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Notes on the Ichthyology of Surinam (Dutch Guiana)

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A new species and two new subspecies of *Nannostomidi* from the Surinam river*)

by

J. J. HOEDEMAN

(Zoological Museum, Amsterdam)

INTRODUCTION.

My previous account on the *Nannostomidi* (1951, The Amsterdam Naturalist, 1 (1): 11—27) dealt with the synonymy of the recognized species. Diagnoses were given of the three genera, *Nannostomus*, *Poecilobrycon* and *Nannobrycon* (new genus). The account was based on but little material, largely on descriptions in literature, yet it could readily be proved that the species described before belong to 5 species only and to 3 well defined genera.

I have since had the opportunity to study rather large series from Surinam and some other localities. An entirely new species was found among this material, which is so interesting in many respects that it induced me to reconsider the matter of the phylogeny of the tribe.

According to a number of structural features the tribe *Nannostomidi* should be placed in the family *Erythrinidae* (as understood here), rather than in the family *Characidae* s.s., as will be pointed out later.

The large series allowed a closer study of geographical subspecies. A better understanding of the evolution within the tribe may be the result.

Though the relation of the tribe to other more primitive Characoids is still pretty obscure, the affinity with the *Hemiodontidi* seems to be beyond doubt. As GREGORY & CONRAD (1938, Zoologica, 23 (17): 324-349) state, the subfamily *Hemiodontinae* (as understood here) must be considered an offshoot of the *Cheirodontidi*, a side shoot of the *Cheirodon-Curimatus* line. *Parodon* is considered a short-bodied primitive forerunner of the elongate fusiform *Poecilobrycon*. I am at present unable to range *Parodon* and allies in any *Cheirodon-Curimatus* line.

Nannostomus stigmasemion FOWLER (1913, Proc. Acad. Nat. Sci. Phila., 65: 523, fig. 4) is probably no Nannastomid, differing essentially in the backward position of the dorsal, the robust head, and its entire appearance. It may even prove to be not a Hemiodontid at all.

*) Received, August 1953.

Poecilobrycon digrammus FOWLER (1913, l.c.: 525, fig. 5) clearly is close to *Poecilobrycon harrisoni*, differing in minor details only, and perhaps within the range of specific variation. For the present it seems better to leave it as a separate species.

The most peculiar and obvious character of all Nannostomids is the position of the jaws and lips, the mouthcleft appearing as if open, not fully closed. This enables the fishes to nip planctonic food from the plants and other objects with the slightly protruding teeth.

MATERIAL

The present paper, is based on both living and preserved material collected in the tributaries of the Surinam river by the Blij-Dorp Expedition early in 1952. Because of a yet unreported character found in specimens of *Poecilobrycon harrisoni*, viz. the presence of up to 3 well developed lateral line pores, I have included material from Demarara (British Guiana) as well.

DEFINITION OF TERMS.

It appears to be advisable to circumscribe the terms applied, which is as follows:

Standard length (st.l.), the length from tip of snout to midbase of caudal fin.

Head, in key and tables, length of head, from tip of snout to vertical from rear end of fleshy operculum.

Depth, the greatest depth of the body.

Snout, the length from tip of snout to front margin of orbit.

Interorbital, the distance (width) between inner margin of orbits, measured over the head.

Postorbital, the length between rear end of fleshy operculum and hind margin of orbit.

Caudal peduncle, the length from vertical from base of last anal ray to midbase of caudal fin.

Fin ray counts, are expressed in arabic numerals in key and tables, including both branched and unbranched rays, except in caudal. In case of the caudal fin rays, the formula 8 -- 9 indicates the presence of 8 branched rays in the upper, and 9 in the lower lobe: thus only branched rays are counted.

Any rudimentary rays in dorsal, anal, pectoral and ventral fins are counted as a single ray when clear base is visible.

Scale counts, will be found self-explanatory.

All counts and measurements are taken under the stereo-binocular dissecting microscope: measurements are taken with the aid of a cross-eye-piece, and nonius cross-tube in tenths of millimeters: they are expressed in 100 ths of the standard length.

Superfamily CHARACICAE HOEDEMAN

Characicae HOEDEMAN, 1952. Beaufortia 2 (20): 6 (erroneously written *Characiicae*): 1954. Aquariumvissen Encyclopaedie: 54—167 (in Dutch).

This superfamily will be discussed more fully on a later page. Together with the superfamily *Gymnoticae* it constitutes the suborder *Characoidea*, the *Characoidea* and *Cyprinoidea* forming the order *Cypriniformes*.

