

Simpsonichthys auratus, a new annual fish from the rio Paracatú drainage, São Francisco basin, Brazil (Cyprinodontiformes, Rivulidae)

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Simpsonichthys auratus, new species, is described from a temporary pool close to rio Taboca, rio Paracatú drainage, rio São Francisco basin, Estado de Minas Gerais, Brazil. It is closely related to *S. trilineatus* with which it shares the golden anterior portion of the body and a ventrolateral dark blotch in male. It differs by having more pelvic-fin rays, the presence of transverse bars on the central portion of the body and the absence of longitudinal body stripes in male.

Simpsonichthys auratus, sp. n., coletada em uma poça temporária junto ao rio Taboca, drenagem do rio Paracatú, bacia do rio São Francisco, Estado de Minas Gerais, Brasil, é descrita. Ela é estreitamente relacionada a *S. trilineatus* com a qual ela compartilha porção anterior do corpo dourada e uma mancha ventro-lateral escura no macho. Ela difere por possuir mais raios de nadadeira pélvica, pela presença de barras transversais na porção central do corpo e ausência de faixas longitudinais no corpo de macho.

Introduction

The notorious diversity of *Simpsonichthys* species has been repeatedly reported in the recent literature (e.g., Costa, 1996). Among the ten members of *Simpsonichthys* restricted to the rio São Francisco basin, two species, *S. trilineatus* Costa & Brasil and *S. alternatus* Costa & Brasil, are endemic to the rio Paracatú drainage, Estado de Minas Gerais (Costa & Brasil, 1994; Costa, 1996).

Simpsonichthys trilineatus was first described on the basis of five specimens collected near the rio Paracatú, close to Brasilândia, in 1994. This type series consisted of three young males and

two adult females. Two years latter, DTBN found a new population of *Simpsonichthys* in the same basin, but about 100 km to south in the floodplain of the rio Taboca, a small tributary of the rio Paracatú. This fish was somewhat similar to *S. trilineatus*, but showed a distinct colour pattern. However, large males of *S. trilineatus* were not then known. This lack of material did not allow adequate comparison of the two populations to determine the taxonomic status of the Taboca population. However, study of additional recent fish collections from both localities, lead to recognition of the population from the rio Taboca floodplains as a new species, herein described.

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Fig. 1. *Simpsonichthys auratus*, male, topotype, about 30 mm SL, collected in 1996, not preserved (photograph W. J. E. M. Costa).

Material and methods

Measurements and counts follow Costa (1988). Measurements are presented as percentages of standard length (SL), except for subunits of head, which are presented as percentages of head length. Counts of pelvic, pectoral and caudal fin-rays were made on cleared and counterstained specimens (C&S) prepared according to Taylor & Van Dyke (1985). The compound caudal centrum was counted as a single element in vertebrae numbers. Nomenclature for frontal squamation follows Hoedeman (1956). Terminology for cephalic neuromasts is according to Gosline's (1949) nomenclature for head laterosensory canals.

Abbreviations for institutions are: MZUSP, Museu de Zoologia, Universidade de São Paulo, São Paulo; UFRJ, Universidade Federal do Rio de Janeiro, Rio de Janeiro, and, UMMZ, University of Michigan, Museum of Zoology, Ann Arbor.

Most comparative material of other rivulids examined in the present study is listed in Costa (1998). Comparative material of *S. trilineatus* includes: MNRJ 12525, holotype, male; UFRJ 2132,

paratype, male (C&S); Brazil: Minas Gerais: João Pinheiro, temporary pool close to rio Paracatú near Brasilândia; G. C. Brasil, 1 May 1994. – MNRJ 12526, paratype, 1 female; UFRJ 2133, paratypes, 1 male, 1 female; same locality; G. C. Brasil, 1 June 1994. – UFRJ 4637, 65 males, 99 females; UFRJ 4670, 5 males, 5 females (C&S); UMMZ 234762, 7 males, 7 females; same locality; W. J. E. M. Costa, D. Belote, G. Neves & D. Almeida, 10 April 1998.

Simpsonichthys auratus, new species (Fig. 1)

Holotype. MZUSP 52912, male, 30.3 mm SL; Brazil: Minas Gerais, Lagoa Grande, temporary pool close to rio Taboca, a tributary of rio Paracatú, rio São Francisco basin; W. J. E. M. Costa, D. Belote, G. Neves & D. Almeida, 10 April 1998.

