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A new species of *Utiaritichthys* Miranda Ribeiro (Characiformes: Serrasalmidae) from the Serra dos Parecis, Tapajós drainage

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Utiaritichthys esguiceroi is described from the upper portion of the rio Juruena, rio Tapajós drainage, Mato Grosso State, Central Brazil. The new species distinguished from its two congeners, *U. sennaebragai* Miranda Ribeiro and *U. longidorsalis* Jégu, Tito de Morais & Santos, by having 99 to 101 perforated scales on lateral line (*vs.* 69 to 83), presence of 17 to19 prepelvic spines (*vs*. 9-13 in *U. sennaebragai* and 28-31 in *U. longidorsalis*), 20 to 21 postpelvic spines (*vs.* 15 to 19 in *U. sennaebragai*, and 14 in *U. longidorsalis*), and 23 to 25 circumpeduncular scales (*vs*. 30-48 in *U. sennaebragai*, and 33-35 in *U. longidorsalis*). Furthermore, the new species differs from *U. longidorsalis* by having larger interdorsal width, and adipose-fin base length (11.8-15.6 *vs*. 7.1-7.9% of SL, and 4.2-5.8 *vs*. 3.7-3.8% of SL, respectively).

Utiaritichthys esguiceroi é descrita da porção superior do rio Juruena, bacia do rio Tapajós, estado do Mato Grosso, Brasil Central. A espécie nova diferencia-se de suas congêneres, *U. sennaebragai* Miranda Ribeiro e *U. longidorsalis* Jégu, Tito de Morais & Santos, pela presença de 99 a 101 escamas perfuradas na linha lateral (*vs.* 69 a 83), presença de 17 a 19 espinhos pré-pélvicos (*vs*. 9-13 em *U. sennaebragai* e 28-31 em *U. longidorsalis*), 20 a 21 espinhos pós-pélvicos (*vs.* 15 a 19 em *U. sennaebragai* e 14 em *U. longidorsalis*), e 23-25 escamas da série circumpeduncular (*vs.* 30-48 em *U. sennaebragai* e 33-35 em *U. longidorsalis*). Em adição, a espécie nova difere de *U. longidorsalis* por possuir a largura interdosal e comprimento da base da nadadeira adiposa maiores (11,8-15,6 *vs*. 7,1-7,9% do CP e 4,2-5,8 *vs*. 3,7-3,8% do CP, respectivamente).

Key words: Neotropical fish, Pacú borracha, Systematics, Taxonomy, Upper Juruena basin.

Introduction

The family Serrasalmidae contains 16 genera and approximately 87 valid recent species, and one fossil species of (*Megapiranha paranensis* Cione, Dahdul, Lundberg & Machado-Allison) widely distributed throughout Neotropical drainages, mostly in South America (Jégu, 2003; Jégu *et al.*, 2004; Cione *et al*., 2009; Hubert & Reno, 2010; Andrade *et al*., 2013; Eschmeyer & Fong, 2014).

The real taxonomic level of the group remains unsolved. Machado-Allison (1983, 1986) proposed the monophyly of the serrasalmids, based on 27 morphological characters. Subsequently, in molecular phylogenies, Orti *et al*. (1996) and Calcagnotto *et al*. (2005) corroborated the monophyly of the group. Calcagnotto *et al*. (2005) based on their molecular tree, raised the group to the family level, disagreeing with Machado-Allison (1982, 1983, 1985, 1986) and Jégu (2003), that considered the clade in question as a subfamily of Characidae.

Utiaritichthys sennaebragai was described by Miranda Ribeiro (1937) from the rio Papagaio, rio Tapajós drainage, upriver from Salto de Utiariti (waterfall), Mato Grosso State, Central Brazil. Jégu *et al*. (1992) redescribed the genus and described an additional species, *U. longidorsalis*, from the rio Aripuanã, rio Madeira drainage, also in Central Brazil. *Utiaritichthys sennaebragai* is recorded in the rios Tapajós, Xingu, Tocantins-Araguaia and Trombetas, in the Amazon drainage, and also in the río Orinoco, in Venezuela; and *U. longidorsalis* Jégu, Tito de Moraes & Santos, 1992, is known only from the rio Madeira. A new species of *Utiaritichthys* was discovered during recent collections made in the rio Juruena, rio Tapajós drainage, in the region of the Chapada dos Parecis, Mato Grosso State, Brazil, and it is described herein.

