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tropical fish hobbyist

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Some hobbyists regard the many new swordtail strains such as the lyretail swordtail and the hi-fin lyretail swordtail as among the most beautiful of all aquarium fishes, real tributes to the skill and perseverance of the dedicated breeders who made them possible; other hobbyists consider them to be a waste of time, unnatural pervasions that lack the charm of the original aquarium swordtail stock. Regardless of how you feel, the newer swordtails are becoming increasingly more common on the aquarium market, and the day might come when you won't be able to buy one of the old-type swordtails. Read Dr. Axelrod's article beginning on page 31 for a review of some basics of swordtail reproduction and an account of the involved breeding techniques that have to be used with some of the newer strains. Cover photo by Jiri Taborsky.

exotic tropical fishes supplements

Pages 33 and 34, 67 and 68. These pages are perforated for easy removal and punched to fit into the Looseleaf Edition of EXOTIC TROPICAL FISHES.

rates

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editorial

Regardless of what the poets say about the saddest words in the language, it's pretty sure that the happiest words we use are "I told you so." There's a beautiful satisfaction in having been proved right in what you've said, whether you've correctly predicted an election or a football game or the results of a mating between a blue platy and a red platy. We like to give advice, and we like it even better when our advice, taken and used, pans out well for the user.

That's one reason why I've always been grateful for the best piece of aquarium advice I've ever been given. It was given to me a long time ago by Bill Vorderwinkler, a real expert's expert. I've benefited from it, and so have many other hobbyists to whom I've passed it along. There's no big secret about it, and you've probably even run into it in print more than once. But many hobbyists don't pay enough attention to it, even though it would help them immensely and immediately. Maybe no one's repeated the advice as often as it deserves to be repeated. Maybe hobbyists just don't care. Maybe it's not the kind of advice that anyone can make a nickel out of. Whatever the reasons for its neglect, here's the advice, which I consider to be the single most important regular positive technique hobbyists can employ to give their fishes longer, healthier lives, better color, and faster growth: MAKE FREQUENT PARTIAL CHANGES OF THE WATER IN YOUR TANKS.

Twice a week, take out 10% or 15% of the water in your tanks and replace it with fresh water of the same temperature or a little warmer. Make this a regular practice and you'll be doing your fishes and yourself a big favor.

Neal Pronek



During recent years many new cichlids have been imported, especially dwarf cichlids. Most of them come from Africa, there being some species of *Pelmatochromis* among them. For about 15 years now many eager aquarists have been raving about *Pelmatochromis kribensis*, which has quite a lot to offer in shape and color. In addition to *kribensis*, the most-known species of *Pelmatochromis* known today include *P. subocellatus*, *P. dimidiatus*, *P. khagei*, *P. taeniatus*, *P. guentheri*, and *P. kingleyae*.

A few months ago I received several young fish of a *Pelmatochromis* species that was unknown to me. It was given to me with the name of *Pelmatochromis aureocephalus*, but had anyone asked me what species these fish were, I would unhesitatingly have classed them as *Pelmatochromis*



A female of the new kribensis-like dwarf cichlid *Pelmatochromis aureocephalus* waits at the entrance to the flower pot chosen as the spawning site as the male fertilizes her eggs. Photo by H. J. Richter.

BY HANS JOACHIM RICHTER

kribensis. I placed the young fish in my 90-gallon show tank immediately upon my arrival home. When I want young fish to develop quickly, I always house them in large tanks, as they grow very rapidly there. After 5 weeks had elapsed, the fish had adjusted well and acquired nice colors. A male and female had already found each other and paired off. This was my clue to net them out and transfer them to a 40-gallon tank. This aquarium had originally been set up for all kinds of *Apistogramma*. It was planted with one large *Echinodorus paniculatus*, several other *Echinodorus* species, and some filler plants. The bottom consisted of gravel and porphyry, to which a mixture of clay had been added. For the *Pelmatochromis aureocephalus* an

inverted flower pot equipped with an opening on the upper side and another on the lower edge was placed in the tank. The water had a hardness of about 20 DH and a pH value of 6.2. The temperature of the water was 80°F.

On being put into this tank, the newcomers settled under one of the *Echinodorus*. The male *Apistogramma borelli*, who never welcomes new tank mates, advanced upon the male *P. aureocephalus* with threatening motions and could not refrain from giving an immediate demonstration he was master of the realm. This he stressed by means of a lightning quick butt in the new male's flank. Intimidated, the two *P. aureocephalus* sought and found a secure shelter in the above-mentioned flower pot. Here they remained invisible for some time, and the *A. borelli* returned to his usual corner of the tank again. In a while, I could see the male *P. aureocephalus* looking out cautiously from the lower opening in the pot. Soon he even dared to come out, but he disappeared immediately again under an *Echinodorus*. After some time, the female showed up too, and both fish proceeded to make a cautious tour of inspection around the tank. This, of course, led to another encounter with Mr. Borelli. This meeting, however, did not finish in a rout of the *P. aureocephalus*. Notwithstanding this, the middle of the tank was accepted as a border, the fishes staying on their respective sides. If by any chance a fish invaded his neighbors' territory, a vigorous chase resulted.

After a few days the pair busied themselves constantly with the flowerpot. They dug under it and transported the gravel stones to the front of the cave entrance they created. One could see the heap of rocks growing from day to day, while the cave entrance grew visibly smaller. Finally the fish came to a point where it was difficult to navigate the entrance. They already had to swim in sideways, which was done very skillfully. So then they began using the upper entrance. I am at a loss to understand why they did not use this opening right from the beginning, for it certainly is easier to swim through a large hole than through a narrow one.

In the interim the female had taken on intense color, color which grew stronger still when she was impressing the male. The most outstanding change was that the ventral region of her bright red belly became an intense purple-blue. Courting was always started by the female, who approached the male swimming with her body bent into an arch and shaking. At first the male does not react at all, and the female draws back a little and starts over again. This she repeats until the male decides to cooperate, which he does by means of a shake of his head and spread fins. Then he swims around the female, with his body slightly slanted to the side, stopping and shaking his head again and again.

One would suppose that spawning should start at this moment, but generally it takes another few days. An interesting point is that the courting



The male of the author's spawning pair peers out of his flower pot cave; although both male and female *P. aureocephalus* showed a good deal of timidity when introduced into an aquarium containing an adult male *Apistogramma borelli*, they soon occupied their own territory and defended it against intrusions. Photo by H. J. Richter.

nearly always takes place in the evening. When spawning finally began, both fish swam into the flowerpot, where they continued to demonstrate mutual affection by shaking at each other. Then the female, who had cleaned the wall of the flowerpot several times, checked it once more with her mouth and started depositing eggs on it. The male, too, knew his task and fertilized the eggs each time the female drew away from the wall. This was repeated until all the eggs had been fastened and fertilized. Then the male quickly left the cave and rushed swiftly around the pot several times. He was visibly excited. After taking his turns around the flowerpot, he glanced about the surroundings. During all this, the *A. borelli*, who had made use of the reigning quiet in the other's half of the tank for a quick look-see, was chased away again, this time quite roughly. Meanwhile the female *P. aureocephalus* busied herself with the spawn, cleaning it over and over again with her mouth. The reddish-brown eggs, numbering about one

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Photo by H. J. Richter.

hundred, were cared for intensively by the female, who, besides the cleaning mentioned, continuously supplied a current of fresh water by means of quick strokes of her fins while standing head-down in a vertical position.

During a previous spawning, the first one for this female, nearly all the eggs had fungused due to lack of cleaning on the part of the female. Errors are lessons . . . and this lesson was certainly well learned, for after 2 days, when I removed the eggs, they were in perfect condition.

Since I was eager to rear some fry, I considered it too great a risk to leave the spawn in the large tank, especially since the bottom covering was too coarse and the hatched young would probably have simply vanished into the gravel.

The flowerpot with the spawn was transferred to a 2-gallon tank with a bare bottom. In tanks used for hatching, one should pay the strictest

The female *P. aureocephalus* adopts the upside-down egg-laying position that enables her to attach the adhesive eggs to the top of the inside of the flower pot; the reddish-brown eggs, which were hatched artificially in a separate tank, took a little less than four days to hatch at a temperature of 75 degrees.

Before the eggs were taken from her, the female took good care of them, fanning them continuously and mouthing them frequently to eliminate fungal growths. In this spawning of about 100 eggs, only eight fungused, and even this small percentage of eggs lost to fungus could have been lessened if the eggs had been left with the female.

