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A new fish species of *Roeboides* from Panamá (Characiformes: Characidae)

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Abstract: A freshwater fish *Roeboides lofini* n.sp. is described from the Río Coclé del Norte drainage of the Atlantic versant of Panamá. The new species differs from other species of the *Roeboides guatemalensis*-group by the number of perforated scales on the lateral line (83-100), body depth (31.8-36.1%), predorsal distance (49.1-51.9%) and the shape of the humeral spot. Rev. Biol. Trop. 59 (4): 1663-1667. Epub 2011 December 01.

Key words: distribution, freshwater fish, Río Coclé del Norte, Atlantic versant.

The genus *Roeboides* Günther, 1864 comprises a monophyletic assemblage of 16 valid species occurring in Central and South America. Six Central American species (*R. dayi* Steindachner, 1878, *R. guatemalensis* Günther, 1864, *R. occidentalis* Meek & Hildebrand, 1916, *R. bouchellei* Fowler, 1923, *R. ilsea* Bussing, 1985, & *R. carti* (Lucena 2000) along with *R. dientonito* Schultz, 1944 from Lago Maracaibo, the Río Orinoco drainage and rivers of Northwestern Guyana, compose the *R. guatemalensis*-group (Lucena 2007).

Among the synapomorphies that support the *Roeboides guatemalensis*-group are: the presence of infraorbitals 4 and 5, the presence of cusps on the teeth of the inner tooth series of the premaxilla; the absence of D4 teeth of the dentary (Lucena 1998); a long, slender projection on the lower posterior margin of *cleithrum* slightly surpassing the first pectoral-fin ray, and a humeral spot located posterior to the vertical through the middle of the pectoral fin (Lucena submitted).

Lucena (2000) examined a few young specimens in poor condition from the Río Coclé del Norte drainage (Río Tambo) and identified them as *Roeboides* sp. He pointed

out some differences between these specimens and specimens belonging to other species of *Roeboides* in Central America. The analysis of new samples from that drainage allowed the recognition of a new species of *Roeboides*, which is described herein.

MATERIAL AND METHODS

Specimens were collected by Jorge Garcia, Universidad de Panamá and were deposited at the Museu de Ciências e Tecnologia da Pontifícia Universidade Católica do Rio Grande do Sul, Porto Alegre, Brazil (MCP) and the Smithsonian Tropical Research Institute, Panama (STRI). Counts and measurements were taken as described by Fink & Weitzman (1974). A cleared and stained (c&s) specimen was prepared according to the method of Taylor & Van Dyke (1985). Vertebral counts included the four vertebrae of the Weberian apparatus and the terminal vertebral *centrum* was counted as a single element. Measurements are given as percentages of standard length (SL). In the Description, the values of the holotype are cited between brackets and n indicates the number of

specimens. The comparative material is cited in Lucena (2000).

RESULTS

Roeboides loftini, new species

Fig. 1; Table 1

Roeboides sp. Lucena 2000:51
(short diagnosis).

Holotype: STRI-7655 (65.1mm SL), Río Turbe, tributary of Río San Juan, upper Río Coclé del Norte drainage, Panamá, 08° 47'05" N - 80° 38'10" W, 2009, Jorge Garcia.

Paratypes: STRI-7656 (3, 44.4-64.6mm SL), same locality as holotype; STRI-7657 (14, 39.7-80.2mm SL, 1 c&s specimen, 65.0mm SL), Río Turbe, tributary of Río San Juan, upper Río Coclé del Norte drainage, Panamá. 08°47'09" N - 80° 37'55" W, MCP 45775 (3, 57.7-75.1mm SL), same locality as STRI-7657.

Non-types: STRI 400 (9, 35.0-65.1mm SL), Río Tambo, Río Coclé del Norte drainage, Panamá (Lucena, 2000).

