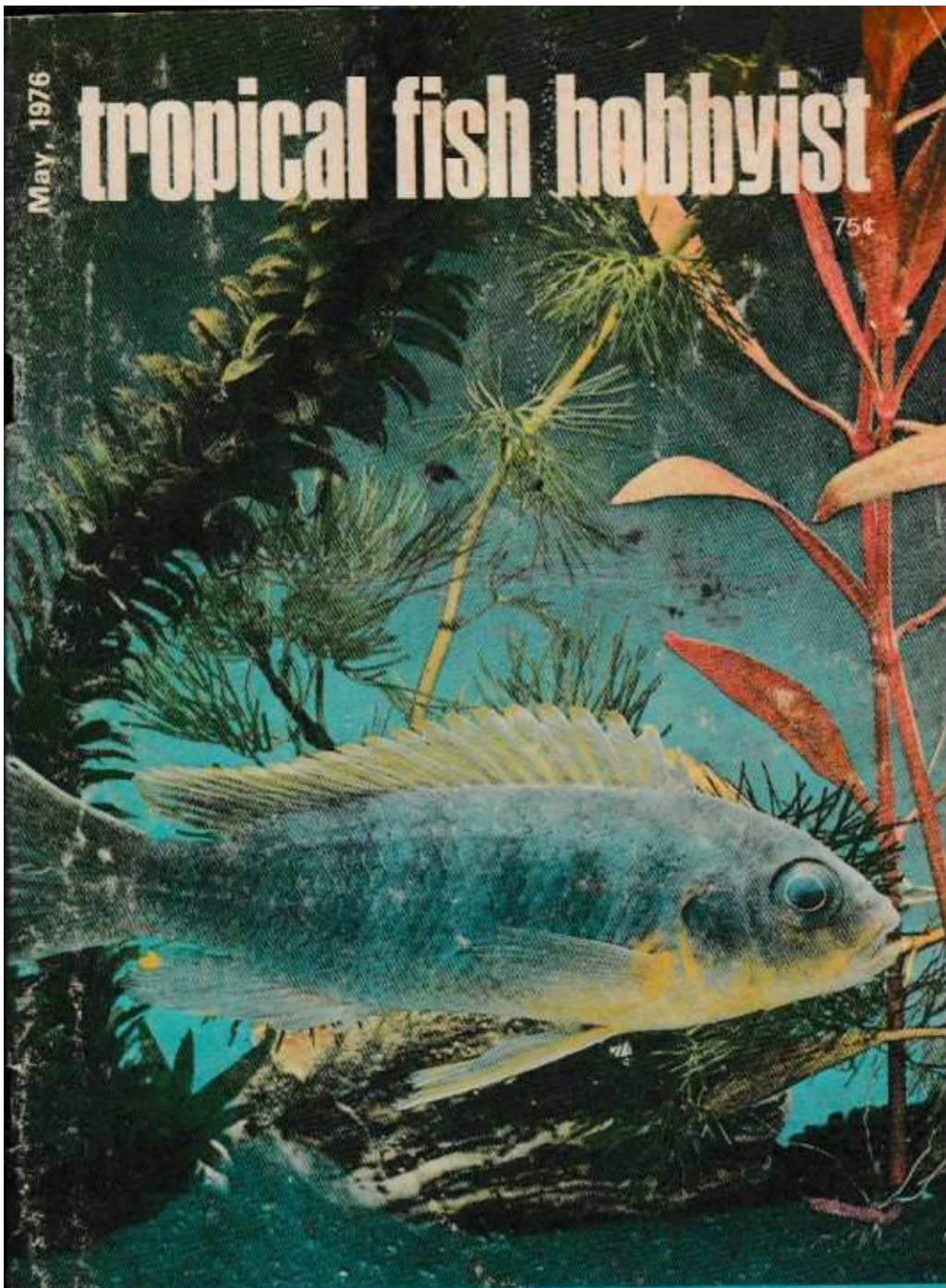


May, 1976

# tropical fish hobbyist

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NEW SPECIES:  
*PSEUDOTROPHEUS AURORA*

# tropical fish hobbyist

VOL. XXIV, May, 1976 (#243, No. 9)

## CONTENTS

Unexplained Angelfish Breeding Failures .....	4
<i>Julidochromis regani</i>	
Meet the Hobbyists: Alois and Sidonia Tham .....	20
Spawning <i>Parosphromenus deissneri</i> .....	30
Salts from the Seven Seas .....	37
Studies on the Family Cichlidae: No. 5	
<i>Pseudotropheus aurora</i> , A New Species of	
Cichlid Fish from Lake Malawi .....	52
Something about <i>Cryptocoryne</i> .....	58
Mall Call .....	67
<i>Julidochromis transcriptus</i> .....	83
Unique Characoid Has Strange Spawning	
Modification .....	94

### ✧ exotic tropical fishes supplements

Pages 17 & 18, 83 & 84. These pages are perforated and punched for easy removal and insertion into the loose-leaf edition of Exotic Tropical Fishes.

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### COVER:

*Pseudotropheus aurora* male,

Photo by Dr. Herbert R. Axelrod

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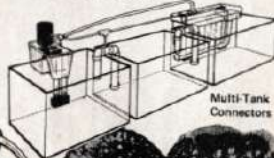


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### COVER:

*Pseudotropheus aurora* male.

Photo by Dr. Herbert R. Axelrod

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Originally considered to be a very difficult species to breed (at least in part because earlier breeders necessarily had to try to succeed with wild-caught parents that had not yet been accustomed to generations of aquarium life), the angelfish later reached a point at which getting the fish to spawn and raising the fry successfully was considered no problem at all, because home and commercial breeders were raising them by the millions. Recently, though, the situation seems almost to be reversing itself, and once-reliable breeders are producing eggs that don't hatch and fry that die off almost immediately if the eggs do hatch. This article discusses some of the possible reasons behind angelfish breeding failures by hobbyists who previously have had good luck in breeding the species.



Angelfish eggs on a *Cryptocoryne* leaf. Angelfish are neither the easiest nor the most difficult of egglayers for hobbyists to breed, but they do present an occasional puzzle; the failure to raise babies successfully from an apparently good spawning is especially puzzling to hobbyists who have had good success with the species prior to the failure. Photo by H.J. Richter.

## UNEXPLAINED ANGELFISH BREEDING FAILURES

by Braz Walker

Angelfish have never been considered one of the "easy" species to breed, although in some cases they certainly have not proved difficult, even to beginners who are lucky enough to stumble onto a compatible pair and otherwise good breeding conditions which are within their realm of tolerance. Where conditions are less than ideal, there is a bit more difficulty, but generally once a breeder has been successful a few times he or she develops the particular "knack" required

**Tropical Fish Hobbyist**

doesn't originate with water which has changed in composition. Water quality can also change rather dramatically through environmental or industrial pollution. Your local water authority can probably inform you if there has been a compositional change related to such a factor.

Don't overlook the possibility of copper poisoning if you have recently moved or installed copper pipe to replace worn-out plumbing. The relative insensitivity of marine fishes to copper and its extensive use as a medication and disease preventive for saltwater fishes tends to make freshwater aquarists forget how lethal it can be in very small quantities to freshwater fishes. Even in amounts which would not be deadly to adult fishes it could prove intolerable to embryos or fresh-hatched babies.

If you hatch angelfish eggs in a separate container from their parents, using a gallon jar or other container with water from the breeding aquarium, be sure that the water is not polluted in the aquarium itself because of your having overfed or perhaps having let the water get too "thick" without removing and replacing a portion of it regularly.

Make sure your hatching container maintains a stable temperature that does not fluctuate appreciably. Low 80's should produce strong, vigorous babies. This is particularly important with some of the aquarium-developed varieties such as blacks and blushing angels, which have less natural vigor and stamina than some of the others and are especially vulnerable up to the time of free-swimming.

Another possibility which could be at fault could be the occurrence of lethal genes. For close to half a century angelfish have been indiscriminately and excessively inbred either to establish certain characteristics or simply because unrelated fish were not available or easily obtained, and it is just possible that from time to time matings might occur between fish whose combined genetic makeup carries the fatal heritage. If this is the case, a re-pairing of the parents with other mates might prove successful. Odds are against this being the problem, and obviously if the breeders have successfully spawned and had their offspring raised previously without problems, something else is to blame.

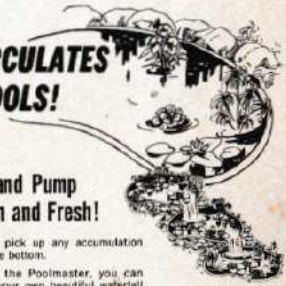
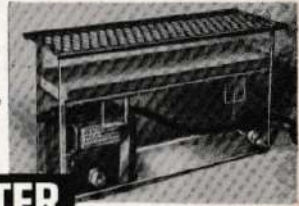
While it seems improbable that an experienced angelfish breeder would attempt to start baby angels on such fare as infusoria or fry food, I was recently contacted by a breeder who apparently had raised angels previously but was now

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One widespread cause for failure at raising egg-layer fry—and this applies to many other species besides angelfish—is simply that the babies are starved to death. If they are offered food of the right size, they might be offered much too little to sustain their fast-paced lives; if they are offered food of the wrong size, either too small or too large, the food won't do them much good. Infusorians like the *Paramecium* and *Euglena* shown here (*Paramecium* above) are not really large enough to keep baby angelfish alive very long. Photos by Charles O. Masters from *Encyclopedia of Live Foods*.



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losing one spawn after another after the fry were free-swimming. A few a day would die until they were gone. The first food they were being offered was a combination of prepared fry food and infusoria, and the baby angels were simply starving to death. While it is technically possible to raise angelfish beginning with infusoria and perhaps even the finely powdered "fry" mixtures, chances are that these foods will prove unacceptable or inadequate, and the entire spawn will be lost. Free-swimming angelfish are easily capable of eating newly hatched brine shrimp, and this is the choice food for them. The movement of the shrimp attracts the babies, who attack the shrimp with gusto. The baby shrimp are nourishing and substantial and promote fastest growth. "Infusoria" cultures are often of doubtful quality to begin with, and considering the voracity of angelfish babies, it would be very difficult to supply them with enough of the microscopic creatures to sustain them any length of time. It is unfortunate that some of the aquarium literature still available advocates the use of infusoria as a first food for angels; it seems somehow doubtful that the author was as successful, if he actually had used this method, as he could have been using brine shrimp.

Another modern development with which an aquarist occasionally manages to wreak havoc on his aquatic scene is the ubiquitous aerosol spray device. Disinfectants and insect sprays are particularly dangerous around aquariums, but even deodorants and hair sprays can be deadly if carelessly used. Insecticide "strips" which are designed to be hung in various places around the house should never be used around

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14

aquariums, since their invisible but potentially lethal gas can be absorbed by the water. Manufacturers warn against their use near aquariums, but many of us still use as a guideline that old G.I. rule which says to read the instructions only if all else fails. Remember, we're talking about embryonic and post-embryonic life, which is much more susceptible to very low levels of toxicants than adults would be.

