

BETTA BELLICA

David Armitage

Normally, large Bettas turn out to be mouthbrooders but the exception is *Betta bellica*, a long, slim 10 cm fish. It looks more like a giant version of one of the *B.coccina* group than one of the *B.splendens* relations. Originally it was described from Perak in Peninsular Malaysia while the similar fish from northern Sumatra was known as *B.fasciata*. This has now been shown to be a synonym. However there is another bellica-like species, with a more sloping profile and longer pelvics from Jambi and Riau which is known as *B.simorum*.

I first came across the fish by the side of the main Singapore - Kuala Lumpur , near Ayer Hitam in small streams on the outskirts of the peat swamp forest remnant that hopefully still shelters the miniature *B.persephone* in puddles on the forest floor. Its main cohabitants were *Trichopsis vittatus* and *Anbas*. It is usually associated with peat swamps where it lives near the banks of small streams and pools in black water. Apparently in the wild, this species is very fond of the larvae of dragon and damselflies but fortunately in the aquarium its diet is less esoteric and it will eat anything from flake to frozen food.

Betta bellica adapts quite well to aquarium life. Despite the species name, bellica which means 'warlike' it is no more aggressive than any large *Betta*. Neutral water of medium hardness and at any temperature between 20 and 26°C seems to suit, although I don't suppose they would object if presented with their natural habitat of pH 4 and negligible hardness. A large fish like this should have a two or three foot tank with plenty of vegetation, both floating and planted, to allow refuges for any harassed individuals,

Sexing is not easy, the males may have slightly more extended rays to the caudal and anal fin - both sexes sometimes show vertical bars. During spawning however, the female becomes lighter with diagonal / longitudinal bars. The nest has been variously described as 2 or 9 inches in diameter and about 0.5 - 1.0 inches deep. The nest is usually anchored to a floating leaf or among floating plants and he may prefer one end of the tank to be dark. Only when he is ready to spawn, will the male allow the female to remain under the nest and not chase her away. Then, after a few false spawnings, the eggs will be released. Unlike *B.splendens*, the twenty or so eggs are often held on the female's body, between her pectoral and pelvic fins from where the male picks them off. The female will search for any that have fallen to the base of the tank. Several bouts like this will occur and spawning may take the best part of a day.

The eggs will hatch after 31-33 h at 83°F and the fry hang, tail down from the nest. They swim free after four days. After a further four days on which they feed on infusoria, the several hundred fry are large enough to take brine shrimp.

ANABANTOID HABITATS IN CAMEROON

Olivier Buisson, CIL

We all went separately to Cameroon in 1999 so at the French killi meeting the idea germinated, 'why not return together ?' Christine, Patrice Lambert, my wife Sandra and myself were soon en-route. We decided to plough a furrow in the south-west of the country. The climate was typical equatorial, with 1.5-10 m of rain per annum and an average temperature of 25-26°C with a fluctuation of less than 3°C. The month of February corresponded with the end of the dry season, December and January are the driest seasons. The vegetation is comprised essentially of primary forest. Our main objective was to collect killis but I was also interested in labyrinths. This article concentrates on four habitats of the latter.

At Douala airport we had the impression of entering a humid greenhouse. In a few minutes we were running with sweat. One of the bags was missing - it didn't arrive until 4 days later - and our hire vehicle wasn't at the rendezvous. We were really in Africa and would need to be patient and adaptable ! The following day, we recovered our Peugeot 306 hire car, changed our travelers cheques into CFA then went to the police station to certify the photocopies of our passports. We would have to present them at each police control, five times in the week. This avoid risking confiscation of the original in order to get a bribe to return them. Here, corruption and swindles are a « national sport ».

From Douala we rolled west to Yaounde, capital of the country then towards the south to Mbalmayo. Next day, we left in the direction of Sangmelima. Several km from Mbalmayo, after the village of Yop, we fished our first habitat, a small stream with amber-colored water. The hardness was near 0. The pH was about 5. There were plants of the genus *Aponogeton* and *Lemna*.

