

# TROPICAL FISH

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# TROPICAL FISH HOBBYIST

## BREEDING FISHES

by Dr. Herbert R. Axelrod. 25 cents from your dealer or direct from T.F.H.

Dr. Herbert R. Axelrod has come to the aid of the beginning tropical fish breeder in his 32-page book *Breeding Fishes*. Leaving nothing to chance, the book covers all aspects of breeding tropical fishes in 11 fact-filled chapters in which general requirements, such as sexing and conditioning the breeders, providing the correct environment, and isolating the breeders, are considered as well as more specific chapters dealing with specific groups of fishes.

The beginning breeder usually starts with the livebearers, and these popular fishes are considered early in the book. Mollys, platies, and swordtails are covered in one chapter, and the all-important guppy is given a chapter of its own.

Every ambitious beginning breeder hopes to breed the lordly Siamese fighting fish successfully, and *Breeding Fishes* devotes a chapter to the spawning of this gorgeous fish. Of the other bubble-nest builders, the gouramis are given a chapter. Other fishes meriting their own individual chapters are the old favorites, the angelfish and the aristocratic discus. Perhaps the easiest of egglayers to breed, the white cloud, is one of the most-often-suggested first egg-layers for beginners and is also given its own chapter.

Chapters are also included on danios, tetras, barbs, and rasboras. The book is illustrated with a number of instructive photos showing fishes in the act of spawning.

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## Contents

Vol. XV, Nov., 1966 (#129) No. 3	
Knowing the Nyasa Cichlids	4
Fishing in the Lakes of Brazil	12
A New Aquatic Fern	25
<i>Cichlasoma taeniatum</i>	33
A Few Tricks for Novice Guppy Breeders	38
The Hawaiian Red Sea Livebearer Mollie	47
<i>Hemiodopsis gracilis</i>	51
<i>Pseudocrenolabes</i>	73

MAIL: Cat. p. 53, Query Cards p. 24, Ads. From The Green Room p. 67, Your Fishes Health p. 65.

COVER  
It's been said a million times before, but it bears repeating: no fish has done more for the hobby than the guppy. If you brought more people into the hobby, kept their interest in the hobby, and challenged even the most skillful breeders more than has any other tropical fish, the guppy would guppy deserve special honors. Work on it, develop it, improve it, particularize it, cross it, with a little luck and a lot of skill, know-how, and patience, he may come up with something like the beautiful red variety on our cover. No article can give you the luck, skill, or patience needed, but for a lot of know-how and some very beautiful guppy color photos read the story beginning on page 38. Photo by M. F. Eshbach of a Paul H. Ruppel photo.

EXOTIC TROPICAL FISHES SUPPLEMENTS  
Pages 33 and 34, 31 and 32. These pages are perforated for easy removal and purchased to fit into the Leader Edition of EXOTIC TROPICAL FISHES.

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## EDITORIALY . . .

Heard a talk the other night at an aquarium society meeting where the speaker said he tried to get a few "secrets" from one of the recognized fish experts. He criticized the expert sharply because he said he had no secrets. Funny thing, when you've been successful at something or other, people always attribute it either to dumb luck or to some deep dark secret being kept selfishly from others. If you give a complete, explicit explanation of how you go about things, you're accused either of lying or holding out some important, indispensable nugget of information. Your listeners pay attention to only about half of what you have to say or follow your instructions in a very sloppy, slipshod manner. Then when good results are not forthcoming, they say your good advice is just a lot of poppycock and you're all kinds of a liar.

What makes an expert? He's a person who works very carefully and is blessed with two priceless ingredients, common sense and experience. His observations are not quotations of someone else's, but good hard facts that he has come to learn for himself. He may at some time or other have made every mistake in the book, but this is where his common sense comes into play: he has stopped to think and analyze what went wrong and has profited by his experiences. He is usually the type of person who is ready to share what he has learned and what he has learned is a trail blazer through the dense forest of ignorance and makes a task which was very difficult easy not only for himself, but for you if you pay attention to him!

*William Vorderwinkler*



*Pseudotropheus auratus*, one of the first of the Nyasa cichlids to be imported, is considered by many to be the most attractive of the group. Photo by W. Hoppe.

## Knowing the Nyasa Cichlids\*

BY DR. WERNER LADIGES  
Hamburg, Germany

When Georg Albert Boulenger published the third volume of his *Catalogue of the Freshwater Fishes of Africa* in 1915, which contained mostly cichlids, there were 286 species in this group known from Africa. Of these species there were only 33 listed from Lake Nyasa and 84 from Lake Tanganyika. Max Poll, in 1959, increased this number of Nyasa species by 177, which were broken up into 23 genera, of which no less than 20 genera were declared as being endemic to (found only in) that lake. In Lake Tanganyika, according to Poll, the count of species comes to 134, with 39 genera, of which 25 are endemic. This adds up to a respectable number of cichlids, and there exist considerable differences in body structure between cichlids from the two lakes. The cichlid genera from Lake Tanganyika differ morphologically to the greatest extent from each other, and it is possible to distinguish adaptations to their preferred mode of life haunts in their body structure. In Lake Nyasa on the other hand, in spite of the cichlids' distribution in various biotopes, these differences are much slighter, and 101 species out of the 177 belong to the genus *Haplochromis*.

I went shortly into the reasons for this extraordinary number of forms

\*Although there is still much to be done, a great deal has been learned about the Nyasa cichlids since they were first imported as aquarium fishes. Three of the species are treated in greater detail than have any Nyasa species been covered in popular literature before.

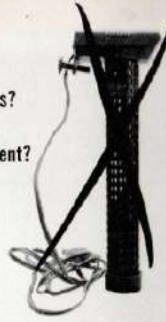


In their bright-blue color phases, *Pseudotropheus zebra* (above—photo by Hansen) and *Labeotropheus fuelleborni* (below—photo by W. Hoppe) look much alike. The most obvious way to tell them apart is by looking for the fleshy, overhanging upper lip of *L. fuelleborni*.





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when I had the pleasurable opportunity of bringing back alive for the first time some fish forms from Lake Tanganyika and describing them. It is to the credit of Mr. W. Griem (Aquarium Hamburg) that he took the pioneering step, in spite of high costs to himself, in providing not only the aquarium hobby but also science with living specimens, thus showing the way to much further knowledge.

Of the fish species brought in previously from Lake Tanganyika, only a few have survived in our tanks. The reason that most of them died so quickly was surely the lack of knowledge of their sometimes special living requirements. Political conditions in this part of Africa, unfortunately, make an intensive and systematic importation impossible. It was very fortunate that Mr. Griem, in 1964, succeeded in establishing an import connection with Lake Nyasa and quickly brought in to Germany a large number of the fishes native to this region.

The many cichlids native here were known from scientific literature, and some of the notes (Fryer 1959) referred to a certain variety of markings and coloration found among some species, but there was no mention made about any remarkable colors in these fishes. You can imagine my astonishment when I saw the first living specimens of cichlids from Lake Nyasa. I will go into their colors in more detail when I describe these species individually.

It was unexpectedly difficult to identify the imported specimens, because their gleaming colors and also their markings underwent great changes after death and still greater changes when they were preserved, and it was no use comparing with the dead material described in the literature. The identification key (Trewavas 1935) was based on their tooth structure. There had to be enough dead specimens to distinguish the species. It remained difficult to establish the identity of those that had changed color and markings when they died by comparing them with living specimens. I am greatly indebted to Dr. Terofal of Munich for undertaking the time-consuming task of identifying the many dead specimens.

It could soon be seen that the imported Nyasa cichlids could not be considered as ideal candidates for the aquarium. They are merely cichlids, with all their good and bad traits, from the viewpoint of the aquarium hobbyist. To the really interested fish hobbyist, however, who considers his aquarium as more than a companion piece to his furniture, these very colorful and little-known fishes offer much excitement and new thrills.

According to Fryer, these fishes are native to highly varied haunts in the lake and have adapted themselves, especially in their manners of nourishment, to these biotopes. Fryer names 4 zones as being typical for these fishes.

THE ZONES

1. Rocky shores with richly algae-covered rocks. The growths on the rocks are rich in all sorts of lower organisms. In an area of 1 square meter he found

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not less than 69,700 Chironomus larvae, and one species of Ostracod was found to number 198,000. There was a plenitude of other organisms, totaling in all 289,405 individuals in 1 square meter, and it was noted at the same time that molluscs were completely missing. About 27 cichlid species are constant inhabitants of this zone.