There is an increasing availability of live foods such as tubifex in the shops now, and while this is an excellent food for conditioning breeders as well as being a pleasure to administer because of the enthusiasm of the fish for these little red worms, because of its nature and the areas from where it is customarily collected, tubifex has in the past been suspected of being a potential source of some unusual aquarium maladies. I seem to recall an account in a British magazine some years ago in which discus eggs failed to hatch because of a viral or bacterial infection which the parents had apparently picked up from tubifex and were passing on to the eggs while showing no symptoms in themselves at the time. This is not to discourage the use of tubifex, which if properly cleaned is a good live food, but when problems come up which seem to have no explanation in an aquarium in which this or other wild-caught live food is being used, it's worth a thought.

There are a few other possible causes of failure with angels in cases where a breeder has been successful before. One other item worthy of mention which causes occasional spawnings which seem to be perfect but somehow never hatch is when two females decide to set up housekeeping. Often the spawn is exceedingly large, since both females may lay eggs. If the fish spawn in the hobbyist's presence, whether they are two females or not should be reasonably easy to determine, since the genital papilla or ovipositor of the female is larger and more blunt than the male's. If the papillae are large and blunt on both fish, chances are you've got a pair of hens.

One other thing to remember is that the healthier the parents, the stronger the offspring. Feed prospective breeders well on a variety of foods. Flake food, frozen brine shrimp, beef heart, freeze-dried foods, scraped or chopped fish, small earthworms and other high quality foods are all good. Make frequent partial water changes, at least 25% every two weeks or so, and don't try to hatch the eggs in "old" water which has started to turn yellow. **r.f.h.**

15

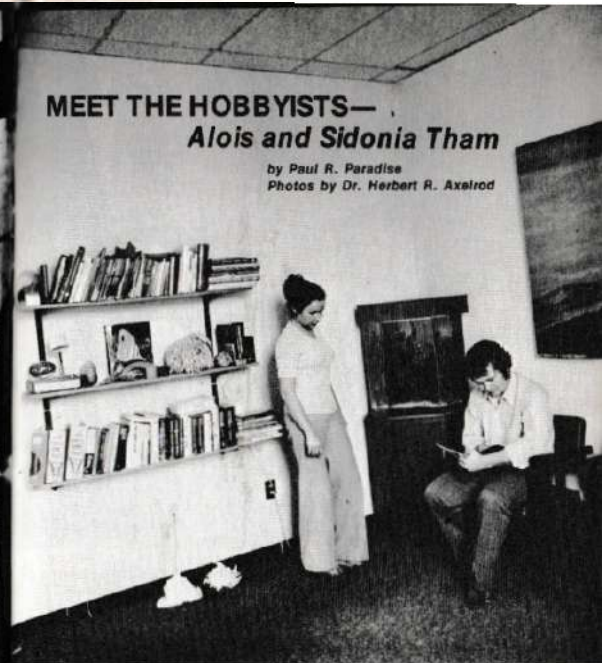


Alois Tham checks the scene in a 700-gallon marine tank in the warehouse area of Saint Marines in Toronto; Czech emigrés, Alois and his wife Sidonia got into the business of wholesaling fishes in a strange way.

20

### MEET THE HOBBYISTS— Alois and Sidonia Tham

by Paul R. Paradise  
Photos by Dr. Herbert R. Axelrod



Alois Tham became interested in the tropical fish hobby when he was 13 years old. In his native country of Czechoslovakia, his birthday present for his 16th birthday, a 200-liter aquarium, had to be custom built. Today Alois, 29, and his attractive wife, Sidonia, 26, operate the Saint Marines Export-Import Co. in Ontario, Canada. What started as a hobby now is a thriving business with six employees and two salesmen, one in Toronto and one in Montreal.

Alois and Sidonia were students in Czechoslovakia studying medicine when the Russian Army invaded their country in

21



Sidonia Tham handles a good deal of the Saint Marines and clerical work by herself and finds that contact with individual customers lends a personal touch to what otherwise would be an impersonal operation.

August, 1968. With the help of their parents, Alois and Sidonia, who both had passports and visas to West Germany, fled with Alois's parents. Three days after arriving in West Germany Alois and Sidonia were married.

Sidonia's parents are still in Czechoslovakia, and it is unlikely that the Thams will ever see them again. When they left, they did not have permission to stay out of the country for more than three weeks, and at the end of that time their stay was considered illegal. Should either of them return home they can expect to be prosecuted. "We have not been pardoned, and if we ever return we will be imprisoned," said Alois very frankly.

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Though they did not speak any English and had little money, the Thams wanted to continue their studies in the West. In 1970, they were accepted into the University of Toronto. The Canadian government, active in encouraging the immigration of new citizens of European descent and in making their absorption into the Dominion easy on all concerned, gave the Thams money for food and rent and paid for a six-month English course. The Thams had little trouble adjusting to the West. The most bewildering thing about the West, according to Alois, was that, "In our old country, even if you have money you cannot buy what you want, since there is a general shortage of most things." One of the first things Alois picked up again after arriving in Canada was his fish hobby, and he began experimenting with marine specimens.

With a very wide range of marine fishes from which to choose, Alois's hobby grew till he was in contact with suppliers from around the world. It was at this time that 20th Century Fox motion picture company hired him. 20th Century Fox was looking for a supplier and advisor for an underwater film to be entitled *Neptune Factor*. With his knowledge of marine fishes and a collection from all around the world, Alois was just the man for the film.

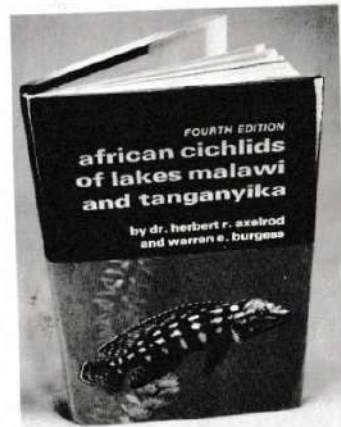
The filming took place in the fall of 1972 and lasted for three months. When the filming was over the movie people started looking for someone to buy the aquariums and equipment used in the production. . . a tempting offer to an aquarist with an interest like Alois's. In his own words, "We decided to try our luck in the wholesale business; we had to interrupt our studies, but we were young and willing to work hard."

The Thams set up their business in a warehouse and at first did all the work themselves. They started out with salt water fishes and invertebrates. Later they added freshwater fishes, plants, reptiles, goldfish, koi and live fish food.

The business was originally registered in Sidonia's name, and that's how it got its name of Saint Marines. Sidonia's initials are S.T. One of their suppliers mistakenly took them for the abbreviation of the word "Saint" and used it on an invoice. The Thams liked it and adopted the name as their official business name, combining it with a drawing of a batfish to make an attractive logotype for their stationery.

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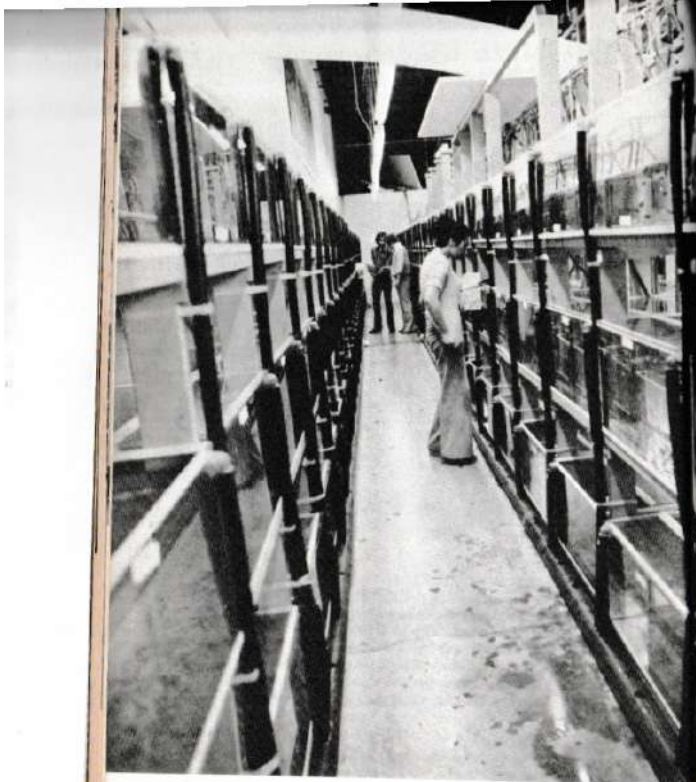
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The scope of the Thams' operation is evident in this photo showing Sidonia Tham inspecting holding tanks in just one aisle of the warehousing facilities.

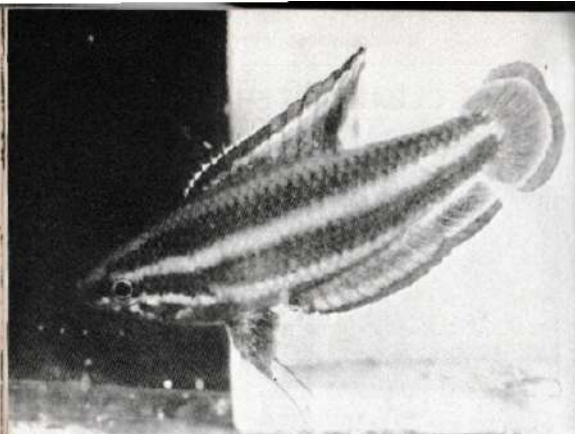


Two generations of Thams at work: Alois and Sidonia Tham check a bagged shipment while Alois's parents look on.

and when a shipment arrives it means a whole night's work for four people. They import mainly from the Atlantic, Philippines, Hawaii, Indonesia, Singapore, Samoa Island, Red Sea, and the Indo-Pacific. They export mostly to Europe. Their operation will soon expand to carrying birds and more reptiles.

Alois was asked whether Department of the Interior regulations restricting fish imports into the U.S. will have any effect in Canada. He replied, "Canada is not considering any restrictions on fish as yet, though as of March, 1975, turtles are forbidden to be imported into Canada."

The Thams believe their success is due to hard work and luck, but mostly to their enjoyment at working with live stock. They do not regret their decision to go wholesale in 1972 and are "grateful to our parents who helped us make it and believed in our success even during the hard times we had in the beginning." (C.F.C.)



Male *Parosphromenus deissneri*. Photo by Dr. W. Foersch.

## Spawning *PAROSPHROMENUS DEISSNERI*

by Dr. Walter Foersch.

