The Scheel Letters, Number 7

Pterolebias

In the Jan. 59 issue of the Danish pet magazine Stuekultur I wrote a popular article on the South American "Veiltail Rivulus", the Pterolebias. Perhaps you may use some of the information herein in your (future) keeping and breeding of these elegant fishes.

Within the South American killies, the Cynolebias group form a particular group from the point of view of an aquarist. Much closer to the Rivulus we possibly find the species within Pterolebias and Rachovia both of which may be confused as true annual fishes. These genera seem to be associated to the large flooded areas along the big rivers. As members of the genus Rachovia have not been kept as aquarium fishes for many years, we shall not deal with these fishes.

The two aquarium kept species of Pterolebias, the "longipinnis" and the "peruensis" remind rather much of Rivulus, most in the "peruensis", which is much more slender than the "longipinnis". But in this genus the caudal fin and in some way also the anal fin are much larger than we find these fins in the common Rivulus.

The best known species is Pterolebias longipinnis. This is the type species of the genus Pterolebias. Agassiz found this species somewhere near the Rio Amazonas in 1865. In 1895 Samuel Garman used it as type species for his new genus Pterolebias. First importation of live specimen came to Germany in 1931. Only a few fish which were not bred and died rather soon. More importations came into Germany in 1939 but also these gave no offspring. After the war, in 1949 the species once more was imported to Germany (Aquarium Hamburg). The fate of these are unknown to me. Our aquarium stock possibly comes from one or more importations to Tropicarium M_nchen in 1955. This stock was established by Dr. Meder and Dr. Foersch and from M_nchen eggs were mailed to Scheidness in the USA who raised a USA stock. My present stock came from Dr. Foersch in 1958 as eggs. We do not know the exact place in nature where this handsome fish is caught. Garmann gives the "lower Rio Amazonas" as the place where Agassiz caught his specimens. Near Santarem. But it is known that the importations to Tropicarium came from Buenos Aires (??). I have little doubt that the lower Rio Amazonas may be the right place. Here in the "vareza" along the flooded parts of the river we find the conditions which an annual fish will like.

The "vareza" is the prolific landscape along the river. During some seasons of the year this lowland is flooded by the river. The conditions around Santarem in particular is well known from the investigations of Harald Sioli, Rudolf Braun and F. Katzer who studied the water conditions. The mean temperature of the air is 27_C for the year. The mean temperature for the coldest month is 26_C and 29_ for the hottest

months. The area has distinct rainy and dry seasons. The dry period is July-Nov. The temperature in the "vareza lakes" was measured by Braun. Mean temperature 29-30_C. Of 30 different values, 24.6_C was the lowest temperature, whereas the highest was 32.0_. The temporary hardness (German degrees) was 0.0-0.9_. pH 5.0-6.0. During the rainy season, plancton and bigger food is plentiful (see Schweizerische Zeitschrift f_r Hydrologie. Vol. 14, 1952: "Limnologische Untersuchungen an einigen Seen im Amazonasgebiet" by R. Braun).

Pterolebias longipinnis grows up to large sizes. 12 cm in nature, but possibly not above 10 cm in tanks. Of these centimeters although 4 are occupied by the large caudal fin. The is smaller and rarely above 6 cm.

Foersch and Meder give very interesting information on the various colour variations within this species.

The ground colour of the imported males mostly was greyish blue, more bluish on the throat. Also the imported females had this greyish blue cast. In the vertical fins streaks and dots of dark colour are seen. On the sides of the body the male has rows of brilliant scales which run from the back forward-downward.

The aquarium raised males have another colouration. About 60% were reddish brown and with intense brownish marblings on the vertical fins. The brilliant scales are easily seen. On the side of the body just behind the pectorals a very remarkable "wound" is seen. This "wound" is formed by some carmine scales surrounded by brilliant black scales. Just the same type of "wound" we often find in African killies: the Aphyosemion (Epiplatys?) petersi. The 40% of the offspring males were coloured more like the imported males. Also about 60% of the tank raised females were brownish and the counterpart to the "wounded" males. Breeding this variant gave once more about 60% of reddish brown males and females. The 40% also of of the offspring were much darker in both sexes. The males have no "wound". The brilliant scales on the sides were brighter in the darker males. Also they developed larger fins. Such males and females also came when they bred the darker fishes. Meder found some particular albinos in his stock. In these the brilliant scales and the marbelings were difficult do detect. Among the tank raised stocks some males (with or without any "wound") had a broad dark blue band in the lower part of the anal fin.