Near the river, we fished in « sand holes ». The people who live there, dig these holes in the wet banks. They extract the fine white sand, put heaps on the roadside and sometimes, trucks come to buy the sand. The extraction of the sand happens during the dry season, because in the rain season, the river overflows its banks. When the water level comes down, lots of fishes become prisoners in the holes. There, in the green water, we found killies (*Aphyosemion exiguum*). These small colorful fishes are abundant in all the area. They're probably a food for the bigger species. We caught young catfishes of the genus *Clarias* (Adults are predators), a small frog of the genus *Hymenochirus* and our first Anabantoids : young *Microctenopoma nanum*.

Further on, warned by heaps of sand, we stopped close to the village of Memgbwa. The stream that passed beneath the road was called Mfouladja. In this season, it was in the process of drying up. The water was amber, the

hardness close to 0 and pH 6 and no longer flowed. It only consisted of successive puddles 1m in diameter and 5-20 cm in depth. In the following two or three days, the stream would be completely dry and all the fish we saw there were close to their deaths. The bottom was muddy and sometimes went up to the knees of our waders. We caught juveniles of *Nanochromis caudifasciatus*, a dwarf cichlid rarely exported, a small species of barb, not exceeding 2.5 cm in length (*B.jae*), characins of the genus *Nannaethiops* (*N. unitaeniatus*), a mormyrid, (a sort of elephant fish devoid of a trunk), *Microctenopoma nanum* and several young *Aphyosemion exiguum*.

Suddenly a beautiful male *A.batesii* which jumped onto the muddy bank, attracted my attention. These fish fed from the net and threw themselves onto the bank where one could pick them up by hand. One of the annual kills, the eggs of these fish incubate in the substrate of the dry stream during the dry season, then hatch during the return of the rains. The other species encountered probably colonised the backwater from the main river as it filled again.

Downstream from the road, I captured a juvenile of *Ctenopoma maculatum* resembling, with its marbled brown coloration, a chocolate gourami. The adult, which attains 15 cm, is a uniform grey with a dark spot on the flank.



***Ctenopoma maculatum* habitat and juvenile specimen**

After exploring several biotops south of Sangmelima, we returned toward Yaounde. On the road to Yaounde, we made a stop close to the village of Mendong where ran another stream called Ayina. We had caught nothing of interest; only *Xenopus* (a strictly aquatic frog), and *Clarias* catfish. But the road was equally bordered by a marsh that we hadn't noticed on our arrival. In fact, it was a simple puddle crowded with pale plants, the dead leaves of which covered the bottom and into which we sank to our knees. The height of the water didn't exceed 5 cm. The pH verged on 5 and the hardness was 0. A single sweep of the

net produced quantities of *M.nanum* (very dark, almost black) and brilliantly coloured *A.exiguum*.



Microctenopoma nanum

We arrived at Yaounde at the end of the afternoon to observe a colony of giant fruit bats and then installed ourselves on the terrace of a local Cafe where we ordered local beer - served in 75 cl bottles and where a local youth tried to sell us some aquariums - 1 litre bottles decorated with gravel, fern and some guppies. As we laughed uproariously, Patrice explained that he had fallen among mad aquarists and showed him some of our collection.

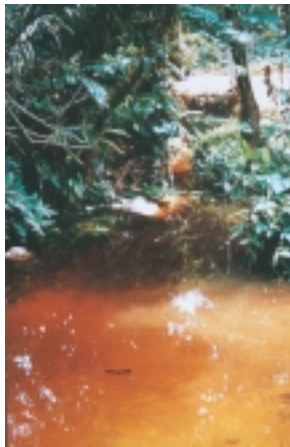
We refound Laurent Chiro, our contact in Cameroon, an old member of the French killi association, he now works with reptiles and we visited his display of venomous snakes including Gabon vipers (*Bitis gabonica*) and Cobras (*Najas melanoleuca*). These species lived by the side of the backwaters we fished but fatal accidents are rare, partly because of the noisy displays preceding snake attacks.

We took the direction of Edea where we wanted to stay for several days to radiate into the countryside. At each of our expeditions, circling swarms of blood-sucking flies about the size of a fruit fly settled on our arms and heads. We made an excursion in the direction of Mouanko a village situated in the Sanaga river drainage where the inhabitants consume great quantities of freshwater mussels and tile their houses with the shells. Rapidly, the tarmac gave way to laterite, the red soil typical of tropical zones. Each vehicle was covered with a cloud of red dust and the vegetation at the side was covered with a thick rusty film which doesn't disappear until the rains come. Progress was slow and testing.

