

May, 1969

# tropical fish hobbyist

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Freshwater Crabs



# tropical fish hobbyist

Vol. XVII, May, 1969 (#159, No. 9)

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## COVER

Suppose you had these very colorful and very interesting little crabs, see, and suppose further that they happened to be able to live in fresh water . . . you'd really have something, wouldn't you? Well, far East exporter Peter Tsang thought the same thing when he came across what he believes to be a mutation of a plain mud-brown Australian river crab. Read about Peter's discovery and how they fared in his tanks in the article beginning on page 92. Cover photo of freshwater crabs (scientific name unknown at present) by Peter Tsang.

## EXOTIC TROPICAL FISHES SUPPLEMENTS

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May, 1969

## editorial

Do you feel like an expert today? If you do, answer this question: what is a tropical fish hobbyist?

Go ahead, give it some thought and put some words together to express your idea of exactly what it is that makes a tropical fish hobbyist. Make your definition long or short, but make it specific. Put in all the things you mean when you describe someone as a tropical fish hobbyist. When you've satisfied yourself that you have a valid definition, write it down and read it or show it to persons whose opinion you respect in matters aquaristic. I'm willing to bet that nine out of ten hobbyists who get a chance to inspect your definition won't agree with it completely. They'll want to change it quite a bit by adding something here, subtracting something there. But if it happens that your definition goes agreed upon and unchallenged by just about everybody you discuss it with, do me a favor: send it to us. We'd like to publish it and get the ideas of other readers throughout the world, to see whether they agree with you. Then maybe after we've arrived at a workable definition of what a tropical fish hobbyist is we can go on to the next step and try to find something else out: how many of us are there?

*Neal Pronek*

Tropical Fish Hobbyist



Two males of *Copeina guttata*.

Dr. Herbert R. Axelrod.

## *Copeina guttata*

BY RUDOLF ZUKAL  
BRNO, CZECHOSLOVAKIA

Since 1912 the Red-Spotted Copeina has regrettably become a very rare occupant of our aquaria. Its body is shaped like that of a trout, comparatively strong, and it reaches a size of approximately 4 inches. One finds reports of larger sizes in the literature, but I, personally, have never seen any. The scales are comparatively large and each one has a red spot. The upper part of the iris of the eye is red. The dorsal fin has a tear-shaped spot; otherwise, the fin is transparent, of a yellowish white color.

May, 1969



The female *Copeina guttata* (above) is easily differentiated from the male through her possession of a more distinct black marking in the dorsal fin and the absence of the red spots along her sides. Photos by R. Zukal.







This is a wild-caught pair of *Copeina guttata*, male above.  
Photo by Harold Schultz.

The sexual distinction in the mature fish is most easily recognized by the spot on the dorsal fin, which is hardly noticeable in the male. The male has vertical, pointed fins of a reddish color. The spot on the dorsal fin vanishes with progressive age. The fins of the females are colorless.

The breed and their breeding behavior is similar to that of the genus *Pyrrhulina*. The fish are peace-loving, but unfortunately rather shy, and like to jump out of the tank. One can keep them with any other fish, even smaller tetras. They eat all kinds of food, and even enjoy vegetation for necessary variety. I keep them in an 100 liter tank together with all paired breeders. Previously, I had kept them in a still larger, profusely planted tank, but because of their shyness, I hardly even saw them. In the present tank, the vegetation is sparse because of the frequent catching of the fish. The fish lost their shyness somewhat, but compared to the other fishes, they dart immediately to the back wall as soon as I arrive. The temperature is 22°C. and regular tap water is used. Here in Brno, water on the average has approximately 10-14 D.H. The pH fluctuates between 6.8 and 7.2.

6

Before I describe the spawning, I want to point out one more bit of experience. From the literature, I knew that changes in the weather, more precisely in barometric pressure, exert a great influence on the behavior of fish. With increasing pressure—good weather—most species of fish spawn readily. Even in community tanks one always encounters a greater liveliness of all inhabitants. This observation I have confirmed in many experiments. And there is still one more point I would like to discuss: shortly before or during spawning, the fish are not easily disturbed; it is even possible in some species to transfer a spawning pair into another tank, who will then continue to spawn after a short pause. This statement applies especially to tetras and barbs.

The behavior of *Copeina guttata* (Steindachner) is similar. One morning, while feeding the fish, I noticed the male had a bright red anal fin, and the female was moving around in circles. All signs pointed to pre-mating behavior. I had no other tank readily available other than a small glass aquarium of a capacity of approximately 2½ gallons. I knew that this tank was much too small, but I had no other alternative as long as I wanted to record this spawning photographically. I washed the sand, filled the tank with water out of a community tank, and then added approximately ¼ of a

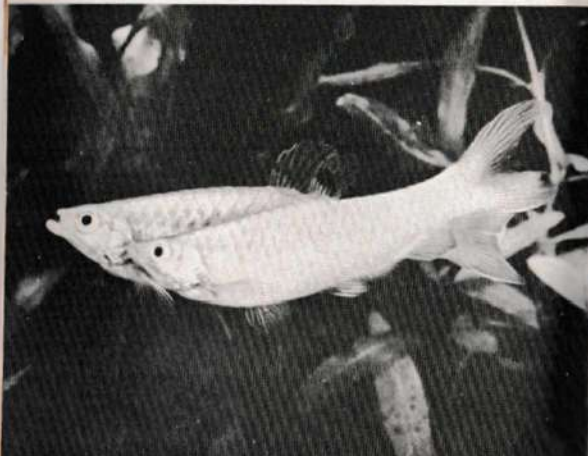
The male, fins spread, approaches the female in mid-water preparatory to driving her to the bottom of the tank to spawn. Photo by R. Zukal.



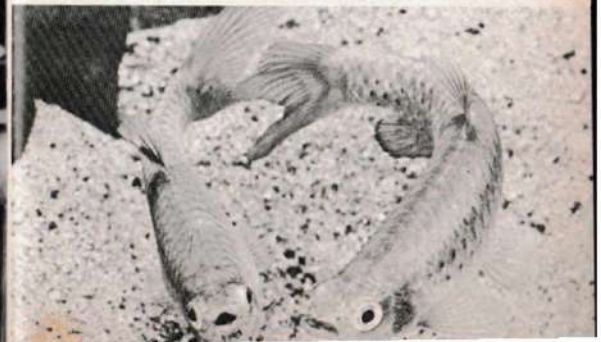
gallon of warm tap water. I kept the temperature in the spawning tank at 27°C. I placed a few of the usual plants along the background, and stuck into the sand of the foreground a large leaf of an amazon swordplant, *Echinodorus pumilatus*. The fish then could choose whichever they preferred. After transferring the pair to the spawning tank, nothing happened for about an hour. It was about 8 a.m., and I put some floating plants on the surface of the water, to reduce the top light. Almost immediately, the spectacle began. The fins of the male, which had turned paler in the meantime, now turned slowly more reddish in coloration and the mating started.