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Material and Methods

The counts and measurements followed Jégu *et al*. (1992). Measurements were taken point to point with the aid of calipers on the left side of the specimens, whenever possible. All measurements are expressed as percentages of standard length (SL), except for subunits of the head, which are expressed as percentages of the head length (HL). Vertebrae counts were made based mostly on 69 X-rayed specimens and two cleared and stained (c&s) specimens prepared according to Taylor & Van Dyke (1985). Skeletal meristic data, numbers of supraneurals, gill-rakers in the first gill arch, teeth, and procurrent caudal-fin rays, were also taken from cleared and stained material. Examined specimens are deposited in the ichthyological collection of the Laboratório de Ictiologia de Ribeirão Preto, Faculdade de Filosofia, Ciência e Letras da Universidade de São Paulo; Ribeirão Preto (LIRP); Museu de Zoologia da Universidade de São Paulo, São Paulo (MZUSP), and Museu de Ciências e Tecnologia da Pontifícia Universidade Católica do Rio Grande do Sul, Porto Alegre (MCP). Asterisk indicates holotype data and numbers in parentheses indicate data from paratypes plus non-types specimens examined. All the non-type material listed in the description was formerly utilized in an independent study of stomach content analysis and sexual determination, having had their visceral cavities evacuated and general body shape and proportions distorted, as a result.

Utiaritichthys esguiceroi, new species

Figs. 1-2

Holotype. LIRP 8184, 197.9 mm SL, Brazil, Mato Grosso State, rio Tapajós drainage, rio Juruena, nearby the município de Sapezal, 12º51'29"S 58º55'23"W, 03 Nov 2008, , R. J. Ilário, M. S. F. Arcifa & A. L. H. Esguícero.

Paratypes. LIRP 8185, 11 (2 c&s), 187.0-260.0 mm SL. MCP 46331, 3, 197.0-217.0 mm SL. MZUSP 109232, 3, 192.0-196.0 mm SL, same data as holotype.

Non-type material examined. Brazil, Mato Grosso State, município de Sapezal, rio Juruena, LIRP 8187, 15, 174.0-211.0 mm SL; LIRP 8188, 3, 187.0-192.0 mm SL, same locality as holotype. LIRP 9045, 13, 21.0-62.0 mm SL, PCH Cidezal, 13º22'39"S 59º00'57"W, 18 Mar 2008, R. J. Ilário. LIRP 9046, 10, 24.0-43.0 mm SL, PCH Parecis, 13º04'43"S 58º58'06"W, 19 Mar 2008, R. J. Ilário. LIRP 9047, 13, 105.4-262.0 mm SL, PCH Sapezal, 13º16'10"S 59º01'26"W, 18 Mar 2008, R. J. Ilário. LIRP 9048, 14, 110.4-180.5 mm SL, PCH Parecis, 13º04'43"S 58º58'06"W, 19 Mar 2008, R. J. Ilário.

Diagnosis. *Utiaritichthys esguiceroi* differs from its congeners by the higher number of perforated scales on the lateral line (99-101, *vs*. 69-72 in *U. sennaebragai*, and 78-82 in *U. longidorsalis*), the higher number of prepelvic spines (17-19, *vs*. 9-10 in *U. sennaebragai*, and 28-31 in *U. longidorsalis*), the lower number of postpelvic spines (20-21, *vs*. 15-17 in *U. sennaebragai*, and 14 in *U. longidorsalis*), and also by the number of circumpeduncular scales (23-25 *vs.* 30-48 in *U. sennaebragai*, and 33-35 in *U. longidorsalis*). Furthermore, the new species differs from *U. longidorsalis* by having larger interdorsal width (11.8-15.6 *vs*. 7.1-7.9% of SL), and larger adipose-fin base length (4.2-5.8 *vs.* 3.7-3.8% of SL).