At Ndog Bong, 15 km from Mouanko, a small river with amber crystal water passed under the road. It formed an area 10 m x 4m, bordered by masses of *Nymphaea lotus* with green leaves striped with red. Downstream, it was less deep and it was possible to fish there. The substrate consisted of a compact and dark gravel. The pH was close to 6.5 In the current swam shoals of *Poropanchax macrophthalmus* and large characins with a large black band on the caudal peduncle (*Alestes* sp?). The *Poropanchax* merited their common English name, 'Lampeyes'. They were small kills (3cm) in which the blue luminous eyes shine

out from their grey body. At the surface one could see large *Epiplatys infrafasciatus infrafasciatus* swimming, other species of killi recognisable by a large frontal scale reflecting the light of the sun. The banks, cloaked with vegetation harboured large quantities of killis of the sub-genus *Chromaphyosemion* (*A.sp. afin. splendopleure*).

On the bottom, I saw, fleeing into the roots, a male *Pelvicachromis*. Prof Amiet, had told us about the surprising presence of *Pelvicachromis pulcher* in the region of Mouanko because the usual localities are in Nigeria. We explored 'blindly', the small coves overgrown by *Nymphaea* and captured other cichlids : a *Chromidotilapia* sp., a *Hemichromis elongatus* and then an 8 cm anabantoid, *Ctenopoma kingsleyae* (the adult attains 15 cm), small characins of the genus *Neolebias* and *Polycentropsis abbreviata*, the African leaf fish. It was one of the species that I'd hoped to find in the area, a stealth predator with an extensible mouth which allows it to take prey of considerable size compared to its own !



Ctenopoma Kingsleyae Habitat In Cameroon And Wild Caught Specimen

We finished our trip with another excursion on the road to Lolodorf which left Kribi, a village on the Atlantic coast and entered the forest toward the centre of the country. Near the village of Mpolongo, a narrow rivulet passed beneath a plank bridge. It was part of the Lokoundje river basin. The water was clear and amber, the current feeble and progress upstream was made difficult by branches and trunks. We capture *Epiplatys intrafasciatus baroi* here with unpaired orange-red unpaired fins instead of the yellow fins bordered with black which you find in all the populations by the coast. We also found *Chromoaphyosemion*, *Pelvicachromis taeniatus*, *Chromidotilapia sp.* and *Microctenopoma nanum*. This species is almost omni-present in Cameroon because we caught our first strain several hundreds km far away from there.

Our fishing materials comprised landing nets in which the mesh was enclosed in a plastic frame to protect them when we scrape it on stony stream bases. Each fish captured was placed in a bottle with a wide neck. The water was changed in each bottle every evening with water salvaged from a stream or tap water allowed to stand for 24 h. This represented a demanding task at the end of the trip (150 bottles!).



Polycentropsis Abbreviata - The African Leaf Fish

The day of departure, the polystyrene box, originally for flu vaccines, representing the precious fruit of our collections, was closed with adhesive tape. At the airport, the bag containing the fish passed all the different customs checks without problems. Then came the return to Paris via Zurich and the cold winter. But our last test still awaited : our baggage didn't arrive until the next plane from

Zurich. We had to have patience for more than two hours. A good part of the afternoon was then dedicated to the installation of my new boarders !

REPRODUCED WITH PERMISSION AND THANKS FROM CIL 'LE MACROPODE 1/02

AAGB MEMBERS WEEKEND 2002

Andrew Smith

For the second year in succession, Halifax Hall was the location for the member's weekend. This year's event was truly multi-national with members from the USA, Sweden and Germany all in attendance, as well as visitors Joe and Kathy Cooper from the American based International Betta Congress.

The first talk was a departure from the normal single contributor. Kevin Webb provided a wide and diverse variety of slides of a number of Anabantoid species in spawning situations. As a group we all shared our various experiences, both good and bad. This was a hugely enjoyable and interesting, informal gathering where everyone had the opportunity to contribute (even though for some reason people think I have an accent!)

Following lunch of mainly the liquid variety, Peter Riley presented an insight to collecting fish, culture and people of Mozambique. Having brought back a few wild caught Killis, his considerable effort to find live food in the dead of the English winter was rejected by the fish in favour of good old flake food. At this time Mick Price judged the table show which as always has a very wide range of different Anabantoids. Thanks once again to Mick for his judging.