The mating lasts for about 2-4 hours. Depending on the size of the fish, about 500 eggs or more are deposited. The female has to be removed after spawning. The male takes over the guarding of the brood. After 36 hours the young hatch. Thereafter, the male should be removed. In another three days, the fry swim freely around. They are very sensitive to fluctuations in temperature. They require very fine live food.

Male and female tremble side-by-side in upper reaches of the tank.



The female then follows the male to the bottom (photo above), where a depression to hold the eggs is made in the gravel (below).







The entire spawning process, including the pre-spawning chases shown on the preceding pages, took about three hours, during which time close to 500 eggs were laid. The male assumes care of the eggs, fanning them with his fins much in the same manner as the cichlids; the female must be removed as soon as spawning has been completed. The eggs hatch in about 36 hours at a temperature of 80 degrees; the father should be removed as soon as the eggs hatch. Although the fry are comparatively large, they require small live foods and are very sensitive to fluctuations in the temperature of their water.



## BettaPhile

Frederick J. Kerr

### INTERNATIONAL BETTA CONGRESS

The International Betta Congress will hold its third annual Convention and Betta Exhibition at Stouffer's Northland Inn, Detroit, Michigan on June 27, 28 and 29th. In addition to the exhibition, which will be judged by three knowledgeable judges, the Convention will feature workshops on photographing, breeding, and feeding bettas, a banquet with a speaker whose name has not been announced, and a betta auction.

BettaPhiles interested in obtaining more information about the Exhibition and Convention should contact show chairman Bob Paulik, 30363 Indigo, Roseville,

Michigan 48066. Individuals interested in exhibiting their bettas, but who cannot attend the Convention, are encouraged to ship their entries. The show chairman should be contacted for details.

Dues for the I. B. C. are \$5.00 per year and include a subscription to the Congress' bi-monthly publication Flare! Dues are payable to Sharen Chappel, 2373 - 7th Avenue, North St. Paul, Minnesota 55109.

### Basements and Bettas

**Q.** I keep eight tanks in a very dark basement. Would a large overhead light bulb provide enough light to keep my fish happy and healthy?

**2.** What is a safe method for moving baby bettas from a small breeding tank to a larger aquarium?

**R. S. Deuar,  
Sudbury, Ontario, Canada**

**A. 1.** Strong light is not necessary for the health of most fishes. As long as they can see to feed, they can be kept in a healthy state.

**2.** Fry can be moved at a very young age in a fine meshed net. Another way is to capture the fry in a jar and transfer both fry and water to the new aquarium. If the breeding tank is small enough and the new aquarium large enough, it may be possible to actually put the smaller aquarium in the larger and allow the fry to swim out.

### Swelling

**Q.** My male betta suddenly developed a swelling where the ventral fins insert into the body. My dealer suggested a sulfa tonic, but this failed. The betta does not appear sluggish, nor does he



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...for me, I would appreciate any help.

**Mark Mason**  
 Cranston, Rhode Island  
 A. This could be a matter of an internal organ. If it is a tumor there is nothing to be done. If it is an abscess, a strong antibiotic might help.

**Fighting Female**  
 Q. I have a female beta plump with

eggs, but when I place a mirror in front of her, she acts just like my male. Could you tell me why she does this?

**Ramon Yi, Miami, Florida**  
 A. All female bettas when isolated from members of their own species become pugnacious and will fight just like males until they get the tar bait out of them either by another female or a male. Don't let anyone tell you that female bettas don't fight. They most certainly do.



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fishes (genus *Synodontis*) are also very easy to understand, as are the treatments given to both the naked and armored catfishes.

It may be presumed that the comprehensive and detailed information provided about the most popular species of catfishes, the *Corydoras* species, will be appreciated by all aquarists. The profusion of illustrations in this section includes over forty in full color, together with a similar number in black and white, and they all collectively depict a wealth of visual information relative to color patterns and size differences of the

variant species within this large genus of catfishes. The special series of black and white spawning photographs are of particular significance to aquarists who have the urge to attempt to breed the more easily acquired *Corydoras*.

Many aquarists will be pleasantly surprised to know that there are so many varieties of *Corydoras*, some of which require very careful visual scrutiny to distinguish one species from another because of the similarity of their markings. This very revealing book about catfishes should adorn the bookshelf of every aquarist for ready reference.

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## Lawrence the Whelk

BY DORIS WHITNEY



Lawrence the Whelk, also known as *Kelletia kelletii*. Photo by the author.

While visiting friends in Malibu, California, over the Fourth of July, I collected several shells I had not seen before. Two especially interesting, the former being the diet of the latter, were *Pholadidea penita*, the common pidcock, a very

swimming and oddly sculptured shell, and *Kelletia kelletii*, Kellet's whelk. My host told me that a nearby restaurant kept a tank of full-grown Kellet's whelks (about six inches long; mine was just over an inch) along with crabs, small sharks and other marine creatures for the menu and the amusement of the customers. The whelk had a handsome shell, but I couldn't work up any enthusiasm over eating one.

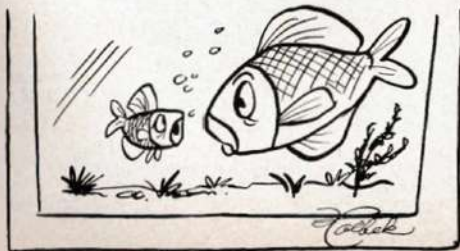
From Malibu I went down to San Diego and first shelled Mission Beach all the way up to Palisades Park, and at La Jolla from Scripps Oceanographic Institution down to the Cove. The next day I took the ferry across to Coronado and went down to Silver Strand Beach. After a frustrating couple of hours trying to look through the dancing surf, I gave up in that location. However I did go across to the Bay side and find a perfectly beautiful *Bulla gouldiana*, which I carefully wrapped in paper because it is one of the most fragile of all shells.

Going on to Imperial Beach I ran into an old friend, Laurindo, who told me that the best and largest selection of shells was around Needle Point, next to the Mexican border.

We bought hamburgers and, after driving to the end of the road, walked along the sand. Almost immediately I had both hands full of shells and had to pick up a plastic bag from the sand because my straw basket had been left in the car. This was much better than I had expected. The beautiful *Sanguinolaria mutallii*, which evidently has no common name, deep purple inside, with shiny light brown periostracum, was new to me, as was the equally shiny Pismo clam with its lovely porcelain-like interior. I found a much larger *Crepidula formicata* than I had ever seen in the Caribbean (where it is also found) and a *Pododemus macrochisma* (pearly monia), of the most fantastic shade of iridescent green.

Down at the estuary we started

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to wade across. There were several people on the other side, but we never could find the high sandbar. The water would come up to our knees and then suddenly drop off. We tried several different routes, but the current was quite strong and we finally had to give up. I was disappointed: the more remote the location, the better the chance of finding interesting undiscovered shells.

On the way back I found the star attraction of my expedition, a live Kelle's whelk. It was about three inches long and slightly faded, so I really didn't pay much attention to it.