Paratypes. MZUSP 52913, 1 male, 28.8 mm SL, 2 females 20.3 and 22.3 mm SL; UFRJ 4666, 1 male, 32.6 mm SL, 2 females, 22.6–23.0 mm SL; UFRJ 4667, 5 males, 29.8–33.6 mm SL, 5 females, 23.3–

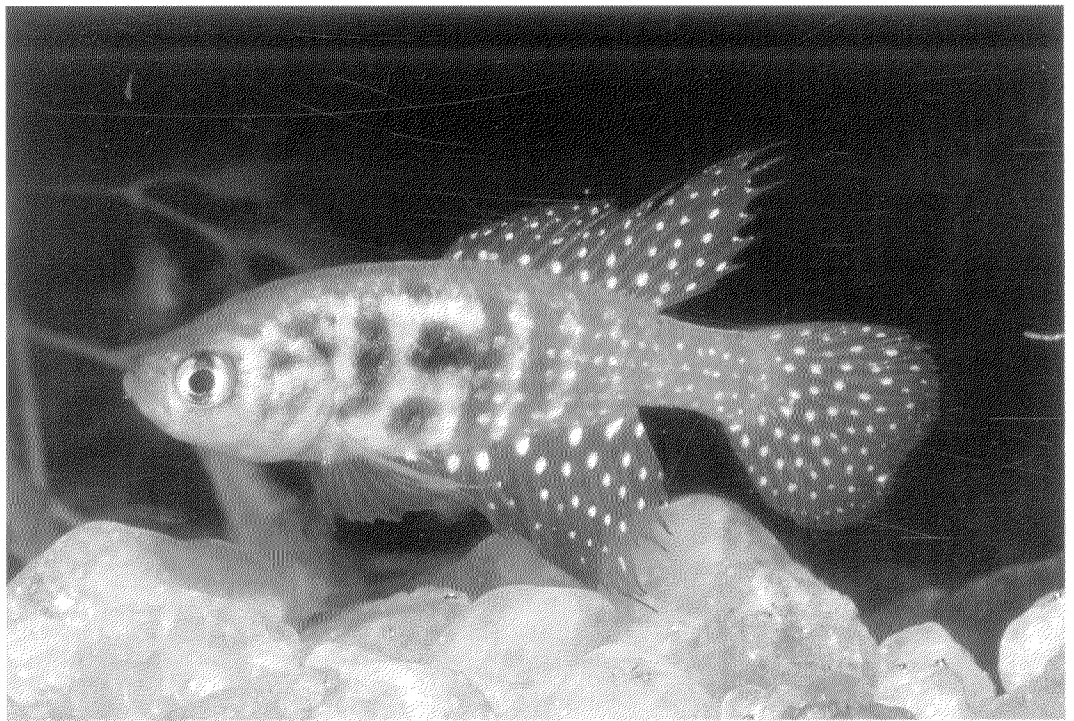


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Fig. 2. Rio Taboca floodplains, type locality of *Simpsonichthys auratus* (photograph W. J. E. M. Costa).

