alkaline water. A pH of 7.5 - 8.0 and hardness above 200ppm is best. Some marine salt should be added to the set-up if your water is softer than this.

Courtship & spawning

Once young females become sexually mature they develop an orange spot at their gonopore. This acts like a magnet to every male in the aquarium. During the next week or so they will pursue and try to mate with her virtually continuously. Once this disappears you know she is pregnant.

Broods take up to 8 weeks to be born. During this long gestation they are initially free swimming in the ovarian lumen. At this time a number of youngsters are eaten by their siblings (many sharks have this stage as well). Later in the pregnancy the female produces club-shaped processes which enter the babies opercular cleft and fill the mouth and pharyngeal cavity. This structure provides all the nutrients the developing baby needs to grow into a youngster about

1.25cm (1/2") long when it is born. If you look at the gill plate of new born youngsters you will see that one of them sticks out more than the other. They lie on the bottom

Which *Jenynsia*?

For many years the One sided livebearer circulated has been thought to be *J. lineata* but this species has never been imported. Recent taxonomy has recognised to species of *Jenynsia*, the commonly kept one being *Jenynsia multidentata*. For further information I refer you to "New species of *Jenynsia* from Brazil and its phylogenetic relationships" *Copeia* 2001 (3) p726-736. Ghendotti, Meisner and Lucinda.

for the first eight hours pumping their gill plates fast. This normal behaviour tends to make aquarists who have no experience with this fish think they are in distress.

Rearing the fry

New born fry can be attacked by hungry adults so it is important to make sure all the colony is well fed. If you have a problem with cannibalism remove any large old females or separate gravid females when they look plump. Brood sizes average 15 to 20 although the brood record is 25.

The fry are very large at birth and will take newly hatched Brine shrimp, Grindal worms, powdered fry food and even growth foods within a day or two of being born. For the first six weeks they can be found swimming at the top of the tank, however, with increasing age they will spend more and more time at the bottom. Growth is rapid with males developing an andropodium within 4 weeks of birth. They are not sexually mature until about 4 months of age.

Whilst this is a specialists' fish its unique breeding habits certainly make it one of the most interesting and worthwhile species to work with. ■

Breeding setup

Tank measuring 60 x 30 x 30cm (24 x 12 x 12in)

Hard, alkaline water (above 200ppm, pH 7.5 - 8.0). Add some marine salt if your water is softer than this



Jenynsia maculata is one of the newer arrivals on the livebearer scene.



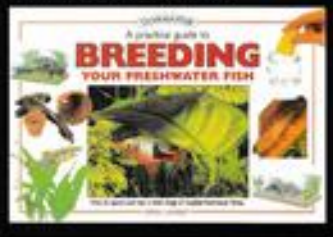
Tough fish

Ideally, the temperature should be set somewhere between 22 - 27°C (72 - 80°F), however, *Jenynsia multidentata* has to tolerate wide swings in temperature when living in the wild. For this reason it has adapted to survive temperatures as low as 12°C (54°F) and as high as 36°C (97°F).



Female *Jenynsia multidentata* giving birth. New born fry of One-sided livebearers are very big when compared to Guppies.

This article has been taken in part from *A practical guide to breeding your freshwater fish* by Derek Lambert published by Interpet. Contact your local aquarium shop to buy a copy.



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Ponderings

In this new column **Dave Bevan** will be dealing with all aspects of ponds and pond life

Fascinating facts

Sometimes called the Doctor fish, the Green tench is covered with a heavy coating of mucus (slime) which is slightly alkaline and may act as a mild antiseptic. There is an old belief that a wounded fish will seek out the tench and rub its wound against the tench's body. It is also said that the voracious pike

TENCH FACTFILE

Common name Green Tench, Doctor Fish

Species *Tinca tinca*

Other forms Golden tench, Red tench, Red and white tench

Size Normally 30 – 50 cms, but up to 70cms, has been recorded. They are usually offered for sale as 10 – 17 cm fish. These can attain 30 – 40 cms, over a 3 to 4 year period.

Weight Maximum 8 kg, but normally about 2kg.

Availability The Green tench (wild form) is widely distributed through Europe and both the green and golden forms widely stocked in aquatic outlets.