An excellent dinner was followed by an evening of socialising in the bar with a few rounds of giant Jenga and a pictorial quiz, matching Anabantoid heads with tails, courtesy of Tony Pinto.

Stuffed with breakfast, we then were treated to Dave Armitage, Tony Pinto and Allan Brown's slide show and talk of their 2001 expedition to Bangka and Belitung, again taking in the scenery, people and culture as well as the fish.

Sunday lunch was notable for the quality of the Sticky Toffee Pudding, and the record for consuming it set by Peter Riley☺

At the AGM the committee that has served the AAGB for a number of years all stood for re-election and were duly elected:-

Chairman, Judging, Show Secretary:- Kevin Webb
Vice Chairman, Information Officer:- Andrew Smith

Secretary, Members Weekend and Registrar:- Chris Clark
Treasurer:- Mick Price
Merchandising:- Colin Kilgor
Editor:- David Armitage

The post of Special Projects was taken on by Tony Pinto who is also responsible for the website, which thanks to Tony can now be found at www.aagb.org thus saving the typing in of too long and address.

Show results

Badis/Nandidae	T Pinto	Pairs	K Webb
Betta bubblenester	A&D Smith	Breeders	K Webb
Betta mouthbrooder	K Webb	AOV anabantoid	K Webb
B. splendens short fin	P Riley	Channa	KWebb
B. splendens twin tail	S&T Jones	Trichogaster	P Riley
B. splendens long fin	P Riley	Donated Class	A&B Brown
B. splendens female	S&T Jones	Photography	K Webb
Belontia	S Cumming	Best in Show (B.splendens short fin)	P.Riley
Ctenopoma	A&D Smith	Best Exhibit (pairs)	K Webb
Macropodus	A&D SMith		
Microctenopoma	D Armitage	Members favourite fish	P Riley (B. splendens long fin)

The auction once again saw a tremendous amount of fish and a large variety of species including:- *Betta albimarginata*, *B. fusca*, *B. dimidiata*, *B. burdigala*, *B. imbellis*, *B. picta*, *B. pugnax spp*, *B. pulchra*, *B. persephone*, *B. tussyae Rompin & Chuckai*, *B. coccina*, *Parosphromenus paludicola*, *P. linkei*, *P. filamentosum*, *P. allani*, *Belontia signata*, *Pseudosphromenus cupanus*, *P. dayi*, among others.

Next year (2003) set for 25th – 27th April at the same venue. Make plans early and come along to enjoy the good food good humour and get that elusive species you have been after as well as the information on how to propergate it (!). The members weekend and members day (October 12th 2002 in Doncaster) are *the* places to get many of the species listed above as they are not readily available in the shops. Already plans have been made for one of the discussions next year. This will be on photographing fish and so far Kevin, Dave and myself will be actively participating although this is designed to be a workshop/discussion forum for everyone.

Finally, thanks to this year's sponsors:-

Aquarium Pharmaceuticals (Betta Fix conditioner/remedies), Aquarium (fish food), Tetra (Fish food), B.A.S Bolton (Filter), King British (fish food)(YAAS) Could I also remind those members who took samples of the Betta treatments to let Chris Clark have your opinions/ comments asap.

A LITTLE TRIP IN MALAYSIA K.Pélissier & D.Charmillon

As long as we have translated travel accounts from Labyrinth, we have hoped to travel to Malaysia to fish and visit this beautiful country. So, finally we have done it! In fact this trip was not so much a fishing expedition but a tourist trip. We I did not plan it too much because we wanted to have the surprise of discovering the country ourselves. We were very scared of bacterial disease and parasite infection, so we decided to take pills against Malaria and be vaccinated against all kind of exotic diseases. However, we did not take every single advised vaccines and drugs because we were afraid to be sick before our holidays with all of this! Before leaving France, we decided that once in Malaysia I would not walk bear feet, swim in fresh water and eat dried or raw fish. Such paranoia!