Home in San Francisco I began to think how I had seen the whelks in the restaurant. I telephoned a rather inquisitive friend who was fond of experimenting and asked if he would like to taste a Kelle's whelk. To my surprise he declined the pleasure, but added that he would like to see it.

That was the first time it occurred to me to keep the whelk alive. It had just been tossed into a bag and packed away in my suit case, loaded into the baggage compartment of the plane and carried home. It had been out of the water about six hours, but the hardy little mollusc didn't appear to show any ill effects. Left alone on the kitchen table, it came out of its shell and began to crawl along.

First thing in the morning I ran down to Aquatic Park, filled a jar with sea water and brought it home.

I put the whelk in a glass bowl with the water and a rock. The rock didn't interest it much; it seemed to prefer clinging to the side of the bowl.

The next problem was what to feed my whelk. At first I brought it an assortment of limpets off some rocks in the Marina. Then I called the Steinhart Aquarium and asked their advice on care and feeding of whelks. They suggested it might like clams. I went to my neighborhood seafood shop and asked for one clam. They were puzzled, and not exactly sympathetic when I told them it was to be whelk food.

Installed in the bowl, the clam came right to life. Several days later I noticed that two of the limpet shells were cleaned out, the clam

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was dead and the whelk was still alive. My conclusion was that the whelk had eaten the limpets, but I never learned why the clam died.

From a book in the library I learned that whelks feed on piddock. Having just found one of those in Malibu, I knew what to look for. Out at Fort Point, under the Golden Gate Bridge, there is quite a rocky shoreline next to the seawall and, as expected, piddock had bored into many of the rocks. But evidently other animals, perhaps crabs, also are piddock eaters; all the shells were empty. I scraped another miscellaneous group of limpets off the rocks and also picked up a black tegula. The latter animal is quite pretty, having a black and white head and six delicate feelers. It was very much at home in the bowl, busily investigating everything.

A few days later whelk and tegula were locked in an embrace that could only be a death grip, but whose? As it happened, the whelk polished off the tegula, leaving the shell fairly clean.

Every three weeks or so one tegula was consumed in a sort of all day feast. The more I observed the various habits of my whelk the more attached to it I became. People would greet me with, "How's Lawrence?"; which was the name I had given it. I kept a page in my shell notebook recording the times and items it ate. When the weather turned warm I put it in the refrigerator, as suggested by the people at the aquarium. But one hot spell may have been too much for it. It died quietly last week, but not without leaving its impact.

In the bowl with *Kellettia kellettii* are a hermit crab, *Pagurus samuelis* (in the shell of *Cantharus macrospiral*) and a black murex, *Muricanthus nigritus*. Photo by the author.



BY WILFRED L. WHITERN, F.Z.S.

This is the initial column in a new series intended to be of special help to beginners in the hobby as well as of interest to more advanced fanciers. Mr. Whitern is an author, illustrator and lecturer of note whose work with aquarium societies has earned high praise from international authorities.

Most new aquarium hobbyists get interested in keeping tropic fish because they've seen an attractive tank setup in the home of a friend or at a pet shop. They see the colorful fishes weaving their brilliant way around the tank and decide that they'd like to have a tank or tanks of their own. The beauty of the plants in a good-looking aquarium serves as an additional stimulus, because most of us harbor at least a little bit of the horticulturist. Of course, there

also are other reasons why people get interested in aquariums. For some, it's not the colors or beauty of the fishes that is the main attraction . . . they just like things that live in water. Others get bitten by the aquarium bug because they're shopping around for a hobby, something to occupy their leisure hours. Whatever the reasons for a person's getting involved with tropic fish, most neophyte aquarists have one trait in common: enthusiasm. They're excited about something new to them, and they want to enjoy it to the fullest.

Unfortunately, the first flush of enthusiasm often pales into indifference as the new hobbyist starts to meet trouble head-on in the form of dead fishes, wilted plants, dirty tanks and the many other forms aquarium troubles can take. The lively, colorful tank he had hoped for becomes a source of annoyance and disappointment in-

stead of enjoyment and productive relaxation as things begin to go bad, so he chucks the whole thing, maybe passing his equipment along to someone else who is likely to repeat the excitement-frustration experience. It's my belief that most people who begin as budding aquarists but later quit keeping tropic fish in disgust all make the same mistake: they don't ever bother to learn the ground rules of the game, the basics of sound aquarium management. They don't start smart.

This column will be about the basics of sound aquarium management. Topics won't necessarily be treated in the order of their importance as they affect success or failure, but they will all be concerned with telling beginners about the pitfalls to avoid and some of the helpful things to do. Following is a once-over-lightly discussion of some of the more obvious aquarium troublemakers; the topics covered here

form far from a complete list, but they're a good beginning.

#### Don't crowd the tank

One inch of fish to each gallon of water is a good rule for beginners, even if it is unrealistic for experienced hobbyists. Use it as a guide (and don't count the tail in figuring the length of the fish).

#### Don't overfeed

Uneaten foods cause the water to get foul, and foul water kills fishes. Make sure that everything you feed the fishes gets eaten within 10 minutes or so.

#### Don't turn on tank lights suddenly

The sudden appearance of bright light in a previously dark tank in which the fishes have been comparatively inactive causes them to dash wildly about the aquarium, possibly injuring themselves by hitting against the sides of the tank or rocks or other objects in the tank. Always try to turn on a small

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The Smithsonian Institution and T.F.H. Publications, Inc. are pleased to announce the publication of a reprint, including the color plates, of the Philippine Bureau of Science's three Monographs on Philippine fishes: No. 1, Jordan and Richardson's Checklist, 1909; No. 23, A. W. Henle's Gobies, 1927; and No. 24, Montalban's Pama-centridae, 1927. These rare historical works are available in a clothbound volume for \$5.50.

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room light and have it on for at least five minutes before turning on the tank lights proper.

**Don't tap on the aquarium**

Tapping on the aquarium many times causes the same results as suddenly turning on the lights; smaller fishes seem especially susceptible to disturbance by tapping. **Don't put the aquarium where it will receive direct sunlight**

There are two distinct problems caused by putting a tank where it will receive a good deal of direct sunlight. First of all, the sunlight will cause the proliferation of algae. The algae are bad not so

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much because they turn the water green but more because they present a very real danger to the fishes should they die. If they die all at once they'll foul the water horribly. Secondly, placing the tank in sunlight usually will have the effect of making the temperature of the tank fluctuate more rapidly than it should, and fairly abrupt temperature changes are bad news for tropicals.

**Don't put unwashed gravel into the tank**

The bad results caused by using unwashed gravel affect appearances more than they affect the health of the tank's inmates, but they don't do the fishes any good, either.

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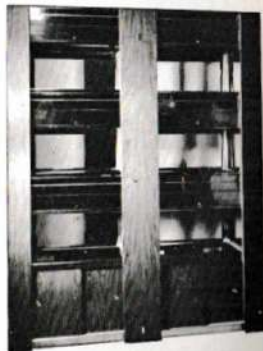
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All right, it's not from Lake Nyasa (Malawi, if you prefer), but at least this interesting cichlid comes from Africa . . . so maybe it's stylish after all.