Habitat Slow flowing rivers and ponds often heavily vegetated with a muddy bottom.

Identification Fins rounded, small eyes with one small barbel at each corner of the mouth.

Scales small and firmly attached to the skin and covered with a thick layer of mucus. Male can be identified by the larger pelvic fins.

Habits Rests by day, active after dark. Can tolerate low levels of oxygen and poor water quality. Often feeds in shoals, rooting in the mud for small snails, caddis larvae, dragonfly nymphs and bloodworms. Does not eat plant material. In very hot or cold weather may bury itself in the mud.

Pondfish value Of dubious value in the wildlife pond as rarely seen but will eat large amounts of wildlife. The golden morph will be best for the ornamental fishpond as it is easier to see. Its feeding habits will result in the bottom being stirred up and its potential size makes it a candidate for larger ponds. Will come to the surface for pellet and flake foods.



A well planted wildlife pond with plenty of cover.



does not eat the tench out of respect for its healing abilities. According to ancient folk medicine if a tench is applied to the palms of the hands or the soles of the feet it will absorb the heat from a fevered patient. Hung round the neck it would cure sore eyes.

Just below the surface

Normally, pond water turns green due to large numbers of green algae but it may also turn brown, red or even blue! Again the cause is a rapid increase in the numbers of other species of algae. Diatoms are a form of algae which turn the water brown and also cover plants and stones with a brown powder-like coating. Blue green algae usually appear in June or July and on still days can form a smelly scum which paints the water surface blue as it decays. Fortunately, these algal flushes are usually short-lived disappearing within a few days. →



Freshwater shrimps will survive only in the cleanest wildlife ponds.

CHECKERED BARB

Barbus oligolepis



PHOTO: AREND VAN DEN NIEUWENHUIZEN

TODAY'S FISHKEEPER



FISH 16

FISH 17

Is black healthier than white?

OVER THE YEARS, I HAVE COME TO THE conclusion that anything to do with fish is an obsession rather than a hobby, or in my case, a means to earning a living. One of the results of my working obsession is that the walls of my study are groaning under the weight of books relating to fish. These books are working tools for me and the only way to access the pearls of wisdom they contain is through reading them, the problem then arises that I am always behind with books and journals which I regard as leisure time reading. As a consequence I was recently reading a copy of *New Scientist* from April 2001, when I came across an article concerning some research which shows that in humans, black skin is better at protecting against disease than white skin.

The popular conception is the black pigment, melanin acts as a filter to protect the body against ultraviolet radiation from the sun, which can damage the skin cells and lead to cancer but it seems this could be wrong. Some parts of the human body which are never usually exposed to sunlight, have melanin pigment and interestingly, the article states that melanin is a poor sunscreen and does not protect against the type of ultra violet radiation which causes skin cancer. Melanin however, is a complex substance which has the ability to neutralise free radicals, certain ions and potentially toxic agents. Laboratory studies with melanin show it to be a sticky molecule and under these conditions, microbes and fungi get trapped in it and are stopped from reproducing.

What has any of this to do with koi, or indeed fish?

Well, fish and therefore koi have melanin which in various concentrations in the skin give rise to shades of colour between brown and black, more familiarly termed 'sumi' by the Japanese. Just to get a bit technical, the cells which have the black pigment are called 'melanocytes' and inside the cell, the melanin is contained in a package called a

Is disease resistance in koi linked to black pigmentation? **Bernice Brewster** has been doing a little light reading which suggests it might



PHOTOS: M.P. & C. REYNOLDS

Koi keepers frequently say the black variety of koi, known as 'magoi', or even Common carp like this one, are tougher and more resilient to disease than the coloured varieties we prefer for the pond.

'melanophore'. Now, the melanocytes are not just confined to the skin and outer body surface of the koi but are also found on and even in the kidneys, the wall of the body cavity and in young fish on the gill tissue, areas which certainly never see daylight. Inside the kidneys and spleen of fish, there are areas of tissue which have been termed 'melanomacrophage centres', which yes, you've guessed have melanin in them!