When we arrived in the Malaysian airport, we didn't feel the warmth, as the airport was air conditioned, but when we went out the humid and sticky air was really something! We decided to go to the East coast because we thought it was less touristic and more typical, so we took a plane from KL to Kuantan . On the third day, we went to visit the Charas caves and Penching water falls with a guide called Eddy. On the road we saw many palm trees and Eddy said that the

government cut the jungle to plant palm oil trees. But where you find palm trees, there is no jungle, so no wild animals and the water is muddy. The Charas caves were nice but I was impatient to see the Penching water falls, do you know why ?

The place was beautiful, the river was 6 or 8 meter wide, no vegetation was present on the bank. David tried a bit of fishing at this place, but unfortunately nothing in the net! We asked Eddy to stop the car near a river on the road from Penching to Kuantan. The water was very very muddy and only caught 2 leeches and one *T.vittatus* were caught . The water had a nasty smell of oil...We went back to Kuantan.

The next day we decided to go to Cherating, a tourist site. We took a bus from Kuantan and rented a chalet with air conditioning. We visited the site and saw a pond where many Nymphaeas were present. In the afternoon we went into the forest near the village, saw a little river and decided to fish. The river was just a little pool and Bingo! David caught his first fish, a type of cat fish. He tried again and got *Trichogaster trichopterus* and *Betta imbellis*. But mosquitoes were biting David too much. It's was a trap! His face was swelling... We went back to the chalet, put the fishes in box and we went to eat in an Indian restaurant. The next day, we woke at 7 and I decided to see which species of fish could be found in the pond near the chalet. At first we saw a big white *tilapia* and then David caught some very small fishes: *Chanas striata* and took pictures of them.

In the afternoon we went to the river to see monkeys, snakes and lizards in the mangrove. During the night, there was a 20cm centipede in the bathroom! The next day we went to the beach and had a meal while it was raining then went back to the *B.imbellis* site. The water was deeper and David caught 2 *T.trichopterus* and another *B.imbellis*. During the night we observed marine turtles on the beach. The next day we had a breakfast with Kamal, our Malay friend who offered to take us on a jungle trip for 120 RM each, but we left him and went to Tasik Chini instead.

At the bus stop, a man called Azman offered to bring us to Kuantan. We took a taxi from Kuantan to Chini and the driver said that the person we wanted to see, Rajan Jones, died of malaria last year... We told him to take us to Kampung Gumun, in a Orang Asli village anyhow. When we arrived in the K.Gummun we tried to find the Rajan's wife and saw an old man who told me 'I am Rajan Jones'. He was alive !

As we had booked one night in a tourist hotel, we went there for the night. The next day Rajan took us to the Kampung Gumun. The Chini lake is a very nice place. The room was bare and simple, it only had a fan. We crossed a bridge to go on an island and caught some *T.vittatus* and Perch species. Some of the children were very thin but they all smiled a lot. We had our Aqualog book with

me and they recognised some fishes on the pictures. The next day we went to the Orang Asli bathroom... a little river. A black water river with lots of vegetation on the banks and 1 to 1,5 M width. Here we caught *Chana micropeltes*, some *Luciocephalus pulcher* and half beaks. During this time, two little girls tried to catch a fruit in a big tree. Later Rajan and the two girls took us to a site in the 'mountains'. After 1h1/2 drive on the road and more than 1h walk we arrived to the water falls. It was Heaven, thanks Rajan !

Seeing his wife and the girls in the water, David forgot his bacteriological fear and swam too. After the diner we fished the river and caught *Betta pugnax*. Karine was not feeling too well, so we decided to go. I touched a frog nest and my hands swelled to twice their normal size.

The next day we took a bus for Kuantan. It was the king's birthday, so we couldn't find a bus for KL so took a taxi with a couple of young Chinese: Mindi and William. We walked in the city and visited many shopping centres with them – they seem to enjoy going there, may be because the air conditioning! Finally it was nearly time to go back to France, we had just time to eat a few more delicacies such as dried fishes sweets... We took the plane to France with many dreams and images in our heads.