**Nannochromis nudiceps**

BY H. J. RICHTER

In addition to the beautiful species that make up the genus *Pelmatochromis*, Africa supplies us with still another group of dwarf cichlids: the different species of *Nannochromis*. As far as recent knowledge goes, this genus includes *Nannochromis nudiceps*, *Nannochromis dimidiatus*, and *Nannochromis squameiceps*. All three species come from the area of the lower Congo, including the so-called "Stanley

Pool," a lake-like enlargement of the lower Congo River.

The three known species of *Nannochromis* diverge a little in body shape from most fish species that come from similar habitats. It is a characteristic feature of the genus that they show an upward curve of the body; this is especially pronounced on older specimens.

Adult male *N. nudiceps* are about 2 1/2 inches long, while the females



A female *Nannochromis nudiceps* showing partially extended ovipositor. Photo by Wolfgang Bechtle.

nearly black tips of the fin rays. The upper half of the tail fin is banded in black and white, while the lower half shows a dot design.

As far as water is concerned, *N. nudiceps* is not very demanding. You may keep it in hard water as well as in soft water, but, of course, if kept in water that is soft it will show prettier colors. Water filtered through peat moss suits the fish especially well. If you want to keep *N. nudiceps* in a community tank, do so, but in this case do not forget to provide for shelter in the form of rock structures, coconut shells or inverted flower pots. The fish like to retire into such hiding places, especially right after having been put into the tank. Fundamentally, *N. nudiceps* is quite shy, but this shyness recedes a little if one refrains from changing the set-up of the tank all the time. It is best at first to introduce only one pair in the tank. After the fish have taken possession of a cave, this range is defended against any trespasser, and they seldom leave it. *N. nudiceps* will also spawn, if kept in large tanks stocked with relatively few fishes. Under favorable circumstances you will one day see the parents leave their cave followed by a swarm of small fry. In a community tank, though, the number of young will tend to decrease, despite the attentive and intensive defense put up by the parents. After a few days the young will range so far that the parent fish will no more be able to keep an eye on them. It is then that the fry generally are victimized

generally grow 1/2 inches less than the males. The basic color of the elongated body is greenish-yellow. On the sides of the body and head one finds gorgeously shiny light-blue spots, while the belly of the fish glitters emerald green. Further to this we observe a delicately pink coloration above the anal fin, especially during the mating period. The dorsal fin has a white seam, which is closed off upwards by the



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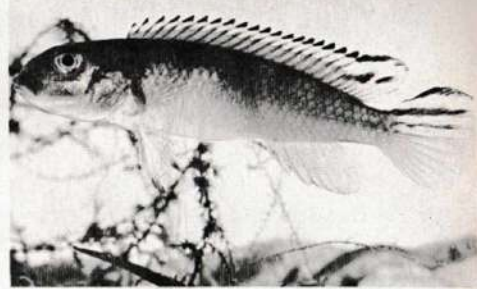
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Male *Nannochromis nudiceps*. Photo by Milan Chvojka.

by the other inhabitants of the tank. If your tank is densely planted, and you are rather fortunate, a few of the baby fish will survive and grow up. Where is the aquarist, though, who will content himself with only a few young?

If you want to raise many young from each spawning, you have to set up a special breeding tank. I use a tank measuring 28 x 12 x 10 inches for this. The bottom covering consists of a 1½-inch layer of gravel with a granulation of about ¼ inch, which, by the way, is the kind of bottom cover one should use for breeding all dwarf cichlids, since it fits well into their mouths when digging and rooting. Furthermore after hatching this kind of bottom prevents the helpless fry from slipping into the interstices of the gravel.

Something that is a "must" is a cave, which in my special case was represented by an overturned flower pot. This has a hole in the upper part serving as an entrance for the fish. Besides this I usually also place a few coconut shells and a driftwood root in the tank. These things offer protection to my pets during those eventual fights which, after all, will happen in any family. A couple of pieces of petrified wood and some branches of blackroot fern complete the decoration of the tank. As to technical accessories, a fine-grained air stone, set to deliver a minimum of air, is placed inside the container.

In my breeding tanks I use a mixture of tap water with a hardness of about 18° dH and rain water with about 4° dH, at a rate of 1:1. To this I add peat extract until the



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Here the male has entered the flower pot and is removing gravel from inside the pot, piling it up below the entrance hole. Both male and female stay inside the pot for a while, but the male is chased out after the eggs have been laid. Photo by the author.

water shows a light brown color, and, in order to lower the pH value to about 6, a bit of Zoropin (a liquid plant-growth-increaser with an acid pH value, supplied by the firm of Fritz Rose, Weimar, Germany). The tank is kept under constant strong aeration during one or two days, and then the pair of breeders is released in it. The temperature should measure about 76° F. At first you will see very little of your fish, for they retire to the nearest hiding place as soon as they can, and treat themselves to a nerve-rest-cure. This they do each for himself (or herself) in separate corners of

the tank. You will see the fish only the next day providing that you have not made them restive by your own excessive proximity. Then they will inspect the tank. During this inspection trip especially the male will approach the overturned flower pot repeatedly and look inside. After this the male generally takes up permanent residence there. He then stands in the opening, having a look-see at the neighborhood. If he sees the female passing by, he generally leaves the cave in a hurry and courts her with tremblings of the body until she corresponds by also starting to tremble and swims





After the fry have become free-swimming and regularly leave the flower pot with the female, the male is allowed to rejoin the family group, and he actively helps in

herding the youngsters about the tank. Here the male shepherds one flock while the female gathers stragglers from inside the overturned pot. Photo by the author.

through the tank together with him. Then they both take up their abode in the flower pot, which they leave only rarely.

The female now grows visibly rounder in the belly region, and one notices that the fish are ready to spawn very soon. Besides this, they make comprehensive preparations which extend over several days. The first thing done is to remove all pebbles from the flower pot. For this a mouthful of pebbles is taken up, carried to the entrance and spit out there. Thus a cone-shaped mound of gravel is built up in front of the opening, reaching nearly up to the admittance hole.

Both mates partake of this toil. In my tank I was able to observe two things, namely: that the fish preferred the flower pot as abode over all other caves, and that they cleared out nearly all pebbles. Consequently I was always able to set up the breeding tank in a manner which would permit me to watch the fish during their preparations for spawning. The only thing I had to do was to place the pot with its opening turned towards the viewing pane. This also made it possible for me to photograph the fish very well while they were busy cleaning out their home.

Shortly before spawning the

44

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### Tropical Fish Hobbyist

May, 1969



In setting up breeding tanks for cave-spawners like *Nannochromis*, the author always provides a choice of places for the fish to use as refuges prior to spawning and as the site for depositing the eggs. The tank used for *N. nudiiceps* contained both flower pot and halved coconut shell, even though only the flower pot was used for the actual spawning. Kept in tanks that contain gravel and rocks but no cave-like structure, this species will soon make a cave of its own by burrowing under the rocks. Photo by the author.