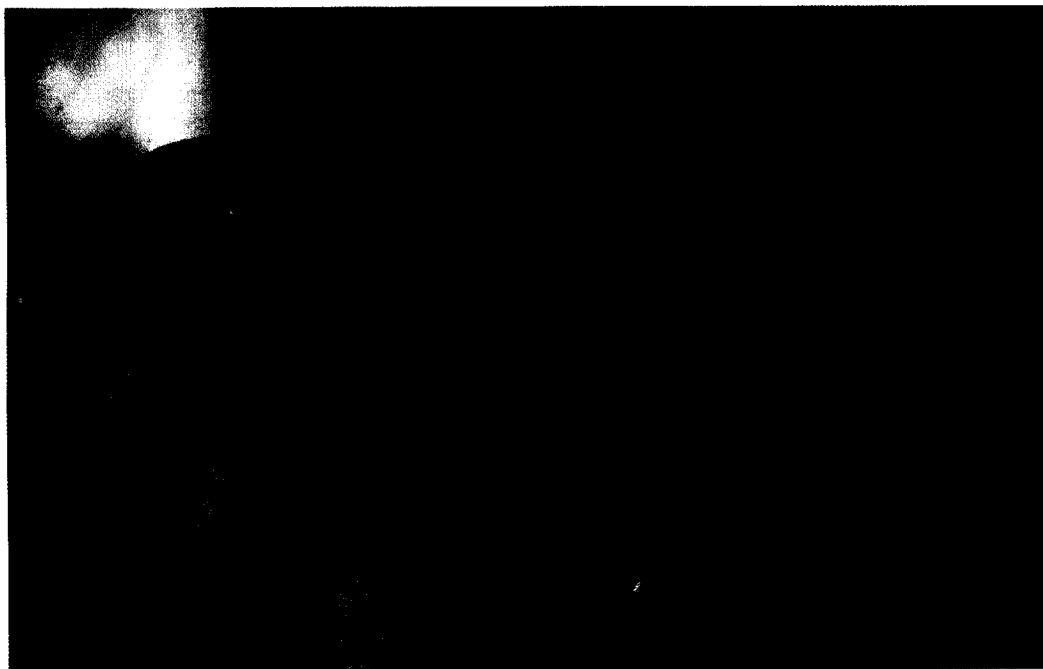


Fig. 3. *Simpsonichthys trilineatus*, male, topotype, about 30 mm SL, collected in 1998, not preserved (photograph W. J. E. M. Costa).



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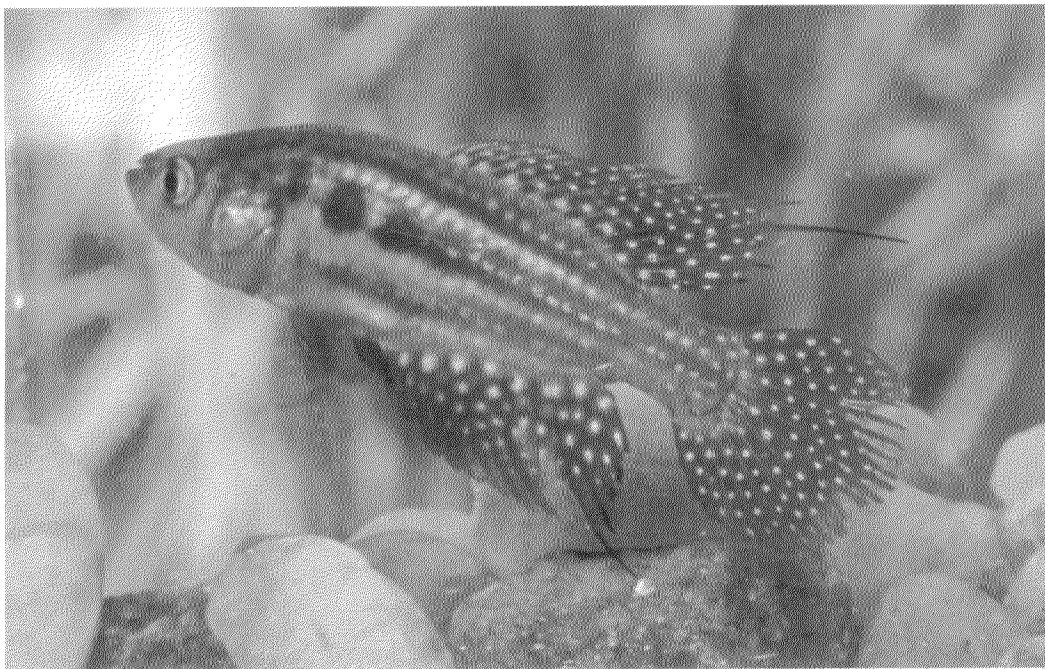


Fig. 3. *Simpsonichthys trilineatus*, male, topotype, about 30 mm SL, collected in 1998, not preserved (photograph W. J. E. M. Costa).

26.8 mm SL (all C&S); UMMZ 234240, one male, 27.5 mm SL, one female, 23.0 mm SL; collected with holotype. - UFRJ 4668, 3 males, 32.4-36.2 mm SL, 7 females, 23.0-25.7 mm SL; same locality; D. T. B. Nielsen & A. Carletto, 1 May 1996.

Additional material (non-types). UFRJ 4635, 5 females; collected with the holotype. - UFRJ 4669, 4 males, 4 females; same locality; D. T. B. Nielsen & A. Carletto, 1 May 1996.

Diagnosis. Distinguished from all other species of the genus by the combination of the following features: dorsal-fin rays 19-21 in male, 13-15 in female; anal-fin rays 18-20 in male, 16-17 in female; pelvic-fin rays 6 in both sexes; anterior half of body side of male bright golden, with a dark brown blotch on its ventrolateral portion; three or four dark purplish brown vertical bars on the central portion of body sides of male; body side of female with rounded spots, usually transversely coalescing on anterior portion of the caudal peduncle.