2. A sandy shore which differs from the rocky one not only in its structure, but also in its sparse habitation by living organisms. Still, here we find seven species of molluscs, and crustaceans are more richly represented. Small patches of reeds and clumps of Vallisneria are typical of the sandy areas. In a square meter of Vallisneria growth, there were found about 447 lower organisms. Not everywhere are the sandy areas so thinly populated, and the patches of reeds are often richer, with Chironomus and Copepod schools of at least 100 to each square meter. A species of Ostracod could even be estimated at thousands per square meter. The totally empty sand stretches were not perhaps the most empty of life; the life was merely distributed very thinly. Molluscs appeared, with occasional masses of Copepods and other tiny organisms, in a density of about 10,000 per square meter. The fish population here is smaller in number of species, there being 16 cichlids.

3. The third zone is a sort of transition between zones 1 and 2, which would, naturally, harbor species from both zones, as well as a few of its own (perhaps five). The typical appearance of the transitional zone is a sandy bottom with large beds of Vallisneria interspersed. The Vallisneria occupy about 25% of the total area here.

4. This is the so-called "Crocodile Creek," located at a bay at the mouth of the Nkata River. The water here is 10 feet deep at most, and is usually cloudy. The sandy bottom is covered with layers of detritus. At times during the dry season its connection with the lake is lost. Important is the thick vegetation; reed-beds and aquatic grasses occur in dense patches, and in the open water there are water-lilies. There are dense bunches of thread algae, of which Spirogyra species are particularly typical. Cichlids are scarce in this biotope, and only one type is typical.

THE FISHES

*Pseudotropheus zebra* (Boulenger). This species, for which I would like to suggest the name "Nyasa blue cichlid," (The name "zebra cichlid" might cause confusion!) was the most numerous of the imported species. This very robust fish is the most-frequently-found cichlid in its habitat in the rocky shores. On a blue background of varying intensity, this species usually shows six to eight dark bars which when the fish is healthy are of a bluish black color. Typical is a sort of mask between the eyes, there is a crescent-shaped band with another above it, divided by a light zone. In the soft part of the anal fin there are several distinct orange spots (Wickler calls them "mouth-breaker spots"). Depending on the fish's mood, the blue basal color can vary from a grayish blue to a cobalt blue to an almost white ice-blue, all of which form a very attractive background for the dark bluish-black bars.

Besides these usual colors there are other color forms. There is a plain azure blue and an almost white variety. While these color variations seem to be just a lack of vertical bars, there is another, seldom-seen color variation which is confined to females. Such females have, scattered on a bluish-white background, a number of black and orange, and sometimes brown, patches. These patches are usually different from one side of the body to the other. Occasionally one finds white specimens with black patches.



*P. zebra* is a typical rock dweller, which feed in an unusual manner on the algal growths which have become loosened from the rocks. The fish's very flexible lips are pressed against the rocks which are then scraped clean by its two- and three-pointed teeth. Firmly anchored algae is not eaten. In spite of the fact that the fish have obviously become specialized to this type of nourishment, in captivity they take not only plant-containing foods, but immediately and without hesitation take every food of an animal nature as well. They are definitely aggressive toward smaller fishes, and a disadvantage of these lovely fish is their quarrelsome nature, even among themselves. In the wild, they guard large territories where there are a number of hiding places. Keeping them in numbers can only be done in very large aquaria. The fish is a mouthbreeder and up to now has been spawned only once.

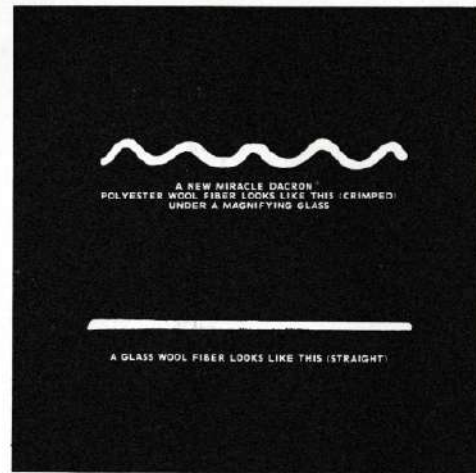
*Pseudotropheus auratus* (Boulenger). So far, this species is the showiest in markings and coloration of all the Nyasa importations. We Germans refer to it as the "turquoise and gold cichlid," "Turkisgoldbarsch." The normal coloration of this species is a bright golden yellow with three black horizontal stripes, of which one runs the length of the middle of the body to the tip of the snout, the second runs along the back, and the last along the outer edge of the dorsal fin. These black stripes have a narrow edge of blue. The upper part of the caudal fin is spotted black. Young fish do not have the blue edging along their stripes. Adult specimens in spawning condition have brilliant electric blue stripes on a black background.

*P. auratus* is found in rocky places and is said to graze on plant growths. In captivity it is just as willing as *P. zebra* to attack other food and accepts large numbers of daphnia and tubifex worms. Finely chopped beef heart is accepted eagerly and even taken from the fingers. The fish do very well with these foods and have bred a number of times. This species is also a mouthbreeder. The youngsters are released by the mother fully developed at a size of about 1 cm. The number varies (depending on the age of the female) from 6 to 40.

*Labotropheus pulcherrus* (E. Ahl). This fish is best adapted for grazing on rock surfaces. It is about 4½ inches in length and has an undergirding mouth opening which extends squarely across the entire width of the head. The gill supports are fairly straight and covered with strong, closely-spaced teeth. The teeth themselves have broad, spatulate tips which are slightly bent inward. They make excellent scrapers. Combined with the form and position of the mouth they are ideal for grazing over a broad strip, and, unlike the two preceding species, these fish are able to scrape off and eat even firmly anchored algae.

Their coloration is very similar to that of *P. zebra*, even the face mask being present. Surprisingly, one finds besides the normal, banded form some females with an orange and black speckled form, as we have found with *P. zebra*. The only difference is that the black is broken up into numerous flecks of irregular size and smaller spots.

In the aquarium, this species is more peaceful than the others, and, amazingly, in spite of their obvious specialization for grazing on algal growths, they quickly adapt to other foods and thrive on them. Good dried foods seem to be especially relished. Of all the species brought in, these were the first to breed. They are mouthbreeders.



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## Fishing in the Lakes of Brazil

BY DR. HERBERT R. AXELROD  
Written in Aruana, Brazil

Brazil is known for its beautiful river systems. The Amazon, the largest river system in the world, has at least 100 rivers flowing into it. Then, each of these rivers is part of a smaller system composed of itself and many small feeder streams. Most of these systems have some fishes which are peculiar to themselves and are not found in other systems.

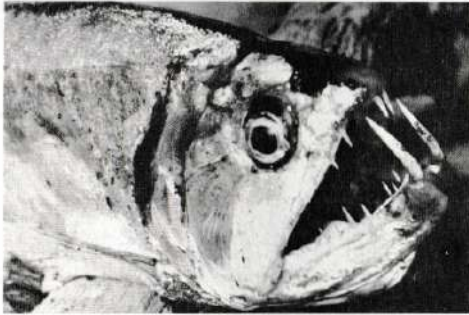
The Amazon River more or less divides Brazil into its two rain regions. The southern part of Brazil has rain during the period from December through March, while the northern part has rain from April through September. Since all the rivers and streams from both regions empty finally into the Amazon, this mighty river never runs dry.

But, for the professional fish collector, the fast moving rivers are hardly the place to fish. First, there are too many dangers involved with fast water, dangers such as stingrays, and soft sand. Then, too, the river is so large and deep that the fishes are hard to catch. The best places to fish are the small pools, lakes, and shallow streams which harbor millions upon millions of fishes. A few days ago the author had the opportunity to fish in some of the small lakes and streams that feed the Rio Araguaia. Most of the lakes and streams have local names, but this particular lake, located about 30 miles upstream from Aruana, Goias had no name. To get to it, we had to take a small boat, large enough only for three people and a few fish cans, with a small 4 HP outboard motor. We found the mile-long ditch that connected

Sandy yellow *Plecostomus* species are abundant in the Araguaia. When these catfish grow large, the natives often eat them. Photo by Harold Schultz.