Description

Morphometric data presented in Table 1. Body deeply compressed, with rounded dorsal and ventral profiles. Greatest body depth at dorsal fin origin. Dorsal profile of head distinctly rounded from upper lip to vertical through anterior nostrils, convex from latter point to tip of supraoccipital spine. Predorsal profile slightly convex from tip of supraoccipital spine to dorsal-fin origin; posteroventrally inclined along dorsal-fin base; slightly convex from posterior dorsal-fin base to adipose-fin origin and very slightly concave along caudal peduncle. Anterior portion of ventral profile of head almost straight and posteroventrally inclined; posterior portion of head and body convex, strongly inclined posterodorsally along anal-fin base and slightly concave along caudal peduncle.

Series of inconspicuous spines forming subtle ventral keel extending approximately from vertical line crossing middle length of first pectoral-fin ray to anus. Total number of ventral spines 38 (8 + 21 non-type specimens) or 40* (10 + 30 non-type specimens); prepelvic spines 17 (7 + 21 non-type specimens) or 19* (11 + 30 non-type specimens); postpelvic spines 20* (12 + 21 non-type specimens) or 21 (6 + 30 non-type specimens). First prepelvic spine trapezoidal in ventral view; the remaining pelvic spines triangular with a spine-like posteriorly-oriented projection; length of posterior spine like projection shorter than plate base width. Postpelvic spines with spine-like projections longer than prepelvic spines and bifurcated posteriorly.

Mouth terminal, with spatulate teeth. Maxilla toothless. Posterior portion of maxilla wider than anterior. Premaxilla with two rows of teeth: labial row with three teeth; first two teeth tricuspid and third truncated: lingual row with four slightly incisform teeth, all with base wider than crown. Dentary teeth five: first four teeth tricuspid, and last tooth truncated: teeth decreasing gradually in size in outer tooth row and a single blunt conical, symphyseal tooth on inner row (Fig. 2): gill-rakers 12/1/18* (holotype + 2 c&s).

Dorsal-fin rays ii, 21* (18 + 51 non-type specimens); first unbranched ray approximately half the length of second ray. Dorsal-fin origin preceded by forwardly directed blunt pterygiophore spine. Dorsal-fin origin located approximately at the middle of SL, at vertical through pelvic-fin origin. Dorsal-fin pterygiophores 19* (16 + 51 non-type specimens). Anal-fin rays iii-iv, 30 (9 + 15 non-type specimens) or 32* (9 + 36 non-type specimens): anal fin sexually dimorphic (see under Sexual dimorphism). Anal-fin origin located distinctly anterior to vertical through dorsal-fin terminus. Anal-fin pterygiophores 33* (18 + 51 non-type specimens). Short well-developed adipose fin present, origin equidistant to dorsal-fin terminus and caudal-fin origin and, anteriorly to vertical through middle of

Fig. 1. *Utiaritichthys esguiceroi*, holotype, female, LIRP 8184, 197.9 mm SL, rio Juruena, rio Tapajós drainage, município de Sapezal, Mato Grosso State, Brazil.

anal-fin. Pectoral-fin rays i,16* (18 + 51 non-type specimens), distal margin slightly convex; its tip not reaching vertical through dorsal and pelvic-fin origins. Pelvic-fin rays i, 7* (18 + 51 non-type specimens). Caudal fin strongly furcate, both lobes equal in size. Principal caudal-fin rays i,9/i,8* (18 + 51 non-type specimens); ten and nine dorsal and ventral caudal-fin procurrent rays, respectively. Vertebrae 35* (18 + 51 non-type specimens). Precaudal vertebrae 19* (18 + 51 non-type specimens); caudal vertebrae 16 (18 + 51 non-type specimens). Supraneurals 8* (18 + 51 non-type specimens).