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attention to cleanliness. I had washed the small tank previously with hot brine and then filled it with hot water. The eggs were placed in the tank only after the temperature of the water had cooled to 75°F. An aerator stone, located exactly under the lower opening of the flowerpot, circulated the water, forcing it into the lower opening and out of the upper one. Thus the eggs were always in a flow of water.

Four days after the spawning, the fry hatched and gathered on the bottom. I took out the flowerpot together with the fungused eggs (about eight of them). The baby fish are relatively large and lie squirming helplessly on the bottom. After a couple of hours, nearly all the fry get close together on the bottom of the tank, staying this way during the next few days. Four days after hatching, they become free swimming. I immediately fed them freshly hatched brine shrimp. Their taut yellowish-red bellies were proof that they had accepted the food. I continued feeding them brine shrimp nauplii for 2 weeks, in the last part of which an addition to

The male *P. aureocephalus* is considerably less colorful than the female during the spawning period, as he lacks the bright red coloration of the belly area. At the size of the fish shown here, the adults are very easy to sex because of differences in color, length of fins, dorsal spot patterns, and body shape. Photo by H. J. Richter.



A female *P. aureocephalus* could be easily confused with a female *P. kribensis* (shown here), because the body shape of the two fishes is almost identical, and even most of the colors are the same. Photo by Dr. Herbert R. Axelrod.

their diet—small *Cyclops*—was made. At this stage the little fish show a leopard-spot design. They grow quite quickly and are best reared on *Cyclops*. After 10 weeks the baby fish already measure 1½ inches and show a design that is typical of nearly all *Pelmatochromis* young. It is possible to sex them when they reach a length of 1½ inches, but one cannot be sure of being perfectly accurate. Exclusive of a few exceptions, male *P. aureocephalus* show a round black dot on the rear part of the dorsal fin, the females have two such dots. But as I have said above there is no sure way to sex the fish. Not even these spots are infallible. For instance, one of my three females has only one dot.

With regard to keeping this species, one should not keep the fish too warm. My own experience shows that they feel best at temperatures around 70°F. Feeding should be as varied as possible and should include lots of live foods. An activity of which the *P. aureocephalus* are very fond is digging in the ground, especially while preparing for spawning. One should keep this in mind and place the inverted flowerpot on a bottom layer of coarse gravel that is at least 1½ inches deep.

Pelmatochromis aureocephalus is surely bound to become a competitor of *Pelmatochromis kribensis* for popularity, especially since it is smaller and rivals *P. kribensis* in beauty.



Bettaphile

Frederick J. Kern

Female Nest-building

Q. I have come to the conclusion that my female betta is really a short-finned male because of its aggressive ways and also because it has repeatedly built small nests. Do you think my conclusion is correct?

A. My long-finned male has yet to build a nest after several weeks. The temperature is 85°. Why won't he build a nest?

David Brunton,
Maple Valley, Washington

A. It is incorrectly believed by many aquarists that female bettas do not fight and that they do not build nests. Try separating two females for a week or two in individual jars and then put them in the same tank and watch the fins fly! Exceptionally aggressive females can sometimes even kill weak males. Fighting is not necessarily an indication of sex.

2. A study carried out by Braddock and Braddock and reported in *Animal Behavior*, Vol. III, 3-4, showed that 97.4% of the females observed had built nests by the time they were 346 days old. The Braddocks observed, however, that only males built nests large enough to hatch eggs in. Are your conclusions correct? I don't know. I suspect the fish is a female, however. Many males build nests infrequently, and some do not build nests at all. In the study mentioned before, 4.8% of the males observed had not built nests by the time they were 360 days old. The Braddocks offered no explanation, nor can I.

Missing Fins

Q. My betta is missing his ventral fins. Will they grow back?

Donald Bambrick,
Jamaica, New York

A. Some strains carry missing ventral fins as a hereditary defect. If your betta is from such a strain, the fins will not grow back. If, on the other hand, your fish lost

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the fins as a result of disease or accident, they may grow back if the fin bases have not been destroyed. If your betta is carrying a defective gene it should not be used for breeding.

Sex Change

Q. I have read that bettas change their sex. I bought a female betta and tried to spawn her but failed. After the spawning attempt I noticed her fins getting long like a male's. I want to know if she has changed sex.

Paul Horvath, Woodbridge, New Jersey

A. It has never been demonstrated to my satisfaction that any aquarium fish can change from a functional female to a functional male or vice versa. I have seen old female guppies and swordtails develop male characteristics, but they were sterile. In your case there seems to be little doubt that you bought a male which simply had not developed long fins yet.

Contradictions

Q. I would like to breed my bettas, but I have found so much contradictory information on the subject.

1. What should the pH be? In all the information I have found, there is no mention of this.

2. I have read that you must use a large aquarium, such as a 10- or 20-gallon; another source said to use a 5-gallon, and yet another said a 2-gallon was fine. Would a 5-gallon suffice?

3. What should the temperature be: 75°, 80° or 85°?

4. Should you use gravel in the breeding aquarium? One book says definitely no, because gravel harbors undesirable organisms. Another source said yes, because it helps produce a good infusoria culture. I would appreciate your suggestions on these problems.

Paula Robinson, Atlanta, Georgia



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A. The reason you find so much contradictory information about breeding bettas is because there are so many ways to do it.

1. In breeding bettas, the pH is of small importance. Domestic bettas are highly adaptable. Naturally, it is best to avoid extremes of pH.

2. Any of the sizes you mention are fine for spawning.

3. The important thing about temperature is that the breeding temperature is more likely to induce spawning behavior if it is about 5 degrees above the temperature at which the fish are usually kept.

4. I doubt gravel harbors undesirable organisms. I also doubt that it contributes much toward the infusoria population unless it has had time to collect feces and other organic matter. Its use is optional.

Fungus, Fin Rot and Velvet.

Q. I have a five-compartment betta tank with two outside filters and a heater. In each compartment I have a little gravel and a shell. The water is clear and stays at about 85°. It is highly alkaline. The fish are fed freeze-dry food and flake food. My problem is that I constantly have problems with fungus, fin rot, and velvet. I have the fish in my hospital tank more than my show tank. What gives?

Gerald Kovacs, Lincoln Park, Michigan

A. I would do several things with this setup. I see no reason why you need two filters, but this should not have any effect on the disease unless you use them as an excuse to avoid keeping the gravel clean and changing the water periodically. The shells should be checked. They make the water too alkaline for bettas, in my opinion. Your diet is all right as far as it goes. Try adding frozen brine shrimp and beef heart. If you have problems with disease in the future, treat it in the betta tank. It could be that the organisms are collecting in the gravel and reinfesting the fish after you cure them.

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Plant Genus, Cebemba, The	Dec. 28	<i>Hemiodus villosus</i> (Aug., #103)	
Recent Research Findings on the Biological Effects of Light, Excerpted from	Oct. 38	<i>Lodgesia reuliff</i> (Aug., #104)	
Scheid, Colonel Jorgens: A Logical Plan	April 64	<i>Macropodus chinensis dayi</i> (June, #99)	
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Saving the "Miscellaneous" Supplement Your Fish Hobby—Collect Fish Stamps	Feb. 15	<i>Parachanna gushki</i> (Feb., #82)	
Swordtail Tank the Easy Way, A	Aug. 84	<i>Parachanna gushki</i> (Mar., #92)	
What I Wore on the Amazon	Jan. 9	<i>Pseudochanna ayburzi</i> (Oct., #108)	
Supplements to	Jan. 36	<i>Pseudochanna ayburzi</i> (Mar., #94)	
"EXOTIC TROPICAL FISHES"		<i>Xiphophorus helleri</i> (True Hi-Fin Lyretail Sword-tail) (Oct., #107)	
<i>Aphyosemion bertoldi</i> (May, #97)		<i>Xiphophorus maculatus</i> (Pearl Albino Platy) (Dec., #111)	
<i>Aphyosemion cinnamomeum</i> (June, #100)		<i>Xiphophorus maculatus</i> (Bleeding Heart Wag Topail Platy) (Dec., #112)	

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INDEX TO EXOTIC TROPICAL FISHES
SUPPLEMENTS

Below is a complete index to the first 100 supplements to *Exotic Tropical Fishes*. The index, arranged alphabetically according to the scientific name of the fish or plant(s) that form the subject matter of each supplement, gives the number of the supplement, the date of issue of *Tropical Fish Hobbyist* magazine in which the supplement appeared, and the scientific and popular name of the fishes and plants concerned. Additionally, the index provides the number of the supplement book containing any given supplement. (These first 100 supplements to *Exotic Tropical Fishes* are available in seven books of supplements at a price of \$1.00 for each book.) Supplement book #1 contains supplements 1 through 16; supplement book #2 contains supplements 17 through 32; supplement book #3 contains supplements 33 through 41; supplement book #4 contains supplements 42 through 52; supplement book #5 contains supplements 53 through 68; supplement book #6 contains supplements 69 through 84; supplement book #7 contains supplements 85 through 100.