One of the most vicious predators of the Areguao region is this *Atractosteus* species. It grows to a length in excess of 3 feet. The long lower grasping teeth pass through openings in the upper jaw. Photo by Harold Schultz.

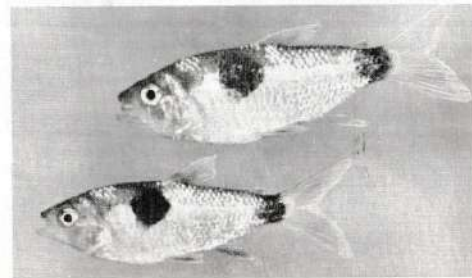
the lake with the river during this dry period of the year. The ditch was covered with fallen trees, overhanging vines, and rotting trunks. It took hours to chop our way through this dense jungle, and we were attacked continuously by mosquitos, gnats, flies, and spiders. My body was covered with hundreds of welts from the stings of spiders alone . . . but my misery was compensated for when we finally reached a magnificent lake about a mile wide. Almost the minute we hit the lake, a foot long aruana (*Osteoglossum*) jumped into our shallow boat. The shock nearly knocked me overboard, and before I could gather my senses the fish jumped out of the boat again. Within a minute, a second aruana jumped in, but this time we were prepared for him and he didn't escape. Within the next few hours, we caught several aruana, garfish (*Boulengeriella* sp.), *Prochilodus*, and tiny characins that kept leaping into our boat. More than half the large fishes jumped out of the boat again, but we did very well and hope to bring many of them back alive to grace the tanks of many public aquariums all over the world.

When we got to a clear area on one side of the lake, we were shocked to find the skeletons of a few dozen jacaré (alligators). This was the place where the alligator hunters would skin their catch. I took some teeth from one of the skulls as a souvenir, never dreaming that within a few hours we would be surrounded by a number of these fellows that were still very much alive! We fished with dip nets, seines, and traps and caught some very

lovely species of *Thayeria*, *Prochilodus*, *Abramites*, *Chilodus*, *Hyphessobrycon*, *Cheirodon*, *Scrubim*, *Aria* (stingrays), *Aequidens*, *Cichlasoma*, small freshwater soles (flounders), scores of different kinds of catfish (*Corydoras*, *Hypostomus*, etc.), *Cichla ocellaris*, and many more. The number and variety of fishes we found were truly astounding. Even delicate freshwater pipefish and hatchetfishes were available to us in this lake, while all around us turtles, larger pirarucu, and piranhas splashed the water. One interesting bird we saw was a black water bird that sank as soon as it landed on the water. Only its long neck protruded a few inches above the water, and it spent 10 minutes under the water at a time.

After fishing in various parts of the lake for the remainder of the day, collecting thousands of fishes (most of them preserved in formaldehyde for further study), we headed for home, but not before we stopped to rest. Almost as soon as we stopped rowing, several huge jacaré came to see what we were doing. Not having any guns with us (or cameras, as several times we nearly lost everything when we hit submerged logs and had to literally carry our canoe over sand bars and fallen trees), nor even a harpoon which we always carry to kill giant stingrays, we were helpless as the huge alligators congregated about us. Nearly half a dozen were within a few feet of our boat and our only defense was to crack a few of them on the head with our sharp paddle. We were in no danger as long as we stayed in the boat, for the 6-foot-long monsters were only inquisitive and would never attack a boat, but I shuddered when I thought of the hours I had spent earlier walking half naked dragging a seine through the water, or pulling the canoe over small sand banks.

*Ecdyon paraxous*, the backtoothed tetra, is probably the most numerous of all fishes in the Areguao. Photo by Harold Schultz.



Up to a couple of decades ago, hundreds of crocodiles could be seen sunning at the water's edge. Most of them were the large *Caiman nigra*, the black crocodile, which attained 12 feet in length. Today, this species is almost extinct. Now, the white crocodile *Caiman lewiniensis*, which gets to be only 6 feet long, is being killed by the thousands. All this is due to the uncontrolled hunting of these animals for their skins. Above, the dead crocodiles are skinned. Below, the skinned carcasses awaiting the vultures which will feed off their soft parts. Photos by Harold Schultz.



The trip back to camp was shorter, as we were motoring with the strong current instead of against it, but the earlier great physical exertion had sapped our strength and we were very tired. We had fished longer than we had expected, and it was getting dark as we sighted the town of Aruana. The air was cold and we shivered in our wet clothes. The coffee was good, though very strong, and it warmed us up. The rest of the night was spent in separating the fishes and getting ready for some more fishing the next day. But, next morning we were too tired to fish and we rested, changed the fishes' water and decided to fish that night on a small island nearby.

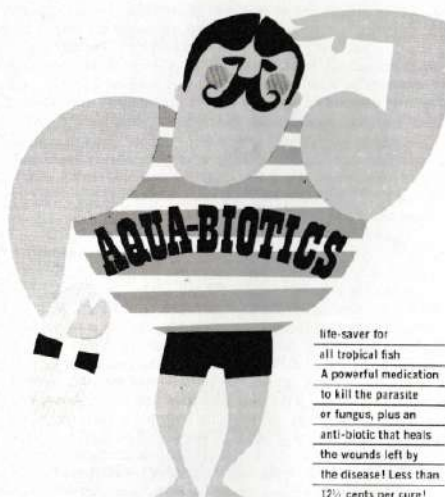
The women weren't too happy at being left alone and they insisted on doing some night fishing with us. So we all packed into a larger canoe and out we went. It was only 8 P.M., but the night was black and dark. We reached the island and moored the canoe securely so the strong current wouldn't send it spinning down the river.

Our powerful flashlights highlighted many new fishes, and we easily netted some beautiful red-tailed *Aphyocharax*, *Leporinus*, various catfishes, and some pretty tetras. Suddenly our Indian guide, Koorooshera, let out a scream and we all rushed to him. He had just stepped on a stingray, but only his toes had touched the front part of the fish. He was afraid to move lest the fish swing around and lash at him with the very powerful tail spike. I quickly handed him the harpoon, and he felt much better with the ray dangling on the end of it. We caught several other rays that night and spent a very interesting time just studying the actions of the fishes and the birds at night. Perhaps one of the most interesting sights was watching the night bats fishing. How they see the fish in the water is a wonder, we could hardly make them out with strong lights. These bats, so plentiful throughout the jungle, are feared by whites, but the Indians respect them. We often had them swarm about us, flying very close, especially the insectivorous bats, but none hit us. The real pests were the parasites we had to pick off each others' bodies every night by the fire. The large chiggers were fat with our blood and left huge red welts. The dangers of the jungle are not the fierce onça (jaguar), or the tapirs or snakes, but the tiny disease-carrying mosquitos, ticks, flies, and microscopic organisms to be found in the water.

There were plenty of game animals to be found, especially the small deer and large rodents (paca) that served as the basis of many feasts we had at night as we talked about beautiful aquarium fishes yet to be found.

Our trip was greatly enhanced by the presence of Sr. Carlos Stegemann, Tropical Acquario, Ltda., Sao Paulo, Brazil, who is the prime source of rare fishes in Brazil. Sr. Stegemann, a fish lover first, and a businessman second, spends all of his time collecting and shipping rare fishes to Europe. He says that the American market is too "cheap" to want to buy rare and beautiful fishes. I hope that this sad situation will soon change.





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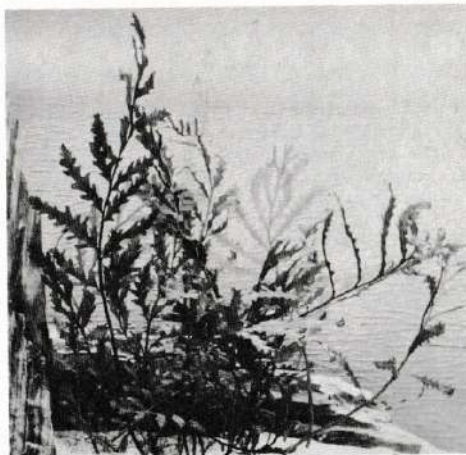
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The aquatic fern *Bolbitis heudelotii*. Photo by Chouck.