Photos by the author

In the fall of 1969 a company (Werner) in Munich received a consignment of chocolate gouramis (*Sphaerichthys osphromenoides*), along with another anabantoid that couldn't be immediately identified. The fish was referred to D. Schaller, who has been working with these fishes for a considerable time; during the many years of his stay in Bangkok he had caught quite a few different anabantoids. He instantly identified the small fish as *Parosphromenus deissneri*. Previously, however, he had known this animal only from drawings in books.

This small fish was described as *Osphromenus deissneri* by Bleeker in 1859, and the description was based on a single specimen from the island of Bangka, southeast of Sumatra. *Osphromenus* actually was a spelling mistake was meant to be *Osphromemus*, but the name was left as it stood. In 1879 Bleeker classified this species under a genus of its own; since then the fish has been known under the name *Parosphromenus deissneri*. The first person to find this fish again, as late as in 1934, seems to have been the American Ichthyolo-

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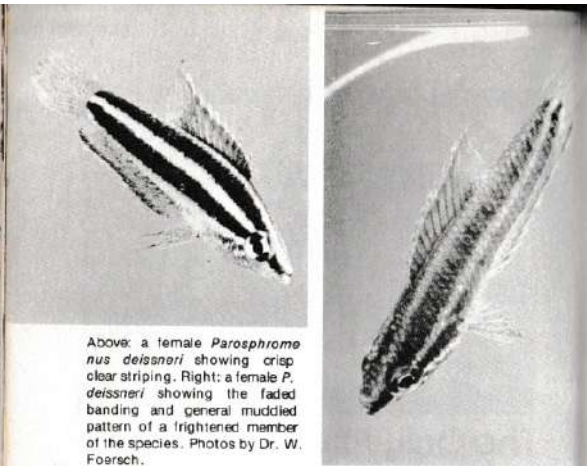
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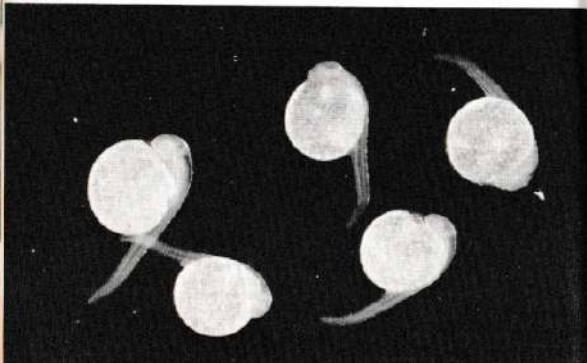
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Above: a female *Parosphromenus deissneri* showing crisp clear striping. Right: a female *P. deissneri* showing the faded banding and general muddied pattern of a frightened member of the species. Photos by Dr. W. Foersch.

These are *P. deissneri* fry that have just hatched, as can be seen from the large yolk sac still present on each of the fry. Photo by Dr. W. Foersch.



glist Albert Herre. In 1897 a collector for the Aquarium Hamburg caught several specimens on Sumatra and thus brought the fish to Germany for the first time. In 1955 Dr. E. Schmidt brought back 20 specimens from Sumatra; they had been caught near Palembang. In 1970 it made its debut in the United States under the name "licorice gourami." So far there have been no reports of its having been bred in captivity.

In 1952 Tweedie described *Parosphromenus paludicola* from Malaya. According to a pencil drawing in the book by Goldstein (*ANABANTOIDS: Gouramis and Related Fishes*, T.F.H. Publications, Inc.) it is distinctly different from *P. deissneri*. The body is longer, the dorsal fin has a greater number of soft rays and extends far back, and the caudal fin is pointed. No specific color markings are discernible. This species has so far not been imported.

When D. Schaller traveled to Southeast Asia for several months at the beginning of 1970 he was determined to look for this small fish and bring it back for us, if possible alive. In March, 1970 he went from Bangkok to Singapore by car and on his way there spent a whole week searching for the fish in various biotopes, always in vain. In Singapore, however, Mr. Alfred from the Ichthyology Department of the National Museum—who himself had caught the *P. deissneri* material preserved there—told him of several localities where the animal could be found. Mr. Alfred had detected its occurrence in a large

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### Tropical Fish Hobbyist

swamp region 300-400 km northwest of Singapore and in the southern part of the east coast of the Malayan peninsula, where *Parosphromenus paludicola* had also been seen. The nearest locality he knew of was 80 miles northwest of Singapore. In a swampy forest near the village of Ayar Hitam. This area tends to be completely flooded during the rainy period, so all bodies of water in it are connected with each other. Schaller eventually found *P. deissneri* in a construction ditch which had been dug when the road was made; it carried dark brown water with a temperature of about 25° C. Apart from 18 *P. deissneri*, Schaller also caught six young *Belontia hasselti* and a few *Lactocophalus pulcher*. The car journey to Bangkok took several days, and he ensured the survival of the little labyrinth fish in that tremendous heat by keeping them in a polystyrene container which he cooled with an ice-bag from time to time. A few weeks later Herr Roloff collected them from the airport in Frankfurt and despatched one male and one female to me. Very soon afterwards he kindly let me have the rest of the fish as well, allowing me to carry out my observations of this still more or less unknown fish on several pairs simultaneously.

I used two 10-liter tanks to hold one pair each and put the rest into a larger tank. All three tanks had one section densely planted with large bushes of Java moss and floating plants. The water had a hardness of 6-8 German degrees and a temperature of 24-25° C. A small internal peat filter ensured that the water was amber-colored and crystal-clear. All the fish seemed quite content on their diet of small *Daphnia*, *Cyclops*, Grindal worms and black mosquito larvae, but they were shy and constantly tried to hide themselves. When they felt frightened and alarmed they stood in an oblique position—often almost vertical—with their fins retracted and the head downwards. The biggest male eventually attained a length of 3.7 cm; the biggest female grew to 3.8 cm. At first they did not show the slightest interest in spawning, and four months elapsed before I was able to watch the courtship display of a male. It swam up to the female and turned over on its side, and the longitudinal bands—as well as the vertical fins and the ventral fins—grew almost black in color. But apart from that nothing happened. In spite of observing the little *P. deissneri* frequently and for long periods at a time, I never once saw them swim up to the surface for air; their failure to do this was strange behavior for an anabantoid species.

Why was it that the fish, which by now had become sexually mature and were "courting" in all three aquaria, did not spawn? What had I done wrong or omitted to do? I went through everything I knew about spawning behavior, nest-building, and brood-care of labyrinth fishes. The Indian climbing perch (*Anabas testudineus*) and the kissing gourami (*Helostoma temminckii*)—as well as, I would suspect, one or two *Otopoma* species—scatter their oily eggs at random, which then rise to the surface and float there. With regard to most of the labyrinth fishes we know, however, the male builds a

Continued on page 86



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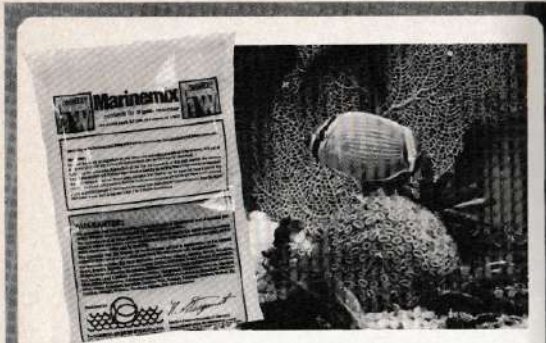
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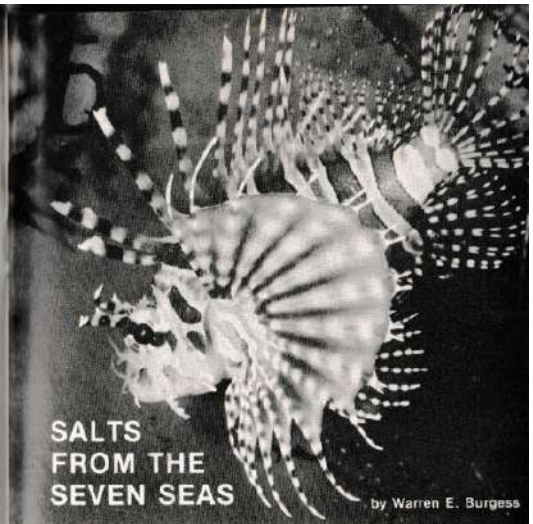
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## SALTS FROM THE SEVEN SEAS

by Warren E. Burgess

Photo by G. Marcuse.

In continuing my discussion of the angelfishes, there are two items that I would like to touch on here: first, the distinguishing characters between the juveniles of the Atlantic species of *Pomacanthus*, and then the name that should be applied to the blue angelfish.

One of the pairs of look-alike angelfishes that may be difficult to distinguish includes the tropical Atlantic gray angelfish (*Pomacanthus arcuatus*) and French angelfish (*Pomacanthus paru*). The adults are quite easily

recognized, the gray angel having body scales with a dark spot surrounded by light coloring and the French having body scales that are basically dark but with a yellow crescent. The young of both species are very similar. They are velvety black in color with two yellow body stripes (in contrast to most Pacific species that have white striping in the juveniles) and some blue in the dorsal, anal and pelvic fins. The classic method of differentiating French and gray juveniles is by the pattern



A juvenile *Holacanthus isabellita*. This is the species that is often called *H. bermudensis*. Photo by Dr. Herbert R. Axelrod.

A juvenile *Holacanthus ciliaris*. The Queen and blue angelfishes hybridize to form intermediates. These hybrids have been called *H. bermudensis* and *H. townsendi*, names which should no longer be used for the true species. Photo by Dr. Walter A. Starck II.



*Pomacanthus paru*. This is the juvenile of the French angelfish, as evidenced by the large black spot in the tail. Note also that the tail has been chewed off a bit. Photo by Douglas Faulkner.

The juvenile Cortez angelfish with an extra body stripe and thin blue lines between the stripes. Photo by Aaron Norman.



of the caudal fin. This works quite well, especially if you have the two species available to compare. The caudal fin of the French angelfish juvenile is provided with a yellow stripe which usually encircles the large rounded central spot. This means the yellow continues along the posterior edge of the fin. In the gray angelfish juvenile the posterior part of the fin is not yellow but is virtually transparent, making the fin look shorter than it really is. The yellow stripe is present at the base of the fin and extends posteriorly as a narrow stripe along the upper and lower edges of the fin but does not extend along the posterior margin. The dark central area is a narrow vertical rectangle in contrast to the larger rounded spot of the French angel. This system works very well—except when you get individuals with the edges of their tails chewed off. What then?

Well, when I was studying butterflyfishes and angelfishes in Miami way-back-when, I noticed that there was another distinguishing characteristic that could be used in these young angelfishes. Looking head-on you will see a stripe between the eyes extending toward the mouth. On reaching the mouth it divides into two parts, one part on either side of the mouth. But in the gray angelfish there is another stripe that continues straight down over the lips. The French angel does not have such a stripe on the lower lip! Regardless of the condition of the



*Pomacanthus arcuatus* juvenile with the clear edge to the caudal fin and the stripe through both lips. Photo by Ed Fisher.