These colour variations no doubt come from some differences in the inheritance factors of the natural stock, but in some way also other factors may play a role. Foersch (in an article on Cynolebias (Cynopoecilus) ladigesi) pointed out that the degree of lighting by which males were kept played an important role to the brilliance of the males. Males which were kept in dark tanks did not develop very much of the handsome green cast on the sides and fins whereas males from very light tanks were handsome greenish. Foersch also in another article wrote that males of Cynolebias bellotti in his stock through some generations were more and more brownish and lost their handsome blue cast. But some males which he raised from some eggs which had been stored very cold for some days. To my opinion the question of the brilliance (that will say the development of the guanin and/or other elements of irridescence) of the male within killies needs a further study because this brilliance indeed is of great importance from an aquarist's point of view.

Not so well known is the Pterolebias peruensis. This species was imported to USA in 1954 from the

Peruvian Amazonas. Myers described this new importation as a new species and called it "peruensis". The importations were made by Paramount. This species is much more slender than is the "longipinnis" and also more "rivulid". The ground colour is a reddish brown to olive. Along the sides 9 to 11 fade cross bars can be seen. These cross bars are very difficult to detect on the foremost part of the body. In the dorsal fin 5 rather distinct dark bands are seen. Also the anal fin has such bars, but only on the hindmost part of the fin they are easily seen.

The caudal fin has many fade cross bars. Near the lower edge a longitudinal band is seen in most males of my present stock. In particular the caudal fin and some parts of the anal fin show many very brilliant green dots (not far from those we find in male Cynolebias nigripinnis, etc.)

In both species the anal and in particular the caudal fins are very well developed. No doubt one could give this species the name "veiltail". In "longipinnis" the caudal fin is more rounded but very often the hindmost part is split up into many points. The 1954/55 importations of "peruensis" was not a "lyre tail type" as is our present stock. In Axelrod's "Handbook of Tropial Fish" there is a good photo of our present type but Axelrod's photo shows a very yound male. The filaments of the caudal fin could be much longer.

In both species the pectorals are also well developed and big pectorals we even find in the fry when they come out of the eggs.

I must say that among my many species of killies these two species are valued highly not for the colouration (this we find much more brilliant in most other species) but for their elegance. Indeed they are very decorative. I have not been able to collect much information on the climatic conditions at the upper Rio Amazonas. But this area has more rain than the possible home of "longipinnis". The total rainfall of the year is about 2500 mm and the more we approach the Andes Mountains the more rain we get. August is the driest month with only (!) 125 mm. No distinct rainy or dry seasons in this area. I wonder what a real "annual fish" has to do in this area. More southward in the great flooded plains and swaps along the Rio Guapore there lives a third species: Pterolebias bokermanni described in 1955 by Travassos. I have not seen the description of this species. This area seems to be well qualified for the life of an "annual fish". During the rainy season about 120 000 square kilometers are flooded by the rivers (Rio Beni, Rio Marmore, Rio Guapore) from the end of Dec. to May or June. Even during the dry season this area holds large swamps.

To the north, in Venezuela, in the flooded plains along the lower Rio Orinoco, the fourth species: Pterloebias zonatus was found by people of the Rockefeller Foundation the state of Guarico in some pond. They brought one single specimen to Myers who in 1935 described this specimen as a new species. In alcohol the ground colour is yellowish brownish with 11 narrow cross bars along the sides and blackish dots on the caudal fin. The description of this poor preserved specimen to my opinion points in the direction of some close relative to our "peruensis". This area is very suitable for annual fish (the two species of Austrofundulus also live here or possibly a little more to the north). The dry season begins at the end of Nov. and lasts to the mid of May. Then the sky is cloudless and the air is dry. In April the rain begins to fall heavily and the rainy season lasts during the following 8 months when the equatorial trough dwells over the country. Most rain falls in the months June-July-August. About 200 mm each month.