## A New Aquatic Fern

BY J. ARNAULT

In 1956, on the return from a fruitful hydrobiological mission, our friend Dr. Géry, who ran things with great competence, wrote a series of articles for the magazine *L'Aquarium et les Poissons* on the flora and fauna of Guinea, Africa. As were most of the hobbyists of that time, I was highly interested in the new plants which had been referred to by Géry in the account of his trip, and I promised myself that if ever a few cuttings showed up I would try them. Alas, these plants were not as robust as was hoped, and I could not get any, because they were never made available.

Among the plants mentioned by Géry, one particularly drew my attention; it was an aquatic fern which the author described without giving its generic name, which was *Bolbitis*, a cosmopolitan tropical genus belonging to the family Polypodiaceae.

25

The years passed, and it seemed that *Ambias lanceolata*, from the Niger River, was to be the only aquatic plant from Africa offered to fill the needs of aquarium hobbyists.

In 1959, I made another tour of West Africa, but went in further than had Lambert and Géry; in the Upper Volta and French Sudan, where, as a medical expedition, we were to examine the breeding grounds of the simuliid flies, the carriers of that terrible disease, onchocerciasis. This put me in a position to study the flora and fauna in the bodies of water occurring in the area.

My first contact with this country gave me the pleasure of finding again the beautiful fern which was referred to by Géry, which, thanks to the excellent photographs that accompanied his text, I was able to identify. I found it only in the shaded streams, in quite strong currents where there was a sandy or rocky bottom. Here, it clings to rocks or to the bottom soil, held by its roots. It has both emerged and submerged leaves, the latter predominating. The water was quite clear at this time of the year (We were in the dry season.) and very soft, about 1 DH. It was slightly acid and its temperature averaged about 83°F. During the rainy season, all of the West African rivers overflow their banks and flood the surrounding plains for a few months. *Bolbitis* resists these periods very well and continues to prosper. It becomes active at this time as a fern, typically aquatic and, therefore, capable of being acclimated eventually to the aquarium. I promised myself to bring back some plants on my return to France, a project which I put into execution in December 1959, and when I was ready to depart from Bobo-Dioulasso, I collected a hundred stalks of *Bolbitis* from a nearby river. This bundle of plants was a happy addition to a cargo of fishes, frogs, and live mice which composed the bulk of my luggage.

With the exception of a few plants of this fern, which I saved for myself, and, which I planted in what I hoped were good conditions, they were distributed among the older members of The Association of French Aquarists. But, alas, our results were not nearly as brilliant as those of Géry; all the stalks grew very poorly in spite of conditions which seemed to be very good. Two years later there were no more of the plants left, except at my home, where one tiny plant survived among many other aquatic plants, and I had lost all hope of ever seeing it multiply some day!

The aquarium where this lone tiny *Bolbitis* grew contained very soft water which was filtered through an outside filter. I was not very pleased with the cleanliness which prevailed in the tank, and this plus the poor results I'd had with my *Bolbitis* made me decide to try an undergravel filter and see if the results would be better. Without emptying the aquarium, I buried a small undergravel filter in the bottom gravel. The water became crystal clear very quickly and the plants took on an air of freshness. The fallen leaves rotted away into mulm, and the *Bolbitis* decided timidly to put out a few fronds. A

29



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" But it says here that piranhas don't attack! "

## A Few Tricks for Novice

A good friend of mine has been preaching for years that the key to raising prize-winning guppies is to give them an outstanding diet and environment.

Personally, I favor the pronouncement that the most important key is to start with outstanding breeding stock and work them properly.

Personal prejudices aside, my friend's advice is often far more practical than my own.

Having visited the homes of dozens of novice guppy breeders, I have

Professional guppy breeders have developed veil-tail guppies like the ones shown here. Novice breeders can purchase the young of such stock and begin their programs with fine fish. It is said that most hobbyists begin by keeping the guppy and sooner or later



## Guppy Breeders

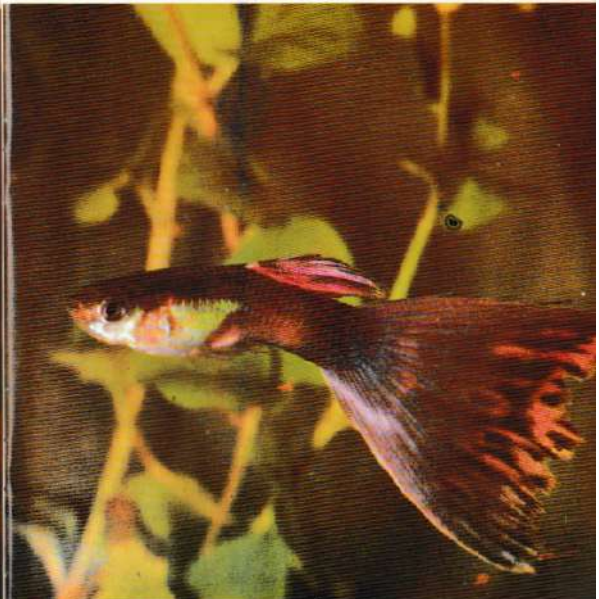
BY TED F. PARKER

repeatedly been made aware of two factors: (a) the outstanding basic quality of the fish with which they are working and (b) the great disasters they create for themselves through a few, relatively minor mistakes.

In most cases, I am convinced, the following few simple rules could easily produce an improvement of 100 percent or better in a matter of only a few months—without the introduction of new stock.

1. Guppies should never be crowded. (If you see fish crowded in the

return to it, breeding the fancy varieties. At any rate, there is no doubt that for years the guppy has been winning the "most popular tropical fish" award hands down, and it will probably do so for many years to come. Photos by Hansen.





tanks of a professional breeder, you can be fairly certain they are being raised to sell, not for shows.) My own experience indicates that one fish per gallon of water is about the maximum degree of crowding my fish will take and still produce prize-winners. And each of my breeding pairs is given a separate 5-gallon tank.

2. Clean, crystal-clear water is vital. Apparent cleanliness is not enough. Filth the aquarist can't see—because it is hidden in the plants or gravel—is just as detrimental to guppies as the filth the aquarist can see. Filters should be changed twice weekly. Each aquarium should be siphoned carefully once weekly and approximately 10 percent of the water replaced.

3. Except for breeding pairs, all the fish in a tank should be of the same size, age, and sex. The purpose in keeping virgin females separated from the males is obvious. Less obvious is the phenomenon ichthyologists call the "size hierarchy effect." In simple terms, this means that in a tank containing fish of mixed sizes the larger fish will usually impede the growth of the smaller fish?

If a breeder watches his fry closely, he will usually observe that all the fry are identical in size up to a certain age. Then he will spot one a little smaller than the rest; then—a few days later—a second; then a third, etc. To a large extent, this is the size hierarchy effect at work. To counteract the size hierarchy effect and raise a single spawning of guppies properly requires a minimum of four tanks—two for males, two for females.

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Although veil or delta-tail guppies are the most popular of the fancy types, some breeders work to achieve other types, such as these double-sword, or lyretail fish. Photo by M. F. Roberts.

The careful breeder watches his fry carefully, culls out the smaller ones and places them in the second tank. If he does no more than this, he will discover (when the fry reach 3 or 4 months of age) that the "small" fry in the "cull" tank are generally of a size and quality just about equal to those in the "select" tank. But, it is usually possible to offset the size hierarchy effect even more than this. By repeatedly shifting the biggest in the cull tank back to the select tank and the smallest in the select tank back to the cull tank, it is frequently possible to bring up a whole spawning to be virtually identical in size and quality! And . . . they will probably be as big as that one good fish you would have raised otherwise.

4. Guppies that reach full development at 3 or 4 months of age are the products of commercial breeders. Show guppy breeders really don't care how long it takes a fish to reach full development, just so long as they win prizes. The typical good show guppy requires approximately 9-12 months to reach full development. Some of the best lines take even longer. Since

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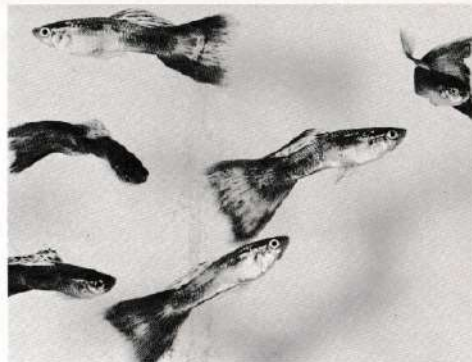
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The best veil-tail males will be those that grow quickly but whose tails begin to "fan out" late. These fish are 4 1/2 months old, and their tails are just beginning to fan. Photo by M. F. Roberts.

most of us have faulty memories, it's a good idea to mark the date of birth on guppy tanks. It's surprising how many novice breeders dump excellent 8-week-old guppy fry under the impression the fish must be 8 months old or more.