Reading from left to right, the first column gives the supplement number; the second column gives the month and year of issue; the third column gives the scientific name; the fourth column gives the popular name; the fifth column gives the supplement book number.

#	Date	Scientific Name	Popular Name	Book #
85	11/67	<i>Abramites hypselonotus</i>	High-backed Headstander	7
68	2/67	<i>Acanthopthalmus javanicus</i>	Javanese Loach	5
31	1/65	<i>Acetrophthalmus hepsetus</i>	Sharp-Toothed Tetra	2
21	7/64	<i>Acuticurimata macrops</i>	Hook-Nosed Characin	2
36	4/65	<i>Ambias species</i>	Water Aspidistras	3
7	12/63	<i>Aphyocharax erythrorus</i>	Flame-Tail Tetra	1
97	5/68	<i>Aphyosemion bertoldi</i>	Berthold's Killie	7
100	6/68	<i>Aphyosemion cinnamomeum</i>	Cinnamon Killie	7
96	4/68	<i>Aphyosemion liberiane</i>	Liberian Killie	7
88	12/67	<i>Aphyosemion geryi</i>	Gery's Aphyosemion	7
87	12/67	<i>Apistogramma trifasciatum</i>	Blue Apistogramma	7
49	3/66	<i>Aponogeton species</i>	Madagascar Aponogetons	4
50	4/66	<i>Aponogeton species</i>	Sinhalese Aponogetons	4
51	5/66	<i>Aponogeton species</i>	Aponogeton plants	4
67	2/67	<i>Austrofundulus myersi</i>	Myers' Killifish	5

#	Date	Scientific Name	Popular Name	Book #
27	10/64	<i>Barbodes kerstenii</i>	Kersten's Barb	2
13	3/64	<i>Brachydanio frankii</i>	Leopard Danio	1
86	11/67	<i>Brachyraphis terrabensis</i>	Upland Livebearer	7
34	2/65	<i>Cabomba species</i>	Fanworts; Cabomba plants	3
40	7/65	<i>Carassius auratus gibelio</i> × <i>Carassius carassius</i>	Japanese Colored Carp, Koi	3
38	5/65	<i>Chaetobranchopsis bitaeniatus</i>	Two-Striped Cichlid	3
5	11/63	<i>Chairodon kriegi</i>	Three-spot Tetra	1
81	9/67	<i>Cichlasoma erythraeum</i>	Red Devil	6
61	11/66	<i>Cichlasoma facetum</i>	Gulf's White Convict Fish	5
3	10/63	<i>Colomesus pinnatus</i>	South American Puffer	1
98	5/68	<i>Corydoras schwaartzii</i>	Schwartz's Corydoras	7
52	6/66	<i>Cryptocoryne species</i>	Cryptocoryne plants	4
8	12/63	<i>Ctenopoma acutirostre</i>	Leopard Ctenopoma	1
90	1/68	<i>Cynolebias wolterstorffi</i>	Wolterstorff's Pearl fish	7
42	9/65	<i>Echinodorus species</i>	Amazon Swordplants	4
43	10/65	<i>Echinodorus species</i>	Amazon Spearplant, Ruffled Swordplant	4
44	11/65	<i>Echinodorus species</i>	Swordplants	4
15	4/64	<i>Dianema urostriata</i>	Stripe-Tailed Catfish	1
77	7/67	<i>Epiplatys annulatus</i>	Clown Killie	6
80	8/67	<i>Epiplatys macrostigma</i>	Spotted Panchax	6
4	10/63	<i>Etopiella debauei</i>	Three-Striped Glass Catfish	1
22	7/64	<i>Gymnorhamphichthys hypostomus</i>	Long-Nosed Knife Fish	2
75	6/67	<i>Haplochromis callipterus</i>	Black-Edged Golden Nyasa Cichlid	6
65	1/67	<i>Helogenes marmoratus</i>	Marbled Helogenes	5
64	12/66	<i>Hemigrammus coeruleus</i>	Cerulean Tetra	5
74	5/67	<i>Hemigrammus marginatus</i>	Bassam Tetra	6
28	10/64	<i>Hemigrammus nanus</i>	Silver-Tipped Tetra	2
29	11/64	<i>Hemigrammus proneki</i>	Pronck's Tetra	2
30	11/64	<i>Hemigrammus vorderwinkleri</i>	Vorderwinkler's Tetra	2
62	11/66	<i>Hemiodopsis goeldii</i>	Goeld's Hemiodus	5
63	12/66	<i>Hemiodopsis sterni</i>	Stern's Hemiodopsis	5
91	2/68	<i>Hemiodus gracilis</i>	Slender Hemiodus	7
72	4/67	<i>Heterandria formosa</i>	Mosquito Fish	6
47	2/66	<i>Heteranthera species</i>	Heteranthera plants	4
48	2/66	<i>Hydrocoleis nymphoides</i>	Water Poppy	4

#	Date	Scientific Name	Popular Name	Book #
18	5/64	<i>Hyphessobrycon aguilha</i>	Red-Tailed Flag Tetra	2
17	5/64	<i>Hyphessobrycon bellottii</i>	Dash-Dot Tetra	2
19	6/64	<i>Hyphessobrycon simulans</i>	Schwartz's Neon	2
76	6/67	<i>Icterus lacustris</i>	Albino Channel Catfish	6
23	8/64	<i>Iguanodectes tenuis</i>	Slender Tetra	2
78	7/67	<i>Julidochromis marlieri</i>	Marlier's Julie	6
73	5/67	<i>Labotropheus fuelebornii</i>	Fuelleborn's Cichlid	6
79	8/67	<i>Labotropheus trewavasae</i>	Red-Top Cichlid	6
60	10/66	<i>Leporinus agassizi</i>	Half-Striped Leporinus	5
66	1/67	<i>Leporinus arcus</i>	Lipstick Leporinus	5
58	9/66	<i>Leporinus multifasciatus</i>	Multi-Banded Leporinus	5
59	10/66	<i>Leporinus striatus</i>	Striped Leporinus	5
25	9/64	<i>Luciocephalus pulcher</i>	Pike-Head	2
9	1/64	<i>Macrodon traira</i>	Houri	1
99	6/68	<i>Macropodus cupanus dayi</i>	Day's Paradise Fish	7
26	9/64	<i>Mastocembelus armatus</i>	Spiny Eel	2
24	8/64	<i>Moenkhausia sanetae-filomenae</i>	Yellow-Banded Moenkhausia	2
57	9/66	<i>Molliniesia caucana</i>	Cauca Molly	5
56	8/66	<i>Myloplus asterias</i>	Starry Myloplus	5
6	11/63	<i>Myloplus schultzei</i>	Schultze's Myloplus	1
55	8/66	<i>Mylossoma argenteum</i>	Silver Mylossoma	5
45	12/65	<i>Najas species</i>	Nymphworts	4
41	8/65	<i>Nymphaea, Nuphar species</i>	Aquarium Lilies	3
39	6/65	<i>Nymphaoides aquatica</i>	Banana plant	3
12	2/64	<i>Pelmatochromis arnoldi</i>	Arnold's Cichlid	1
70	3/67	<i>Pelmatochromis klugei</i>	Kluge's Dwarf Cichlid	6
16	4/64	<i>Periophthalmus papilio</i>	Butterfly Mudskipper	1
89	1/68	<i>Petrotilapia tridentiger</i>	Blue Petrotilapia	7
92	2/68	<i>Phractocephalus hemiliopterus</i>	Redtailed Catfish	7
93	3/68	<i>Phractura ansorgei</i>	African Whip-tailed Catfish	7
32	12/64	<i>Piabucus dentatus</i>	Golden-Striped Slender Tetra	2
10	1/64	<i>Pimelodella gracilis</i>	Slender Pimelodella	1
95	4/68	<i>Pimelodella pictus</i>	Spotted Pimelodella	7
69	3/67	<i>Pseudotropheus auratus</i>	Nyasa Golden Cichlid	6
94	3/68	<i>Pseudotropheus elongatus</i>	Slender Pseudotropheus	7
83	10/67	<i>Pseudotropheus zebra</i>	Nyasa Blue Cichlid	6
54	7/66	<i>Pterophyllum dumerilii</i>	Long-Nosed Angelfish	5