The role of melanomacrophage centres have been the subject of scientific interest for many years and their location in the kidney and spleen would indicate some role in immune function. Thirty years ago, it was intimated these have a function in engulfing invading infectious organisms, that is primarily bacteria and viruses. More recently, the immune system of a group of goldfish were challenged with sheep blood and after a few days, the red blood cells turned up inside the melanomacrophage centres. Another group of goldfish were then challenged with bacteria and a few days later these were found to have been engulfed and digested inside the melanomacrophage centres.

Does this mean that melanin really is part of the immune function of vertebrates (back boned animals) and not a sun blocker? Well, not conclusively, no one has yet proved beyond any doubt that melanin plays a role in defending the body against invading

pathogens but the recent research work with humans is certainly corroborative evidence. It makes sense really when you think of the damage caused by solar ultraviolet light to the skin of white people, that a substance like melanin would be important to prevent secondary infection of this injured tissue and that's why we get a tan! Leaving humans aside for a minute, as koi keepers we frequently say the black variety of koi, known as 'magoi', or even common carp are tougher and more resilient to ulceration and other disease than the coloured varieties we prefer for the pond. Could it be because they have more melanin in the skin than the coloured varieties? ■

A little light reading?

For those who want a little leisure reading, whilst relaxing and getting 'tanned' on holiday this year, more information can be found in the following:

- *New Scientist* no. 2288 p.7 (28th April 2001)
- Edelstein, L. M. 1971 *Melanin: A Unique Polymer*. In: Joachim, H.L. *Pathobiology Annual* Appleton-Century-Crofts, New York, p. 399
- Iwama, G & Nakanishi, T. (Eds) 1996 *The Fish Immune System. Organism, Pathogen, and Environment*. In: Hoar, W.S. et al. (1996) *Fish Physiology* 15. Academic Press, San Diego & London.

Bob & Val's Top Tips

Bob and Val have some important tips for amphibian enthusiasts



What to avoid

- Avoid substrates which develop mould where damp conditions are needed e.g. wood chips, shavings, corn cob granules. Suitable choices for damp vivaria include soil-based potting compost, sphagnum moss, dead leaves, orchid bark compost. Peat is unsuitable; it is dusty when dry and acid when wet. Sand must be non-dusty such as bird sand (with/without oystershell) or special reptile sands. Building sand is far too dusty.

- Avoid impulse buying. Thorough, preliminary research to ascertain requirements, eventual size, longevity, sociability etc. should be done before acquisition. Also the vivarium should be 'up and running' with appropriate furnishing, day/night temperature ranges and humidity levels (where necessary) before you buy.

- Never spray electrical fittings especially when hot. If your electrical knowledge is not too good seek qualified advice concerning installations.

Some good ideas

- Waterfalls which simply circulate water can soon be contaminated with faeces. If incorporating a waterfall it is better to build your own - allowing the water to pass through a biological filter bed (aquarium gravel).

- To prevent livefoods (or baby reptiles) drowning in water bowls add sufficient pebbles to allow escape with spaces



Fire Salamanders make lovely pets and are commonly available.

- between for drinking and always provide fresh drinking water daily.

- Keep crickets in a container with cardboard tubes (from foil, toilet rolls etc.). They can then be shaken into a jar with a ventilated lid. Stand the tubes at an angle to prevent accumulation of faeces etc. Chilling livefoods makes them easier to handle especially if different sizes have to be selected. If the crickets are kept in a small container for too long they produce a lot of moisture and die off. Use them when movement has all but stopped. It is worth investing in a medium-size plastic aquarium and lid which can be placed on a low-wattage heat mat to maintain a suitable temperature for keeping crickets. This enables them to be fed to boost their nutritional value. Locusts can also be kept in a similar manner.

- Amphibians often suffer during heat waves. Temperatures can be lowered by placing bags of ice cubes in or around the vivarium in extreme circumstances. Freezer packs are an alternative.

- With many amphibian species a higher ratio of males to females will often stimulate spawning.

Some 'musts'

- Quarantine new acquisitions before introducing them to established animals. Six-months or longer is recommended for wild-caught specimens.

- Amphibians must always have a damp hiding place or small water bowl even if drying out for pre-breeding conditioning.