5. The fry of many outstanding show stock lines are likely to look completely hopeless until they reach a certain stage of development. An excellent line of reds may actually appear to be an excellent line of blues at 4 months, excellent red-blue multis at 5 months, and show little prospect of being good reds until they are 6 months or older. The many different possible caudal fin shapes (scalloped, round, pin-tailed, sword, etc.) that can appear

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These reds were raised by Paul Mohr, the foremost breeder of guppies in the world and the writer of GUPPY CORNER, which appears in this magazine every month. Photo by M. F. Roberts.

on 2- and 3-month old veiltail fry is almost unbelievable. Such things do not worry the experienced breeder. Time—and a strong pedigree on the breeders—will solve such problems. But many novice breeders give up in disgust and start over again with stock that may be—but frequently isn't—equal to what he has given up.

6. It counts for very little what comes up in the other breeders' tanks. What counts is what comes up in your own tanks. If a novice raises half-way decent fish with his own stock, he should stick with it and work at it—not go ranning all over looking for better fish. The other breeders' fish are bred to do well in the other breeders' tanks, not in the purchasers' tanks.

A good line, properly worked, steadily becomes a better and better line for its owner. A properly made outcross can be highly beneficial. But a completely new line may need 2 or 3 years to adjust to a changed environment. And remember, no matter how many species of fish you have spawned, no matter how many trophies you have won, you are still only a novice at guppy breeding until you can consistently produce prize-winning guppies.

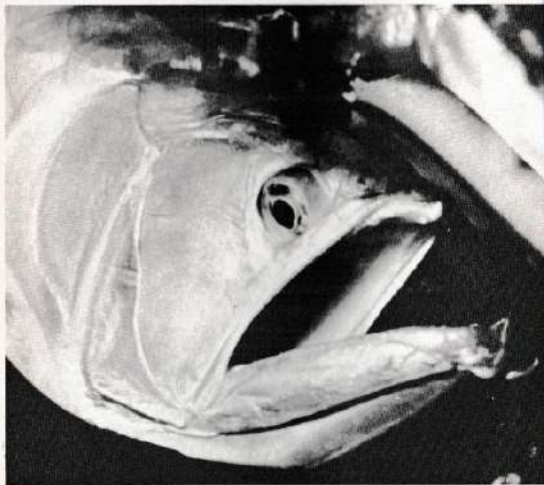
## The Hawaiian Rust Red Lyretail Molly

BY GLENN Y. TAKESHITA  
Honolulu, Hawaii

Finally, after many, many years of careful breeding and dreaming, a rust red sport has been raised in a normal brood of black lyretail mollies by Mr. Stanley Yamada in the Aiea Haina district on Oahu, Hawaii. This unusually colored male lyretail molly is about 4 months old and 1½ inches in body length at this writing. The rust red body color has intensified with age, and, at present, the fish shows great promise as a show specimen.

Mr. Yamada is eagerly trying to breed this male with some of its sisters that carry a few splashes of the rust red body color so that he may establish this new color strain. The reddish-brown body color of the male is distinctly different from the fawn or chocolate brown body of the chocolate sailfin mollies that were so popular a few years back. The red color of this male

A male rust red lyretail molly. Photo by Glenn Y. Takeshita.



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The Forkbeard (*Osteoglossum bicirrhosum*) is a river fish of South America. It has a long, slim body covered with large bone-like scales which are arranged in a mosaic pattern making a coat of armor. This fish is a hunter and a robber. It does not eat TetraMin. Its gigantic flap-mouth is equipped with rows of small teeth, and its prey—mostly fish—is gobbled in large draughts of water.



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molly is a very rich rust red-brown, very similar to the iron rich red soil so prevalent in rural districts on Oahu.

Mr. Yamada has also placed with his male "sport" a virgin female albino lyretail molly and also a virgin fawn colored brown molly in hopes that the rust red body color would be carried dominantly on the light clear body color of the progeny from these females. Since past data substantiates that both the light yellow body color of the albino and the light fawn brown body color of the brown molly are recessive genetic traits, the results from these matings should be very interesting and may very well be the "magic" combination to get the desired rust red color on its way to being fixed in a strain.

The lyretail molly has really come a long way from the initial black stock which was fixed 4 years ago by a meticulous and dedicated Chinese tropical fish breeder. Presently, several different color varieties have been developed such as the 1. marble, 2. peacock, 3. green, 4. smoke, 5. blue, 6. white, 7. sphenops/latipinna hybrid, 8. albino, and now the 9. rust red. Undoubtedly many more will be created in the years to come. The brown lyretail molly is still undeveloped, but it is just a matter of time before even this color variety will display the beautiful and aristocratic lyretail character.

In the past decade or so in Hawaii, it seems that the breeders have become quite artistic as well as scientific in their attempt to give the tropical fish hobby something new, beautiful, and unique. They have been quite successful in this respect, and today Hawaii is very rich with many exceptional and unique specimens just waiting to be carefully manipulated by gifted breeders into new strains that everyone in the hobby can enjoy.

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# MAIL CALL

By William Vorderwinkler

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.

**Ich**

Q. I need some advice, and the pet shop from which I bought our aquarium has closed. Would you please help me? Our fish have had what appears to be ich for the past 2 months. I have used several different medications to cure the disease, but it comes back after a few days. One black molly died, and now one of the kissing gouramis is infected. A friend advised that we discard all plants and wash the gravel and aquarium in a saline solution. However, my husband objects to throwing away all of our plants. Is this advisable? Also, should any other preventive measures be taken? As much as we enjoy our aquarium we are becoming thoroughly discouraged. Please help us.

Mrs. E. D. Rooker, Norlina, N.C.

A. Presuming that your diagnosis of "ich" is correct, let us work from that angle. Always remember this, Mrs. Rooker: a healthy, well kept fish seldom gets ich. It's

usually only when they have been abused by being cycled or kept in a dirty aquarium that trouble sets in. No, you don't need to throw out your plants. Ich in the free-swimming stage can live for no more than 3 days without latching onto a host in the form of a living fish. Put your

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fishes into a separate tank and medicate them as you did before, bringing the water up to 80° F. or more. Then after 3 days, when the fishes have no more white spots, the tank in which you had them will harbor no more ich spores, and the fishes can be put back once more. Then is the time to turn over a new leaf: keep the tank properly heated and clean, and avoid overfeeding and overcrowding.

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Q. I know that this is not a question, but perhaps does it belong in the MAIL CALL column. Far, if you publish it, I think that it will help many fellow hobbyists. I would like to take time to thank the many companies who advertise in your magazine. On occasion I have written for information on their products and have always received a letter that shows they have time to acknowledge me personally. Sometimes I have even received samples of fish food, remedies, feeding charts, catalogues, and other items that have benefited me greatly. I appreciate their service and hope all other hobbyists will realize that it is available and benefit as I have.

Wade Tate III, Bristol, Va.

A. It's refreshing to read a letter like yours; advertisers are much-abused as a rule by people who write trying to get "something for nothing." If they are successful in getting something, being

grateful for it is the furthest thing from their thoughts. But honest gratitude, as your letter shows, still is present here and there.

**No spawning**

Q. I have a pair of dwarf gouramis. The male has built his nest three times so far, but each time he lets it fall apart. Water temperature is kept at an even 78° F., and the pH of the water is 7.3. Why is there no spawning?

Johnathan Singer, Bronx, N.Y.

A. Your male is evidently interested enough to build a nest, but probably gets no cooperation from the female when he does, so he lets the nest go to pot when she

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**November, 1966**



Male dwarf gourami building nest

does not lay eggs into it. I recommend that you try separating the female for about a week and feed her well with the best available food. By this time she should be good and plump, and the male, who should be getting his share of the food as well, will also still be ready.