#	Date	Scientific Name	Popular Name	Book #
53	7/66	<i>Rasbora bankanensis</i>	Banka Rasbora	5
82	9/67	<i>Rasbora cephalotaenia</i>	Porthole Rasbora	6
20	6/64	<i>Rasbora sarawakensis</i>	Sarawak Rasbora	2
84	10/67	<i>Rasbora sumatrana</i>	Sumatran Rasbora	6
46	1/66	<i>Rorippa species</i>	Water Nasturtium	4
11	2/64	<i>Tetraodon miurus</i>	Congo Puffer	1
1	9/63	<i>Tropheus duboisi</i>	White-Spotted Cichlid	1
2	9/63	<i>Tyttocharax madeirae</i>	Bristly-Mouthed Tetra	1
14	3/64	<i>Vandellia cirrhosa</i>	Candiru	1
71	4/67	<i>Xiphophorus helleri</i>	Lytetail Swordtail	6
37	5/65	<i>Xiphophorus helleri</i> × <i>Xiphophorus variatus</i>	Sunset Hi-Fin Variatus	3
35	3/65	<i>Xiphophorus helleri</i> × <i>Xiphophorus variatus</i>	Black Helmet-Hi-Fin Variatus Platy	3
33	1/65	<i>Xiphophorus helleri</i> × <i>Xiphophorus variatus</i>	Delta Topsail Variatus	3

SUPPLEMENTS TO EXOTIC TROPICAL FISHES

The first 100 supplements to EXOTIC TROPICAL FISHES are available in seven Supplement Books, each containing a minimum of 32 pages. Supplement Books are available at \$1.00 each. The individual supplements they contain are pre-punched with holes to fit the EXOTIC TROPICAL FISHES binder, and each supplement is paginated and marked to show exactly where it should be placed in the master volume.

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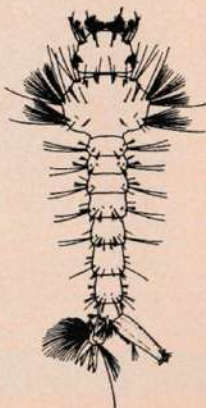
Hobbyists will derive greatest benefit from these portions of the text that describe and picture the numerous protozoans and crustaceans that live in temporary ponds, mainly because many of these animals can be used for live

home aquaria after having been introduced with live food or with plants. Unless the hobbyist can recognize these creatures and their potential for doing damage, he stands to lose.

So even though *Pond Life* is not an aquarium book, it has a distinct connection to the aquarium hobby and has a lot of worthwhile information to pass along. The easy-to-understand text is supplemented by 73 useful illustrations, most of which are line drawings of the different animals and plants that form the major subject matter of the book.



food. Of equal importance and interest to tropical fish keepers is the section dealing with the types of insects and insect larvae to be found in temporary ponds. Although some of these insects and their young are harmless or beneficial, a few are very dangerous to fishes and therefore of importance to tropical fish keepers, because they occasionally show up in



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Mrs. Dagmar Taborsky at work in the Prague laboratory of the Czechoslovakian Aquarium Society, preparing a male lyretail swordtail for the transfer of spermatophores to a lyretail female; work of this type is necessary with some of the new lyretail swordtail strains because the males are incapable of fertilizing the females themselves. Photo by Jiri Taborsky.

Reproduction in Swordtails

By Dr. Herbert R. Axelrod

Excerpted from *Swordtails for the Advanced Hobbyist*.

Most fishes lay eggs in order to insure the future of their species. These fishes are called *oviparous* fishes because their eggs develop outside the female's body. Goldfish, barbs, gouramis, tetras and cichlids are examples of oviparous fishes. Certain fishes, such as pipefishes and seahorses, are strange in that the female deposits the eggs in special

brood pouches in the male, and the eggs develop and hatch inside this special masculine pouch. In all oviparous fishes the egg contains a fair amount of food material (yolk) and, interestingly enough, a newborn oviparous fish weighs about 30 per cent less than the newly laid egg from which it developed, thus showing that the developing embryo used about 30 per cent of the yolk for energy to convert yolk into the cells which make up the fish itself.

Another type of reproduction in fishes and other animals is *viviparous* reproduction. In this case the egg contains little or no yolk, the developing embryo being almost completely dependent upon its mother for food. As may be expected, viviparous fishes and animals have fewer offspring than do oviparous, and the weight of the newborn is considerably greater than that of the fertilized egg.

Swordtails, mollies, platies and gambusia, based upon the weight relationship between the fertilized egg and the newborn fish, seem to lie somewhere in between viviparous and oviparous reproduction, for the weight of the fertilized egg is the same as that of the newborn fish. Perhaps at the instant of birth the newborn fish takes in a substantial amount of water, thus offsetting the weight lost during the utilization of yolk as a source of energy for the building of tissues? The main problem seems to be in physiologically explaining how the mother swordtail is able to get food into the developing egg when there seems to be no mechanism (placenta) for a transfer of food between the parent and the developing embryo.

In the poeciliid fishes (swordtails, platies, mollies, gambusia, etc.) the eggs are fertilized and develop before they have moved from the ovarian tissue from which they have emanated. In certain other livebearing fishes, the eggs develop, ripen and move into the ovarian cavity where they are fertilized and develop. Then, too, swordtails have a capacity for *superfoetation* thus enabling them to store sperm for future generations from a single mating with a male.

Continued on Page 82

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A visit to Bangkok's leading fish exporter

Chao Phraya Aquarium

BY DR. HERRBERT R. AXELROD Photos by the author

Their letterhead reads *Chao Phraya Aquarium, Dealers in Tropica(1) Fishes and Water Plant, 1287 Rama IV Road, Klong Toey, Amphur Prakanong, Bangkok, Thailand.* Except for a few misspellings, it's true.

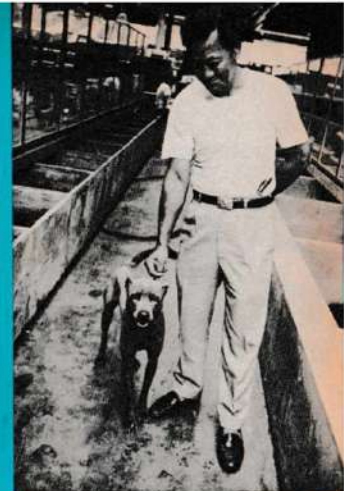
On their price list they have 87 fishes, most of which they collect in the wilds of Thailand, but many of which they breed themselves. They are great because they love their fish so much. They are successful because it is one close, wonderful family that knows every fish they ship . . . and they care. You have to be with this wonderful group of people to know what I mean.

I was in Bangkok at the end of April, 1968. The temperature was normal; 95° F. and 97% humidity. If it wasn't for the wonderful Thai people, I would have preferred almost any place else. But let me tell you the story.

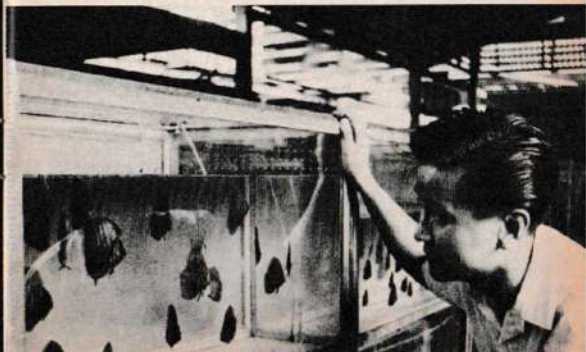
Chao Phraya Aquarium has been a leader in the exportation of native Thai *Cryptocoryne* plants. It seems they can never get enough, so they raise them in huge vats. The staff is lined up from left to right: . . . Sunee Song Heng (daughter), Virachai Song Heng (son), translator, Siew Ung Song Heng (mother), Kor Song Heng (father).



Kor Song Heng named his Chao Phraya Aquarium after the main river in Bangkok, the Chao Phraya River. He is also a lover of the native Thai dog, called Sriwastak; this is the only breed which does not develop ugly mange (a skin disease) which drives long-haired breeds crazy. The dogs.



Virachai gives his tank raised discus tender loving care. It is this extra effort given by the owner-manager that makes one firm's fish better than another's.



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Specimens of *Rasbora borapetensis* were selling in Bangkok at seven for a penny; they were cheap because they can be collected right in the city.