Diagnosis: *Roeboides loftini* is a member of the *R. guatemalensis*-group. It differs from *R. occidentalis*, *R. dayi*, and *R. dientonito* by the number of lateral line scales (83-100 vs. 51-80), from *R. dayi* and *R. dientonito* by the number of scale rows above the lateral line (20-22 vs. 10-18) and around the caudal peduncle (27-30 vs. 17-24), and from *R. dientonito* by the number of scale rows below the lateral line (20-24 vs. 17-21). *Roeboides loftini* differs from *R. ilsea*, a species with a high number of lateral line scales (84-93), by the lower body depth (31.8-36.1%, mean=33.7% vs. 36.9-41.8%, mean=38.8%) and shorter predorsal distance (49.1-51.9%, mean=50.4% vs. 51.4-55.9%, mean=52.9%). *Roeboides loftini* differs from other Central American species, *R. bouchellei*, *R. guatemalensis* and *R. carti* in the shape of the humeral spot. *Roeboides*

bouchellei exhibits a small, sometimes inconspicuous, slightly vertically elongate humeral spot, extending over 3 or 4 horizontal rows of scales and 2 or 3 vertical rows, whereas *R. loftini* exhibits a conspicuous, slightly rounded humeral spot extending over 5-7 horizontal rows of scales and 5-8 vertical rows. In addition, *R. loftini* has a tenuous, short extension on the anterodorsal portion of the humeral spot (Fig. 1) which is absent in *R. bouchellei*. The humeral spot of *R. carti* reaches or surpasses the vertical through the origin of the anal fin and, in adults, extends posteriorly to the vertical through the origin of the dorsal fin (Lucena 2000). *Roeboides guatemalensis* has a large, anteriorly sometimes bifurcate, black stripe, extending between the vertical through the middle of the pelvic fin and the vertical near the posterior *terminus* of the base of the dorsal fin (Lucena 2000). *Roeboides loftini* differs from *R. carti* and *R. guatemalensis* by its rounded humeral spot located far from the verticals through the origins of the dorsal and anal fins (5-8 and 3-5 vertical series of scales, respectively).

Description: Table 1 presents the morphometric data for the holotype and 20 paratypes. Predorsal profile elevated and convex from base of supraoccipital process to dorsal fin origin; posteroventrally sloped along dorsal-fin base and straight from *terminus* of dorsal fin base to caudal peduncle. Ventral profile convex from lower lip to anal fin origin; straight along anal fin base. Mouth subterminal with lower jaw slightly shorter than upper jaw. Snout profile convex from dorsal view. Maxilla expanded anteroposteriorly, extending posteriorly to vertical through middle of orbit or slightly beyond that point. Premaxilla with two large mamilliform teeth projecting anteriorly from each side of upper jaw at margin of lip. Rows of teeth irregular. Outer row with 4 to 6 conical teeth, rarely with side cusps. Inner row with 3 to 5 mamilliform-like teeth with two small lateral cusps. Maxilla with 9-14 teeth; first five to seven conic with one or two mamilliform teeth displaced towards lateral surface of bone and



Fig. 1. *Roeboides loftini* n. sp., STRI-7655 (65.1 mm SL), holotype, Río Turbe, tributary of Río San Juan, upper Río Coelé del Norte drainage, Panama. Scale bar=10mm.

TABLE 1
Morphometric data for *Roeboides loftini*, n. sp., n=20 for all values of paratypes

Measurement	Holotype	Paratypes			SD
		low	high	mean	
Standard length (mm)	65.1	44.4	80.2	61.2	
		percents of standard length			
Body depth	35.3	31.8	36.1	33.7	1.263
Predorsal length	50.3	49.1	51.9	50.4	0.805
Preanal length	46.3	44.5	50.0	47.6	1.608
Prepectoral fin length	27.0	24.9	34.1	26.9	2.184
Prepelvic fin length	36.7	33.1	39.5	35.6	1.425
Caudal peduncle length	8.1	8.1	10.7	9.5	0.740
Caudal peduncle depth	8.1	6.3	8.4	7.5	0.493
Head length	28.2	24.5	28.3	26.1	0.895
		percents of head length			
Snout length	26.6	23.0	30.2	26.4	2.164
Orbital diameter	32.0	31.2	39.5	34.8	2.160
Upper-jaw length	46.7	39.5	48.0	45.3	2.460
Interorbital width	23.3	21.0	36.0	24.6	2.927

followed by conic or mamilliform-like teeth along ventral border of bone. Dentary with one large mamilliform teeth projecting anterolaterally and laterally (Lucena, 1998). Two anterior-most dentary tooth larger, mamilliform, weakly tricuspid and followed by two or three smaller

conic and one mamilliform-like tricuspid teeth and then 9-14 smaller conic teeth posteriorly curved lingually.