In order to avoid confusion we prefer not to give a diagnosis yet, but merely a survey of the tribes included in this superfamily. At a later date, when all groups and every described species will have been put in their proper place, it probably will be the best-known group of fishes.

Family Erythrinidae GILL

Erythrininae & Curimatinae GILL, 1858, Ann. Lyc. Nat. Hist., New York, 6 (10—13): 410—413, 421—422 (genera *Macrodon* = *Hoplias*, *Erythrinus*, and *Curimatus* Curimata).
Erythrininae, Hemiodontinae & Anostomatinae GREGORY & CONRAD, 1938, Zoologica, 23 (17), 324, 343—349 (discussion of relationship).
Erythrinidae HOEDEMAN, 1954, l.c.: 55—92.

The family as understood here, comprises two subfamilies, viz. *Erythrininae* and *Anostominae*, each with four tribes.

Subfamily Erythrininae

Erythrininae HOEDEMAN, 1954, l.c.: 56—84.

This subfamily consists of four tribes, *Lebiasinidi*, *Erythrinidi*, *Pyrrhulinidi* and *Nannostomidi*. It corresponds with subfamilies *Erythrininae*, *Lebiasininae* and part of the *Hemiodontidae* of REGAN.

The genus *Characidium* and allies (tribe *Characidiidi* HOEDEMAN, 1950, l.c.: 11) does not belong in this group of Erythriniform fishes but is now included in the *Characidae*, *Characinae* s.s.

Tribe Nannostomidi HOEDEMAN

Nannostomini HOEDEMAN, 1950, l.c.: 11—17 (genera *Nannostomus*, *Poecilobrycon*, and *Nannobrycon* g.n.)
Nannostomidi HOEDEMAN, 1954, l.c.: 70—84.

The presence of lateral line pores, discovered in *Poecilobrycon*, requires changing the accepted arrangement of the genera. This new arrangement is supported moreover by, likewise unreported, differences in the dentition of *Poecilobrycon* on the one hand, and of *Nannostomus* and *Nannobrycon* on the other. The teeth of almost every specimen examined show 6 cusps instead of 5 in all three genera. There are 5-pointed teeth, surely, but most of them have 6 cusps in the material reported on below.

In *Poecilobrycon* the central cusp (in the 5-pointed teeth) or one of the two central ones (in 6-pointed teeth) are conspicuously longer giving the theeth a more or less hastate appearence. In *Nannostomus* and *Nannobrycon* all cusps are equal or subequal, giving the teeth a sugarspoon shape. *Poecilobrycon* cannot be derived from either of these genera, nor vice versa. The two groups probably had a common ancestor, close to the present-day *Pyrrhulina*, to which both are more closely related than to each other. The phylogenetic relationship might be expressed as follows:

1 *Pyrrhulinidi*
2 Pre-nannostomid
3a *Poecilobrycon*
3b { *Nannostomus*, *Nannobrycon*

KEY TO THE GENERA, SPECIES AND SUBSPECIES OF THE *Nannostomidi*

1a Scales in median lateral series 26—28 (25—29); lateral line pores 0—3; adipose fin always present, depth 16—20 (22); teeth 6 (5—6) pointed, hastate; branched caudal rays 8—9 + 9—8, ... genus *Poecilobrycon* EIGENMANN, 1909

2a length of head 23 (22—25); depth 16—20; eye 7.5—8: median scales 27 (26—29); dorsal rays 10 (9—10), ...
— *harrisoni* EIGENMANN, 1909

2b length of head 26—27; depth 21—22; eye 9; scales 25; dorsal rays 10—11.
— *diagrammus* FOWLER, 1913

1b Scales in median lateral series 18—26 (17—27); normally no lateral line pores; depth 18—28, teeth 6 (5—6) pointed, spoon-shaped; dorsal rays 8—10.

3a caudal lobes equal; number of branched rays in both lobes equal; depth 20—28; adipose fin present or absent; air-bladder nearly cylindrical, ...
..... genus *Nannostomus* GÜNTHER, 1872

4a scales in median lateral series 21—26 (21—27); 9 (10) predorsal scales; depth 21—26; no black margin along outer edge of anal fin.

5a two dark lateral bands, from tip of lower jaw and from upper margin of eye to bases of caudal lobes.