Scales cycloid, small. Lateral line complete; perforated scales 99* (13 + 38 non-type specimens) or 101 (5 + 13 non-type specimens). Longitudinal scale rows between dorsal-fin origin and lateral line 34* (11 + 35 non-type specimens) or 36 (7 + 16 non-type specimens); scale rows between lateral line to pelvic-fin origin 27 (4 + 8 non-type specimens) or 28* (14 + 43 non-type specimens). Circumpeduncular scales 23 (4 + 2 non-type specimens), 24*(12 + 42 non-type specimens) or 25(2 + 7 non-type specimens). Vertebrae 35*(18 + 51 non-type specimens).

Color in alcohol. Overall body background color light brown. Dorsal portion of head and predorsal region dark brown. Dark brown patches on first to fourth and sixth infraorbitals. Yellow pale background on fifth infraorbital. Dark vertically elongated spot on posterior portion of opercle. A single, very inconspicuous humeral blotch. Flanks with a dark brown narrow stripe extending from posterior border of opercle to caudal fin. Five to six large vertical bands along dorsal portion of flank; first through third more conspicuous. Ventral portion of body pale yellow and white. Dorsal and anal fins hyaline with ray tips with dark chromatophores. Yellowish white pectoral fin rays, becoming hyaline toward tips; yellowish white pelvic-fin rays. Yellowish white caudal-fin rays, with mostly brown tips.

Table 1. Morphometric data for *Utiaritichthys esguiceroi*. Range, Mean and Standard Deviation (SD) include values of the holotype (H); n = number of specimens.

Character	H	n	Range	Mean	SD
Standard length	197.9	18	178.1-228.3	197.7	-
Percents of Standard Length (SL)					
Greatest body depth	51.3	18	45.2-51.6	49.7	1.9
Head height	35.4	18	25.8-35.3	29.7	2.1
Head length	25.4	18	24.3-28.0	26.1	1.0
Dorsal fin base length	23.5	18	21.3-26.0	23.5	1.4
Dorsal fin length	24.8	18	19.4-29.0	22.3	2.0
Interdorsal width	13.6	18	11.8-15.6	14.4	0.9
Anal fin base length	26.1	18	24.1-28.4	25.8	1.1
Adipose fin base length	5.0	18	4.2-5.8	4.8	0.4
Pectoral fin length	20.5	18	18.0-20.6	19.4	0.8
Predorsal length	56.7	18	51.5-58.1	55.5	2.0
Preanal length	79.3	18	72.9-86.0	78.4	2.6
Prepectoral length	24.5	18	23.5-27.3	25.0	1.0
Prepelvic length	55.8	18	55.8-61.9	58.7	1.7
Pelvic/anal distance	10.5	18	8.0-10-5	9.0	0.6
Pelvic/pectoral distance	18.5	18	17.0-19.9	18.6	0.8
Caudal peduncle depth	9.7	18	8.4-9.7	9.1	0.3
Caudal peduncle length	7.9	18	6.1-9.6	7.7	1.0
Percents of Head Length (HL)					
Eye diameter	27.8	18	21.5-27.8	24.7	1.4
Interorbital width	43.3	18	37.7-43.3	40.6	1.5
3rd infraorbital width	13.2	18	9.9-14.5	13.0	1.1
4th infraorbital width	15.1	18	12.0-17.8	15.1	1.1
Check gap width	14.2	18	9.7-14.2	11.7	1.1
Snout length	31.5	18	28.6-34.9	32.8	1.8
Postorbital distance	41.6	18	39.1-46.9	43.0	1.9
Percents of dorsal fin base length					
Interdorsal width	58.1	18	53.3-65.6	60.0	3.2
Adipose fin base length	21.3	18	17.2-26.5	19.9	2.1