Description. Morphometric data are given in Table 1. Dorsal profile convex from snout to end of dorsal-fin base, approximately straight on caudal peduncle. Ventral profile convex from lower

jaw to end of anal-fin base, nearly straight on caudal peduncle. Body moderately deep, compressed, body width 1.8 in body depth of larger males.

Tip of dorsal and anal fins of male pointed, with short to moderately elongate filamentous rays, their tips reaching a vertical through central portion of the caudal fin. Dorsal and anal fins rounded in female. Caudal fin rounded. Pectoral fin elliptical. Posterior margin of the pectoral fin reaches a vertical through the base of the 6th anal-fin ray in male and the urogenital papilla in female. Tip of pelvic fin reaches base of the 3rd anal-fin ray in male and the 1st or 2nd ray in female. Anal-fin origin in a vertical through base of the 2nd or 3rd dorsal-fin ray in male and 1st ray in females. Dorsal-fin rays 19-21 in male, 13-15 in female; anal-fin rays 18-20 in male, 16-17 in female; caudal-fin rays 25-28; pectoral-fin rays 13-14; pelvic-fin rays 6. Small, papilliform contact organs on medial surface of the first pectoral-fin ray of male. Total vertebrae 26-28.

Scales cycloid, but with ctenii-like contact organs on scales of the anteroventral portion of body side of male. Frontal squamation A-patterned. Supraorbital neuromasts 17. Longitudinal series of scales 27; transverse series of scales 8; scale rows around caudal peduncle 12.

Table 1. Morphometric data of *Simpsonichthys auratus*. H: holotype; P: paratypes.

	males				females				
	H	P	P	P	P	P	P	P	P
	MZUSP	UFRJ	MZUSP	UMMZ	UMMZ	UFRJ	UFRJ	MZUSP	MZUSP
	52912	4666	52913	234240	234240	4666	4666	52913	52913
SL [mm]	30.3	32.6	28.8	27.5	23.0	23.0	22.6	22.3	20.3
In percents of standard length									
Body depth	34.1	33.7	35.8	33.7	33.5	33.7	33.7	32.9	33.5
Caudal peduncle depth	15.3	15.4	16.8	16.0	15.7	15.4	15.1	15.0	15.8
Predorsal length	50.4	48.4	51.0	51.7	62.2	63.7	63.5	63.2	65.6
Prepelvic length	48.7	46.5	48.2	49.2	57.4	54.4	53.5	57.3	58.5
Length of dorsal-fin base	33.0	35.1	34.3	32.3	23.5	21.6	23.9	19.0	19.2
Length of anal-fin base	32.4	33.0	32.1	33.0	22.4	21.4	21.8	21.1	21.2
Caudal-fin length	36.6	37.2	37.5	37.0	36.5	35.0	32.1	-	34.3
Pectoral-fin length	29.2	28.0	30.9	30.1	27.3	25.9	25.4	24.1	27.5
Pelvic-fin length	11.2	10.6	11.6	12.0	10.4	11.2	10.1	10.2	10.2
Head length	31.2	30.5	31.8	32.6	34.2	34.0	35.7	32.3	33.4
In percents of head length									
Head depth	93.4	99.6	98.7	88.0	89.8	88.8	86.6	84.6	87.7
Head width	62.1	64.0	64.6	62.9	66.2	64.6	61.2	66.0	66.8
Snout length	13.7	13.8	14.0	14.4	13.8	13.2	12.9	12.5	13.4
Eye diameter	35.5	30.3	33.3	32.7	35.3	34.0	35.0	36.9	35.7

Costa & Nielsen: *Simpsonichthys auratus*

Coloration. light golden humeral elongated lateroventral purplish brown vertical spots. Head brown spots. Iris yellowish brown dorsal brown anal fins red lower

Female brownish portion of ing forming the anterior Head gray through eye

Habitat. in a small, area close to etation in the nah of center the pool is was collected

Distribution. ty, a temporary Francisco bay

Etymology. referring to jective.

Simpsonichthys neatus, found having similar both species anterior part tion not occu genus. Howev tion is bright male of *S. au* oventral por body, exactly male of *S. tri*

Ichthyol. Explor.

Coloration. Male: Anterior half of body side light golden, with two or three rounded black humeral blotches, the first one often vertically elongated; a rounded dark brown blotch on the lateroventral portion. Posterior half of body light purplish brown, with three darker purplish brown vertical stripes below dorsal fin, and six to eight horizontal rows of small light greenish blue spots. Head golden with small dark brown spots. Iris yellow with a median vertical dark reddish brown stripe. Pelvic and unpaired fins dark reddish brown, with white dots. Tips of dorsal and anal fins black. Pectoral fin hyaline with a pale red lower border.