I was in Copenhagen when I received a telephone call to visit Bangkok and investigate the possibility of shipping Thai fishes to Gulf via S.A.S.'s new Trans-Asian Express plane. This plane flies from Bangkok to Tashkent to Copenhagen. A fast plane change and you are in New York. The total flying time is about 24 hours from Bangkok to New York, versus almost twice that much going around southwest Asia, the Middle East, eastern and western Europe and eventually New York, with a minimum of six stops. I called S.A.S. in Copenhagen and discovered they had a flight from Copenhagen to Bangkok twice a week and they had a seat for me. I got on the plane (it was almost empty) and off we went. In two hours we were over Moscow and in about 7 hours we landed in Tashkent. It was 2 AM. You couldn't buy a stamp, a souvenir or a bottle of vodka. This was a State operated enterprise and the hours were 8 AM to 6 PM . . . "that," they said, "was long enough." What about the tourists stopping over in the middle of the night? Well, they only stay 45 minutes anyway, so . . .

I bought my vodka on the way back and was I amazed that they gave me change in Indian head pennies and buffalo head nickels.

Tropical Fish Hobbyist

We landed in Bangkok early in the morning after flying over the Himalayas, Burma, India; we even strayed over Cambodia. It was a boring flight. The plane flew too high to see anything.

When we landed in Bangkok, the American influence was obvious. Taxi-drivers were screaming their excellence . . . guides were pleading that they knew more about Bangkok than anyone else . . . hawkers were selling black market alligator handbags (among other things) . . . and the hotels were jammed and they had no one to find you a room. So, what could I do but call up a few of my friends . . . and the first one I called was Kor Song Heng, the owner of Chao Phraya Aquarium. "STAY THERE," he said, "I'll have my son Virachai pick you up in a few minutes." An hour later Virachai was there and he was so kind and helpful that I will be forever indebted to him.

The first thing we did was to visit the family home . . . which is attached to the family business. I was immediately impressed with the cleanliness and orderliness of the premises. There wasn't a sick fish to be seen anywhere.

Epalzeorhynchus kallopterus, the flying fox, is not often seen in American shops, even though it appears on the price lists of many Oriental exporters. Photo by H. Hansen.



January, 1969



Acanthopsis choirorhynchus has never attained the popularity of some of the other Asiatic loaches exported from Thailand. Photo by H. Hansen.

The Dad, Kor Song Heng, reads Chinese as well as Thai, and he was indulging in a Chinese newspaper when I arrived. They immediately served me some cold drinks, beer and delicious fresh fruits like pineapple and melons. Their beautiful daughter, Sunee, did the serving, while I sat with the Mother, Siew Ung. They had a translator there, but Virachai had such a wonderful command of the English language that we didn't need any help.

The family is a very religious and close family. They have their own altar in their home, and throughout the garden and business area they have special praying altars that make it convenient to communicate with Buddha whenever they feel it is necessary.

Their fish house has about 1,000 aquariums and they have only one species per aquarium. Naturally they don't use heaters . . . their problem is to keep the sun away from the tanks or the fishes will be cooked. The water temperature is always over 80° F., so they need almost constant aeration. They breed Siamese fighting fishes *en masse*, producing 30,000 per month.

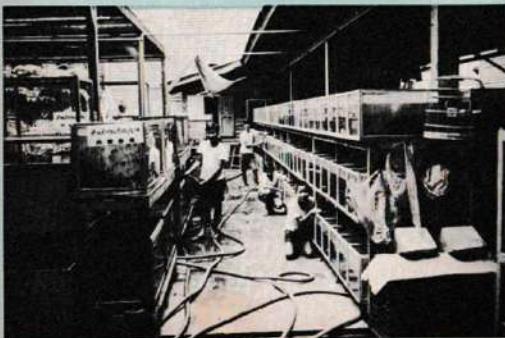
Tropical Fish Hobbyist

Chao Phraya Aquarium



Virachai is in charge of raising the bettas and he is very proud of the quality of his fishes. Bettas are their main source of income.

A group of the family youngsters, from front to rear, Samsri, Sang, Boonsom and Phang, have the job of siphoning the tanks and filling them up again. Every day about 50% of the water is siphoned off the bottom and refilled with "tap" water. There is plenty of water in Bangkok where it rains an average of 20 days a month. The sign on the left reads in both Chinese and Thai: DO NOT ENTER.



A closeup of the monos shipped from Bangkok.



A specialty of Chao Phraya Aquarium is monos, the brackish water fish which is so popular all around the world. Here Sunee feeds them daphnia and mosquito larvae. They are slowly acclimated to pure fresh water and raised until they are 1 1/4 inches long before they are shipped.

Egglayers which drop non-adhesive eggs are spawned in floating traps with screen mesh bottoms. Floating plants keep the sun from heating the water too high.



Tropical Fish Hobbyist

They also breed special fighters for fighting. These are usually plain colored fish which have little commercial value for their export business. I was not invited to watch a real *Betta Fight* where they bet money, as it is illegal now in Thailand.

Kor Song Heng has been in the fish business for 20 years, though he only started exporting about 10 years ago. He exports to almost every country in the civilized world and while I was there they had a new fish farm under construction very close to the airport.

Kor Song Heng was one of the pioneers in collecting fishes in the wild and he has always given freely of his time to take scientists through the wild jungles of northern Thailand in search of new aquarium plants and new fishes. The list of fishes which he stocks and ships is as follows. I record it merely for historical purposes, for many of the fishes do not appear in the scientific records as having been found previously in Thailand. When I expressed my doubts about certain fishes coming from Thailand, Kor Song Heng promised he would prove it to me any time I so desired. I believe him for he is one of the very rare tropical fish exporters who has proven to be

Botia modesta is one of the staple exports of Bangkok fish farmers; less colorful than the clown loach, *Botia macracantha*, it still brings a good price.



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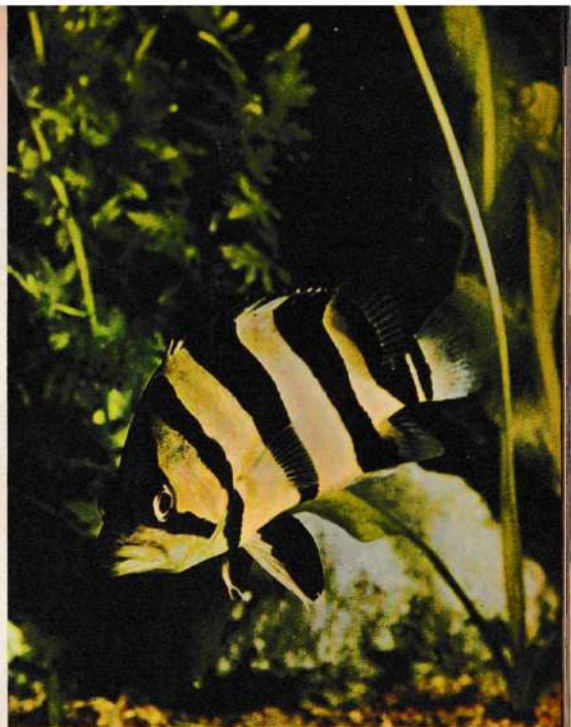
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Almost all of the *Datioides microlepis* exported from Bangkok are small and pale in coloration; they look a lot different from this adult specimen of the tiger fish. Photo by Peter Tsang.

honest, capable and sincere during the many years he has served us at Gulf Fish Farms. While I could write pages and pages about his beautiful fishes and his "setup," the many accompanying photos do a much better job of it.

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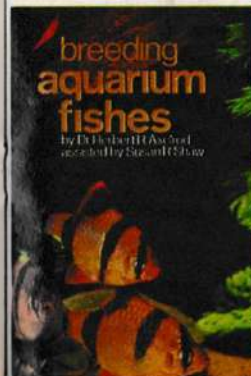


This *Heterobagrus* catfish (exact species unknown) is an Asiatic rival to the popular upside down catfishes of Africa; if exported in quantity, it might soon replace some of the plainer *Synodontis* species as an aquarium oddity.