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*Pomacanthus paru* juvenile with the black spot completely circled by yellow. Photo by Rayburn L. Taylor.

*Pomacanthus arcuatus* juv. with the elongate black spot and broad clear caudal edge. Photo by Dr. Herbert R. Axelrod.



caudal fin, then, you can tell the two apart.

The Cortez angelfish of the eastern Pacific, *Pomacanthus coelestis*, also has yellow stripes like the Atlantic species but has three on the body instead of two and has slender blue lines between them. The caudal fin of the Cortez looks very much like that of the gray angel.

Just as people were getting used to the scientific names of the blue and queen angelfishes, they were changed (or, I should say, one was changed). *Holocentrus ciliaris*, the queen angelfish, still retains that name and it has become fairly well established. The blue angelfish, however, has had name changes from *H. isabellita* to *H. bermudensis* and back again. Henry Fiddern, who worked on the hybridization of these species, discovered that the types of *Holocentrus ciliaris* var. *bermudensis* Goode 1876 were probably hy-

brids. He therefore used the later name *H. isabellita* Jordan and Rutter 1898 for the blue angel. The American Fisheries Society list of common and scientific names of fishes from the United States and Canada reversed this decision, explaining that the international rules of nomenclature allowed a species group name to be based on a hybrid. They used *H. bermudensis*. But a recent change in the rules no longer allows this and the name must revert to *H. isabellita*. For those who never changed from using *H. isabellita* there is no problem. For those who kept up and changed to *H. bermudensis*, either get used to using the name *H. isabellita* again or wait and hope for a change back; after all, of the 12 specimens used by Goode in his description of *bermudensis*, some might be true blue angelfish and might give added support for using that name. (L.F.H.)

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## STUDIES ON THE FAMILY CICHLIDAE:

## 5. *Pseudotropheus aurora*, A New Species of Cichlid Fish from Lake Malawi.

by Warren E. Burgess

As the popularity of African cichlids grows and these fishes become more distributed throughout the aquarium world, the need for proper scientific names becomes even greater. Most commercial shippers and importers (or even dealers) have to call the fishes by some name, whether it is a common name, a name of an already described fish that it may (or may not) be, or a fictitious name made up for the fish somewhere along the line.

The fish that is to be described here has been known in the aquarium trade as *Pseudotropheus lucerna*. After examination of many specimens of this species and the type specimens of *Pseudotropheus lucerna*, I have come to the conclusion that they are not the same species, nor do they belong to any other species of the genus *Pseudotropheus*.

Thanks are due to Jack Freiberg and John Lombardo of African Fish Imports for providing specimens of this new species for study.

### *Pseudotropheus aurora*, new species

**Holotype.** — USNM 216292, male, 82.4 mm SL, donated by Jack Freiberg and John Lombardo of African Fish Imports from a shipment of fishes from Lake Malawi.

**Paratypes.** — USNM 216293, 8 males and 8 females, 71.5-85.7 mm SL, same data as holotype. Additional paratypes will be placed in the British Museum (Natural History) and American Museum of Natural History.

**Type Locality.** — Malawi, Lake Malawi, probably Likoma Island.

**Diagnosis.** — *Pseudotropheus aurora* differs from all other species of *Pseudotropheus* by its very large eyes, 2.6-3.2 in the head length. *P. lucerna* also has a large eye, but it is only 3.3-4.0 in the head length. The tooth band of the lower jaw of *P. lucerna* is transverse whereas that of *P. aurora* is rounded.

**Description.** — Proportional measurements (data for holotype is in *italic type*): Depth 3.1, 2.8-3.1 (32.3-35.7%) in SL; head 3.3, 3.0-3.3 (30.3-33.3%) in SL; eye 3.3, 2.6-3.2 (31.3-38.5%) in head length; snout length 3.0, 2.8-3.4 (26.4-35.7%) in head length; interorbital width 3.5,

3.2-3.9 (25.6-31.3%) in head length; upper jaw length 3.2, 2.8-3.5 (28.0-35.7%) in head length; lower jaw length 3.4, 3.2-4.0 (25.9-31.3%) in head length; length of preorbital bone 5.4, 4.8-6.3 (17.6-20.3%) in head length; depth of caudal peduncle 7.7, 7.4-8.2 (12.2-13.5%) in SL; predorsal length 5.0, 2.9-3.1 (32.3-37.9%) in SL; pectoral fin length 3.6, 3.6-5.2 (19.2-27.8%) in SL; pelvic fin length 5.5, 5.4-6.5 (15.2-18.5%) in SL; and pelvic fin length 2.9, 2.9-4.7 (21.9-34.5%) in SL.

**Fins:** Dorsal fin XVII-XVIII, 9-10; anal fin III, 7-8 (usually 8); pectoral fin 13-14 (all elements counted except short splinter at upper edge); caudal fin truncate.

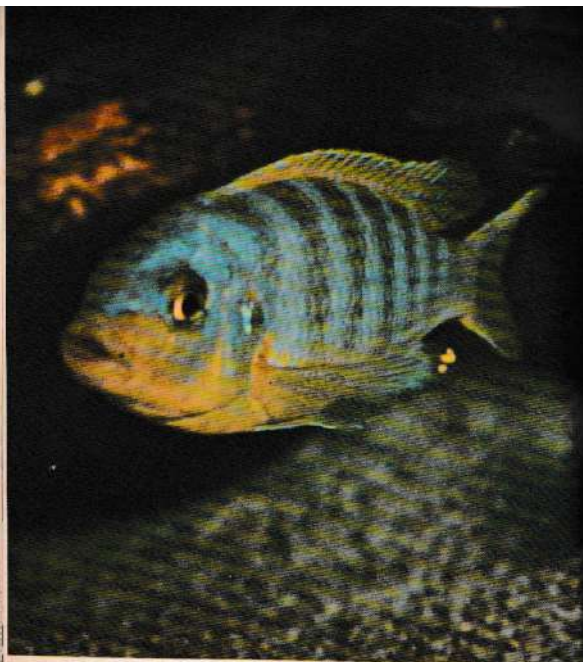
**Scales:** Lateral line scales 22-25 + 9-12 (plus one or two pored scales that may extend onto the caudal fin); scales in a longitudinal line from the upper edge of the opercle to the base of the caudal fin 29-33 (usually 30 or 31); 7-8 + 1 + 10-11 scales in a transverse series from base of first dorsal fin spine to base of first anal fin spine; caudal fin scaled, dorsal and anal fins not scaled.

**Gill rakers:** 3 (one with 4) + 1 + 11-12.

**Teeth:** Teeth of jaws in curved rows; outer row distinctly bicuspid, the cusps subequal, that closer to the symphysis larger; in upper outer row, teeth becoming smaller posteriorly and ending in 5-9 unicuspid teeth which increase in size again until the last; inner rows of teeth in each jaw three, occasionally an irregular fourth row present, the first two tricuspid, the third (and fourth if present) losing the lateral cusps and appearing unicuspid and larger than the two tricuspid rows anterior to it; about 43-49 teeth in outer row of upper jaw (unicuspid teeth included) and about 19-24 bicuspid teeth in the outer row of the lower jaw. Teeth of lower pharyngeals not distinctly like those of either *Pseudotropheus* nor *Melanochromis*. They are somewhat crowded, less so than those of *P. zebra* but more so than that of typical *Melanochromis*, with the posterior row slightly enlarged and composed of 35-45 teeth. There is often less than a complete posterior row of enlarged teeth in the lower pharyngeals, giving it a more *Pseudotropheus*-like appearance.

**Internal anatomy:** The specimens were examined to determine sex and the lower pharyngeals were removed from the holotype and a female paratype as well as several other specimens for comparison.

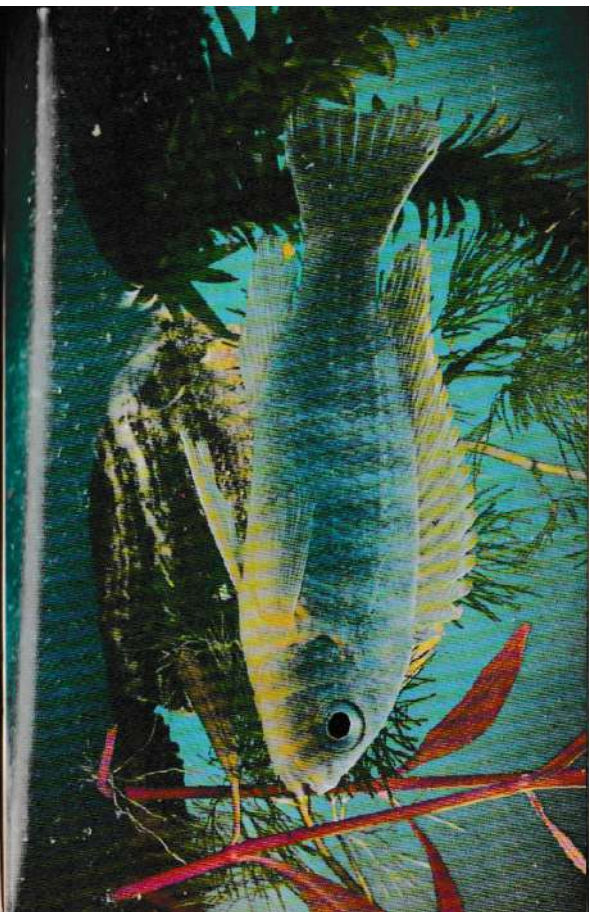
**Coloration:** **Male**—Body and upper part of head blue with faint traces of dark vertical bars crossing body. Lower part of head (including mouth), chest, and belly (including pectoral and pelvic fins) bright yellow to orange-yellow, this color suffusing into the lower part of the body and the caudal peduncle. Dorsal fin yellow with submarginal bluish-white stripe and some similarly colored markings in the rayed part of the fin. Caudal fin varies from bluish to yellowish-blue to yellow; anal fin pale bluish to pale yellowish to almost hyaline, usually with a bright golden yellow spot along the pos-



This fish has the color pattern of *Pseudotropheus aurora* and may be this species, but the angle of the fish does not allow a good view of the size of the eye and without the specimen the identity cannot be confirmed. Photo by Gerard Meola courtesy of African Fish Imports.

#### Opposite:

*Pseudotropheus aurora* Burgess. The colors are somewhat faded in this specimen. The characteristic large eye is very obvious. Photo by Dr. Herbert R. Axelrod.



### Tropical Fish Hobbyist

terior edge. A black spot at angle of opercle. *Female*—Usually drab brownish but sometimes with some hint of the blues and yellows of the male. Dorsal, anal, and pelvic fins pale bluish or yellowish to hyaline, without bright golden spot. Pectoral fins pale yellowish. A dark spot at angle of opercle.