REPRODUCED WITH THANKS FROM 'LE MACROPODE'

BLEEKER WHO? Andrew Smith

How many times do we look at the names of various species of Anabantoid (an indeed other fish or living thing) and although take note of the name that appears after the description, never wonder who that person is/was? I thought that I would research some of the names using books, library and internet and over the course of the next few months, occasionally bring one or two of them to the fore. First off is the Dutch physician Pieter Bleeker (1819-1878)

Bleeker is most likely the most important contributor to East Indian Ichthyology, and his bibliography contains some 730 items, 520 of these on fishes. He was a medical surgeon in the Dutch East Indian army and carried out this research in addition to his duties as a serviceman, between 1842 and 1860. Military and civil contacts would send specimens to him from the Dutch Indian islands, the reports of which would be presented at scientific societies.

In 1863, Bleeker retired from the military to care for his wife, although this did not stop him publishing his work and he continued to do so from then until his death

in 1878. As he was never a salaried employee of any particular museum his collections remained his property. Eventually they were deposited in various museums in Holland. His 'type' specimens were deposited in the British museum of Natural History and in the Rijksmuseum van Natuurlijke Histoire. As the latter was as a result of a public auction of his effects following his passing, some 'type' specimens may well have been lost, and some may never have actually made it back to Europe from his military stationing.

For Betta enthusiasts, it is worth noting the Pieter Bleeker set this genus up in 1850 as in *Betta* Bleeker 1850:12 (type species *Betta trifasciata* Bleeker, 1850=*Panchax pictum* Valenciennes in Cuvier and Valenciennes 1846 by monotype)

Acknowledgement - For research I use search engines like Altavista, Google, HotBot and Ask Jeeves, and also referred to the book *The Freshwater fishes of Western Borneo* by Tyson Roberts.

MICROWORMS FOR MICROMOUTHS

A nearly perfect food for Betta (and other) fry

Alexander Priest, IAA

Aquarists like to take credit for "spawning" fish. Of course, the truth is that, in most cases, the fish are only doing what comes naturally. To the extent the aquarist can take any credit, it is only in keeping the fish alive long enough for them to spawn. I know some of you will try to counter with the argument that it was the exceptional care by, and ideal conditions created by, the aquarist that resulted in spawning. Sometimes that is true, other times it is just as true that a fish will spawn when it is very stressed as an instinctive reaction to propagate before it dies. What an aquarist can take credit for is the successful raising of the fry to adulthood.

In order to do this, one of the key elements is feeding. While some fry will immediately take to finely powdered flake food, many will not instinctively recognize as food anything that is not moving on its own. There are many different live foods suitable for fry, and one of the least expensive and easiest to grow at home are microworms. A quick search of the popular Internet search engine Google for the term "microworms" gave me 1,930 "hits" (that is, 1,930 internet sites referencing microworms). While many of these are duplicates of each other, the fact is that this is a very popular fry food, and there is a great deal of information on microworms to be had. Unfortunately, a lot is contradictory. Depending on which website you refer to, microworms live for up to eight hours in a tank, or up to 12 hours, or up to one day, or up to three days. You either need to add yeast to a new culture, or you do not. Microworms reproduce either by self-fertilizing hermaphrodites, with an occasional male, or they reproduce

sexually, with males just being less numerous than females. You either need to use mature tank water, deionized or reverse osmosis water, dechlorinated tap water, or can use just plain untreated tap water. To harvest microworms, you use a cotton swab, or an eyedropper, or your fingers, or a wooden stick, or a brush, or you use a plastic scraper together with a glass of aged water, a tall pilsner beer glass, and a turkey baster. Whew! In this article, I'm going to share with you my personal experiences with this live food. I'm not going to say that mine is the only way. I'm not even going to assert that my way is the best way. I can only tell you that I know my way works.

Microworms: What They Are

Microworms (*Panagrellus redivivus*) are endemic to the leaf litter of the forest floor. They belong to the phylum *Aschelminthes* and the class *Nematoda* (roundworms). Mention "roundworms" and some people think of the pork tapeworm, hookworms, pinworms and similar parasites. However, microworms only feed on microscopic organisms, such as yeast, and pose no threat to fish or humans. Microworms are an excellent first food for cichlids, bettas, and killifish fry. They are also popular with many small adult fish, including tetras, guppies, and corys (which especially seem to appreciate the fact that they stay on the bottom of the tank, waiting to be gobbled up). The size of a microworm at its earliest stage after being hatched is 0.25 to 0.35 mm (that's 0.00984 to 0.01378 inches, even less than a newly hatched brine shrimp).