6a snout 7 (6—8); depth 21—25; predorsal scales 10 (9—11); median black lateral band terminating in two reddish blotches at base of caudal lobes, ... — *beckfordi* GÜNTHER, 1872

7a dorsal rays 8—9; anal rays 11—12; predorsal scales 9½; head 26—28; snout 8; scales 22—23.
..... *b. beckfordi* ssp. (Georgetown)

7b dorsal rays 10 (9—11); anal rays 10—11 (12); predorsal scales 11 (10); head 25—30 (23—31); snout 6—7 (8); scales 21—23,
..... — **b. surinami** ssp.n. (Berg en Dal)

7c dorsal rays 11; anal rays 9—10; predorsal scales 10; head 23—24; snout 8; scales 23—24,
..... — *b. aripirangensis* MEINKEN, 1931
(Isle Aripiranga, Amazon)

6b snout 10 (9—10); depth 21—23; predorsal scales 10 (9—10); black lateral band extending on rays of lower caudal lobe; dorsal rays 9; anal rays 9—10; caudal rays 8 (7) + 8 (7); scales 24 (23); head 24—28; eye 8½—9,
..... — **bifasciatus** sp.n. (Berg en Dal)

5b three dark lateral bands or stripes, the lower one below base of pectorals to base of first anal ray, the middle one from snout terminating at base of caudal in two reddish blotches at bases of lobes; caudal rays 10 + 10; scales 24—27; predorsal scales 10; snout 9—10,
..... — *trifasciatus* STEINDACHNER, 1876
(Mouth Rio Negro, Amazon)

4b median scales 17—21; predorsal scales 8—10; black margin along edge of anal fin *marginatus* EIGENMANN, 1909

8a anal rays 11—12; caudal rays 10 + 10; scales 19—21; head 30—32 (29—32); depth 27—28.
— *m. marginatus ssp.* (Maduni Creek, British Guiana)

8b anal rays 10—11 (10); caudal rays 8—9 + 9—8 (9—7); scales 17—19 (18—19); head 28—29 (27—30); depth 23—26,
..... — **m. picturatus** *ssp.n.* (Berg en Dal)

3b lower caudal lobe the greater with 2—4 more rays than the upper one; air-bladder carrot-shaped, responsible for the obliquely slanting swimming position; dorsal rays 9—10; anal rays 9—11; caudal rays 9—10 + 11—14; scales 22—26; predorsal scales 9—10; head 23—29; depth 18—21 (17—22);
..... genus *Nannobrycon* HOEDEMAN, 1951

Nannostomus beckfordi surinami new subspecies

Nannostomus anomalus BOESEMAN, 1952, Zool. Meded., 31 (17): 184—185 (first record from Surinam: Republiek, Coropina Creek and Makambi Creek, Surinam); BOESEMAN, 1953, l.c. 32 (1): 16 (various localities in Surinam).

Though I have not seen the material upon which BOESEMAN's report is based, I am inclined to range it among this new subspecies from that locality.

Z.M.A. No. 100.514, holotype, male 25.6 mm. st.l., and 220 paratypes

20.8 tot 26.4 mm. st.l., Blij-Dorp Exp., March 1952, Surinam River, Berg en Dal, Surinam.

Next to the characters given in the key, and those in table 1, this new subspecies differs markedly from both others in the rather constant number of 10 dorsal rays, in which character it appears to be fully intermediate. The very short snout is a character on which it can readily be set apart, whereas the colour of the new form is typical too. It shows a rather conspicuous dark band in the dorsal region, which is rather faint in both *beckfordi* ssp. and *aripirangensis*. There is moreover, a striking golden to copper-red line bordering the upper margin of the black lateral band; the latter being more blackish instead of brownish.

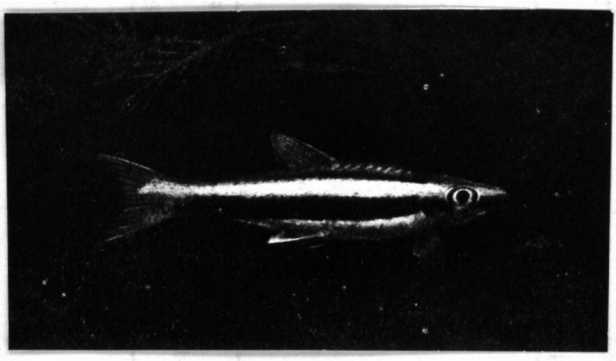
Preserved (alcohol) specimens show the same differences: in particular, the many melanophores in the dorsal region can be readily observed.