List of Fishes

● *Acanthopsis choirorhynchus*, *Acanthopthalmus kuhlii*, *Aplocheilus panchax*, *Acanthopthalmus* species, *Balantiocheilus melanopterus*, *Betta splendens*, *Botia almorhae*, *Botia horae*, *Botia hymenophysa*, *Botia modesta*, *Botia sidhimunki*, *Brachygobius xanthozona*, *Brachydano albolineatus*, *Barbus tetrazona*, *Barbus schwanefeldi*, *Clarias macrocephalus*, *Chela caeruleostigmata*, *Chanda wolfii*, *Datioides microlepis*, *Datioides quadrfasciatus*, *Dermogenys pusillus*, *Epalzeorhynchus kallopterus*, *Epalzeorhynchus siamensis*, *Esomus metallicus*, *Gyrinocheilus aymonieri*, *Ghost Glass Goby*, *Heterobagrus bocourti*, *Helostoma temmincki*, *Helostoma rudolphi*, *Kryptopterus bicirrhus*, *Kryptopterus limpok*, *Labeo bicolor*, *Labeo chrysophekadon*, *Labeo erythrus*, *Leiocassis siamensis*, *Mahidolia mystacina*, *Monodactylus argenteus*, *Mastacembelus armatus*, *Macrogonathus aculeatus*, *Myrus vittatus*, *Microglanis paratyboe*, *Notopterus chitala*, *Noemacheilus* species, *Ophronemus gourami*, *Osteochilus vittatus*, *Osteochilus hasseltii*, *Ophicephalus lucius*, *Oryzias latipes*, *Polycantropsis abbreviata*, *Rasbora borapetensis*, *Rasbora daniconius*, *Rasbora heteromorpha*, *Rasbora maculata*, *Rasbora urophthalmus*, *Rasbora trilineata*, *Rasbora hoogveldii*, *Scatophagus argus*, *Scatophagus rubifrons*, *Tachyurus caelatus*, *Tetraodon fluviatilis*, *Tetraodon palembangensis*, *Therapon jarbua*, *Trichogaster microlepis*, *Trichogaster pectoralis*, *Trichogaster trichopterus*, *Trichogaster leeri*, *Trichopsis vittatus*, *Trichopsis pumilus*, *Toxotes jaculator*, *Xenentodon cancela*, *Pteropangasius cultratus*, *Pangasius larraudii*, *Pangasius micronema*, *Pangasius sanitwongsei*, *Puntius arphoides*, *Rasbora steineri*, *Clarias macrocephalus*, *Catlocarpio siamensis*, *Hemichromis bimaculatus*, *Fire Spiny eel*, *Brown Discus*.

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Rametzi
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Gold Jet Red Tail Black Guppy
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Black Tuxedo Guppies
Albino Guppies
Green Delta Guppies
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by paul habnel



GUPPY corner

Q. 1. A friend of mine gave me some new guppies about a month ago. Since then all of mine have died, but six of his remain. I would like to know what happened.

2. In my tank there are many worm-like creatures clinging to the glass. I clean the tank regularly, but they keep coming back. How can I get rid of them?

3. How can you prevent the decaying of plants in the aquarium?

Susan McGill,
Seattle, Washington

A. 1. It could be that your friend's fish carried a sickness to which they, but not your guppies, were immune. This may be the answer, but you can't be sure; the death of

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your fish could have been pure coincidence or could have been caused by entirely unrelated factors. It is always advisable to keep new fishes separated for from two to six weeks.

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Tropical Fish Hobbyist

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2. If the worm-like creatures have a whitish color, they are probably planarians. Planarians are often brought into the tank with live food. Also, an "over-ripe" tank



Planarian worm

gives the planarians plenty of chances to multiply. Some hobbyists try to get rid of planarians by hanging a small mesh-filled gauze bag in the aquarium overnight, removing it in the morning. The theory is that the planarians will be attracted to the meat and can be lifted out of the tank with the gauze bag, provided you put a net under the bag as you lift it. The treatment should be repeated until all of the planarians are gone. The net should be cleaned with boiling water after each usage.

3. I do not know what conditions you provide for your fish, or what plants you have. Plants, like animals, need different combinations of conditions in order to do well. Very hard water would have a tendency to make some plants decay, and perhaps that's your trouble.

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Oftentimes newly purchased fishes, or fishes placed into freshly aged water, develop shimmies, fungus, or seem to die for some unknown reason. This is especially true of Swordtails, Mollies, Platies and Fancy Guppies. Even fish pathologists have not been able to detect why these fishes were poisoned.

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P.S. Each "matchbook" tablet package has a different fish photo in back of which is a full description of the fish and a story about it. This series is included in our **REMEDY AND TONIC, ICH, WHITE SPOT CURE, and STOPS ALGAE**. When you have collected the entire series of 48 photographs, send them with \$3 and you will get an autographed copy of Dr. Axelrod's **ENCYCLOPEDIA OF TROPICAL FISHES**.

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Tropical Fish Hobbyist

Q. I have been successful in the fresh water hobby and I would like to try my luck at salt water. Can you help me with the following questions?
Ken Whittenburg,
Rome, Georgia

1. Could I use coral, sea fans and sponges, both living and dead?
2. Would life in the tank be best benefited by the use of fluorescent light, incandescent light, or sunlight?
3. Can ordinary aquarium gravel be used?

A. 1. Coral can be used in the aquarium provided the coral is completely cured. Since this is a long process, I recommend that you purchase coral already cured at your dealer's. As to sea fans, these should be dried but not put into the tank. Instead, I paste the sea fans on the outside back of my aquarium glass. This makes the sea fans look as if they're in the water. As for sponges, forget them. They pollute the water in the tank.

2. Fluorescent and incandescent both can be used. Since there are no plants, not much light is needed.



Various types of corals in use in a marine aquarium.

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Blennius nigriceps. Photo by Marcuse.

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Tropical Fish Hobbyist

The only use for light is that your fish can find the food they need. Sunlight is out all together. It takes no time for your tank to be covered with a thick covering of algae, if the tank receives direct sunlight.

3. Ordinary gravel is o.k. to use, but silicate sand is better. Uneaten food can fall in between the gravel and spoil. With silicate sand, the food stays on top and can be seen and easily removed.

Q. I have on hand a large 200 gallon tank contaminated by my two year old son feeding the fishes a large paper clip. The water I think is a total loss. Can it be salvaged by the use of ion exchange resins?

Douglas G. Robertson,
Huntsville, Alabama

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A. It would take months for a paper clip to contaminate 200 gallons of water. I think you would have discovered the clip before it could do any real damage. Ion exchange resins are used to maintain the pH and DH of water. I know of no chemicals that will remove toxic elements from your aquarium water.

Q. Do large sea horses, specifically Hippocampus hudsonius, eat their young, as most other fishes do?

Curt Doerr, Charleston, W. Va.

A. Sea horses do not eat their young.

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MAIL CALL

If you have an aquarium question that you would like answered, send it to MAIL CALL. Each month the most interesting questions received and their answers will be published in this column. Letters containing questions cannot be acknowledged or answered personally. Address all questions to: MAIL CALL, T.F.H. Publications, Inc., 245 Cornelison Avenue, Jersey City, N. J. 07302.

Catfish with Spawning Gouramis

Q. I recently bought a pair of opaline gouramis. The female is pregnant and the male is building a nest.

1. Can you give me some pointers on what to do after the fry hatch?

2. Can you keep a catfish in the same tank with the gouramis while they are spawning? (They're in a 7 1/2-gallon tank.)

Joseph Fitzpatrick
Brooklyn, New York

Opaline gourami



A. 1. Check any good aquarium book that contains information about spawning the popular gourami species. Gouramis in Color, published by T.F.H. and available at your local pet shop, is a good elementary text.

2. It is possible to keep one of the smaller catfishes in the tank during the spawning of opaline gouramis (and most other anabantid species), but it definitely is not advisable, since the catfish could easily disrupt the spawning and there is nothing to gain by having it there in the first place.

What's Killing the Sharks?

Q. We are consistently losing red-tail sharks. The pH of our water is about 7.6, and the water is hard. The water is aerated with a bottom filter, and we change the wool about twice weekly. We feed our sharks frozen shrimp, tubifex worms, and flake foods. The temperature is maintained at between 74° and 76°.

W. E. Stafford,
Tallahassee, Florida

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Tropical Fish Hobbyist

A. 1. A small amount of salt in the water won't hurt the pure freshwater killies, but don't keep them in water that is truly brackish. Very few killies available on the market right now come from real brackish water. If the brackish water killies you have in mind are some of the killifishes common along the eastern coast (such as some of the Fundulus species), you'd be better off trying to put them into pure fresh water than trying to adapt foreign killies to brackish water.



Fundulus heteroclitus, a common salt- and brackish-water killie native to the coastal waters of the northeast U. S.

2. In really brackish water, none of the normally available catfishes and algae-eaters would be comfortable and would eventually die.

3. Many of the combative killifish species get along better with non-killie species than they do with members of their own family. It is possible to maintain a

group of different cyprinodont species together in harmony if you pay careful attention to feeding habits, size differentials, and temperament of the species involved.