What You Need to "Grow Your Own"

To grow microworms at home using my method, you will need:

- A "starter" culture of microworms
- At least two plastic containers, with lids
- A "starchy" culture (food) media
- Yeast
- Water

You can get a starter culture from another aquarist (one of the benefits of belonging to an aquarium society), or from commercial sources. Microworm starter cultures can even be found on Internet auction sites, such as eBay. The plastic containers can be anything from a washed out margarine container, to a shoebox. The container only has to be waterproof and have a tight-fitting lid (both to prevent the worms from crawling out over the sides, and to keep the culture medium from drying up). I recommend a dark colored container, because you will be harvesting the worms as they crawl on the inner sides of the container, and since the worms themselves are white, it is easier to see them against a dark background. However, a clear, or translucent container is also quite acceptable. To prepare the containers, punch several small holes in the lid. The holes should not be too large. (While I have never encountered this, many writers have indicated that holes that are too large attract fruit flies.) When punching the

holes, I recommend that they be closer to the middle of the lid, rather than the edge. In addition, I recommend using either a serrated knife, or coarse sandpaper, to “scratch” the sides of the container. I have not seen this mentioned in any of the articles I came across (admittedly, I did not read all 1,930 of them), but the reason I do it is that I have found this makes it easier for the microworms to crawl up the side of the container.

You will need at least two containers (I recommend three), because once your initial culture is started, you should start a second culture (more on that, later). The media I use is Beech-Nut oatmeal for babies. Among the many articles on this subject, recommendations for media included instant mashed potato mix; regular flour; breakfast cereal without fruit, cooked porridge; a mix of cornmeal and whole-wheat flour, white bread, bread soaked in beer, and yellow corn meal. The yeast I use is Fleischmann’s® “Active Dry” yeast. Similar products might work just as well, but I know this product works for me.

Preparing and Culturing the Media

- 1) Mix enough baby oatmeal with ordinary, untreated, warm tap water to form a moist paste, about three quarters of an inch deep in your container.
- 2) Sprinkle enough active dry yeast to lightly cover the surface, moisten and mix gently. The end mix should be moist (you may need to add a bit more water, as oatmeal tends to soak up moisture), but not “soupy.” If you added too much water, add a little more cereal.
- 3) Using a moistened finger or paper towel, clean the sides of the container from any media. (This will save you a lot of work later, because you will be able to harvest worms from the side of the container and use them immediately, without having to first put them into water and syphon them out to avoid contaminating your tank with yeast and cereal.)
- 4) Add your live culture, spreading it over the prepared cereal/yeast mix.
- 5) Cover and keep the mixture at room temperature. (If you are going away for a while, you can refrigerate a batch – they won’t grow much, but if kept moist, they should last much longer.)
- 6) You should see the surface of the media “shimmer” with the activity of the worms within two days, and be ready to harvest your first worms in three to four days.

Harvesting and Using Microworms

These worms are very accommodating. They crawl out of the food media, to cover the sides of the container. You can put sticks in the middle of the media and they will crawl onto the sticks also. If you followed my recommendation to clean the sides of the container of any food, you can use your finger to scoop the worms and then just swirl your finger around in the tank to release them. Even if you are “squeamish” about worms, you probably can handle this. These worms

are so small, that the only thing your naked eye can see is something resembling white foam.

While a worm culture that has gone bad has a bad odor, a healthy culture gives off a faint aroma of yeast or beer. This is where the second (and I use a third, myself) container comes in. Within a week of your first "harvest," prepare a second container in the same manner as the first. Take some of the worm culture from your first container, and "seed" your second mixture with it. You should get two to three weeks of harvesting from a given batch. Once a week, slightly stir the mixture and if it gets too soupy, add a little more cereal. If the growth slows, dissolve some yeast and pour it on the surface of the mix. If the batch starts smelling really bad, throw it out. A fresh healthy culture can often be harvested more than once a day, and requires no additional feeding or aeration. (However, the addition of extra yeast can often revive a culture.)