46



The free-swimming fry greatly resemble *Pelmatochromis kribensis* of the same age and are always on the lookout for food. Photo by the author.





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female becomes completely round in the belly region, and one clearly recognizes the extruded ovipositor. The male, too, shows his genital papilla, but this is narrower and shorter than the female's tube.

Now the fish start courting more frequently and cleaning the inner side of the flower pot or, to be more exact, the roof of same. It is here that, after intense chasing, the eggs are deposited by the female and fecundated by the male. The yellowish-white eggs then hang from the roof by means of threads and are actively cleaned and fanned by the female. After the act of spawning is finished, the male has no more business in the cave, and has to linger around outside the pot. Now and then the female permits

him a quick glance through the admittance hole, but as a rule he is chased away.

In most cases it will take the female eight to ten days to come out of the flower pot followed by a swarm of young fry. The number of young of my pair increased from about 80 at the first spawning to about 140 on later occasions. After the female has taken the brood "for a walk" for the first time, the male becomes spruce again and keeps repeatedly edging into the swarm. At first the female does not view his intrusion favorably, but she is simply unable to get rid of him, in spite of chasing him away as many times as she can. Since the female seems to understand that this cannot be helped, soon both parents are lead-

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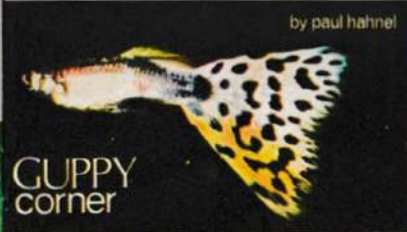
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Q. I have seven tanks at home, all containing beautiful guppies. Up until recently all my fish were thriving, but now they are dying off in alarmingly large numbers. They look as though their internal organs are ready to come out. I

have spoken and/or written to a number of people regarding my problem, but no one seems to be able to offer any helpful suggestions. A friend of mine has the same problem with his fish. I have tried using salt, but the fish don't seem to respond to it. Do you have any suggestions?

Robert Lewis  
Bloomington, Indiana

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2. Is there a special lighting for entries at a guppy show? If so, what type is used?

Ralph A. Donatelli  
Waldwick, New Jersey

A. 1. Spear-tailed guppies are bred in Europe and are especially popular in England. They have their own judging standard. Yes, they are a breed and definitely worth raising.

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Q. 1. Must I feed only live food to the fishes I am going to keep in my tank?

2. Do you advise including live plants in the marine aquarium?

William Frank  
New York, N. Y.

A. 1. Live food should make up the bulk of the marine diet. One can occasionally give some small quantities of prepared foods, but again live foods are most preferred by the fishes.

2. Most marine hobbyists do not include live plants in their tanks. They are difficult to keep and once they die they can foul the water very quickly.

Q. 1. Can a small California octopus live peacefully in a community marine aquarium?

2. How many fish can be safely kept in a ten-gallon marine aquarium?

Tommy Paxton  
Gardena, California

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May, 1969

A. 1. Any octopus is better off in a tank by itself. When you keep an octopus in a community tank there is always the risk that it will release a cloud of ink and thereby foul the water for the rest of the inhabitants.

2. You can keep four 2-inch fishes in a ten-gallon tank. You should remember, though, that with proper equipment and the maintenance of optimum aquarium conditions you can keep more fishes than the number given above.

Q. How big do dwarf sea horses become, and is baby brine shrimp the only thing they will eat?

Cindy Alder,  
Santa Clara, California

A. Dwarf Sea Horses attain a size of about a little over an inch. For the average hobbyist, newly hatched baby brine shrimp is the only food that I would suggest.

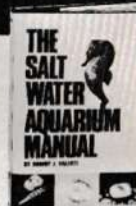
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*gonopodium works with one ventral fin to form a tube through which the sperm packets are transferred. Obviously when the gonopodium overlaps the ventrals, the fish becomes sterile. The crumpled and does not help either. The cause is the same gene that caused the lyretail characteristic. These males are probably fertile only when young.*

**Honey Gouramis**

**Q.** I have six honey gouramis. I think that I have a pair of them.

1. When in the process of conditioning them, what sort of food would you suggest?

2. How large an aquarium should I use to breed them in?

3. What should I feed the newly hatched fish?

4. What book contains information about this species?

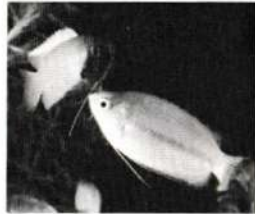
**Mark Shigeoka, Wailua, Hawaii**

**A.** 1. There is no special food for conditioning fishes. Most advanced aquarists do not find it necessary to "condition" their fishes because they never let them get out of condition. Honey gouramis are carnivorous and should be fed such things as tubifex, brine shrimp and daphnia.

2. A five-gallon is large enough.

3. Feeding any of the labyrinth fishes just after they hatch is unfortunately a

Honey gouramis, Colisa chuna.



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*matter of luck. If you are lucky at producing infusoria, that is a good first food. If you have difficulty in culturing these organisms, there are several brands of good fry food available. It is very important not to feed this food too long, because the fry soon out grow it and starve. Small quantities of live newly hatched brine shrimp should be offered with the infusoria or tube food. When the pink color of the bellies of most of the fry indicates that they are eating the shrimp, the first foods should be discontinued.*

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**Tricolor Shark**

**Q.** I have been keeping a tricolor shark in my community tank. I cannot find any literature on this fish. What can you tell me about it?

**Mrs. Joseph Maniskas, Davenport, Iowa**



Balantiocheilus melanopecterus

**A.** You are probably referring to Balantiocheilus melanopecterus, which is also called the Bala shark. The fish is listed in Exotic Tropical Fishes. This fish was first imported around 1955 and is a member of the barb group. It is found in Thailand, Borneo and Sumatra; it reaches a length of about 14 inches, but aquarium specimens grow only about half that length. There have been no reported spawnings.

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**Plant Problems**

**Q.** I have had Amazon swordplants and temple plants in my aquarium. After they have been there for a week or so, they lose their color and disintegrate. Sometimes the leaves have been slightly chewed by fishes. Could this be the reason for the color change and disintegration?

**Duane E. Perry, Idaho Falls, Idaho**

**A.** Unfortunately you do not mention whether other plants fare better in your aquarium. It is very unlikely that the fishes do any real damage. Check on lighting conditions. Another possibility is that the water in your aquarium is getting too "thick" as the result of replacing evaporated water over a period of time. This is especially true if you use a water softener. Most aquarists agree that a partial change of water each week is good practice.