Female: Side of body light gray with dark brownish gray spots; usually spots, on anterior portion of caudal peduncle transversely coalescing forming vertical bars; two black blotches on the anteromedian portion of midline of the sides. Head gray. Iris yellow; a faint brown vertical bar through eye. Fins hyaline.

Habitat notes. *Simpsonichthys auratus* was found in a small, shallow (about 50 cm deep) flooded area close to rio Taboca (Fig. 2). The typical vegetation in this region is the Cerrado, the savannah of central Brazil. However, the area around the pool is deforested for cattle. No other fish was collected in this habitat.

Distribution. Known only from the type locality, a temporary pool close to rio Taboca, rio São Francisco basin, Brazil (Fig. 4).

Etymology. From the Latin *auratus* (golden), referring to the colour pattern of males. An adjective.

Discussion

Simpsonichthys auratus is closely related to *S. trilineatus*, found in the same river drainage. Besides having similar meristic and morphometric data, both species share a golden coloration on the anterior part of the body (Figs. 1 and 3), a condition not occurring in any other species of the genus. However, in *S. auratus* the golden coloration is brighter than in *S. trilineatus*. Besides, the male of *S. auratus* has a dark blotch on the lateroventral portion of the anterior region of the body, exactly in the same position where the male of *S. trilineatus* possesses a dark area. This

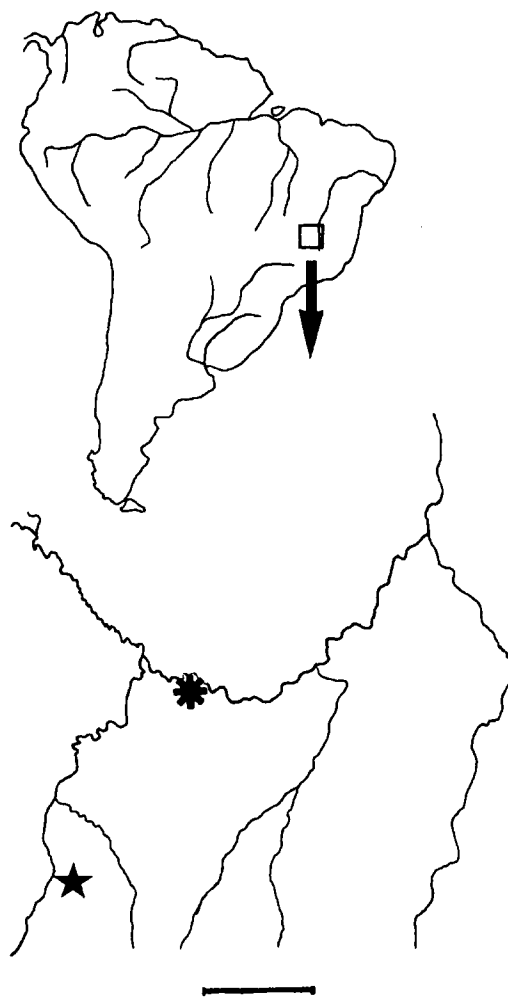


Fig. 4. Geographic distribution of *Simpsonichthys auratus* (star), and *S. trilineatus* (asterisk).

dark mark corresponds to the anterior portion of the ventralmost of the three longitudinal stripes diagnostic for the latter species. This is tentatively interpreted as a synapomorphy, because in both species these marks are in the same position and missing in closely related taxa.

Simpsonichthys trilineatus is distinguished from *S. auratus* and all other congeners by the autapomorphic possession of three horizontal purplish brown stripes and a reduced number of pelvic-fin rays (5 vs. 6). In *S. auratus* there is no vestige of stripes of *S. trilineatus* (Fig. 1), and there are six rays in the pelvic fin, although the first very reduced. The female of *S. trilineatus* usually has

several spots on the anterior portion of the caudal peduncle which longitudinally coalesce, a condition never found in *S. auratus* female, in which the spots often transversely coalesce, which represents the plesiomorphic condition for the genus (Costa, 1996).

In addition, presence of three dark purplish brown vertical bars restricted to the central portion of the body sides of the male of *S. auratus* readily distinguishes the new species from *S. trilineatus*. This color pattern is unique among cynolebiatins and, therefore, considered autapomorphic.

Acknowledgements

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Costa & Nielsen: *Simpsonichthys auratus*

Biologie de

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