About Yeast Some articles say that it is not necessary to use yeast in every mixture. The authors of those articles say that if you take some of the worm/food/yeast mixture from an active container, there will be enough yeast to start a second culture. (Microworms feed on the yeast, not on the cereal – the cereal is there to feed the yeast.) As an experiment, I mixed two identical batches of cereal and water (measuring the amount of each) and put them into two identically sized and shaped containers. I added the same amount of culture media, from the same source, to each. The only difference is that I added yeast to one batch, but not to the other. After four days, the batch with yeast added was producing enough worms to harvest. After a week, the other batch barely showed any activity. To that second batch, I added some dissolved yeast, covering half of the media with it. Within less than a day, the side of the container next to the half covered with the dissolved yeast was filled with microworms, while the other half still barely showed any activity. The conclusion I draw from this is that the yeast is an absolutely essential ingredient in every batch.

On the website of the International Killifish Association : <http://killifish.vrx.net/feeding/live/cultured/worms/micro/> I read the one and only actual warning I encountered on the use of yeast. In a copyrighted article by Richard J. Sexton, the following statement was made: "Some people add a pinch of yeast to the media which prevents it from fouling as quickly. I've personally had problems with yeast anywhere near aquarium water - it seems to form long sticky white threads and gets in the fishes gills causing distress and death. Apparently this is not universal as some people have success, but forewarned is forearmed." If you harvest from the sides of a container that has no yeast or food on it, I doubt that the dangers described will be a problem.

When and Why Use Microworms?

- They are the ideal size for even very small fry.

- They are 76% water and 24% dry matter; 40% of the dry matter is protein and 20% is fat.
- The wiggling of the worms attracts fry.
- Microworms do not swim away.
- Microworms live longer in fresh water than do baby brine shrimp.
- Microworms do not cloud water.
- Microworms do not need any setup to hatch. Airstones, filters, heat and light are not required.
- Microworms are inexpensive, as compared to hatching baby brine shrimp.
- Microworms can be cultured continuously. You must keep buying (high priced) brine shrimp eggs.
- Except for a culture allowed to go bad, microworms do not smell as strong as many other live foods (grindal worms, for example).

• An article by R.W. Rottmann of the University of Florida Cooperative Extension Program at: <http://edis.ifas.ufl.edu/FA022> states that "A starter culture can be stored for over six months at slightly above 32°F." Cheap, easy, long-lasting, clean, and well accepted – what more could you ask for in a fish food? It's too bad that the longest they get is only a millimeter in length, or they'd be great for adults, as well.

This article reprinted, with permission, via IAA's 'Osphromenid' from the October 2001 issue of Modern Aquarium, the publication of the Greater City Aquarium Society of New York.

EDITOR'S RAMBLINGS

No room for me inside the front cover so I'm having to ambush you from the end these days. You'll see I finally fulfilled the promise of a bit of colour again for which thanks to Steve Cumming for arranging the plate and to help from Michel Dantec and Olivier Buisson, CIL for the use of the photos. I've got other plates lined up for the end of the year but, as I often say, it's not so much the expense that stops us doing more plates, it's getting the pictures in the first place! The next issue will concentrate on Bettas and later on, I have an issue dedicated to Nandids and Badis.

It's not so long ago that we had our Members' Weekend at Sheffield again. One successful innovation was a workshop on breeding labyrinths. We had a number of short talks from different specialists to introduce a general discussion from the floor. I noticed a couple of people taking notes so maybe someone will convert their notes into an article sometime. Once again, our weekend was deemed a success, with international visitors again from USA, Sweden and Germany. One thing I have often heard people remark is how friendly the atmosphere is, so don't be afraid to come along because

you don't know anybody. Believe me,
you soon will !

I've put some dates of up-coming meetings next year inside the back cover so you can book them early in your diaries and there'll be no excuse about double bookings ! For a change, the AAGB and IGL meetings don't actually clash so it would be nice to get to each others' meeting next Spring.

Andrew and Debbie Smith have continued to do stirring work, publicising AAGB, recruiting and re-recruiting members and raising money for the Sandelia Fund 'down south' Thanks to their efforts and 'T' shirt sales, we will shortly be able to send another 2 kg of flake to S.Africa to feed the display at the Albany museum and will still have a float of about £100.

We had a nicely busy May here in the frozen wastes of 'The North', starting with the Manchester killi auction, followed by Ryedale, Wyke and Castleford Open Shows in successive weeks. I used to be a bit negative about shows, but it has proved a great way of maintaining the fish network, getting together to exchange specimens and just having a meal afterwards with your mates.

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