**Burst bellies**  
Q. I. I have read over and over again that it is not possible to over-feed aquarium fish. It is possible to "over-

feed the aquarium!" they say, however. When I fed fresh, adult brine shrimp to my 4-inch baby swordtails, their bellies got fuller and fuller until it looked as if they would burst. "Have no fear," I told myself, "all of my books say that it can't"

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happen." But it did; their bellies burst! Why?

2. How long does it take swordtails to grow? I have six, all about a quarter of an inch in length, all females, in a 10-gallon tank. They have plenty of food, plenty of heat, plenty of room, plenty of aeration and filtration. They've been the same size now for about a month.

**Paul Forel,**  
Redondo Beach, Calif.

**A. 1.** This is a very rare thing. When a fish finds that he has eaten too much, his normal reaction would be to throw up, frequently to eat again as soon as he does so. It could be that the adults brine shrimp packed so firmly into their little stomachs that they were unable to regurgitate it.

2. If, indeed, they have plenty of room as you say they have, growth should be normal. At a quarter of an inch in length, all receding youngsters look like females.

**Culling**

**Q.** I have 100 baby marble mollies and have read that in order to improve my stock I have to cull. The trouble is I can't tell the difference between the good females and the bad ones (they are all 1 and 2 months old). They are all growing, none are deformed, and they are colorful. Are there any points to look for in separating them?

**Cindy Zimmerman,**  
Cherry Hill, N.J.

**A.** You remind me of the farm hand who was told to sort a wagonload of apples by

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putting the excellent ones in one basket, the slightly defective ones into a second basket, the ones that were only so-so in another basket, and the really bad ones in still another. After a few hours he came back to the farmer and told him he was

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quitting. "Is the work too hard for you?" the farmer asked. "No," the farmhand told him. "It's them damned decisions. They're driving me crazy!" Most hobbyists cull fish by discarding all the ones that are under par and then keeping the rest. I suggest you go at it the other way: make up your mind as to how many fish you want, and then go to work on the

taskful of youngsters, picking out the best in color, body size, and finnage. When you have the amount you want, keep them and discard the rest.

**Leeches**

**Q.** I have had a 10-gallon setup in my room for several months. The other day I was cleaning it and found several leeches. I can't understand how they got there and wonder if you could tell me. I haven't brought them in on any plants from a creek or my dealer. Also, how can I get rid of them?

**Truman Eyer, Jr.,**  
Gettysburg, Pa.

**A.** You may have smuggled in those leeches along with some live food. Some-

leech.



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times they are so tiny that their presence is not even suspected for quite a while. When you see one, fish it out with a net and crush it against the floor. If you have many, you will have to take out the fishes, plants, snails, and other life. Then mix enough salt in the tank water to make a strong brine. This kills leeches pretty effectively. Discard the plants, sterilize the gravel with heat or salt, then set your tank up anew.

**Ulreys**

**Q.** I have just purchased a pair of ulreys. I have searched through the books I have available at home and am not able to find anything on them. The closest I have come is that they are possibly of the characin or killifish family. I am interested in breeding the pair, any information will be appreciated.

**Charles W. Boyce,**  
El Paso, Texas

**A.** Ooo-oooo! I wonder how many thousand fish species you covered saying that they were either characins or killifishes. First of all, let me say that they're characins. When they were first introduced to hobbyists, they were identified as Hemigrammus ulreysi. They were popularly known as "ulreys" or "tetra ulrey." Then someone came along and said that Hemigrammus ulreysi was a

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different fish, and that these were Hyphessobrycon heterothabidus. For many years hobbyists persisted in calling them "ulreys", and I see that some dealers still do. Breed them as you would any of the small characins like, for instance, glowlight tetras. Lots of luck!

**Water color**

**Q.** I am curious to know anything and everything I can about the color of aquarium water. I have read a few fleeting references about it and would appreciate it if you would answer these questions:

1. Does it matter to the fish what color the water is?
2. Why or why not?
3. Is it really important?

**Steven Whitaker,**  
Syosset, N.Y.

**A. 1.** Fishes are said to be color-blind, and



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stating the water in which they are kept should not make a great deal of difference.  
 2. On the other hand, fishes are somewhat sensitive to the intensity of the light in which they live. The ecology of a fish must be considered: if a fish comes from open waters where there is a great deal of sunlight, it is not at all apt to be as sensitive to bright light as one that comes from deep or very woody waters.  
 3. Fish are fish, and not Easter eggs. I feel that keeping them in colored water is not natural, and in an aquarium we are usually trying to show things as they really are. But, then again, tastes vary. Remember this too: fishes do not show true colors in tinted water, and only when we look at them in clear water do we see what they really look like. Taking a tankful of beautifully colored fishes and tinting their water is like taking the Mona Lisa and hanging a translucent curtain over it.

**Zebrae**  
 Q. In the books that I have read about zebra danios it is stated that when trying to spawn zebrae, put the pair into an aquarium partly filled with water and have marbles on the bottom to catch the eggs. I am trying to raise some zebrae in a 10-gallon tank and have some questions:

1. Do you put the pair into the tank any time and let the female become brooder with eggs right in the spawning tank? Or do you wait until the female is filled with eggs before you put them in the tank?
2. What pH should the water be for spawning zebrae?
3. Recently I purchased a pair of butterfly cichlids (*Apistogramma ramirezi*) and the owner of the store told me that these beautiful fish needed water with a pH of around 6.8 (slightly

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acid water). Yet he had kept them in water with the pH at about 7.4 for about a month. I took them home and put them in a 51-gallon aquarium, after which I fed them dried foods and white worms. After about 2 weeks, I found them floating at the top, dead. The pH of the water was about 7.3. Could the pH have killed them so quickly?

- Mike Reeve, Kitchener, Ont., Canada**
- A. 1. The female should be kept away from the male until she fills up with eggs. If you keep them together they are very likely to spawn before you want them to.
  2. Water chemistry is not very important, as long as the water is not too far from neutral. The water, however, should be clean.
  3. Trouble with a lot of dealers is that they want you to do as they say, but not as they do. Your fish would have done best at a slightly acid pH, but your

biggest error was giving them dried food. They should be fed a variety of live or frozen foods. What generally kills a fish whose pH is concerned is not so much the pH itself, but a too-rapid change from alkaline to acid water or vice versa. This is seldom mentioned but, nevertheless, very important.

- Lyretail swordtails**
- Q. 1. I asked my local pet dealer what would be the result of using natural rock in the aquarium, as I thought this would be very attractive. He said there would be too much "hydro" on such rocks and that this would be harmful to the fish. What does he mean by "hydro"? Hydrogen, hydrochloric acid, or what?
  2. Can it be eliminated? How?
  3. What would be the result of putting two female bettas which were ready to spawn with one male also ready to spawn?

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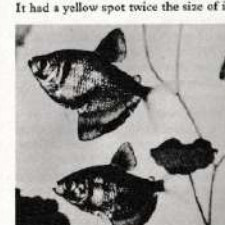
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4. A black tetra of mine died recently. It had a yellow spot twice the size of its



Black tetras.

eye behind the gill. What disease could this have been?

5. How big a tank is needed to spawn the dwarf gourami?

6. Recently I saw some lyretail swordtails. I noticed that the male had a very lengthy gonopodium. I gathered this was a side effect of having a lengthened tail extension. I have heard that the swordtail and the platy were members of the same genus. If a platy had a lengthened tail would it too have a long gonopodium?

**Mitch Gilbert, Clarks Grove, Minn.**

A. 1. I think your dealer figured that you would get your rocks from some creek or other and that there would be hydra on

them. There would be no danger of this on rocks from dry land, but you must also be careful that there is nothing soluble in them like lime which could change your water's chemistry, or any metals that could poison your water.

2. Granting that you have a rock which is non-soluble and non-metallic, merely scrub it off with fresh water.

3. Probably one female would be driven away and then the spawning would be accomplished with the other. I do not recommend this, because the one that is driven away may be badly beaten.

4. It probably was a spot of fungus, but these things have to be seen to be diagnosed properly.

5. It only takes a small tank for dwarf gouramis to spawn, but if you want to raise a sizeable amount of young, you must give them some room to grow.

6. It stands to reason that the male, if his other fins were lengthened abnormally, would also have a longer gonopodium. Yes, platies and swordtails are both members of the genus Xiphophorus. A platy with a high dorsal fin might also be expected to have a long gonopodium.