4. In most cases, the bigger killies will ignore the smaller killies that they can't swallow, but some bullying is to be expected.

5. The blue gularis doesn't need salty water, but it's not a very good community fish in any event. Besides being an eater of small fishes, it's pretty lethargic.

Too Much Light

Q. Recently I set up a 40-gallon community tank which is planted completely with natural plants. I have kept the reflector light on all the time, and both the plants and the fish appear to be thriving. However, I do get an excess of algae on both the glass and the plants.

Lately I tried turning off the light for a period of time and found that many of the fish seem to lose their sense of equilibrium and swim into the sides of the aquarium, the rocks and the gravel.

My question is: Is there any solution I could use to keep the algae down and still keep my lights on? E. J. Collins
Matawan, New Jersey

A. If you have sufficient illumination for good plant growth, you're almost certain to grow a little algae. You're using too much light; don't keep the lights on all the time and you'll certainly cut down on the amount of algae in the tank. You also

Otocinclus affinis, a small algae-eating catfish.



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could use a small algae-eater such as *Otocinclus affinis* or a *Gyrinocheilus aymonieri* to keep plant leaves free of algae. A probable explanation of the loss of equilibrium in your fishes is that fishes kept under a continuous bright light would have some difficulty in adapting to a total darkness, but they should get over it quickly.

Mystery Fish

Q. Last night I purchased a "pink-tailed chalis" (please excuse me if the spelling is incorrect, but the only two local fish stores having this fish weren't sure of the spelling either). The fish is approximately four inches long and has a grayish silvery-white body with raspberry-red fins.

1. Can you tell me the correct common name of the fish, its genus and species, its family, and where it comes from? I can't find anything about it in the book I have.

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2. What should the pH, DH, and temperature be for this species? It currently is alone in a 15-gallon tank with a water temperature between 78° and 80° and a pH of 7.0.

3. What size can it reach in the above-mentioned tank when kept under proper conditions?

4. I also bought two one-inch-long "gold tetras" for a 40-gallon community tank that now houses about twenty small and medium-size fishes; the tank is kept at a temperature of 80° and is filtered and aerated. The "gold tetras" are not gold in color at all; they are silver, and rather glittery, with a tiny amount of black on the tail. When I asked the store owner who sold me the fish why he was selling silvery tetras as "gold" tetras, he joked and said that they had tarnished. Can you tell me

the proper name of this tetra and whether it will be all right in the big community tank?

Mrs. Randolph T. Ott, Downey, California

A. 1. Your fish is *Chalceus macrolepidotus*, known commonly as pink-tailed chalceus; this fish, a characin, is often sold as an African tetra, even though it comes from the Guianas region of South America.



Chalceus macrolepidotus.

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2. The pH and hardness are of no special importance if extremes are avoided. The temperature range is okay, but the species can take cooler water, too.

3. In time, it will grow to about eight inches in length in your 15-gallon tank; in a larger tank, it might grow to about ten inches.

4. We can't tell you the name of your tetra with any great degree of certitude.

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because there are many nondescript silvery tetras like the ones you bought. It's probably a *Hemigrammus* species of some sort, and it will be fine under the tank conditions you described. You could let that temperature drop a few degrees, though; a range of 74 to 80 would be better than a straight near-80 temperature.

Crowded Tank

Q. I had a 5-gallon tank that had some angel fish, two mollies, two swordtails, two albinos, and one lemon tetra and a catfish. All of a sudden they started to die. So far seven fish have died. The only thing is that I have only one kind of food, daphnia. Is this bad for them? Should I feed them a variety?

Margo Critchell, Ann Arbor, Michigan

A. A steady diet of daphnia, whether it's live, frozen, or dried, wouldn't be good for your fishes, so give them a greater variety. But the lopsided diet probably

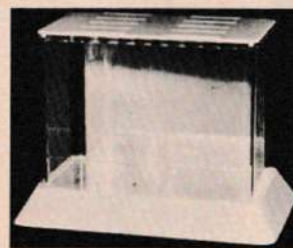
isn't the major cause of the deaths; over-crowding is. The tank was too crowded, and eventually the crowded conditions caused the water to become saturated with pollutants; that's why the fishes all started to die off at once. Put fewer fishes into the aquarium and make frequent partial changes of the water, and you'll have a healthier tank.

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Albino Catfish

Q. I've been reading your magazine for three years and have learned a lot. I would appreciate it very much if you would answer the following questions about an albino catfish on which I can find no information whatever.

1. What is the scientific name for this fish?

2. How do you tell male from female?
3. What size tank would I use?
4. What should the temperature of the water be?
5. What do the young eat?

Wayne McCauley, Santa Clara, California

A. 1. There are a number of albino catfishes available from time to time. There are at least two albino *Corydoras* species that have been spawned in quantity and made available to hobbyists, and there is an albino *Hypostomus*, and there is *Clarias batrachus*. Since *Clarias* has been sold in many shops throughout the country recently whereas the others

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Albino *Corydoras aeneus*.

haven't been, our guess is that this is your fish. This species has been getting quite a bit of unfavorable publicity lately (much of which is deserved) because of its tendency to endanger other aquatic wildlife in the southern states. It can travel on land for considerable distances.

2. The adult female will be heavier in build. You can't differentiate the sexes of young *Clarias*.

3. *Clarias batrachus* gets to be about a foot long, so the bigger the tank the better. A small specimen will do very well in a 10-gallon tank.

4. The species has a very wide temperature tolerance range; 70° to 80° would be fine.

5. Just about anything. Be careful about putting even a young *Clarias* with fishes that can swallow; it has a hearty appetite.

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African Frogs

Q. 1. Is there more than one species of African underwater frog?
2. Can they be sexed, and have they been bred in captivity?

Kenneth Comstock, Tamaroa, Illinois

A. Yes, there's more than one species of African underwater frog; a good article about breeding one species, *Hymenochirus boulengeri*, appeared in the April, 1961 issue of *Tropical Fish Hobbyist*.



Eggs of African frog.

African underwater frogs, *Hymenochirus boulengeri*, mating.



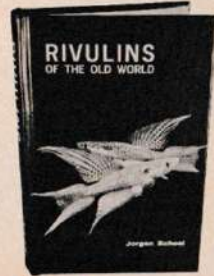
African underwater frog tadpole.

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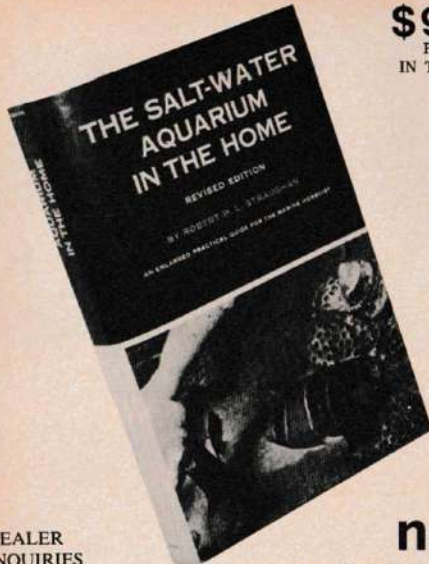
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Both upper and lower caudal extensions on this male lyretail swordtail are about equally well developed, although the lower extension looks heavier because it is much more deeply pigmented. Photo by Jiri Taborsky.

two days for the spermatozoa to fertilize the eggs of a given brood. Sometimes the brood is born at the same time and some of the young are seen to have larger yolk sacs than others, looking like newborn egg-layers. These are usually healthy youngsters and they develop as normally as their brethren.

The larger swordtails, *helleri* and *montezumae*, usually have about 75 fry at a time, though in some very mature females 175 is not to be unexpected. The time between broods of fertilized females varies between 3 weeks and



The male lyretail swordtails shown here above and below demonstrate graphically why breeders of some of the long-finned and lyre-tailed swordtail strains have to resort to manual transference of spermatophores to effect fertilization of females of the strains. In many cases, the males are incapable of fertilizing the females, because their gonopodia are too long to allow normal swordtail union.

Photos by Jiri Taborsky.



This beautiful lyretail swordtail female is close to perfect in her exemplification of lyretail development; females of the fancy swordtail strains are able to maintain the lyretail characteristic without showing the thread-like finnage extensions that mar the appearance of some of the males. Photo by Jiri Taborsky.



4½ weeks, but almost all spawns are between the 23rd and 29th day after the previous brood. There is definite evidence that more babies are born, and more frequently, during the summer. At our fish farms in Florida (Gulf Fish Farms in Palmetto), we produce 70 per cent of our 2,000,000 annual production of swordtails between March and November. Babies are rare in the wintertime when the water in the pools drops to 62° from a normal 75°.