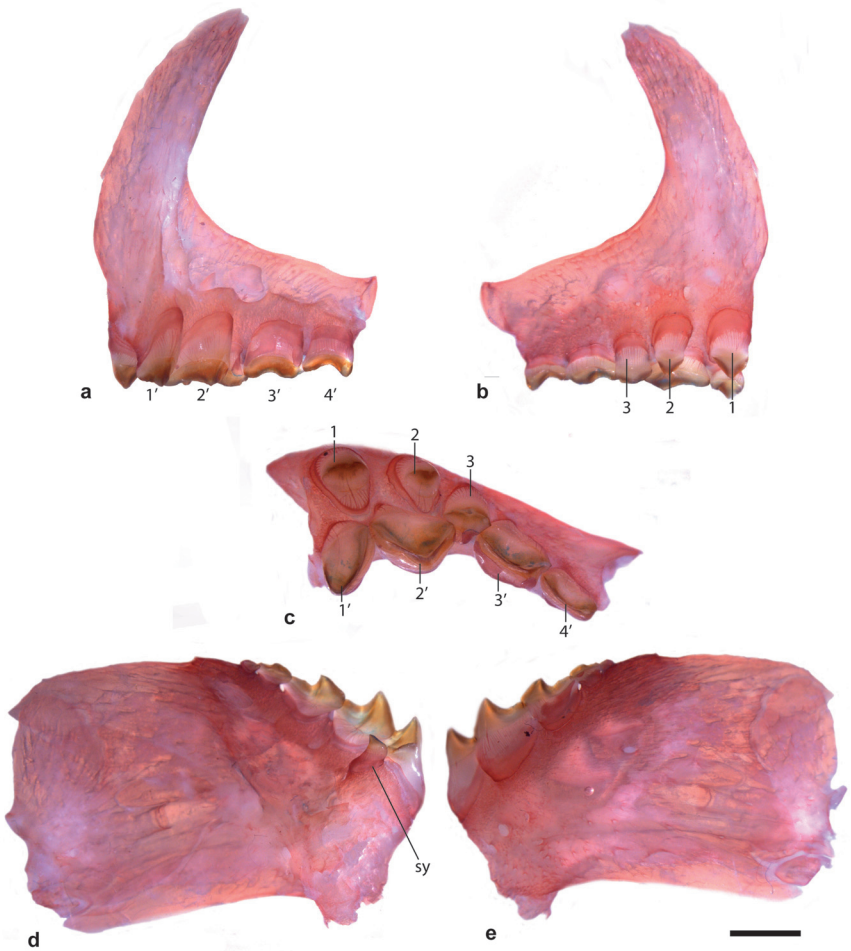

Fig. 2. *Utiaritichthys esguiceroi*, LIRP 8185, 194.0 mm SL, paratype. a-c, lingual, labial, and ventral views of left premaxilla (1-3 teeth in labial row; 1'-4' teeth in lingual row); d-e, lingual and labial views of left dentary. sy = symphyseal tooth. Scale bar = 2 mm.

Color in life. Based on LIRP 8157, 193.0 mm SL. Background body color greenish silver, lightly golden over facial bones. Ventral portion of body white. All fins green; dorsal fin dark green, with hyaline ray tips forming a transparent narrow margin. Anterior anal-fin rays dark, becoming progressively light towards posterior. Anterior borders of pectoral and pelvic fins darker than posterior borders. Caudal-fin lobes and base darker than their respective margins. Iris golden with black dorsal and ventral areas.

Sexual dimorphism. Juveniles specimens lacking secondary sexual characters. Adult specimens (188.0-228.3 mm SL) with distinct secondary sexual characters on anal-fin. Males specimens with anteriormost nine rays longer than additional rays forming a distinct anterior lobe, and elongation of 11th to 28th branched rays forming second bell-shaped lobe. This condition contrast with that of females in which the anteriormost 12 anal-fin rays are distinctly longer than other posteriormost rays, forming a distinct lobe. It remains unknown at this point whether such modifications are permanent or restricted to reproductive seasons.

Distribution. All *Utiaritichthys esguiceroi* samples were collected in the upper section of the rio Juruena, Tapajós drainage, upriver of Salto de Utiariti (waterfall), município de Sapezal, Mato Grosso State, Brazil (Fig. 3).