*Comparisons.* — The very large eye, as indicated in the diagnosis, is quite distinctive, being larger than in any other known species of *Pseudotropheus* or *Melanochromis*. The species with the largest eye in the genus *Pseudotropheus* is *P. lucerna*, but the eye of that species is only 3.3-4.0 in the head length as compared to 2.6-3.2 in *P. aurora*. Also in contrast to *P. lucerna* the teeth of *P. aurora* are arranged in curved rows; those of *P. lucerna* are arranged in a transverse band. *P. aurora* has 3 rows of teeth behind the outer bicuspid row, the last of these unicuspid; *P. lucerna* has four rows of tricuspid teeth behind the outer bicuspid row; *P. aurora* has about 43-49 teeth in the upper outer row compared to 60-82 in *P. lucerna*. *P. aurora* also lacks the dark edges to the dorsal, anal, pelvic, and caudal fins which are evident in the type specimens of *P. lucerna*. The large eye of *P. aurora* was probably the reason that it was labeled *P. lucerna*. It is obvious, however, that these two are distinct and quite different species.

*Distribution.* — This species is endemic to Lake Malawi. Although its complete distribution within the lake is not completely known, it has been reported from Likoma Island.

*Etymology.* — This species was named *aurora* from the Latin for dawn or morning in reference to the bright golden-yellow color of the chest and lower head area impinging on the blue color of the fish.

#### REFERENCES

Jackson, P.B.N. 1961. *Natl. Mus. Southern Rhodesia (Natural Sciences), Occas. Papers*, 3(25B):535-621.  
Trewavas, E. 1985. *Annals & Magazine of Natural History*, (Series 10), 16:65-118.

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*Cryptocoryne cordata*. Photo by R. Zúkal.

### Something About *Cryptocoryne*

by Dr. Karel Rataj  
Botanical Institute  
Sumpark, Czechoslovakia

There can be no doubt that the genus *Cryptocoryne* is most populous of the aquarium plants. According to the latest research, this genus comprises 51 species and 12 subspecies or variations, 37 species and 10 subspecies and variations of which are grown in artificial cultures today. These figures are higher than those for *Echinodorus*, the second largest genus of aquarium plants. I lack the courage to insist that the cryptocorynes are the most beautiful plants—this is, of course, a matter of opinion. What is certain, however, is that their leaves show almost all shades of color and that their blossoms are not only very beautiful but also extremely interesting and of an unusual structure.

58



There is plenty of confusion and variance of opinion regarding the correct taxonomic placement of fishes, but the taxonomy of plants is even more involved. One of the problems in plant taxonomy is caused by the fact that classification depends to a certain extent on the type of reproductive products produced by the plants being categorized, and often there is no basis for comparison, because the plants just don't flower. Also, the same plant can look entirely different depending on its age and condition and whether it has grown in a bog situation or completely submerged. Both plants shown here, for example, are *Cryptocoryne petchii*, but they don't look the same, having been grown under different conditions. The *C. petchii* individual in the upper photo exhibits the emerged form of leaf, whereas the lower plant was grown entirely under water. Photos by R. Zúkal.



Much has already been written about cryptocorynes, and in scientific periodicals all over the world many successful growers have shared their experiences with the readers. Nevertheless, in the home aquaria we usually see no more than two, or at best three, species—the ones that are most common and easiest to grow. Other species thrive only in the care of experienced growers, since so little was (and is) known regarding their demands on the environment—and the little that was known was badly understood. Aquarists often ask, "How do I grow cryptocorynes?" If this question is supplied with an answer (by an "expert"), the aquarist is advised to ask no further questions because the answer cannot be anything but fundamentally wrong—the fundamental error already lies in the question. The genus *Cryptocoryne* comprises so many species and is spread over such an enormous geographical area that it is impossible to generalize. The question should be formulated thus: "How do I grow *Cryptocoryne cordata* (*C. balanae*, *C. affinis*, or some other species)?"

Most frequently, the answer to the first question mentioned above will be that cryptocorynes require half-shade and gravel mixed with peat and that they do not tolerate hard water and lime in any form. But, nonetheless, we find a whole host of *Cryptocoryne* species exclusively on a chalk substratum, and almost all species love the sunshine and adequate light and neutral or only very slightly acid water. However, these are comparatively far-reaching questions to which I would like to return in subsequent articles at some later date. Today I want to deal with cryptocorynes from the morphological aspect and acquaint the reader with those fundamental characteristics he needs to know for the correct identification of the species.

The genus *Cryptocoryne* was described by Fischer in 1828. At that time, a few species had already been classified as belonging to the genera *Arum* and *Ambrosinia*. The longest-known species and type of the genus is *Cryptocoryne spiralis* (Retz.) Fischer, first described in 1779 as *Arum spirale* Retz. *Ambrosinia ciliata* Roxb. (today known as *Cryptocoryne ciliata*) was described in 1819 and *Ambrosinia retrospiralis* Roxb. in the year 1832.

Evolutionally, the genus *Cryptocoryne* is among the most recent genera of the family Araceae. It is closely related to the genus *Lagenandra* and distinguished from the latter by possessing only 4-8 styles (usually 6) in its single whorl, as opposed to *Lagenandra*, which has a larger number of styles which are arranged into a spiral.

Cryptocorynes are bog, aquatic or semi-aquatic plants, only rarely terrestrial, and there is very little variation in their growth habits in submerged or emersed conditions. The leaves usually divide into stalk and blade. The blades are heart-shaped, oval, spatulate, or ribbon-shaped, skin-like to leathery, and have smooth or finely serrated edges. On the surface they are smooth, waxy to curly. In some species, the leaf blades are pitted or bullate. Pitted and bullate leaves

occur simultaneously with the smooth leaves—hence this characteristic is of only secondary importance in the identification of the species.

Species that grow in fast-moving waters have adapted their leaves to the current; the leaves lie on top of the water surface or beneath it. All the stalks have basal sheaths. Their length in relation to the length of the leaf blade is more or less constant only in emersed plants. In submerged plants, the length of the stalks varies in accordance with the water level and the light intensity.

In some species the leaves are a uniform green, whereas in others they have a bright color. The topside of the blades is mostly brown-green or olive, sometimes with cross striations. The underside is yellow-green, olive-brown, light to dark red or a shiny purple. This coloration of the leaves is never constant and varies in accordance with certain light conditions.

The root is erect, of roughly the same length as the leaves, sometimes branched to a greater or lesser extent. New plants are produced vegetatively on the short rootstock of the main root. Some species grow stolons on which new plants then emerge at intervals of 1-10 cm. Both types of vegetative reproduction can occur simultaneously in some species. For other species, one of the two possibilities is characteristic.

The most complicated organ of the cryptocorynes is the inflorescence. We call it the sheathing bract or spathe. It grows on a small stalk of varying length. The lower part of the spathe contains the oval or pear-shaped receptacle. Both externally and internally it is almost colorless or of a color that is characteristic for the species. It may be symmetrically curved or constricted in the middle of top third.

The female flowers are monoecious, in two whorls. Only the outer whorl with 4-8 (mostly 6) styles is fertile. The flowers in the inner whorl are abortive, infertile, and are transformed into aromatic scent bodies. The styles grow into each other. They are situated at the sides, standing at a slight angle, and—during development—their stigmata change their position so as to be sometimes slanting and sometimes crosswise. In some cases the styles can become so twisted that the stigmata point downward and stand in a horizontal position. Only one single species, *Cryptocoryne gomezii*, has its stigmata pointing upward. The stigmata are usually evenly rounded off at the top; they are rarely incised and therefore bilobate (*C. hejnyii*) or twice incised and therefore trilobate (*C. evae*). The shape of the stigmata, their length and width, nature of the surface, central depression, etc., are characteristics which alter during development and cannot be identified from herbarium materials. The taxonomic significance of these characteristics, in the way they were employed by Prof. de Wit, is therefore doubtful.

The scent bodies are usually convexly curved. In some species,

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the scent bodies are extended into small irregular branched teeth. From among the scent bodies emerges the spadix. It is 0.8-2 cm long. Most of the spadix consists of the lower spindle part, which makes up about 1/2 of the length. Then follows the part with the carpel. The carpel is usually arranged into 3-7 spirals. Out of this fertile part grows the short sterile appendix at the top. In one species, *C. pallidivervis*, the stamens on the spadix go downward, so that the lower sterile part of the spadix is almost absent. The spindle of the spadix is colorless white, occasionally adorned with vertical darker lines. In one species, *C. bertelthausenii*, the spindle is dark red.

The stamens are diandrous, i.e. in pairs which have grown together. The anthers are sessile, raised at the edges, with a crater-like depression in the center, and the ripe pollen comes away in slimy little chains. The receptacle is sealed off at the top by a vertical skin-like capsule that is fused with the appendix before the maturity period so that it can be opened neither inward nor outward. During the maturity period of the female organs the appendix separates from the capsule and the latter can now be opened inward.

Toward the top, the receptacle merges with the tube (*tubus superior*). In some species the tube is completely absent while in others it constitutes the longest part of the inflorescence. In deep water the tube can grow to as much as 5 times the usual length (that is, the length of the tube as it is in the same species in emersed conditions).

Plants flowering in submerged conditions strive to reach the water surface with the top of the inflorescence by extending the tube, whereas the length of the receptacle remains more or less constant. In some species the tube is straight or twisted only once or twice. For other species, multiple twisting of the tube is characteristic. Up to the gullet of the tube, in the upper part of the inflorescence, the whole inflorescence is almost water-proof. On the inside the tube is colorless white. On the outside it is white, pinkish-red, or brown.

At the top the tube opens through a gullet. Usually the gullet is practically horizontal. Attached to it is the spathe blade ("the little flag"). Sometimes the gullet has the same color as its flag while at other times it differs not only in color but also in the structure of the surface. Round the gullet we sometimes see a ring of raised tissue; this ring is known as the collar.

The "flag" of the inflorescence is tongue-shaped. Often it does not broaden at the base when it is, however, twisted several times like a spiral, opening only through a narrow slit. In some cases it is clearly open at the bottom and at the top extended into a tail which may be short or of medium length; in some species the tail is longer than the rest of the inflorescence. The inner part of the "flag" is smooth, matte or shiny; in certain species it is rough ("warty"), yellow, red or purple in various shades. **G.F.H.**

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# MAIL CALL

If you have an aquarium question that you would like to have answered, send it to MAIL CALL. Letters containing questions of course cannot be acknowledged or answered personally, but each month a number of the most interesting questions and their answers will be published in this column. Address all questions to: MAIL CALL, T.F.H. Publications, Inc., P.O. Box 27, Neptune City, New Jersey 07753. Please do not combine MAIL CALL questions with correspondence about subscriptions or book orders.

**Cool It!**  
Q. We have recently been having extremely hot summers where I live and I know that such weather is not rare in other parts of the country, so others must also be concerned. Are there any good aquarium cooling systems on the market; if not, why not? If so, how much do they cost? Where can I get them? If there are, no cooling systems made for aquariums, where can I get plans to make my own?  
Konrad M. Hamilton  
West Linn, Oregon

for hobbyists. If there were plans for construction of a workable unit that you could afford to build, you may be sure that manufacturers would be producing such devices.