**Recessive Genes**

**Q.** Why are some baby guppies born gray while others from the same brood may be gold or white?

**Cheryl Paul, Ellensburg, Washington**

**A.** Gray is dominant to all of its mutations. As a result a gray guppy can carry recessive genes which are not expressed until the fish is mated with a fish carrying a similar recessive gene. If both fish are hybrid for the gene, i.e., they both appear

gray but carry the recessive gene, the offspring will be 75% gray to 25% gold or albino, depending on what the recessive gene is.

**Black Acara**

**Q.** I have two black acaras (Aequidens portalgrensis), one four inches long and the other five inches long. These fish have been kept in a 29-gallon



Black acara, Aequidens portalgrensis. (Also called green acara.)

aquarium and recently killed two five-inch-long blue gouramis. The acaras were moved to a ten-gallon aquarium of their own.

1. Are all black acaras this vicious?
2. Will they try to spawn, or are they too young?
3. What size can they attain?

4. The smaller fish keeps ramming his head into the aquarium cover. How can I prevent this without lowering the water?

**Paul Freyer, Wauwatosa, Wisconsin**

**A.** 1. There are always exceptions to any generality about fishes, but black acaras are nearly always tough customers especially when they are in the breeding mood.

2. Size is probably more important than age. They are big enough.

3. They reach ten inches long in nature. Aquarium specimens reach about five inches.

4. Try floating plants. How long they will last with this species is questionable.

**Raising Brine Shrimp**

**Q.** In the October 1967 issue of TFH there was an article on raising brine shrimp which suggested adding mineral water to the salt solution and to feed the shrimp algae. Both are sometimes difficult to obtain. Are there any substitutes?

**Jeff Brunner, Salt Lake City, Utah**

**A.** In your case, I would suggest using water from the Great Salt Lake for Utah shrimp. If you want to raise California shrimp, use one of the many artificial sea salts in the strength suggested on the box. Brine shrimp may be fed small quantities of yeast, either dried or cake form. It takes about one month to raise the shrimp to adult size.

**Dwarf Molly**

**Q.** About two years ago I bought a pair of marble mollies. The female gave birth to six young. They are now full grown, but one is less than three-fourths of an inch long. Can you explain this?

**John Kilgore, Rocky River, Ohio**

**A.** To give a really scientific answer, it would be necessary to run complicated tests on the fish in question. There is a possibility that this individual did not produce a sufficient quantity of growth hormone and as a result remained abnormally

small. Fishes are not so different from people. Look at an average crowd and you will find some very large and some very small.

**Green Fish?**

**Q.** My science teacher says that algae grows on fishes. I say it does not. Who is right?

**Ty French, Frostproof, Florida**

**A.** I have never heard of any kind of algae growing on fresh water fishes. If any reader can cite an authority for this, we will pass it on.

**Mylossoma "Piranha"**

**Q.** I have two young Mylossoma denticentris piranhas and I am having trouble keeping the aquarium gravel clean. If I put one or two catfish in the aquarium would the piranhas attack them?

**Steve Heckman, Des Moines, Iowa**

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A. The term "piranha" is a complete misnomer when applied to this species. *M. duriventris* is not a carnivorous species. As a matter of fact, when they get large they may eat every aquarium plant you have. By all means, put the catfish in, as well as any other fish which would brighten up the tank.



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#### Veiltail Swords

Q. I have three hi-fin veiltail swords which are gravid at this time. I am hoping for the best. Thelma Simpson, developer of the hi-fin swords, has seen these and said they were quite nice. Of course, I feel that TFH couldn't care less, unless I were a well known breeder or a well known doctor. Anyway, have veiltail swords been marketed?

Irene L. Gorman,  
Los Angeles, California

A. To the best of my knowledge, veiltail swords have not been offered, at least not conspicuously. TFH is not interested particularly in covering its pages with information and photographs of strains of fishes which may disappear tomorrow. This could very easily happen when there are only three such fish in existence. When you have enough breeding stock to distribute to wholesale breeders, have color slides taken of them and write up your experiences and send back to TFH. That is how the well known breeders and doctors become well known.

#### Hydra

Q. Please tell me where hydra comes from and how to get rid of it. I found it in an aquarium, so I set up a new aquarium, filter and everything. The only things in the new aquarium that were in the old one were the fish which were dipped in something to get rid of parasites. Even the net was new, but still the hydra came back. Please help.

Ether Koffron,  
Chicago, Illinois

A. When you used the new net you had to put it in the old aquarium to catch the fish. In the process the net doubtless caught a number of hydra which were not killed by the "something" you dipped the fish in. When you moved the fish to the new aquarium, you also moved the hydra. Some authors say that the blue gourami eats hydra, others say it doesn't. A surer method of eradication is to add a solution of 7 milligrams of copper sulfate per



Hydra

gallon of water in six equal doses over a period of three days. Watch the fishes carefully and remove any that show breathing distress. Two days after the last hydra is seen, change 50% of the water.

#### Lyretail Sphenops

Q. I want to know if there is a fish called a lyretail sphenops molly. I have developed four such fish, two males and two females. Could you tell me if there is such a fish on the market?

Karl Fechner,  
Garden Grove, California

A. Lyretail sphenops have been offered by wholesalers for some time and are becoming very popular because they are more easily raised by aquarists than are lyretail sailfins.

#### Spawning Zebras

Q. I attempted to spawn zebra danios by the following method. I put two layers of marbles on the bottom of a large fish bowl with three inches of water over the marbles. The male and female were added and after twenty-four hours were removed. I could find no eggs. What am I doing wrong?

Dan Schultz,  
Sturtevant, Wisconsin



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A. You could be off in a number of matters. It is best to separate the female from the male and feed her very well for about a week before attempting to spawn her. Your temperature may have been too low; 75 to 80 degrees is best. Most breeders use two males for each female. Another possibility is that you did not recognize the eggs when you saw them. Next time carry on as though there were eggs even if you don't see them. If you see no fry within a week, then you can try again.

#### Croaking Gourami

Q. I recently spawned a pair of croaking gouramis. The male built a nest in a 20-gallon community tank. Mating followed the procedure outlined in the August 1968 issue of TFH, except after one night the male moved the eggs to the back of the aquarium. There he packed them into a tight ball. The next morning he enlarged the nest by adding

bubbles. These fish are really something to look at and it is a shame that they are not more popular.

J. Zamlut,  
Gainesville, Florida

A. Although you ask no question, a comment is in order about the popularity of



Croaking gourami

fishes. Aquarists who are interested in more unusual fishes frequently complain that their dealers do not carry anything but the common varieties. One way around this is to place a standing order with your dealer telling him fish you would like to have. Give him a healthy deposit to show you are serious. It might take several months, because the fish you want may not always be available. If your dealer is not willing to try to find the rarer for you, it would be a good idea to find one who will.

#### Aphyosemion australe

Q. 1. After the female *Aphyosemion australe* has deposited her eggs in the spawning mop, how do I get the eggs off it?

2. I have a book that says to put the eggs in some water with a drop of fungus medication. How deep should the water be for this to be effective?