Gill-rakers long, upper limb with five to seven rakers (n=20, mode=6) [6], lower limb with nine or ten rakers (n=20, mode=9) [9].

Dorsal fin rays i+9 (n=20). Fin origin situated approximately slightly beyond vertical through origin of anal fin. Anal fin rays iv-v, 45-50 (n=20, mode=47) [46]. Males with one or two small, retrorse bony hooks per segment on first to seventh or eighth segmented rays. Pectoral fin rays i+12-14 (n=19, mode=13) [12]. Tip of longest ray falling slightly short of, or reaching, anal fin origin. Pelvic fin rays i,7 (n=20). Longest pelvic ray extending beyond anal fin origin. Males with one bony hook per segment present from first to seventh segmented anal fin rays. Caudal fin forked with 19 principal rays (n=20).

Lateral line scales 83-100 (n=20, mode=88/89) [85]. Scale rows above lateral line 20-22 (n=20, mode=20) [21]; scale rows below lateral line 20-24 (n=19, mode=22) [22]; scale rows around caudal peduncle 25-30 (n=10, mode=29/30) [20]. Precaudal vertebrae 15; caudal vertebrae 23; total vertebrae 38 (n=1 c&s specimen).

Color in alcohol: Ground color yellowish-tan. Dorsal portions of head and body densely pigmented dark brown. Conspicuous dark lateral band extending between margin of opercle and caudal fin base. Expanded posteriorly into large spot on caudal peduncle. Slightly dusky lateral band situated anterior of humeral spot. Most specimens with chromatophores concentrated along the myosepta within lateral band resulting in chevron-shaped marks. Conspicuous black humeral spot distinctly separated from verticals through origins of dorsal and anal fins by 5-8 and 3-5 rows of scales, respectively. Humeral spot in well-preserved specimens shows faint dorsal, anteriorly-oriented extension. Fins, especially dorsal and anal fins, dusky.

Color in life: Overall coloration silvery or yellowish. Tip of snout black. Dark midlateral stripe sometimes inconspicuous and hidden by silvery lateral band. Dark humeral spot conspicuous. Caudal peduncle spot dark diffuse. Caudal fin yellow. Tip of caudal-fin rays clear. Other fins slightly yellowish.

Etymology: The specific epithet, *loftini*, is a patronym in honor of Dr. Horace Loftin in recognition of his contributions to our knowledge of the distribution of the freshwater fishes of Panamá.

Distribution: The species is known only from the Río Coclé del Norte drainage, an Atlantic versant drainage of Northwestern Panamá.

DISCUSSION

Roeboides loftini has an incomplete infraorbital series. One of the synapomorphies of the *R. guatemalensis*-group is a complete infraorbital series with the presence of the fourth and fifth infraorbitals (Lucena submitted). The condition present in *R. loftini* may be parsimoniously considered an autapomorphy.

In addition to *R. loftini*, five species of *Roeboides* occur in Panamá, all showing disjunct distributions: *R. dayi*, *R. guatemalensis*, and *R. carti* from the Atlantic versant, and *R. occidentalis* and *R. bouchellei*, from the Pacific versant. Along the Atlantic versant of Panamá, the Río Coclé del Norte drainage represents the westernmost occurrence of *Roeboides*. *R. bouchellei*, another species that may occur in the Atlantic drainages of Central America, has its distribution from Río Matina, Costa Rica (Bussing 2002) to the Río Negro drainage (or Río Sico Tinto), Honduras (Matamoros *et al.* 2009). This apparent gap in the Atlantic versant distribution of Panamá may be due to the lack of collections in that area. *Roeboides* is absent along the Atlantic coast of Central America North from Río Negro, Honduras.

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RESUMEN

Roeboides loftini n.sp., se describe en la desembocadura del río Coclé del Norte en la Vertiente Atlántica de Panamá. La nueva especie se diferencia de otras especies del grupo del *Roeboides guatemalensis*, por el número de escamas perforadas en la línea lateral (83-100), la profundidad del cuerpo (31.8-36.1%), distancia predorsal (49.1-51.9%) y la forma de la mancha humeral.

Palabras clave: distribución, peces de agua dulce, Río Coclé del Norte, vertiente del Atlántico.

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