**In Salty Water**  
Q. What is the best way to raise brine shrimp to adult size?  
Forrest Hester  
Good Hope, Illinois

**A. Directions, according to derivation of the eggs, for hatching brine shrimp eggs are on the packages in which they are sold. The newly-hatched shrimp (nauplii) are fed upon yeast and attain adult size in about three weeks. For detailed accounts on two methods of raising brine shrimp, refer to the "Salts"**

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May, 1976

**Like Pink Elephants**  
Q. Three months ago I acquired five inch-long pink convict cichlids. I think I have a male and four females and I have them by themselves in a 15-gallon tank. I would like to breed these fish but I cannot find any information on them, not even what they eat or their scientific name. Can you help?  
Charles Jolliff  
Kennett, Missouri

Q. For many months now the names pink congo and pink congo cichlid have been bandied about by writers, and readers have responded with a barrage of questions about them and their handling. This color variation and others now being claimed are nothing more than that, and

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these fish, whatever they may hereafter be called, are still just variants of *Cichlasoma nigrofasciatum* and differ only in coloration.

**CAOAC CONVENTION**

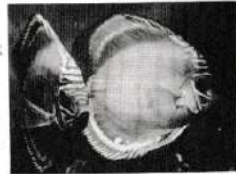
The convention-show of the Canadian Association of Aquarium Clubs will be held May 14-16 at the Holiday Inn [City Centre Tower] in London, Ontario; the London Aquaria Society is host club for the convention. This year's affair is the 17th CAOAC convention and promises to be the biggest yet; there are 51 different exhibit classifications. Guest speaker for the show is Dr. Joanne Norton, famous for her work in fish genetics. Entry forms and additional information can be obtained from show chairman Terry D. Little, c/o London Aquaria Society, P.O. Box 484, Terminal "B", London, Ontario N6A 4W8.

**Q.** In a past issue of *T.F.H.* you mention that anabantoids must have atmospheric oxygen. I have been told that in breeding anabantoids the air temperature above the water should be the same as that of the water and that this situation is obtained by putting an airtight cover on the breeding tank. When a tank is covered in such manner, will there be any danger to my anabantoids if a small airstone or artificial air supply is introduced?

**W. L. Schlitter**  
Westminster, Colorado

**A.** The purpose of the extra cover suggested is to maintain a suitable humidity (not mandatory) in approximation of conditions prevailing in the habitats of these fishes. Unless a sealant is used, such a cover, even a solid glass sheet atop the tank frame, is not absolutely airtight. Anabantoids and other fishes that must have some atmospheric oxygen obtain it at the sur-

face of the water and will suffocate only when they are prevented from rising to the surface. In a truly airtight enclosure, death would be assured for all animals therein upon exhaustion of the entrapped oxygen. For your planned breeding set-up, no extra facilities for aeration are required.



Brown discus, *Symphysodon aequifasciata axelrodi*. Photo by M. Kucar.

**Spots Before His Eyes**

**Q.** I have been keeping fishes for nearly ten years and am now involved with brown discus, *Symphysodon aequifasciata axelrodi*. Mine are approximately a year old and 4 1/2-inches in size. I have recently noted small black spots on their bodies. The selling dealer told me that these were tank-raised fish but now says that they are wild

type. Another dealer tells me that discus turn black if there is too much nitrogenous waste in the tank. Please straighten out this dilemma.

**Walter Szaara**  
Winnipeg, Manitoba, Canada

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**A. 1.** We have not heard of nitrogen caused blackening of discus, but these fishes often darken and become completely black at the approach of death. It is conceivable that your fish are for some unexplained reason depositing melanin in the skin, but it is advisable to consider black spot disease.

**2.** Most observers concede that visual sex differentiation among discus is impossible or nearly so except through scrutiny of actions. Others, however, maintain that males are a bit more generously provided with heavy blue lines on the sides.

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**Covering Bets on Bettas**

**Q.** I am interested in breeding bettas, and the literature I have seen on the subject leaves several unanswered questions.

1. When the time comes to separate fry, can the males be reared in quart jars or must larger containers be used to prevent stunting of fin growth or affecting coloration?
2. Since the jars must be cleaned and water changed, how does one minimize the shock of water changes?
3. When feeding infusoria, how does one determine the correct amount to feed?
4. What can be done to assure good fin growth?

**Richard A. Weise**  
Levittown, New York



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**A. 1.** Quart jars are large enough.

**2.** Assure that new water is of the same quality and temperature as that of the water previously inhabited.

**3.** Feed sparingly and observe when the fry appear surfaced, but feed often. The finest grind of dry foods may also be used.

**4.** Supply a generous amount of meaty foods in the diet.

**No Parasols or Dark Glasses Needed**

**Q.** The afternoon sun catches a part of our large community tank. Does this in any way harm the fish by looking at the bright light? Also is it possible for the aquarium to crack because of the sun shining on it? (Mrs.) Thomas P. Wurth Remsen, Iowa

**A.** No, and again no. However, if the tank is placed at the window, there should be plantings or rock formations to provide places for retirement. Few fishes are comfortable in brilliant lighting because of exposure to possible danger, and some species seldom leave darkened refuges except to feed; to expose such as these in brilliantly lighted open water would make for nervous fishes.

**Bun Rap on Pills!**

**Q.** I have been breeding dwarf gouramis and using infusoria tablets to provide food for the fry. After two weeks I have found thousands of tiny white wormlike organisms all over the tank. Can these be infusoria?

**Barry Fuchben**  
Brooklyn, New York

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The photo below shows the head of a mature 8" male *Haplochromis moorei* (Boulenger). A solid blue body and large hump distinguish him from all other African cichlids. *H. moorei* live along the sandy shores of Lake Malawi where they eat bits of food stirred up from the bottom by large digging fish. In aquariums *H. moorei* flourish on the standard diet of brine shrimp, blended beef heart, and dry flakes. Our current list offers both wild adults and tank raised juveniles.



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**A.** Infusoria identifies a class of the zoological phylum Protozoa, characterized by ciliated bodies and free-living aquatic habits. These microscopic protozoans are various in form and generally subsist upon infusions of decaying organic matter, swimming about unseen in their watery world. They are visible to the naked eye only when in great concentrations and then resemble smoke or a cloud of minute particles; only under microscopic examination could some, such as paramoecia, be mistaken for worms. It is rather unlikely that the invasion of whatever you have, worms or planarians, came from contaminated infusoria tablets, but it would be

good policy to strip, sterilize, and reset your tank to rid it of what may be harmful intruders.

**Good for Flyfishing Too**

**Q. 1.** Are live houseflies acceptable food for the larger cichlids?  
**2.** What are the water conditions suitable for *Haplochromis desfontainesi*, and how are sexes distinguished?

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*tainesi*, and how are sexes distinguished?

**Michael McAvoy**  
 Hayward, California

**A. 1.** Yes, but a large number would be required for a mere snack, and you have to avoid flies that have been poisoned.

**2.** Water conditions are not critical, and temperature of 75-80° is suitable. The so-called egg-spots on the anal fin mark the male.

**MOSQUITOFISH AT WORK**

Mosquitofish, those species especially noted for their utility in eradicating populations of mosquitoes because they prey on mosquito larvae, are coming back into favor as mosquito control agents because of the current disfavor of chemical pesticides for use in areas where food is grown for human consumption. *Gambusia affinis* continues to be used as a mosquitofish in California's rich agricultural regions, especially ricefields, and has been found to be

Support your local aquarium society.

effective against the proliferation of disease-carrying mosquitoes. Currently plans are being made to preserve desert pupfish species by using them as mosquito control agents; *Cyprinodon maculatus* and *Cyprinodon radiosus* are two pupfish species now being worked with by fisheries personnel in California.



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**On the Top**

**Q.** In all of the books I have read about the proper methods of setting up an aquarium, a lot of attention is paid to the idea of making sure that the tank is equipped with a cover, and the reason usually advanced for doing this is that a cover will prevent the fish from jumping out. Well, in my experience I have discovered that fish just don't jump that often, so I think that the advice is unneeded; worse, it can be harmful, because during hot weather it is best to keep the tank uncovered so that heat can be dissipated and the temperature of the water doesn't build up too high.

**Joseph G. Green**  
 Pensacola, Florida

**A.** You're right in saying that a cover can be harmful during hot spells, because it's true that a cover — at least a cover that impedes evaporation — can make the tank trap too much heat. But preventing jumping is not the only reason for keeping a tank covered; a full hood arrangement also will help to keep the tank cleaner and free of airborne contaminants, and in the winter its function of helping the tank to retain heat will be a good thing, not a bad thing. Additionally,

your experience is in contrast to that of many other hobbyists, who do have trouble with jumping fishes. A lot depends on which species you keep, as some fishes are jumpers and some are not. The ideal solution to a cover-caused trapped-heat problem in areas that have a climate that gets hot enough in summer to cause a heat build-up problem and cold enough in winter to cause a heat loss problem is to use two different types of covers, the solid type for winter and the screen type for summer.

**Warmer Water and Worms**

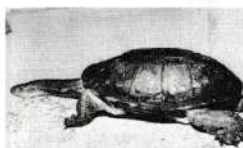
**Q.** I purchased an Australian soft shelled long-necked turtle three years ago. The pet shop could not give me any information on it and I could not find any at the library. I especially would like to know temperature requirements for it. For the first two winters I did not heat the water and the average temperature was approximately 60 degrees. During this time the turtle was fairly inactive by staying buried in the gravel and hiding in the rocks. Last winter I heated the water at about 75 degrees and the turtle was noticeably more active. (I haven't heated the water in the

summer because the turtle seems fairly active.) Is a warmer water temperature necessary?

I would also like to know a good feeding schedule for it. For the past few years I have been feeding it every four to five days. The turtle seems fairly happy with that schedule but I would like to know if it should be fed more often. (I usually feed it meal worms, freeze-dried tubifex worms, and vitamins once a week.)

**Norman Amstutz**  
 Akron, Ohio

**A.** The common name under which the turtle was sold to you is incorrect, as there are no soft-shelled turtles (family Trionychidae) native to Australia. Your turtle probably is Australian snake-necked turtle, *Chelodina*. Photo by Dr. Herbert R. Axelrod.



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a species of *Chelodina*. You have done right to raise the temperature to keep the turtle active, as it requires warmth for its well being, and your feeding schedule is sensible [although you should try to mix in fresh fish and an occasional feeding of live tubifex worms as well; don't give the animal too one-sided a diet].

**Wash Your Troubles Away**

**Q.** I was planning to build separate outdoor pools for goldfish and turtles but have just read in the paper that the city will be spraying twice weekly during the summer for mosquitoes. Shall I forget about the pools?