Gary Richardson,  
Chicago, Illinois

A. 1. Many aquarists sort through the mop strand by strand and remove the eggs with their fingers. A small pair of tweezers can also be used; run the open



Aphyosemion australe

middle section of the tweezers along the strand to which the egg adheres until the egg is lifted on the tweezers.

2. The depth of water is really of little importance as long as the eggs are covered. If you are concerned about the concentration of fungus remedy, the eggs seem to do as well with several drops of one.

#### Basement Tanks

Q. My tanks are situated in the basement and get very little light. Once in a while they get a little sunshine through a window. I cannot afford a reflector. Are there any plants which will grow in such an environment?

M. C. O'Connor,  
Springfield, Massachusetts

A. The best bet would be members of the genus *Cryptocoryne*. Some species thrive under very low lighting conditions.

#### Arowana

Q. 1. I have an arowana which is one foot long. It is in a 70-gallon aquarium. Could I put two red devils with him?

2. How about tinfin barb?

Brian Walton,  
Manhattan Beach, California

A. 1 and 2. It should be safe to put anything in the aquarium that he could not swallow. That limits the selection a good deal.

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**Driftwood**

**Q.** I have seen some very nice aquascapes with driftwood in them. I have heard that the driftwood must be treated before it is placed in the aquarium. How is this done?

**Dane Jackson, Audubon, New Jersey**

**A.** If the wood is from fresh water, it need not be treated beyond cleaning it. If it is salt water driftwood, it must be soaked in freshwater until all the salt is leached out.

**Egg Stripping**

**Q.** I have heard of stripping eggs from fish. Can this be done with an active fish like the pearl danio, and if so how?

**Mrs. Loraine Nunn, Toronto, Canada**

**A.** Stripping eggs and milt from small fishes is usually done with the idea that the fish will be killed. Ripe fish are held by the head with the genital opening in a small container of water. The sides of the

fish are stroked from head to tail gently. This will force the eggs or the milt from the fish into the container of water. When one sex has been stripped, the other is done in the same manner. The sex products are allowed to mix for several minutes and the eggs are then placed in an aquarium to hatch.

**Short Gill Plates**

**Q.** I am writing in hopes that you or one of your colleagues can answer the following question. Can you tell me what causes short gill plates in angels? I am currently raising about 5 or 6 thousand angels a month, but I could double or triple this figure if I didn't have to dump the deformed ones. My breeders are raised in hard alkaline water, given the best of live food and they spawn regularly. I keep records of the spawns and one spawn out of a pair will be good and the next spawn will be nearly 100% deformed.

**Dennis J. Hannon, Jacksonville, Florida**

**A.** My bet is that this is hereditary in spite of the fact that it doesn't show up in every spawn. To check this yourself, try some breeding stock unrelated to yours and see if the condition doesn't disappear.

**Archer Fish**

**Q.** I have an archer fish which I feed baby fish. Although the dealer had it in a freshwater tank, most references say



Archer fish, *Toxotes jaculator*

brackish water should be used. Will you comment on this?

**Richard J. Sharp, Yukon, Oklahoma**

**A.** Although the archer fish seems to adapt itself to fresh water, in nature it is found in brackish water most of the time. They are said to spawn in completely salt water with very young archers sometimes found in completely fresh water. Because the fish comes from water with some salt content it is well to assume that this would be the best for it. Archer fish kept in completely fresh water tend to have various forms of fin fungus. Although sea salt may be used, I prefer to use one of the synthetic mixtures designed for use with marine fishes. One teaspoon of the salts per gallon of water would be a good starting point; if skin diseases seemed to be a problem, the concentration could be increased two or three times. Changing the concen-

tration of salts should be done over a period of one or two days to give the fish a chance to adjust to very different osmotic conditions.

**Plant Lights**

**Q.** We have been using a plant light and someone said that it burns the fish. I bought a regular tube, but when I turned it on, the fish seems to go behind objects to get away from the light. Will you please comment on this?

**Richard Hawthorne, Independence, Missouri**

**A.** There are enough superstitions in the hobby without one over developing. There is absolutely no evidence that the plant lights have adverse effects on fishes. There are many thousands of aquarists using these lights and if they were harmful it would have been reported long before now. Go back to your plant light. Your plants will grow better and your fish will look better too.

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May, 1969

**YOUR FISHES' HEALTH**

**Lymphocystis**

By **Roger Lee Herman**

Lymphocystis is a viral disease which can occur in both freshwater and saltwater aquaria. Some examples of both types of fishes most often affected by lymphocystis are:

<b>Freshwater</b>	<b>Saltwater</b>
Paradise fish	Butterfly fish
Discus	Angelfishes
Dwarf cichlids	Clownfish
Sunfishes	Scat

While its ability to cause disease in both fresh and saltwater fishes makes the lymphocystis virus unusual, its effect on the fish cell is even more interesting.

In order to live and reproduce, a virus must get inside a living cell. Once inside it steals food from the cell for its own use. Some viruses take so much food from the cell that the cell dies.

Lymphocystis virus is different. It causes the cell to grow. The fish cell infected by the causative virus may increase its size by 10,000 times or more. Such enlarged cells can actually be seen with the naked eye and can be confused with that all-too-common "Ich." With a strong magnifying glass or a microscope, "Ich" can be seen moving under the skin. No movement can be seen with lymphocystis cells.

A fish with a mild infection may show only a few spots resembling, as we have said, "Ich." A heavily infected fish may have so many "lymphocystis cells" that they form growths resembling tumors. Such heavy infections make the fish look bad but are not usually fatal. At the usual aquarium temperatures, the

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lymphocystis cell usually reaches its maximum size in about one month. After this, the cells begin to burst or to slough off until there is no sign of the disease on the fish. When these cells are lost, they release millions of virus particles into the water. These in turn infect new fish. The fish which had the infection show neither scars nor discoloration to indicate where the infected cells were.

While this disease is not usually fatal and the growths do disappear, it is desirable to eliminate the disease from your aquarium. As with viral diseases of higher animals, there is no drug which will cure lymphocystis. It is necessary to destroy infected fish or to keep them

in a separate container and to disinfect the community tank.

Many aquarium owners will never see this disease, but it can occur and can be confused with "Ich." Perhaps it would account for some of the "stubborn Ich" cases which are so hard to cure.

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## The Newest Oldest Fish Food . . . Fairy Shrimp

by Dr. Herbert R. Axelrod

Ever since I became involved with aquarium fishes as a livelihood more than 20 years ago, I had always considered the feeding of fishes in captivity the key to proper health and breeding success. Now, after these twenty years, I am more convinced than ever that feeding is extremely important.

It goes without saying that the great successes we are having breeding many freshwater tropicals is a direct result of the availability of good foods. The first big stride forward in fish breeding came with the discovery that it was economically feasible to harvest, pack and sell the eggs of the brine shrimp, *Artemia*, to fish breeders all over the world. These eggs are hatched and the nauplii are fed to the newly hatched fishes. Prior to this time, messy infusoria was used and a lucky 25% of the fish spawned MIGHT grow to maturity. With freshly hatched brine shrimp, 60-65% could be reared.