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them. There would be no danger of this on rocks from dry land, but you must also be careful that there is nothing soluble in them like lime which could change your water's chemistry, or any metals that could poison your water.

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10A. Total No. Copies Printed (Net Press Run)	84,578	85,600
B. Paid Circulation	43,207	42,726
1. Sales through dealers, agents, etc.	41,444	44,608
2. To firm subscribers by mail, carrier delivery or by other means	84,651	87,394
C. Free distribution	300	300
D. Total distribution	84,651	87,634
E. Office use	3,222	3,206
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By Paul Hahnel

**Tail-splitting**

**Q.** 1. What factors cause, and how can I correct tail-splitting in veiltail guppies? I segregate by sex, try to keep my tanks clean, use 1/4 of a teaspoonful of salt per gallon of water, and keep 30 fish in a 10-gallon tank.  
2. How many "good" guppies can be raised in a 10-gallon tank?  
3. Your ALL ABOUT GUPPIES is very good.

C. D. Johnson,  
Baton Rouge, La.

**A.** 1. I am getting many letters asking about split fins. The tail fin is the most delicate part of the guppy, and it easily attracts fungus or bacteria. Here are a few things which may be responsible for splitting fins:

- a. Lack of vitamins.
- b. High pH.

- c. Too much inbreeding.
- d. Lack of calcium and phosphorus.
- e. Inbreeding.
- f. Bad water conditions and food.
- g. Fish poor in health, through the above conditions.
- h. Filaments between rays in the tail weak.

Clear water in your tank does not always mean a healthy home for your fish. Of all the above-mentioned reasons for tail-splitting, bad water conditions are usually the offenders, and no adding of salt will help.

2. Do not overcrowd your tank; a larger

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aquarium will always be beneficial to your fish.

3. Thank you!

**5-gallon tanks**

**Q.** After waiting for 3 years, my mother has decided to allow me a small guppy breeding setup. I was allowed 50 dollars to buy all my supplies. With this money I have figured on getting:

- 1. Two 10-gallon tanks.
- 2. Six 5-gallon tanks.
- 3. All necessary equipment.

The only way to get decent results with such a small setup is ruthless culling, but still do you recommend any other changes? All advice is greatly appreciated.

Allan Miller, Harrisburg, Pa.

**A.** My experience has been that 5-gallon tanks pollute easily, and that is why I never use such a small size.

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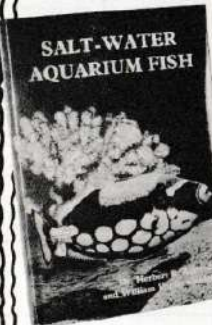
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*Salts From  
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By Alfred A. Schultz

**Caught in the net . . .** A new society has been formed in Great Britain. It is called "The Marine Study Aquatic Society of Great Britain", and was formed to cater solely to the marine specialist. A comprehensive monthly news journal will be issued, and supplies for keeping tropical and cold water marine species will be made available for its members. For more information, send all inquiries to: The Hon. Secretary, The Marine Study Aquatic Society, 2, Gatcombe Rd., London N19, England.

A letter from a marine fish importer in California informs me that they have been importing some of the rarest

marine fishes from such places as the Arabian Gulf, Australia, Ceylon, and Singapore. They claim to have good supplies of such fishes as *Balistapus* species and *Balistoides conspicillum*. I hope this means we'll be seeing more of these fishes around soon.

In response to a statement I made that clown loaches could not be converted to the marine aquarium, Mr. R. A. Risely of Singapore informs me that *Botia* are being caught in nets in the Musi River near Palembang in southern Sumatra, which is tidal. There could be some loach species which can live in brackish or even salt water.

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Q. I have just started my saltwater aquarium and have a few questions to ask:

1. What is the correct temperature for marine fishes?
2. Is there any way of breeding *Dascyllus melanurus*?
3. What can I use in my tank for decoration?

Robert Di Giorgio,  
Yonkers, N.Y.

- A. 1. 70 to 75 degrees.  
2. The *Dascyllus* species have been bred only a few times to my knowledge, but the fry have never been raised.  
3. Cleaned coral is the best decoration for your tank. Plastic plants with the lead weights removed can also be used.

Q. Can I use regular colored gravel in my marine tanks?

Paul Lau, Chicago, Ill.

A. I do not recommend the use of colored or plain gravel rather than sand in a saltwater aquarium. Regular gravel is too coarse and any uneaten food will fall between the grains and then decay.

Q. I have been keeping freshwater tropicals for 5 years. I have just become interested in saltwater tropicals. I have the book by Axelrod and Vanderwinkel, SALTWATER AQUARIUM FISH, but there are

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still some questions I would like answered:

1. How many fishes can I keep in a 2-gallon filtered and aerated drum bowl?
2. How many pennies can I put into a 2-gallon bowl to cure certain ailments?
3. I am planning on starting a larger tank; if everything turns out well, could you suggest a good fish to start with?

George Shuteck,  
Cleveland, Ohio

A. 1. A 2-gallon drum bowl is too small a container to keep most marine fishes in. However, I have kept dwarf sea horses in a drum bowl using a "Little Miracle" filter.

2. Copper pennies should not be used indiscriminately. Never use more than 3 pennies to a 20-gallon tank.

3. Cleanfishes are a good hardy group to start with; also beau gregories and sergeant majors.

## YOUR FISHES' HEALTH

BY MIKE REED

### Light

Ranking high among the most-often-asked questions in the tropical fish hobby is "How much light do I give my fishes?" Most authors in the field try to give some fairly exact figures on wattage and number of hours for various sizes of aquariums. The figures they come up with work out for many aquarists because the amount of light that any single aquarium can get before being thrown seriously out of balance actually falls within a fairly broad range rather than being an exact figure. Yet, some aquarists light their tanks strictly according to the books and run into a great deal of trouble. The reason for this is that no two tanks are exactly alike in their optimum light requirements, and some tanks differ drastically from one another in these requirements. Among the many factors which affect the amount of light a tank should have are number and types of plants used, species of fishes housed, and the temperature, pH, and hardness of the water.

The importance of light in the aquarium is that it allows the fishes to see, provides the energy that plants need for life, limits the multiplication of certain bacteria that tend to cloud the water, and allows you to see inside. Most tropical fishes require only a very small amount of light to see, far less than most plants need even for minimal growth. If a tank gets too much light, the result is usually an overabundance of algae. The algae begins to coat the glass, gravel, rocks, and plants. It can become not only unsightly, but downright dangerous. If it coats your plants sufficiently, for example, it blocks them from getting their full share of the light and they will soon die. In severe cases, the algae will become so profuse that it turns the water pea-soup green, choking and killing both your fishes and your plants. If a tank gets too small an amount of light, the plants will begin to turn yellow and die, the bacterial count of the aquarium water will often rise, and your fishes will become inactive and, finally, ill.

Before we go any further, let's straighten out what is meant by "amount" of light. Amount means both the total duration of the light and the total intensity of the light. If you tell me only that you leave the lights on for 12 hours a day, I know just part of the story. If you tell me only that you use two 25-watt bulbs, I also know just part of the story. But, if you tell me that you are using two 25-watt bulbs for 12 hours a day, I know the amount of light you are provid-

ing artificially. Thus, the amount of light your tank gets can be varied by regulating either its intensity or the duration or both.

When you first set up a new tank, begin by giving the amount of light that is most convenient for you. If you're lucky, this amount of light will be within the range that is acceptable for your aquarium: both plants and fishes will thrive. But if algae begins to show up in great quantities or your plants begin to die and your fishes are sluggish, it's time to change the amount of light.

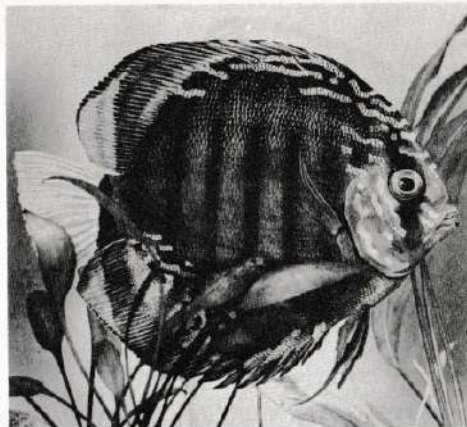
Now, there are two kinds of light to consider, natural and artificial. Natural light is the light of the sun, and artificial light is the light from electric light bulbs. The first reaction of most people is to give as much natural light as possible to their aquariums. They do this because they feel that natural light must be better than artificial light in some way. The fact is that your plants and fishes couldn't care less whether their light is natural or artificial. Either will do, but artificial light is far easier to regulate. (You need only vary the length of time your lights are on or the total wattage of your bulbs.) For this reason, many experienced aquarists always keep their tanks in the darker portions of the room, where the sun cannot stream in on them from a window.