- Spot cleaning (removal of individual faeces) is useful but the vivarium will need periodic complete cleaning and sterilising. Use a 3% bleach solution - thoroughly rinsed afterwards. Household disinfectants can be harmful - special vivarium disinfectants are available but they must not be used with amphibians as their permeable skin quickly absorbs any toxins present.

- Always wash hands after handling animals or cleaning their quarters - humans can contract disease from all domestic animals. If bitten or scratched treat with antiseptic. If you have any cuts avoid placing hands in tadpole/turtle water. Use kitchen gloves for extra hygiene. ■



Heterixalus alboguttatus is a brightly coloured, small to medium sized Tree frog.

Close encounters



of the fish kind

Mothers give more than fathers as **John Dawes** explains in his article on the hybridisation of two *Limia* species



PHOTO: JOHN DAWES

These are F1 hybrids from an *L. melanogaster* mother (hence the few body spots and the distinct vertical body bands) and a *L. vittata* male.

I HAVE ALWAYS BEEN INTERESTED IN hybrids. I remember this fascination going back to my childhood days when I used to breed canaries, goldfinches and budgerigars, as well as rear two colour morphs of silkworm (*Bombyx mori*), the one with white caterpillars and a "Jamaican" strain in which the caterpillars had a dark-brown band on each body segment.

I was always producing canary x goldfinch crosses ("mules"), interbreeding different colour forms of budgerigars and attempting to cross the normal and "Jamaican" strains of silkworms. It was therefore perfectly logical for me to become interested in fish hybrids almost as soon as I took up

fish keeping at the age of seven years.

One of the great fascinations of hybrids is what they tell us about the biological closeness, or otherwise, of species, how their genes interact...or fail to interact, how far the production of fertile hybrids can be taken through the generations (as in swordtails and platies), and so on.

I have produced countless hybrids in my 49 years as an aquarist, and what I've learned from them has led to a deep appreciation of the marvels of nature and its numerous secrets.

Surprising Results

I was not, however, prepared for the results that I obtained when I crossed two of my favourite livebearing species, the Cuban *Limia* (*Limia vittata*) and the Blue *Limia* (*Limia melanogaster*).

Even allowing for the possibility that my results may not be entirely statistically valid, owing to the relatively small numbers of fish involved (a total of just 60 specimens), I think that they may well be significant, making the study worthy of repetition, since it may, perhaps, represent the first-ever case of cytoplasmic inheritance in ornamental aquarium fish.

Basically, what I did was cross several virgin *L. vittata* females with *L. melanogaster*

males and, just for interest's sake, several virgin *L. melanogaster* females with *L. vittata* males. Since, in each case, the species were identical, I expected all the hybrids to be the same as each other and look something in between their parents in appearance.

What I got was a complete surprise. The hybrids were different...depending on the sex of the parents chosen!

Maternal Effects

If the mother was a *Limia vittata*, then the offspring had more spots (Average 39) on their caudal fins (a 'vittata' characteristic) than if the mother was a *Limia melanogaster* (Average 12.3). The same applied to the other fins. Also, if the mother was a *Limia melanogaster*, the hybrids had more vertical bars (Average 7.8) on their body (a 'melanogaster' characteristic) than if the mother was a *Limia vittata* (Average 4.9).

This puzzled me at first, until I remembered the concept of cytoplasmic



Male *Limia vittata* with beautiful spots, and a female *Limia melanogaster*. You can see some vertical bars in the posterior half of her body.

inheritance which I had first come across during my days as a biology undergraduate student. Hereditary characteristics, as we all know, are controlled by genes, which are

This puzzled me at first, until I remembered the concept of cytoplasmic inheritance...

located on chromosomes, which, in turn, are found inside the nucleus of living cells. However, other organelles which lie outside the nucleus (but still inside the cells) can



The reverse situation: a *Limia melanogaster* male and a *Limia vittata* female.



The specimens shown are F₁ hybrids having an *L. vittata* mother. Note the large number of spots on the fins and the weak body bands on the body of the male (fish nearest the camera).

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also contain genetic material, as can the cytoplasm itself.