From the examination of the frontal scalation pattern in the Rivulus and Pterolebias, Hoedemann came to the conclusion that Pterolebias longipinnis possibly is an offshot of the "urophthalmus complex" which forms a distinct group within the species of Rivulus, which belongs to the "maromoratus" series. The "urophthalmus complex" contains Riulus urophthalmus (Para etc.), Rivulus lanceolatus (British Guayana) and Rivulus santensis (Santos).

From our knowledge of the climatic conditions we may conclude that these species would like rather warm water in our tanks. Dr. Meder kept his Pterolebias longipinnis at 20-22_C as he believed that they live for a longer period at such "low" temperatures. He writes that 9-12 months would be normal to these fishes. Older German information in the DATZ etc. claim that the temperature should not be kept below 24_C. About Pterolebias peruensis a little is reported, but I keep my young fishes at 18-24_C and they do well.

All information in the various aquaristic literature says that the water should not be alkaline. The fish do live a sounder life in slightly acetic water. Some information recommends adding of little salt (NaCl) and most people possibly keep this species in tanks with peat in contact with the water.

Both species do take dry food, but they prefer live food. Daphnia, Cyclops, etc. I kept two males of "longipinnis" together with one female. The males never fought and certainly before the female came into their tank they "spawned" busy with each others. The biggest male allwyas was the "male". Also after the arrival of the female I saw these two males "spawning". They use to dig hollows into the fine mud in their tank, in the way that Nothobranchius (palmquisti) did.

Just now I keep 20 specimens of "perunensis" 30-50 cm long, all males together. These do not fight each other. For some weeks I kept my smaller 2/1 Pterolebias longipinnis together with my much bigger pair of Pterolebias peruensis. The males and females (16 liter glass tank) lived peacefully together.

The spawning act possibly takes place in the same way by both species. Foersch described the spawning act of "longipinnis". When the male sees the ripe female, which used to stay near the surface, he approached her by swimming in an elegant curve in front of her. Now he spreads his fins and gill cover. If the female is ripe she swims to the bottom in front of him. She finds the right place where eggs are deposited. After some searching she finds the place and places herself in a vertical position, nose down, and now she dives into the soft mud by quick and jerking movements. This is the signal to the male to start his dive close to her. Both fishes disappear in the mud, within a very short time. By the quick movements of the fishes the mud raises in a big cloud from the bottom. The breeding pair stays in the mud for about 1 minute. Then the male comes to the surface and stays near the bottom waiting for the female to appear. In this way they make several dives until the female is empty.

Foersch had difficulties in having spawning on a hard bottom, but at last Foersch was able to watch the spawning act. He saw that the female like the female of "bellotti" formed her anal fine like a pouch to catch the egg. Eggs are rather big. 1.35-1.45 mm in both species. There are only a few very short filaments and a pattern of fine dots on the surface of the membrane. These eggs remind much of eggs of Cynolebias (bellotti, nigripinnis, and whitei).

Foersch studied the development of the eggs of "longipinnis". After 6 weeks of drying or when the eggs were ripened in water about 80% of the eggs had finished the development. Very often the fry were ready inside the eggs after 4-5 weeks. About 1/3 of these eggs did not hatch by watering, nor by dry food or by prolonged drying or repeated dryings and waterings. Only a few were forced out of the eggs by these methods. Other fry died in the eggs without hatching. Foersch normally had only 20% of "resting eggs" (few % and up to 30% depending on the conditions). His adult "longipinnis" were not hurt by temperatures down to 8_C for a short period. The eggs were not hurt by 8-10_C during two weeks, even 5_C in a refridgerator did not hurt them (4 days).

"Resting eggs" normally will develop (within 14 days) after a delay of 4-6 weeks. In one egg the development started after 3 months as "resting egg".