**Pamela E. Liddy**  
Springfield, Massachusetts

**A.** You will already have made your decision before your letter can be

answered, but we reply so you and other readers may have a guide to ward future plagues. Check with your health department as to nature of spray to be used. Most likely the spraying is to be of an oily substance which will cover water surfaces and kill the wrigglers by preventing them from taking oxygen from the air. Most other aquatic animals will not be harmed. Even so, you may wish to have uncoated water in your pools and need only to run off the surface water after each spraying by using the garden hose and gentle flow of water to overflow the pools.

**Without Heading?**

**Q.** Could you tell me how many inches of fish I can have in a 20-gallon tank?

**Scott St. Martin**  
Acton, Massachusetts

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**Drawn-Out Affair**

**Q.** My dealer is offering a very attractive fish that he calls an elongate mbuna. What he says is the male is a dark blue fish with dark vertical stripes, and what he says is the female is also blue, but the blue is a lighter color; her stripes also are lighter. I would like to obtain a pair of these fish but hesitate because of their price and because I don't know how they'll behave among my other fishes, which are all peaceful species. The dealer says that because they are African cichlids they might fight with the other fishes. Will they?

**Martin Cook**

Winston Salem, North Carolina

**A.** They probably will. From your description and the dealer's name for them, it appears that the fish you're considering are *Pseudotropheus elongatus*. They are African cichlids, as he says (they come from

Lake Malawi), and they have a tendency to be quarrelsome. They are less aggressive than some African cichlid species but more aggressive than others, and you'd be better off putting them into a separate aquarium than putting them into your peaceful community. Follow the general directions laid out in Dr. Axelrod's African Cichlids of Lakes Malawi and Tanganyika as a good general program for their maintenance.

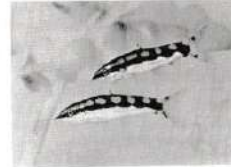
**No Loathing for Loaches**

**Q.** I have always liked the looks of the clown loach, *Botia macracantha*, and some of the other loach species, but I have never had good luck in keeping them; they didn't last long for me, and while they did they had the nasty habit of fighting among themselves and just about every other fish in their tank. They even used to pick on my *Corydoras* catfish, something no other fish with which I have had experience did. Aren't any of the loach species peaceful?

**A. Markewich**

Boston, Massachusetts

**A.** Most of the *Botia* species (which happen to not have been in very



*Botia sidhimunki*. Photo by Chuojka.

good supply for the last couple of years and probably will be in even shorter supply as time goes on demonstrate aggressive tendencies. About the only *Botia* species which you should have no aggression problem is the smallest *Botia*, *Botia sidhimunki*. This fish is occasionally available.

**Wants Change in Supplement Listing**

**Q.** I wish to make a recommendation about future publication of an index to *Exotic Tropical Fishes* supplements, since I find the index as printed in the February, 1976 issue of *TFH* of little use to me.

I own a looseleaf edition of *Exotic Tropical Fishes*, into which I place the supplements in page number order. However, your index as currently prepared contains the supplement and book number, and the date it appeared in *TFH*. Why does it not contain the page number, which would seem to be a logical need for owners of the looseleaf edition, so that we might locate the supplement with some ease?

It seems to me that you publish this index once a year. I would sug-

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### Tropical Fish Hobbyist

gest that next year you utilize the format of the comprehensive index that came with the looseleaf edition, and which covered supplements 1 to 141. In other words, please list separately the scientific name, and the popular name, with a page number after each listing. I think many hobbyists would find the index more useful that way.

William J. Quinn  
Bronx, New York

A. Yours has not been the only request of this nature that we have received; each year, shortly after appearance of the index, in *Tropical Fish Hobbyist*, we receive a number like it. Quite frankly, we've always been a little bit puzzled by the letters, as it seems to be unnecessary to list a page number to refer to fishes that are listed alphabetically by scientific name. But you're right about the potential value of either listing a page number or providing the scientific name cross-reference point for the common names, since the common names are not listed alphabetically. Basically, most persons who request that the page numbers be listed in accompaniment to the supplement listings are viewing the supplement listing as a book index, and it is not; it is simply a listing to show which supplements

are available. The comprehensive index to Exotic Tropical Fishes, which is referenced to both scientific and common name by page number, is revised periodically to reflect the inclusion of new supplements. An entirely new comprehensive index that covers both the basic volume plus all supplements will be published coincidental with the publication of Supplement Book 20.

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### Tropical Fish Hobbyist

PAROSPHROMENUS: Continued from page 34

bubble-nest on the water surface, consisting of tiny air bubbles "wrapped up" in a hardened oral secretion. Here the eggs are guarded—and later the fry, until they are able to swim free. Sometimes the nest consists partly of plants. Frequently, the nest is built between floating plants or underneath them. Certain *Betta* species, some of which occur in running waters, are mouthbrooders. The male puts the eggs into its mouth and does not spit out the fry until they are able to swim. Depending on environmental conditions, presumably, the chocolate gourami may build a bubble-nest or exercise mouth-breeding. *Trichopsis pumilus* and *T. schalleri* tend to build their bubble-nests underneath floating plants and inside the "cushions" formed by these plants. But they may also build them under the leaves of water plants in deeper water layers. If this opportunity is not open to them, they retreat into caves with their bubble-nests. *Trichopsis vittatus* also accepts caves if nothing else is available. *Macropodus cupanus cupanus* and *Macropodus cupanus dayi*, too, sometimes build their bubble-nests under the roof of this type of cave.

All species that build their bubble-nests in caves (as described above) frequently use the latter as hiding places as well and even defend them as their territory. When I put a small flower bowl (5.5 x 5.5 cm) into the tank of one of my *P. deissneri* pairs the male moved in an hour later and from then onwards the bowl remained his territory. I therefore offered similar hiding places to my other pairs, and not infrequently the males could now be seen in the upper region of their new home, where they stood in an oblique position, the head downwards. Frequently, when one male wanted to hide from another, it swam into a corner of the cave and pressed its whole body firmly against the wall.

When actual spawning began, I watched how a male embraced a female in labyrinth fish fashion in the uppermost and darkest corner of the bowl. The female was standing straight and the male embraced it several times, in quick succession, from below. Then the two fish remained motionless, locked in their embrace, until the male turned the female over so that she came to lie in an almost horizontal position. Immediately afterwards the fish separated. No eggs could be seen, but after each pseudo-copulation the two fish swam down to the bottom, head first, as if they were looking for eggs. Then they swam up to the roof of the bowl and pressed their snouts against it, again as if they were looking for something. During courtship the male exhibited two broad dark and two narrow light longitudinal bands which extended from the caudal peduncle to the eye. A narrow fairly light stripe ran from the back to the mouth. All the fins, with the exception of the dorsal fins, were virtually black. The female looked medium to dark brown and had no light longitudinal stripes. Two and one-half hours later a large number of white eggs were lying on the bottom of the bowl. From time to time male and female swam to the ceiling of the "cave." A bubble-nest was not present. After another two and a

May, 1976

half hours many of the eggs were scattered over the bottom and the top of the bowl. Three hours later all the eggs and the male had vanished and the female was standing in the farthest corner of the aquarium. I had raised the back of the bowl by putting a small stone underneath it—to preserve the bubble-nest under the roof, if the animals were to build one. I now discovered the eggs under the bowl, beside the stone; the male was guarding them. Although I siphoned off the 50 eggs (for breeding experiments), the male remained in the same spot and was still there the following day.

The light gray eggs are roughly 1 mm large. After just a few hours the germinal disc has already become clearly visible. After two days one can discern the constriction of the as yet pigmentless embryo, which extends over half the yolk. At 25° C., the light gray fry with their enormous yolk-sac hatch after barely three days. If there is the slightest water turbidity, they may hatch prematurely (half a day too early), but if conditions are favorable these fry, too, will develop normally. The pigmentation of the eyes and the yolk-sac only starts the following day and then proceeds very rapidly. The other thing one will very soon be able to see is a small dark spot on the caudal peduncle. At first the fry lay on their sides at the bottom of the water and did not move. Then, a full two days after hatching, when the tank was brightly illuminated, they wriggled through the water for the very first time. Three days later they reacted to the slightest vibrations. At the age of five days they were all sticking to the glass pane. Six days after hatching the first of the fry started to swim free; about the seventh day they measured 4½-5 mm and were swimming about in all water layers. By this time the yolk-sac had been depleted. They frequently sought cover beside the aerator or behind the air-tube and could be seen there in an oblique position, with the head downward. During the night they adhered to the glass pane; some of them still did this even when they were 32 days old. Immediately after they had begun to swim free they greedily swallowed nauplii of *Artemia*, and after 21 days they were 8 and after 32 days 10 mm long. With regard to the fry of other anabantoid species, we know that their labyrinth forms when they are only a few weeks old and that from then on they frequently swim to the surface for air. I have never observed this in *P. deissneri* at all, not in any of the broods I have raised.

I was later able to watch two different pairs in the act of spawning. Often the female already joined the male inside the cave hours before. Always, the male clasped the female in a U-shaped embrace from below and after 10-12 seconds turned her sideways. Then the female turned the posterior part of her body slightly to the side and—presumably during egg-laying—moved her tail fin to and fro. Afterwards the male relaxed the embrace a little and the female swam out of it. For a few seconds the male remained motionless, his body still forming a U; then he slowly sank to the bottom. Both on its body and on its anal fin it carried 6-8 whitish eggs which either fell off when the

male came out of its U-position or had already been removed by the female (which would pick them up with the mouth). After a short interval, the two sexes then picked up the eggs and attempted to stick them on the ceiling. Usually this was initiated by the female. After removing them from the male's body, she kept them in her mouth and then swam to the cave with them. Sometimes the two fish would stand vertically above the bottom and pick up the eggs. But, apart from a few, the eggs kept falling down again and those that had stuck to the ceiling were usually pushed off

During the author's first attempts at spawning *P. deissneri* the eggs fell from the roof of the cave; the male tended them for a time but then lost interest. Photo by Dr. W. Foersch.

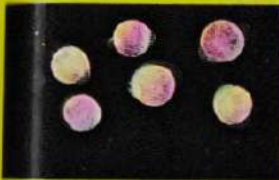
*P. deissneri* fry 12 hours after hatching; within the short 12-hour time span between hatching and the time this photo was taken, the fry had elongated considerably, and the yolk sacs are noticeably diminished. Photo by Dr. W. Foersch.



Female *P. deissneri* showing crisp longitudinal banding pattern. Photo by Dr. W. Foersch.



*P. deissneri* eggs two and one-half days after having been laid; the developing (not yet pigmented) embryos can be clearly seen. Photo by Dr. W. Foersch.



*P. deissneri* fry three days after hatching, at this stage they are 4 mm long and clearly pigmented. Photo by Dr. W. Foersch.