With the invention of freeze-drying of fish foods, this score is even higher. Freeze-drying, the process by which live-frozen foods are preserved by evaporating the ice directly into steam without going through the liquid stage, preserves the flavor and nutrition of foods and sterilizes it by killing most of the bacteria and fish parasites found in all brine shrimp and tubifex worms.

Now a new food is available. Not new in the scientific sense, but new in terms of its being available in quantity for the fish hobbyist.

This new food is called FAIRY SHRIMP. Fairy shrimp are crustaceans (class Crustacea) belonging to the subclass Branchiopoda, and are further categorized into the order Anostraca. They are very closely related to brine shrimp and belong to the same order.

Branchiopods breathe through their "feet." The feet are leaflike and have a number of lobes dividing them. Each lobe has a kind of gill plate which serves to supply the necessary exchange of gases we call breathing. Most branchiopods are freshwater forms that live in closed bodies of water. All have wonderful eggs which are protected with drought-resisting properties which make them almost completely impervious to heat, light or desiccation. All species produce eggs which require drying before they hatch, and most of them produce two distinct kinds of egg.

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The summer eggs are the vegetative, asexual eggs. These eggs are produced in tremendous quantities when compared to the winter eggs (which are sexual). Summer eggs almost always hatch out to be females since they were produced alone by females and have no male elements whatsoever. The winter eggs, too, usually produce females, but many males are also evident. Brine shrimp eggs of the best quality are winter eggs in which many males are present.

There are many species of fairy shrimps to be found all over the temperate world. They are characterized by their lack of a hard shell, called the "carapace," and they are the perfect fish food because they have more "meat" than brine shrimp. They appear in many color varieties, dependent upon their diet. The light-colored fairy shrimp are found mostly in the U.S.A. and they have more body weight and fat content than the reddish ones from Taiwan and the surrounding areas. Both, though, are ideal fish foods.

Hobbyists over the years have used live fairy shrimp as fish food when they could find them. Interestingly enough, the first successful breeders of angelfish and discus fed their breeding stock live fairy shrimp and indicated that their success was due to the feeding of this very nutritious crustacean.

There are now freeze-dried fairy shrimp available in most pet shops which specialize in tropical fishes. Miracle makes one brand; Taiwanese companies market other brands. In my tests, the three brands I have tested yielded equal results, but all must be used properly to get best results. I recommend that before the fish are offered the fairy shrimp, the shrimp should be soaked in warm or hot water for about 5 minutes so hard, dry skin can soften and make it easier for the fish to eat. If you feed them directly to the fish, many fish will hold them in their mouths until they become soft enough to swallow. This soaking has other values, too. As is characteristic of freeze-dried fish foods, fairy shrimp float. While this prevents over-feeding and keeps your tank from pollution, it starves the bottom feeders and the surface feeders get all of the food. By soaking the food in hot tap water, I found that all the fish were able to get some and without exception they thrived on it. I was especially happy to see that fairy shrimp are accepted as a natural food by the insect-eating fishes (hatchet fishes especially) and with this new food I predict we'll be hearing about new spawnings of the hard-to-breed insect-eating species which haven't been bred before.

The species which will eat this food, while not doing so well on other foods, are primarily the African cichlids whose natural diets are primarily insects, the hatchetfishes (silver and marble hatchets, especially), and many of the saltwater coral reef fishes.

At present, a 15 gram plastic vial of fairy shrimp sells for 69¢. It is available only through pet shops; the 5¢ & 10¢ stores and supermarket pet racks don't offer this product.

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## Fantastic Freshwater Crabs for the Aquarium

BY PETER TSANG



A tank containing the freshwater crabs must be arranged so that the crustaceans can get out of the water from time to time. This photograph was taken from directly above a piece of rockwork which served as a gathering place for the crabs in one of the author's tanks. Photo by Peter Tsang.

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About two months ago, some friends and I were looking for fishes out in the country in the far north of Queensland, Australia. At one point, we came to a river, and just as we approached the bridge that crosses it, I saw a lot of movement and an occasional flash of very bright color on the river bank. Naturally, we stopped at once to investigate.

For a moment, we stood in awe looking down from atop the bank. We'd never seen anything like them before . . . unbelievably colorful freshwater crabs! We dashed down into the mud to catch some of these little gems of life. It was pretty uncomfortable because the whole area was full of sharp rocks that cut into our feet. Worst of all, there were millions of sand flies biting us relentlessly. But, at that point, I don't think anything could have stopped us as we excitedly gathered up a number of the remarkable little crabs.

I believe these colorful crabs must be a mutation from the normal, drably colored type which outnumbers them 5 to 1 in their natural habitat. The drably colored ones are identical in shape, size and even in pattern to the colorful ones. However, the only color in the drab form is a bit of brilliant red on the tip of each of the two largest claws.

Of the 30-odd crabs we caught and placed in my home aquarium, only about half a dozen died in the first few days. The remaining ones are still in top condition up to this day. In their tank, I have a large rock that reaches out of the water from the bottom and, also, a few pieces of floating driftwood. This arrangement allows the crabs to get to the surface of the water for a breath of air whenever they want it.

I also have a fair number of fishes (mostly guppies) in the tank and, so far, have not lost a single one. As a matter of fact, the crabs are not the least bit interested in the fishes. However, each day at feeding times, the crabs become extremely active as they try to get at the food before the fishes do. But the fishes always win the race. Nevertheless, the crabs never starve because they always manage to pick up the leftovers, making them excellent scavengers.

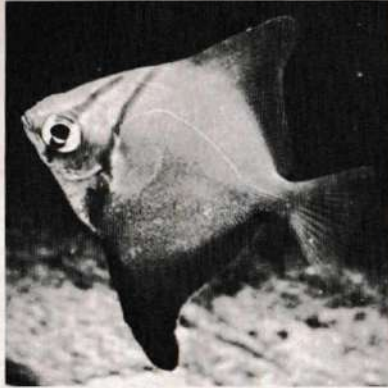
Little is required to keep the crabs happy. The water they come from was fairly hard and alkaline, much like the water in which sailfin mollies are happiest. However, like most crustaceans, they will probably adapt themselves to all but the most severe conditions. They eat anything that falls to the bottom. The only absolute "must" in the success of keeping them is some way in which they can reach the surface and stay there for a moment or two. Plants, rocks, or driftwood may be used to serve this purpose. Hiding places are not necessary, but the crabs must not be kept with large fishes that have an appetite for invertebrates.

You are probably thinking that you would like a few of these little crabs for your aquarium. If so, I have good news for you. Plans have been made to export them in fairly large numbers so that aquarists all over the world can enjoy their great beauty. Here's hoping you enjoy yours as much as I do mine.

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Contest Winners



Close-up by John R. Lawson, Cleveland, Ohio.

Landscape by Johnny Cowen, Shreveport, Louisiana.



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