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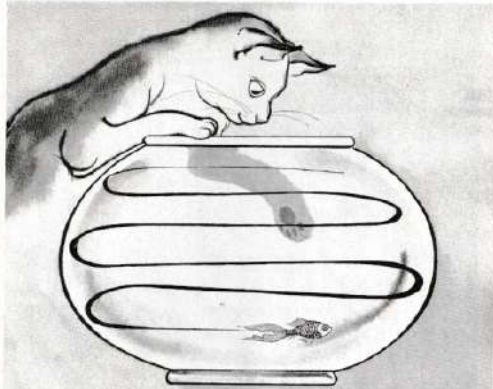
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The colors of most fishes show up extremely well under Gro-Lux fluorescent lighting. The colors of certain species benefit even more than the colors of others. Discus with good mask and body markings seem to just glow under such lighting. Photo by G. J. M. Timmerman.

Now for the question of whether you should use incandescent or fluorescent lighting. There is no doubt that either will do. However, fluorescent lighting offers several advantages. First of all, although a fluorescent reflector costs more to purchase than an incandescent one, it costs less to operate. In addition, the light from fluorescent tubes is more even than the light from incandescents. Also, fluorescent tubes throw off only a fraction of the heat that incandescent bulbs do. This is particularly important in warmer parts of the world during summer months when the elimination of even a small amount of heat that could be transferred to the water might mean the difference of losing some of your fishes or not losing them. Then too, a fluorescent reflector can accommodate the well-known Gro-Lux tubes. These special fluorescent tubes produce a quality in their light that gives extra stimulation of plant growth and intensifies the colors of many tropical fishes.





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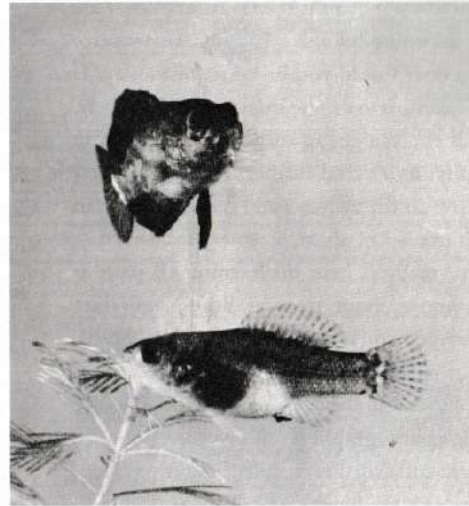
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A pair of dwarf sunfish, *Elassoma evergladei*. Note the female's sides bulging with eggs.

## *Elassoma evergladei*

BY RUDOLF ZURAL  
BRNO, CZECHOSLOVAKIA  
Photos by the author

This dwarf sunfish was first brought into Europe in 1925 from the United States, where its range covers the states of North Carolina, South Carolina, Georgia, and Florida. This range lies at an average elevation of 700 feet above sea level and in the north is bordered by mountain ranges. The weather here is damp and warm. In the winter the temperature does not generally drop below 55° F. Here the fish is found in swampy wooded areas,



Can you identify this fish? Do you know where it comes from? What are its spawning habits? How about this one? Could you breed it for money? If you can answer these questions definitively, or if you can get an authoritative answer in a jiffy, don't read further. But if you don't know all the answers and can't get them in a hurry — in short, if you are a hobbyist who really is bent on learning all there is to know about tropical fishes, aquarium management and, yes, commercial breeding, — buy this book. Its 892 pages alive with almost 600 illuminating color photographs by the world's foremost authorities makes it the best investment you, as a hobbyist, can make. Exotic Tropical Fishes is available at your pet shop in two editions: hardbound and looseleaf to accommodate supplements by the authors.

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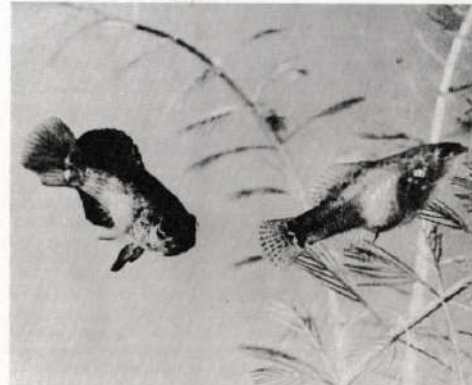
in densely overgrown clear ponds, and in ditches. It is most common in Florida, and has been found in grassy streams around Palm Beach and Miami, where the tiny sunfish are seen rushing among clumps of *Myriophyllum* and *Cabomba*.

*Elassoma evergladei* is one of the smallest of the bony fishes in existence, attaining a size of 1 to 1½ inches. An interesting point is that it grows larger in the aquarium than it does in nature. Its coloration is yellowish brown to blackish brown, which in males during breeding season becomes black with gleaming green dots on the sides of the body. The fins are edged with white. The female is heavier in the body, and her body color is light brown, her belly color pinkish. Her fins have no color.

The fish are best kept at 65° F. in a small tank by themselves. Because they are peaceful, a number of them can be kept together. The tank should be densely planted, if possible with *Myriophyllum*, and not heated, even in the winter. Use normal tap water that is well aerated and has been allowed to age. Fresh unaged water is not suitable. They accept only small, living foods.

The dwarf sunfish could be kept with small peaceful species, although the males stage harmless battles, but it is best to keep only one or more pairs

The male flirts, coaxes, herds, and bullies the female until she finally swims into the plants.







The first of the eggs that the pair have brushed off onto the plants are visible as the plant frond between them.

together because it is a true "lone wolf" which likes to remain hidden. This fish is particularly sensitive to temperature changes in either direction, so they should be avoided.

For breeding, a temperature of 68 to 76 F. is recommended, depending on whether they were kept at lower or higher than the recommended 65 F. previously. Raise the temperature 2 to 4 F. from the temperature at which they have been kept. The best months for spawning are from February through April, but I have bred them successfully in other months.

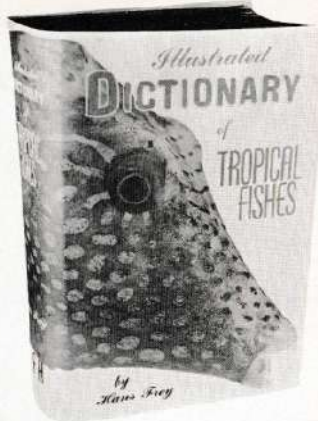
One August, I put a male in a 2-gallon aquarium which was heated to 72 F. After 3 days I put two females in with him. When the male caught sight of the females, he immediately spread his fins, hesitated a moment, and moved his ventral fins back and forth. One of the females remained anxiously on the bottom, and the male danced before her in a most impressive, almost vertical pose. With widespread fins, he met the now swimming



Above, the male in his everyday colors. Below, the male in his spawning colors as he flirts with the relatively drab female.



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female and again posed before her. And then the chase after the female began.

Whenever the female came near the male, he struck a pose and tried to lure her among the plants. After some chasing the male repeatedly tried to butt the female in the belly. At last she showed herself to be willing and swam into the plant thicket, to be followed at once by the male.

While in the thicket, the female searched for a proper place to deposit her eggs. Then the fish snuggled together and the eggs were brushed off on the plants, there to be fertilized immediately by the male. Each egg hangs by a tiny thread. The eggs are not eaten by the parents. The way the eggs hang from the plants is reminiscent of decorated Christmas trees.

Several females can be served by a single male at each spawning. Once I counted more than 100 eggs from two females and one male. The eggs are tiny, clear, and slightly yellowish in color. The fry hatch out in about 60 hours. Once they have become freeswimming, they must be provided with the tiniest of living foods. They mature in 4 months.

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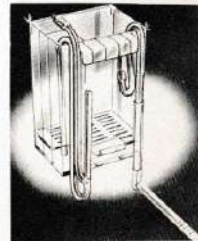
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