It therefore seems possible that, at least in these two *Limia* species, while both parents may contribute equal amounts of nuclear genes, the mothers may be contributing something extra, thus influencing what their offspring look like.

I raised F₁ (first-generation) hybrids and found them to be fertile. However, shortly before the F₂'s had reached sexual maturity and their spots and bands could be counted, I lost them all, owing to a major electrical breakdown, during which I also lost stocks of goodfolds I was working on, along with two populations of *Asynxox mexicanus*: a cave morph population and a normally pigmented one, plus some *Poecilia* hybrids and *Colisa* hybrids as well.

Things have moved on since then and I haven't repeated the *Limia* crosses, but, perhaps, someone reading this edition of *Encounters* may have carried out similar matings? If so, please let me know. I'd love to hear from you. ■

Today's Comment

This sort of experimental hybridisation is done by biologists like John for a specific purpose and is vital if our knowledge of how species are related to each other is to grow. It also, however, highlights a real problem with keeping closely related species in the same aquarium. *Limias* will all too easily hybridise with each other. Many wild species of Molly, Swordtail and Platy will also hybridise if kept together. For this reason you should only keep one member of any livebearer genus in a tank if you intend to breed from them at any time in the future. The cultivated forms of livebearers, however, are all hybrids anyway so they can be kept together if you want to.

...End Point

Everyone knows and loves the Neon tetra, but have you heard about the Neon Rasbora? **Derek Lambert** has all you need to know about this little gem



The Neon Rasbora is a splendid little fish for a community tank.

NEON TETRAS HAVE LONG BEEN KNOWN and kept by aquarists the world over, yet in Asia a totally unrelated little gem is waiting to take the aquatic world by storm. The Neon Rasbora (*Sundodanilo axelrodi*) has brilliant blue males with a reddish underbelly. I have to admit it is not as brightly coloured as the Neon Tetra but it certainly does a very good imitation of one. Females are supposed to lack much of the blue colour and are a rusty red instead. There are lots of different colour forms of this fish with some strains being more blue than others.

Like the Neon tetra it is a very small fish with about 1" (2.5cm) being an absolute maximum size for this little gem. It is very peaceful species and loves living in a shoal. Males may scrap a little but no harm is done and they all seem to get along fine for most of the time. Unlike Neon tetras, which are prone to staying close to the bottom, this species will be found out and about in the upper to mid water areas of your aquarium.

Aquarium conditions

So what sort of aquarium will these lovely fish live in? Basically they like a planted area in the tank to take refuge in if they are being pestered too much by other fish. Companion species should be other small peaceful fish (including Neon or other small tetra species

if you want). Fast moving fish like Danios don't upset them and of course any other small Rasbora species would be fine. Another group of fish they can happily be kept with are Liquorice gouramis, small Bettas and other tiny Anabantids. These are the sort of fish they are found with in nature.

The only potential source of trouble comes from their preferred water

Dietary requirements are extremely easy

conditions. These, in common with many of the South American and wild caught Asian species, really like soft water. They may survive in harder water conditions but to be seen at their best soft acidic water conditions should be provided.

Dietary requirements are extremely easy. Any flake food and very small granular food suits them fine. They love small live foods as well with newly hatched Brine Shrimp just about topping the bill for them. The temperature should be maintained between 73 - 79 F (23 - 26 C) although they do not seem to be temperature sensitive.

Nothing known about breeding

As far as we know this species has not been bred in captivity as yet. If it is like the other closely related species then it is an egg scatterer which produces very tiny eggs and fry. These require infusoria as their first food and may take as long as two weeks before progressing to larger live foods such as newly hatched Brine shrimp. As I say this is speculation at the moment, unless one of our readers knows different. We will bring you that story if and when it breaks.

First introduction

This species was first imported for the hobby in about 1976 but has only ever been a rare species in the trade. The reason for this is probably because very few shops knew just what a lovely fish it really is, so they never ordered it in. Now we have the added complication that it may be listed as *Rasbora axelrodi* or under its current scientific name of *Sundodanilo axelrodi*. It even has two common names of either the Neon Rasbora or Axelrod's Rasbora. Either way it is a lovely fish and well worth seeking out if you have a community of small fish living in a soft water aquarium. ■