The head-down oblique position of the brooding male *P. deissneri* was a typical position for the fish and did not indicate ill health. Note the eggs at one corner of the spawning cave. Photo by Dr. W. Foersch.

again by the over-zealous parents. In his attempts to stick the eggs to the ceiling, the male frequently stood in a vertical position and pressed his body into the corner of the bowl. To start with, the two sexes worked side by side, but later the female was driven away. Occasionally, when this happened and the male left its territory, he would temporarily lose those beautiful colors shown during courtship, mating, and broodcare.

As described above, *P. deissneri* spawns in caves and attaches its eggs to the roof of the cave—without building a bubble-nest. On only one occasion was I able to detect a few air-bubbles, after spawning, under the ceiling of a bowl, but these bubbles soon disappeared. In nature this small labyrinth fish presumably spawns in sheltered spots under leaves, under river banks, roots, or in small "caves" in the dense plant thicket where it is able to attach the eggs to a substrate. That much, then, I knew. Meanwhile the first young—from eggs I had siphoned off and grown artificially—had become sexually mature, and it turned out that their offspring were no longer so sensitive to water quality, notably during the first few days. It was

88

89

### Tropical Fish Hobbyist

therefore no problem to continue to breed this fish in captivity. What I really wanted, however, was to witness the natural rearing of a new generation. So I kept asking myself why it was that the eggs would not adhere to the roof of the cave. And suddenly I recalled an old story of more than 20 years ago, concerning the breeding of *Nannostomus marginatus*, a fish that got itself a bad name for devouring its own eggs. One hobbyist wrote me that the dwarf pencil fish could be bred quite successfully on a permanent basis in small bowls and that it would leave its eggs alone if it was given sufficient live food every day. But as he pointed out to me in a note that accompanied a "tested and approved" pair of breeders, it was essential not to use soft water, as the soft water would make the eggs stick to the spawning substrate. In water with a hardness of 10-12 German degrees the eggs did not stick; they dropped to the bottom, where the parent animals took little notice of them, and could be collected and taken out once or twice a day.

If the eggs of the dwarf pencil fish stick to the plants in soft water, why should the eggs of *P. deissneri* not adhere to the cave's ceiling under the same conditions? From then on, whenever I carried out a partial water change in the four breeding tanks, I used peat-filtered rain water so that the aquarium water grew increasingly softer. In January, 1972, during the daily check-up, I discovered a large number of eggs without air-bubbles under the ceiling of a bowl, with the broodcaring male in attendance. Not a single egg was lying on the bottom! The eggs became fewer every day, however, and after four days all of them had disappeared. At least I knew that the walls of the earthenware bowl were not too smooth after all—it was just that the eggs needed soft water to stick to them. The fish in these aquaria spawned more than 70 times in all, and usually all the eggs stuck to the ceiling of the "cave" immediately after spawning. Sometimes the eggs were piled up like a bunch of grapes; sometimes they were attached to the top corner of the lateral wall of the bowl. Where all the eggs—or the majority of the eggs—were lying on the bottom or fell off the ceiling after a day or two, they were likely to have been damaged or unfertilized eggs.

Often the females were ready to spawn again at intervals of eight days. If there were two females in the tank with the male, one female tended to spawn not much later than the other. It could also happen that the male spawned with both of the females simultaneously and that the eggs lay everywhere in the cave, under the ceiling and on the bottom. Sometimes a fight would break out between the two females.

Since I had no success in getting the spawning pairs to perform a complete natural brood cycle, I decided to discontinue my experiments. I took a trip lasting about two weeks, and when I returned I could hardly believe my eyes at the sight that greeted me. Under the roof of a cave in one of the tanks there hung numerous embryos that had apparently hatched about two days before my return; there were

90

### May, 1976

no air bubbles. In another tank (containing one male and two females) there were many fry, some of them in the oblique position that indicated that they were comparatively newly hatched, some in the horizontal position that indicated that they were about to become free-swimming... and there was also a new clutch of eggs. Finally, in a third aquarium, I discovered a considerable number of young fish—some already partially pigmented—and many air-bubbles. It would appear, therefore, that these little labyrinth fish take air-bubbles into the nest after all when exercising broodcare over a longer period. Why was it that suddenly, after so many failed attempts, natural broodcare was carried out simultaneously in three different tanks? I still do not know the answer. Nothing had been changed during my absence. The *P. deissneri* had only been disturbed every other day, when they were given food, and the light in the fish room was switched off early in the evening. In spite of much activity that now went on in the aquarium room and the fact that often a bright light was left on until midnight, the fish in all three aquaria continued to look after the brood.

Within three months there had been 25 instances of natural broodcare which I was able to observe and record. The embryos hatch after three days but hardly look like embryos at first. Even if one examines them very closely, they still look like longish eggs, some of them sticking together, forming a "bunch of grapes." The embryos grow increasingly longer and one and a half days later the small tails become visible when most of the larvae are adhering to the ceiling, in a vertical position. Pigmentation has already begun at this stage and now proceeds rapidly. Eleven to twelve days after egg-laying the relatively large young have resorbed the yolk-sac and leave their place of birth. Gravid females approaching the broodcaring male were usually driven away. In some instances, however, another or the same female mated again with the male seven to eight days after spawning. The by this time already well-developed larvae were, of course, still in the cave, but the female ignored them. During the winter months I supplemented the normal diet of the adult fish with nauplii of *Artemia salina*. Fry which I had left with their parents during that time grew up quite safely.

On the day of spawning there were few, if any, air-bubbles under the roof of the cave. Usually they did not appear until the second or third day. Later, when broodcare was well under way, countless bubbles were carried into the nest and, in most cases, many of them were still there when the fry had already left the nest. Sometimes the male stays in the deserted cave for another two to three days, standing under the remaining few bubbles.

It is certain that *P. deissneri* differs from the other labyrinth fishes in that it does not come up to the surface for air. Whether it makes use of its labyrinth at times of stress (high temperatures, water with a low oxygen-content) remains to be established by re-

91



*Parosphromenus deissneri* shows a much lesser degree of development of the labyrinth organ and is much less dependent on atmospheric oxygen than most other aquarium anabantoid species. Those anabantoid species that are less dependent on atmospheric oxygen (*Trichopsis*, *Macropodus* to a certain extent) show a tendency to lay their eggs in protected submerged areas rather than at the surface of the water. The *Trichopsis* species shown here, for example (*Trichopsis pumilus* above and *Trichopsis vittatus* below) at times will construct the nest at the water's surface and at other times will lay the eggs in caves or in the cupped underside of an aquatic plant well below the water's surface. Photos by H.J. Richter.



May, 1976



*P. deissneri* fry seven and one-half days after hatching; these fry are about to become free-swimming. Photo by Dr. W. Foersch.



Above right and both photos below: the male is seen tending spawn that remained attached to roof of cave after the author had used softer water in the breeding tank. While he was using comparatively harder water, the eggs continued to fall from the roof of the cave, and the male lost interest in them after a few days. Photos by Dr. W. Foersch.



search. During the course of evolution it appears to have "learnt" to manage without its labyrinth. Like its relatives, however, it brings air-bubbles into the nest towards the end of broodcare (unless it is prevented from doing so, as my later experiments showed).

It has taken me a long time to find out as much as I have about this outsider among the labyrinth fishes. But *P. deissneri* is a lot more than just interesting. One never tires of watching the male in its splendid colors courting the female or looking after its offspring. I have to point out, however, that *P. deissneri* is unsuitable for the community tank, and it is not recommended to combine it with large or restless fishes. The aquarist who is prepared to take a certain amount of trouble and provide the fish with the conditions it requires will find the keeping of *P. deissneri* a very special and rewarding experience.

93

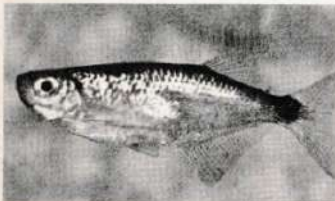
Tropical Fish Hobbyist

### UNIQUE CHARACOID HAS STRANGE SPAWNING MODIFICATION

The December, 1975 issue of the German aquarium magazine *Die Aquarien-und Terrarien Zeitschrift* carried an interesting illustrated article written by Dr. Stanley H. Weitzman, Curator of Fishes at the Smithsonian Institution, about a little-known species of South American characoid that possesses a unique distinction: fishes of its genus (*Pterobrycon*) are the only ones in the world that have movable scales. They don't have many movable scales, but each species has at least one or two movable scales on each side of the body. The scales are situated on the dorsal part of the



A pair of *Pterobrycon myrmae*. The black spot at the center of the body of the male is not a marking on the body itself but the black tip of the movable scales on the left side of the body. Photo by Weitzman and Fink.



94

May, 1976



While in a head-to-tail position to the female, the male waves the banner-like scales near her. Photo by Weitzman and Fink.

body, behind the head; they are long and slender and used to attract the female during courtship.

In *Pterobrycon landoni*, discovered in Colombia in 1912 by Dr. Carl Eigenmann, there is only one scale on each side. *Pterobrycon myrmae*, de-

Here the male *Pterobrycon myrmae* is evidencing control of the elongated scales by positioning them to attract the attention of the female. Photo by Weitzman and Fink.

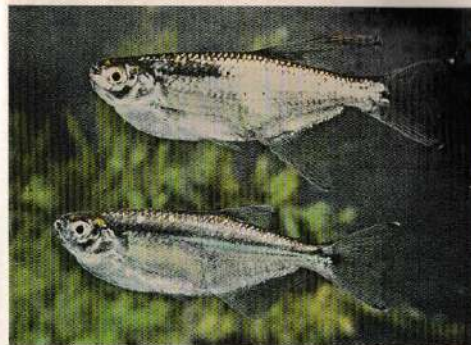


95



*Mimagoniates microlepis*, a glandulocaudin species that has shown up on the aquarium market from time to time. Photo by Dr. Herbert R. Axelrod.

*Corynopoma riisei*, the swordtail characin. Photo by R. Zukal.



*Pseudocorynopoma doriae*, the false swordtail characin. Photo by Dr. Herbert R. Axelrod.

*Gephyrocharax caucanus*, one of the glandulocaudin species that has been introduced into the aquarium hobby. Photo by Dr. Herbert R. Axelrod.



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scribed in 1974 by Dr. William Bussing of the University of Costa Rica, has two scales on each side, and each scale has a distinct black tip.

The subfamily Glandulocaudinae contains, in addition to *Pterobrycon*, four or five other genera of fishes that have been seen in aquaria and about ten that have not been seen by hobbyists. *Corynopoma riisei*, the swordtailed characin, has long been the object of study because of its peculiar spawning pattern and anatomical adaptation especially of the male, in which the gill covers are extended backward into a long spine that ends in a flattened tip. During courtship the male uses the spiny extensions of the gill covers to excite the female by stroking her with them, and in contrast to what happens with most egg-layers, he transfers a packet of sperm to her instead of releasing the sperm into the water.

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