Ecological notes. Esguicero (pers. comm.), based on the examination of the stomach contents of approximately 50 specimens (non-type material), found that juveniles of *Utiaritichthys esguiceroi* fed on aquatic and terrestrial insects and particulate organic matter, whether the adults fed almost exclusively on Podostemaceae macrophytes and filamentous algae, both typical of riffles and rapids. Furthermore, juveniles inhabit the calm portions of the rio Juruena - usually near the margins-, whereas the adults swim in the main river channel, mostly in riffles and rapids. It is noteworthy that *Utiaritichthys esguiceroi* diet and mesohabitat preference ontogenetic shifts are similar to the same shifts observed by Jégu *et al.* (1989) in *Mylesinus paraschomburgkii* Jégu, Santos & Ferreira.

Etymology. The specific epithet is named after André L. H. Esguícero, collector of the holotype and paratypes of the new species.

Remarks. Notwithstanding the unresolved monophyly and taxonomic definition of *Utiaritichthys*, all the species of *Utiaritichthys* (including the one described herein) present non-parallel premaxillary teeth rows (see Fig. 2), as already pointed by Jégu *et al.* (1992) and Géry 1972 - and also lack, as the species presently allocated in *Myloplus*, the unique characters possessed by the Serrasalminae genus *Myleus*, *Tometes*, *Mylesinus*, and *Ossubtus* cited by Jégu *et al.* (1992).

Considering the all problems cited before, our decision to allocate the new species described herein in the genus *Utiaritichthys* is based on the fact that all our examined specimens share all the *Utiaritichthys* characters listed in the genus redescription, differing from the *Myloplus* only by a comparatively longer body (see Jégu *et al.*, 1992). Furthermore, since an unequivocal phylogenetic definition of *Myloplus* is currently lacking, we believe that is most prudent to allocate the new species in the genus *Utiaritichthys.*

Specimens of *Utiaritichthys esguiceroi* and *U. sennaebragai* were both collected in the upper rio Tapajós drainage, although both species seem to be geographically separated by a major waterfall, at least 70 m high.

Although *Utiaritichthys esguiceroi* is morphometricallly very similar to *Utiaritichthys* sp. n. of Jégu *et al.* (1992: 116, table II) based on a single specimen deposited in the Museum National d'histoire naturelle, Paris (MNHN 1991-704) and collected in Fleuve Sinnamary, Guyana, the absence of mandibular simphyseal teeth, the lower number of perforated scales (83) on the lateral line, and the higher numbers of prepelvic (28) and postpelvic (14) spines, clearly separate *Utiaritichthys esguiceroi* from that known but undescribed species.

The apparent endemicity of *Utiaritichthys esguiceroi*, together with the respective endemicities of *Jupiaba paranatinga* Netto-Ferreira, Zanata, Birindelli & Sousa, *Astyanax ajuricaba* Marinho & Lima and *Hyphessobrycon hexastichos* Bertaco & Carvalho reinforces the recommendation of Carvalho & Albert (2011) to scientifically explore the ichthyofauna of the highly endemic area of the huge upper rio Tapajós basin. This exploration must done very quickly, due to the major and crescent anthropic impacts being inflicted to that area. All the fast flowing water species of the Serrasalmidae representatives (*i.e.*, *Acnodon*, *Mylesinus*, *Ossubtus*, and *Utiaritichthys*) are most likely seriously threatened by at least ten hydroelectric dams, either in construction, or planned for the upriver and fast flowing sections of the major tributaries of the rio Amazonas right margin (Brasil - MME, 2011), like the rios Madeira, Tapajos, and Xingu (see Jégu *et al.*, 1992; Zuanon & Jégu, 2008; Vieira *et al.*, 2008). The 50 non-type specimens examined on "Ecological Notes" were dissected for stomach content analysis and, consequently, had their respective visceral cavities emptied, strongly altered body proportions making them unsuitable for taking morphometric data. Nonetheless, no significant differences were found in their meristic and coloration in comparison with type-specimens.