Restricted type locality: Berg en Dal at Surinam River, Surinam.

Nannostomus bifasciatus new species

Nannostomus bifasciatus HOEDEMAN, 1953, Ency. Ag.h., X.30.11.311 (photo, description in Dutch); 1954, Aquariumvissen Encyclopaedie: 77—79, fig. 56 (photo, description in Dutch); v. d. NIEUWENHUIZEN, 1954, Het Aq., 24 (11): 258—262, with 8 photo's of the mating (first report of breeding in captivity).

Z.M.A. No. 100.513 holotype, male specimen 33.6 mm. st.l., and 3 paratypes 27.2, 29.5, and 29.7 mm. st.l., Blij-Dorp Exp., March 1952, Berg en Dal at Surinam River, Surinam.



Nannostomus bifasciatus Photo J. J. Hoedeman

There can be hardly any doubt about this new species being a *Nannostomus*, in spite of its resemblance to both *Nannobrycon* and *Poecilobrycon*. When observed alive in a tank among allies as *Poecilobrycon harrisoni* and *Nannobrycon eques*, they obviously differ. When I first saw them I mistook them for *P. harrisoni* or at least for one of its subspecies. The oblique swimming position of *Nannobrycon* though less pronounced is sometimes, observed in the present species also, especially while nipping planktonic food from the plants.

Nannostomus bifasciatus is relatively shorter, having the peculiar extension of the black lateral band on the lower caudal lobe like *Nanno-*

Table 1. Counts and measurements in Surinam *Nannostomus*, compaired with allies

Species and subspecies	fin rays counts																	scales counts																
	dorsal				anal				caudal									median lateral series											predorsal							
	8	9	10	11	9	10	11	12	7	8	9	10		10	9	8	7	6	17	18	19	20	21	22	23	24	25	26	27	8	9	10	11		
beckfordi ssp.	+	+	.				+	+		+	+	+		+	+									+	+					+	.			
b. surinami		1	7	2		4	4	1	7	3							5	5					3	4	3						2	8		
b. aripirangensis				+	-	+					7			?											+	+						+		
bifasciatus		4			3	1			1	3						3	1								1	3					1	3		
trifasciatus						+						+		+												+	+	+	+		+			
marginatus ssp.		.		.			+	.				+		+							.	+	.							+	+			
m. picturatus		1	10	8		14	12			4	8				1	8	3		4	8	9									2	24			

Species and subspecies	measurements expressed in 100th of standard length																																	
	head									depth									snout							eye									
	23	24	25	26	27	28	29	30	31	20	21	22	23	24	25	26	27	28	6	7	8	8½	9	9½	10	8	8½	9	9½	10				
beckfordi ssp.				+	+	+					+	+	+	+							+						+	+	+	+				
b. surinami	1	.	1	1	2	1	2	2	1	1	3	1	2	3					4	5	1					2	1	3	1	3				
b. aripirangensis	+	+									+	+	+	+	+						+		+				+	+	+					
bifasciatus		1	1	1	.	1					2	1	1										1		1	2		2	2					
trifasciatus				+	+	+	+				+	+	+	+									+		+	+			+					
marginatus ssp.							+	+	+							+	+	+					+	+						.	+			
m. picturatus					2	13	9	3					11	13	3	5							16	7						24	2			

brycon shows. The vestigious adipose fin is situated above the anal fin as in other *Nannostomus* species, and unlike in *Poecilobrycon*, which has a more posteriorly inserted adipose fin. From *N. beckfordi* and *marginatus* it differs in the longer snout, sharing this character with *N. trifasciatus*. There appears to be only a rudiment of an adipose fin in the form of some short loose filaments (like tiny rays), and a slight elevation of the two anterior scales.

The colour is best distinguished in live specimens: no wonder aquarists are delighted about this new importation. The plain silvery-white groundcolour is traversed by a most brilliant black lateral band, running from tip of lower jaw through the eye, and extending beyond the base of the caudal fin. The dorsal region is dark, though not as brilliantly blackish as the lateral band, while the same holds for the ventral region, which is less brilliantly white than the upper half of the flanks. We could say upper and lower halves are each others negative, as will be clear from the photograph.

Besides, an extremely faint reddish flush on the base of the caudal and anal fins, and ice-blue tipped ventrals (especially in the males) lend this species its attractiveness. The male, furthermore, shows a narrow golden-red streak just above the black lateral band, running from snout to just in front of the caudal base. This golden streak is diffuse from time to time, except on the snout, where it may be observed in larger females also.