In almost all cases, swordtails drop their young between dawn and three hours later. Normally it takes about 1½ minutes per fry dropped on the average. Some are born head first and some tail first, and I have moving pictures showing them born two or three at a time.

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Tropical Fish Hobbyist

January, 1969

Crossing *Metynnis*



Metynnis schreitmulleri. The females used in the author's *Metynnis* x *Mylossoma* cross were of this species. Photo by H. J. Franke.

BY HIROSHI AZUMA

In the previous issue of TFH magazine I described how simple it was to spawn *Metynnis schreitmulleri*. I will now give you a few pages from my laboratory notebook which describes the method by which I successfully obtained fertile eggs from crossing *Metynnis schreitmulleri* with *Mylossoma argenteum*. Unfortunately I was not able to get active hybrids, but I am still trying, and if I am successful, you can be sure that I'll report it to you with deliberate speed!

Date: October 6, 1967. 3 P.M. in the afternoon.

Place: My laboratory in Tokyo which I call Amazon-en Laboratory. The address is Arakawa-ku, Tokyo, Japan.

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An adult *Mylossoma argenteum* similar to those used in the experiment. Photo by Dr. Herbert R. Axelrod.

with *Mylossoma*

I used a female *Metynnis schreitmulleri* female about 2 years old. She measured 12 cm. in length (about 4½ inches). The male was a 3 year old *Mylossoma argenteum* 13 cm. long (5 inches). Usually it takes two men working in unison for artificial spawning, one squeezing the eggs from the female and the other milking the sperm from the male. I did it by myself.

I held the *Metynnis* in my left hand and the *Mylossoma* in my right hand. Then I gently, delicately pressed the ventral part of the *Metynnis* toward the anal opening. If the female is ripe, the eggs flow easily and the whole mass of eggs seems uniformly semi-transparent. I squeezed out between 10 and 20 eggs every time I tried. This is the same number as they spawn naturally in the aquarium.

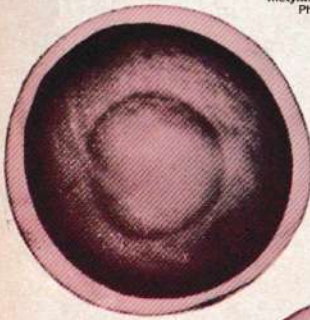
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As soon as I got eggs, I fertilized them by squeezing sperm from the male using the same technique. I squeezed the eggs and sperm into a shallow tray with clean, aged water. Within seconds after they were fertilized, I transferred them to a hatching tank made of all glass. The tank measured 30 x 30 x 40 cm. (12 x 12 x 16 inches) and had water at 30°C. (86°F.). Gentle aeration from an airstone was provided. The pH was 6.6.

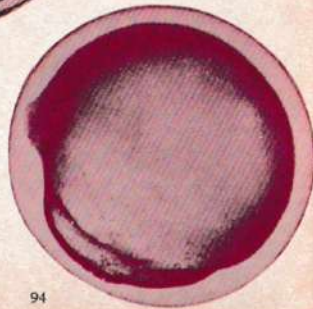
On the same day, at 7 P.M., after removing unfertilized eggs which became opaque, I had 81 eggs in good condition.

At 11 P.M. on the same day, I removed 3 more opaque eggs leaving 78 good eggs.

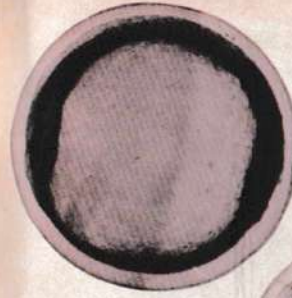
The egg development photos shown on this page and the next are of the development of eggs from a normal *metynnis schreitmuelleri* spawning. Photos by Hiroshi Azuma.



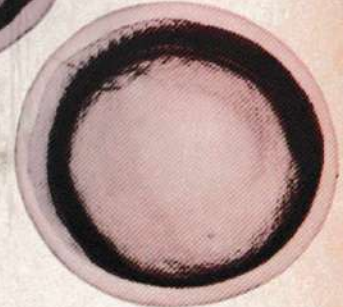
The fertilized egg 5 hours after spawning.



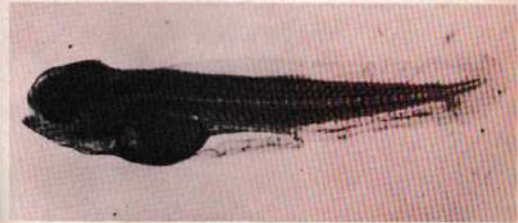
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The fertilized egg 15 hours after spawning.



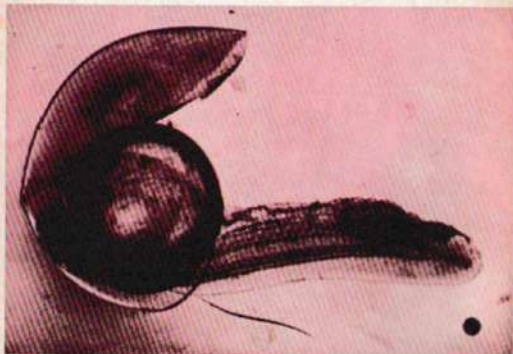
The developed fry 7 days after spawning now in the free swimming stage.



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A newly hatched *Metynnis schreitmuelleri* and newly hatched *Metynnis schreitmuelleri* x *Mylossoma argenteum* fry are markedly different in appearance. Photos by Hiroshi Azuma.



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One of the fry of the *Metynnis* x *Mylossoma* cross-breeding experiment, about 42 hours after hatching. This young fish and the others that hatched succumbed to a bacterial infection, but the author hopes to produce living hybrids from future experimental crossings. Photo by Hiroshi Azuma.

The next morning at 9 A.M. I removed 5 transparent eggs which showed no development.

On October 8th at 9 A.M. 7 eggs hatched out. When you compare the newly hatched embryos with those of pure *Metynnis* (see the two photomicrographs) you can notice that the tails are quite different and the entire rear end of the fish has a different shape.

On October 9th at 9 A.M. the fry were at the larval stage and all the remaining 66 eggs were hatching out. I tested the water and found bacteria beginning to show themselves. The water was still 30°C. (86°F.) and the pH dropped a wee bit to 6.5.

On October 10th at 11 P.M. the fry had absorbed about half their yolk sacs and their mouths began to open. As soon as their yolk sacs were beginning to show depletion and their mouths began to open, I noticed an increase in the size of the yolk sac. It seemed that the fry were eating bacteria and taking in water into their sacs. Their heart beat became noticeably fainter as though the strain on this organ was too much. A bacterial infection took hold in each fry at this time and they all died about 104 hours after they were fertilized.

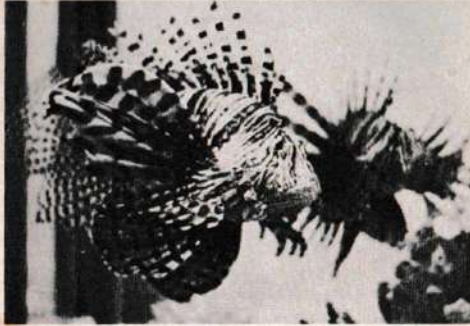
I intend to continue my experiments and determine whether it is possible to get fully viable hybrids from this cross. I'll also experiment with other crosses from these genera and report to you on the pages of this magazine.

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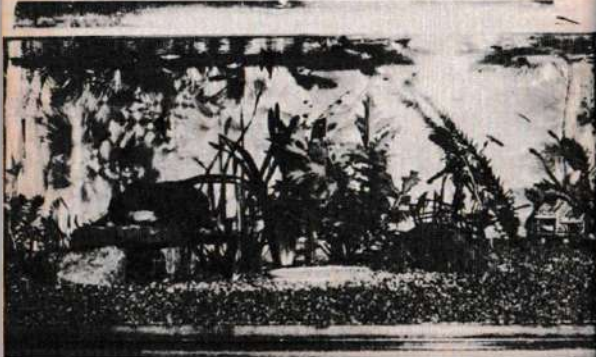
Contest Winners

Submissions for this month's photo contest were very heavy, and many photographs were of marine species; we even received some excellent breeding and fry development photos.

(Category I, Close-up): Master Sergeant Raymond H. Kennerty, currently serving overseas, home address unknown.



(Category II, Landscape): Rayburn L. Taylor, Waco, Texas.



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