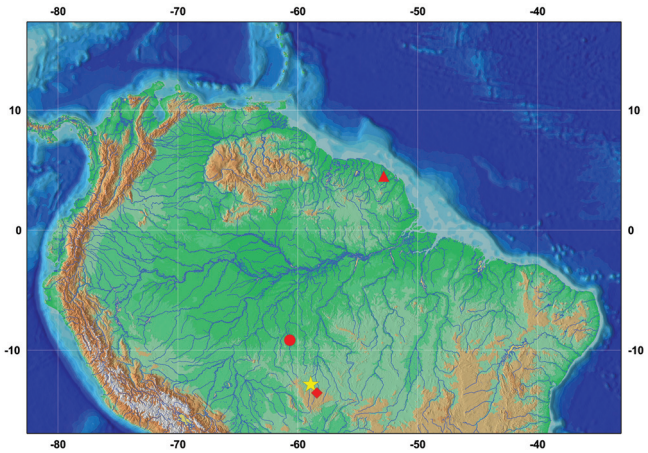

Fig. 3. Map of northern South America, showing the type locality of distribution of *Utiaritichthys* species. *Utiaritichthys esguiceroi* (yellow star); *Utiaritichthys sennaebragai* (red lozenge); *Utiaritichthys longidorsalis* (red circle); and *Utiaritichthys* sp. Sinammary (red triangle).

Key of species of genus *Utiaritichthys.*

1. Lateral line perforated scales 99-101; 17-19 prepelvic spines; 20-21 postpelvic spines; 23-25 circumpeduncular scales; interdorsal width 11.8-15.6% SL; and adipose-fin 4.2-5.8% SL ..... *U. esguiceroi* (rios Juruena, Tapajós drainage, Amazonas system).

1'. Lateral line perforated scales 69-83; 9-31 prepelvic spines; 15-19 postpelvic spines; 30-48 circumpeduncular scales; interdorsal width 7.1-7.9% SL; and adipose-fin 3.7-3.8% SL 2

2. Lateral line perforated scales 69-83; 9-13 prepelvic spines; 15-19 postpelvic spines; and 30-48 circumpeduncular scales ..... *U. sennaebragai* (rios Tapajós, Xingu, Tocantins-Araguaia, Juruena, and Trombetas, rio Amazonas system, and río Orinoco, Venezuela).

2'. Lateral line perforated scales 78-82; 28-31 prepelvic spines; 14 postpelvic spines; and 33-35 circumpeduncular scales ..... *U. longidorsalis* (rio Aripuanã, rio Madeira drainage, rio Amazonas system).

Comparative material. *Utiaritichthys sennaebragai*: All from Brazil. MNRJ 12154, 322.0 mm SL, female, lectotype, Mato Grosso, Salto do Utiarity, tributary of rio Papagaio, Tapajós drainage.. MNRJ 3407, 3, 173.0-291.0 mm SL, females, paralectotypes, same locality of lectotype. LIRP 8186, 9, 118.0-205.0 mm SL, Mato Grosso, Sapezal, rio Juruena downstream, Tapajós drainage. LIRP 9041, 8, 44.8-126.2 mm SL, Mato Grosso, Sapezal, rio Juruena, PCH Telegráfica Resgate. LIRP 9042, 1, 149.1 mm SL, Mato Grosso, Sapezal, rio Juruena, PCH Rondon. LIRP 9043, 3, 118.2-135.0 mm SL, Mato Grosso, Sapezal, rio Juruena, PCH Telégrafica. LIRP 9044, 19, 77.4-246.8 mm SL, Mato Grosso, Sapezal, rio Juruena, PCH Telegráfica. MCP 42662, 4, 60.4-142.4 mm SL, Mato Grosso, Sapezal, Tapajós, rio Papagaio. MZUSP 79024, 11, 12.7-121.3 mm SL, Mato Grosso, rio Jaurú, fazenda do Sr. Salú, upriver of Salto da Fumaça.

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