Preserved (alcohol) specimens soon loose the faint red and iceblue of the living ones, but the contrasting black and white remain.

D. 9; A. 9 (10); V. 8; P. 9; C. 8 (7) + 8 (7); scales 24 (23); no lateral line pores predorsal scales 10 (9); head 24—28; depth 21—23 (16 in one male specimen, probably not normal, as it is 21 in the male holotype); snout 10 (9); eye 8.5—9.0.

This new species is based on the above-mentioned 4 preserved specimens, and series of living ones which I had the oppotunity to observe for several months in my home aquarium.[1]) I do not hesitate to describe it as new, for the features are too obvious, whereas it can readily be set apart as a good species on the meristicals only.

Phylogeneticaly this new species seems close to the stem of the tribe, near the presumed Pre-Nannostomid, taking an intermediate position between *Nannostomus beckfordi* and *Nannobrycon eques*.

Restricted type locality: Berg en Dal at Surinam River, Surinam.

Nannostomus marginatus picturatus new subspecies

Nannostomus marginatus BOESEMAN, 1952, l.c.: 184 (Zanderij I and Maroni Basin, Surinam; first record from Surinam); BOESEMAN, 1953, l.c.: 16 (side-creek of Coropina creek, near railroad, Republiek, and Maroni basin)

Z.M.A. No. 100.324, holotype, male 21.0 mm st.l., and 4 paratypes 20.6—20.9 mm st.l., Blij-Dorp Exp., February 1952, near Zanderij II Surinam.

[1]) It is interesting to note that this new species, which I placed between *Nannostomus* and *Nannobrycon* on account of technical features, shows a pairing behaviour intermediate between these genera as well, as is described by Mr. A. v. d. NIEUWENHUIZEN (l.c.).

Table 2. Counts and measurements in *Poecilobrycon harrisoni* and *P. digrammus*

Species	fin rays												scales											
	dorsal			anal			caudal						lateral						pores					
	9	10	11	10	11	12	8	9	+	9	8		24	25	26	27	28	29	0	1	2	3		
harrisoni [1]	+			+			+				+				+	+	•	•	?					
harrisoni [2]	2	41		5	38		2	38		31	10				4	72	3	1	5	3	17	51		
digrammus		+	+	+	+		•				•		+	+					?					

Species	measurements expressed in 100th of standardlength																															
	head										depth										snout					eye					
	22	23	24	25	26	27	28	29	30		16	17	18	19	20	21	22	23	24		7	7½	8	8½	9		7½	8	8½	9		
harrisoni [1]				+										+																		
harrisoni [2]		4	31	6	2						9	9	3	11	5							3	12	17	4		17	23				
digrammus [3]					t	•	+	+	+							+	+	+	+		+	+								+	

[1]) after EIGENMANN, 1909
[2]) coll. Z.M.A. No 100.511
[3]) after FOWLER, 1913. t = type

Z.M.A. No. 100.515, paratypes, 22 specimens 19.2—21.4 mm st.l., partly in bad condition, Blij-Dorp Exp., March 1952, Berg en Dal at Suriname River, Suriname.

This new subspecies is meristically different from the typical form from British Guiana in the lower scale counts, the shorter head, the lower depth, and the detailed characters given in the key and in table 1. In most specimens I found one or two perforated lateral line scales.

Restricted type locality: A ditch near Zanderij II, Surinam.

Poecilobrycon harrisoni Eigenmann

Poecilobrycon harrisoni EIGENMANN, 1909. Ann. Carn. Mus., 6 (1): 43 (Canal at Christianburg, Br. Guiana); EIGENMANN, 1912, Mem. Carn. Mus., 5: 284, pl. 37, fig. 1; HOEDEMAN, 1950, l.c.: 22 (rediagnosis and references; synonymy).

Z.M.A. No. 100.511, 43 specimens 25.2 to 40.7 mm. st.l., Expedition E.E. De Natuur — Haarlem, November 1952, Demarara, Br. Guiana.

These specimens slightly differ from the description by EIGENMANN of the Christianburg types, as will be clear form the data in table 2, in which meristicals of the second form *P. digrammus* FOWLER, 1913 have been included.

This British Guiana material is included, as mentioned before, because of the presence, yet unreported, of perforated scales in the lateral line system. All previous authors state that both genera *Poecilobrycon* and *Nannostomus*, lack a lateral line. I found perforated scales in both, however.