Here are the data of the eggs I got from Dr. Foersch in 1958. After 45 days in dry peat 21% of the eggs hatched in the first watering without any use of dry food. 1/5 of these were not able to swim (belly sliders). 72% of the eggs had fully developed embryos. 4% had a very small embryo, with no pigmentation and no blood. 3% had no trace of an embryo.

In the Aug. 1955 issue of the "Aquarium" LaCorte gives some information on his stock of "peruensis". Females gave away 20-30 eggs a day. His first eggs had a fully developed embryo after 3 months. Hatching with dry food gave only belly slideres. Some of the 3 months eggs he then dried for 3-4 weeks and from this peat he hatched sound fry.

Fry of both species are rather big. 5.0-5.5mm. Rather dark coloured and slender. The eyes have reddish orange brilliance. The fry swims around at all levels in the tank. They are raised just like other fry of killies. They mature in about 6-8 weeks.

The development of some eggs of Pterolebias peruensis

I have collected some data on 3 (4) batches of eggs which Jack Scheidness mailed me during 1958. These data not only may show you the fate of ripe eggs shipped during too cold weather, but also the importance of a minute control of the eggs in peat, if no fry hatches out during the first watering. These batches certainly learned me to be more careful in my inspection of batches of eggs which apparently were ruined (by frost).

- 05 Aug. 58: Jack drove to New York and brought 3 pairs of Pterolebias peruensis (possibly from a South American importation) at Paramount. In Philadelphia these pairs soon spawned on nylon-mop. Eggs were soon sent to me. Jack's instructions: Dry for about 40-50 days, normally you will have 3-7% of belly sliders by that length of drying.

- 14 Aug. 58: First batch arrived in Virum in a rather wet mop. I shook out 10 transparent eggs and two "white" eggs. No development inside any egg. Eggs placed in a small glass on shallow water added the usual concentration of methyleneblue and euflavine in order to protect eggs. The green medicine penetrates all eggs which soon were very green indeed.

- 20 Aug. 58: 8 eggs still transparent. 7 of these in moist peat for drying. One egg stays in water for further inspection. Nothing came out of this batch I.

- 07 Sep. 58: In the mean time Jack spawned his pairs on peat.

- 04 Sep. 58 he packed two more batches (II and III) for me. He kept half the amount of the two samples in Philadelphia (see also 15 Nov. 59). Both batches (possibly from two pairs, as I think one pair was shipped to Werner) were spawned from 15 Aug. to 31 Aug. 58. Jack's instructions: first watering after 29 Sep. 58, second watering after 10 Oct. 58. Eggs arrived in Virum on 07 Sep. 58 and were stored in two air tight glasses for further ripening.

- 04 Oct. 58: Both batches in peat had their first watering. No fry. I did not inspect the peat, nor did I notice any eggs at all. Redrying on 07 Oct. 58, uniting both batches, as they had the same spawning data. Same day, as I was packing a few eggs of Cynopoecilus melanotaenia for Emmens (Mullner's stock) I noticed some hard balls in a little sample of peat which I took from the peat of "peruensis" for the ampoulle for Emmens. Further inspection of the peat showed lots of hard eggs covered with particles of peat.

- 15 Nov. 58: Jack mails some more peat from the spawnings 15 Aug. and 31 Aug. 58 which he had kept as reserve. Before mailing he controlled a small sample of this peat and hatched some fry. Batch (IV) arrived in Virum on 15 Nov. 58 during unusual cold weather and in order to find out the condition of these eggs I at once washed out all eggs. I found:
    - 11 eggs with fully developed embryo, all dead (frozen)
    - 1 egg with about 3/4 developed embryo, malformed, dead
    - 1 egg with pigmented smaller embryo, dead
    - 1 egg with little pigmentation on embryo, circulation of blood. Alive
    - 22 eggs with non pigmented, small embryo, no blood system developed, but the embryos more lively inside eggs, alive
    - 14 eggs very covered by particles of peat, no big embryo, but possibly non pigmented embryo or no embryo
    - 12 eggs transparent, no trace of development (resting egg)
    - 2 "white" eggs (fungus)

  Totally 64 eggs, at least 13 of these were very dead indeed. During cold weather the mailing of "resting eggs" or eggs with non pigmented embryo will no doubt be the safest method in future. These eggs were divided in two portions and dried up in moist peat. 36 "good" eggs in one batch and 28 "questionable" in another batch.

