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The Genus Rivulus

Dr. J.J. Hoedeman kindly sent me his last review of the genus Rivulus, named "Rivulid Fishes of Surinam and other Guayanas" ("Studies on the Fauna of Surinam and other Guayanas" vol. III 1959). From this interesting paper I draw some information of general interest to aquarists:

The genus Rivulus was proposed by Poey in 1861, using "cylindraceus" as the typical form. Up to that time only one species -now within Rivulus- was known to zoologists: "brasiliensis" from Para (Belem) at the mouth of the River Amazona, described by Valenciennes as a Fundulus in 1811. Totally 58 different species have been described by zoologists and placed within the genus Rivulus, however some of these species names were found to be synonyms, whereas others now are placed inside other genera of South American Killies. These are:

- R. brevis = Rachovia brevis (Colombia)
- R. balzanus = Rivulichthys balzanus
- R. rondoni = Rivulichthys rondoni
- R. rogoague = Rivulichthys rogoague

Hoedeman considered 3 general groups (called "series") in Rivulus, these groups representing 3 main evolutionary lines descending from ancestors which once lived in tropical America. From here the groups dispersed to the North using 2 different routes: one eastern via the Greater and Lesser Antilles ("marmoratus" group) and one western route via the Yucatan and the Middle America provinces ("cylindraceus" group). The third group ("breviceps") remained in tropical America generally, although one species reached Haiti ("roloffi"), whereas 2 species reached Rio de Janeiro ("dorni" and "brasiliensis") and 1 species Matto Grosso: Rio Paraguay system ("punctatus").

The main characters of these groups are:

"breviceps" series: rather small species with low scale counts, typified by a more or less complete series of vertical stripes, bars or streaks on the caudal which fade with age and change into longitudinal markings, no real caudal ocellus in either sex. This group inhabits the lowlands of Guayana and Amazonas. The forms ("agilae") prefer to live near the bottom of the tank, but are not real bottom dwellers like Cynolebias. The resting attitude of the group is sloping, tail downwards (as most Aphyosemion of the subgenus

Aphyosemion) preferably between clusters of water plants, but never right at the surface. In Surinam this series inhabits the lowlands up to 250 m above sea level and up to 150 km from the coast. The species probably are able to tolerate brackish water.

"marmoratus" series: larger species, finely scaled, often with a marbling effect in the markings, caudal ocellus in young and females, and sometimes also in mature males. This series is chiefly confined to coastal drainage systems. This series is divided into 3 groups (called "complexes"). Behavior in aquarium: like the "breviceps" series (?). Surinam species are found up to the 200 m level and up to 300 km from the coast.

"cylindraceus" series: more or less robust forms, coarsely scaled, lateral band or longitudinal markings on or between the scale rows, caudal ocellus in young and females only. This series is divided into 3 groups ("complexes"), all more or less restricted to elevated river systems and hill stream regions. The aquarium-kept forms defend a certain territory. Some of the species are surface dwellers, resting in an almost straight position, with their flat head pressed against the air above (as most Epiplatys and Aplocheilus).

Species (or forms)

"breviceps" series has following forms:

- 1 "roloffi" San Domingo, Haiti 1938
- 2 "brasiliensis" Eastern (?) Brazil 1811
- 3 "dorni" Rio de Janeiro 1924
- 4 "frenatus" Guayana 1909/12
- 5 "breviceps" Guayana 1909
- 6 "agilae" Surinam 1954
- 7 "geayi" French Guayana 1899
- 8 "dibaphus" Lower Amazonas, north of the river 1927
- 9 "ornatus" Lower Amazonas, Silva 1895
- 10 "striatus" Middle Amazonas, Cudajas 1912
- 11 "beniensis" Upper Amazonas, Rio Benin, Bolivia 1927
- 12 "taeniatus" Upper Amazonas, Rio Caqueta, Colombia 1945
- 13 "compactus" Rio Tocantins, Porto Nacional 1927
- 14 "punctatus" Matto Grosso, Rio Paraguay basin 1895
- 15 "obscurus" Middle Amazonas, Lake Hyuanuary 1895
- 16 "atratus" 1895

Hoedeman considers all these forms to be geographical races, more or less completely isolated from each other geographically.

"marmoratus" series is divided into 3 complexes: "marmoratus"- "isthmensis"- "urophthalmus"
"marmoratus" complex has the following forms:

- 1 "ocellatus" Rio de Janeiro 1868
- 2 "marmoratus" Cuba, Curacao, Bonaire, Barbuda etc.1880
- 3 "myersi" Progreso, Yucatan 1936
- "isthmensis" complex
- 4 "isthmensis" Costa Rica 1895
- 5 "volcanus" Panama 1938
- 6 "hildebrandi" Panama 1927
- 7 "peruensis" Perim, Peru 1903

"urophthalmus" complex

- 8 "urophthalmus" Guayana, Lower Amazonas etc. 1866
- 9 "stagnatus" Guayana 1909
- 10 "lanceolatus" Guayana 1909
- 11 "santensis" Santos, Brazil 1906
- 12 "xanthonotus" Obidos, Amazonas 1926
- 13 "mazaruni" River Mazaruni, British Guayana 1924

Hoedeman considers the complexes as species or superspecies, so far. 5 species or forms have been imported as aquarium fish, but apparently none is on the international fish market now.

"cylindraceus" series is also divided into 3 complexes: "cylindraceus"-"elegans"-"micropus"

"cylindraceus" complex

- 1 "cylindraceus" Cuba 1861
- 2 "heyi" Haiti 1914
- 3 "zygonectes" Vereda, Brazil 1927

"elegans" complex

- 4 "tenuis" Mexico, Guatemala, Costa Rica 1904
- 5 "brunneus" Panama 1913
- 6 "montium" Panama 1938
- 7 "elegans" Northern South America and Trinidad 1880
- 8 "leucurus" Rio Jurado, Colombia 1944
- 9 "magdalenae" Magdalena Basin, Colombia 1916

"micropus" complex

- 10 "micropus" Rio Negro and Peruvian Amazonas 1863
- 11 "bondi" Caracas, Northern Venezuela 1949
- 12 "harti" Orinoco Basin, Margarita, Trinidad 1890

- 13 "holmiae" Guayana 1909
- 14 "waimacui" Guayana 1909

Two more species possibly belong to the "elegans" complex: "milesi" from Honda, Colombia (Fowler's drawing shows a fish very like the so-called "Golden Tail Rivulus") and "compactus" from Rio Tocantins, Brazil. As far as I am informed only 3 species or forms are kept as aquarium fish: "cylindraceus", "holmiae" and the "Golden Tail Rivulus", all belonging to the "cylindraceus" series. If you know of other aquarium-kept forms, I will be very glad to be informed. Hoedeman considered the "Golden Tail Rivulus" to be a (natural?) hybrid. Also "waimacui" is considered to be a natural hybrid. Natural hybrids were found in collections of Rivulus from Surinam (Dutch Guyana). Hoedeman found these combinations: "urophthalmus"/"holmiae": "urophthalmus" dominating "urophthalmus"/"holmiae": "holmiae" dominating "waimacui?", "urophthalmus"/"holmiae" and/or "breviceps"/"holmiae"

The hybrids first mentioned occur at places where the lowland form (urophthalmus) is mixed with the midland form (holmiae). However, hybrids are also found within the lower and higher mountain populations.