- 15 Nov. 58: Batch II and III (arrived on 07 Sep. 58) had their second watering. No fry on 16 Nov. 58, one fry on 17 Nov. 58, one fry on 18 Nov. 58. These fry grew up to form one pair, but at maturity the male jumped out of the tank and died.

- 09 Dec. 58: The "36 good eggs" arrived on 15 Nov. 58 in water. No fry. Eggs washed out of the peat and controlled one by one under the microscope.

- 9 eggs with big hatchable embryo
- 4 eggs with smaller but pigmented embryo with blood circulation
- 7 eggs with small non pigmented embryo without any blood
- 5 eggs without any embryo or with trace of embryo

All eggs dried up once more in the same amount of peat. 22 Dec. 58

- Batch II and III (arrived on 07 Sep. 58) in water, using dry food. After 24 hours no fry. Eggs washed out:
  - 79 eggs with embryo pigmented and with blood, hatchable? 29,5%
  - 189 eggs with non pigmented embryo or without any embryo 70,5%

  15 ripe eggs were treated with "dry food" and some hatched within 5 hours or more. Two times 60 transparent eggs were stored in moist peat and dried up. The rest of the transparent eggs were kept on shallow water and later on batches of these were shipped to Mullner (05 Jan. and 21 Jan. 59) and to Foersch (02 Apr. 59), Norderhaug and Leakey.

- On 25 Feb. 59 I noticed that no transparent egg could be found among the eggs on shallow water. All these eggs had heavy pigmented embryos.

- On 25 Dec. 58 also 10, 10, 15, 30 eggs with large embryo were stored in air tight containers in order to mail these if weather would permit this. Let us see what happened to the two times 60 (transparent), the 30 ripe eggs and the two sections of batch I (arrived on 15 Nov. 58).

- 28 Feb. 59: Watering of all these batches (except the 10, 10, 15 ripe ones)
  - 60 eggs gave no fry after 24 hours, 18 fry and 8 belly sliders after 48 hours, 8 fry and 2 belly sliders after 72 hours, totally 26 sound fry and 10 belly sliders. The belly sliders were placed on a few millimeters of water and after two days most of them were free swimming fry (of totally 21 belly sliders in these hatchings I had all except 2, which died, transformed into sound fry). The peat also had 10 eggs with big, hatchable embryo, one egg with smaller embryo and 11 eggs without any embryo (58 out of 60).
  - 60 eggs gave no fry after 72 hours. Peat had 19 eggs with big, hatchable embryo and 29 transparent eggs (48 out of 60).
  - 30 "ripe" eggs gave 23 sound fry and 1 belly slider after 24 hours and 1 sound fry after another 24 hours. No eggs left in peat (25 out of 30).
  - "36 good eggs" (batch IV from Jack) gave no fry after 24 hours, after 48 hours 6 sound fry and 13 belly sliders. Peat had also 3 eggs with large embryos and one "grey" egg (23 out of 25 eggs left on 09 Dec. 58).
  - "28 questionable eggs" also in batch IV gave 5 sound fry and no eggs were left in the peat.

- 09 Mar. 59: I packed 42 transparent eggs once more in one sample. They are still in peat. On 02 May 59 I washed out 39 eggs, 37 have big, hatchable embryo, 2 with no embryo, dry food water on all eggs. 33 fry hatched within 2-3 hours. After 24 hours on low water with coarse peat 18 were swimming all right.

  Further breeding of this species will show us if the development of eggs as I found in these

batches is the normal one. I do not believe in that, no doubt these eggs were more or less frozen during the transportation in airplaine.

No doubt the delay in hatching of the fry in most of the waterings and the non hatchable of many ripe eggs came from the very clean peat and water which was used in these batches. In most waterings there came no cloudy water, the water stayed very clear and just like in p.e. Nothobranchius the eggs do not hatch from the change inside pressure after watering, but also need bacteria to burst.

? Bill Edwards

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