

NEW CHARACID FISH, *Hemigrammus skolioplatus* (CHARACIFORMES: CHARACIDAE) FROM UPPER RIO TAPAJÓS DRAINAGE, CENTRAL BRAZIL

Vinicius A. Bertaco*

Tiago P. Carvalho*

RESUMO

Novo caracídeo, *Hemigrammus skolioplatus* (Characiformes: Characidae), do alto rio Tapajós, Brasil Central

Uma nova espécie de caracídeo, *Hemigrammus skolioplatus*, é descrita para alto rio Tapajós, Mato Grosso, Brasil. A nova espécie distingue-se das demais espécies de *Hemigrammus* pela presença de uma faixa escura, curva, que se estende longitudinalmente sobre a série de escamas da linha lateral desde a mancha umeral até a porção inferior da base da nadadeira caudal.

Palavras-chave: Neotropical, Amazonas, rio Juruena, Chapada dos Parecis, taxonomia.

ABSTRACT

A new characid species, *Hemigrammus skolioplatus*, is described from the upper rio Tapajós in Mato Grosso State, Brazil. The new species is distinguished from all other *Hemigrammus* species by the presence of a black, curve, longitudinal band extending over the scale row of the lateral line from humeral spot to the inferior portion of the caudal-fin base.

Key words: Neotropical, Amazon, rio Juruena, Chapada dos Parecis, taxonomy.

INTRODUCTION

Hemigrammus Gill is a genus of small characid fishes, including 43 valid species widely distributed in the rio Amazonas, rio Orinoco, rio Paraná-Paraguay, rio São Francisco drainages, and rivers in the Guianas, Suriname, and northwest Brazil, with a cis-andean distribution (Lima *et al.*, 2003).

* Laboratório de Ictiologia, Museu de Ciências e Tecnologia, Pontifícia Universidade Católica do Rio Grande do Sul, Av. Ipiranga 6681, Caixa Postal 1429, 90619-900 Porto Alegre, RS, Brazil. E-mails: ubertaco@puers.br (VAB), tiagobio2002@yahoo.com.br (TPC).

Hemigrammus was erected by Gill (1858) as subgenus of *Poecilurichthys* Gill differing from the other characids by the lateral line abruptly discontinued at the middle of the body (lateral line incomplete). *Hemigrammus* was extensively revised by Eigenmann (1918) whose accounts still constitute the single comprehensive review of the then-known members of the genus. The anatomical diversity within genus, and the high number of species involved are the major reasons for the lack of phylogenetic analyses dealing with relationships of the species within this genus, and with other genera. The recognition of species groups is herein primarily based on Eigenmann (1918) and Géry (1977). However, those authors did not propose a hypothesis of intrageneric relationships of *Hemigrammus*.

During a recent expedition to some of the south tributaries of the Amazon river in Central and Western regions of Brazil, a new characid species was collected in some tributaries of the rio Juruena, upper rio Tapajós drainage, which is described below. This species best fits into the current definition of *Hemigrammus*.

MATERIAL AND METHODS

Counts were taken as described by Fink & Weitzman (1974) with the exception of number of scale rows below lateral line counted from the scale row ventral to lateral line to the scale row closest to the first pelvic-fin ray. Vertebral counts, supraneurals, gill-rakers of first arch, teeth and procurrent caudal-fin-ray counts were taken from cleared and stained specimen (c&s) prepared according to the method of Taylor & Van Dyke (1985). Teeth counts were also taken in all type specimens. Vertebral counts include the four vertebrae integrated in the Weberian apparatus and the terminal half centrum plus associated elements (PU_1+U_1) counted as one element. Teeth and bone SEM (scanning electronic microscopy) photographs were taken from dissected c&s specimen.

The measurements follow Fink & Weitzman (1974) except the standard length; taken from tip of snout to the last vertebra. Measurements were taken point to point with the aid of an electronic caliper on the left side of specimens whenever possible. All measurements other than SL are expressed as a percents of SL except subunits of the head that are recorded as percents of head length (HL).

The examined specimens are deposited in the California Academy of Sciences, San Francisco (CAS), and Museu de Ciências e Tecnologia, Pontifícia Universidade Católica do Rio Grande do Sul, Porto Alegre (MCP).

RESULTS

Hemigrammus skolioplatus, new species

(Figs. 1-2; Table 1)

Holotype. MCP 38389, 33.7 mm SL, Brazil, Mato Grosso, Comodoro, rio Doze de Outubro on road BR 364 between Comodoro and Vilhena, 12°58'39"S 60°00'30"W, 14 Jul 2004, R. E. Reis, P. A. Buckup, A. R. Cardoso & E. H. L. Pereira.

Paratypes. All from rio Juruena drainage: Brazil, Mato Grosso: MCP 37825, 7 (1 c&s), 13.5-33.7 mm SL, collected with the holotype. MCP 37823, 1, 28.6 mm SL, rio Mutum on road BR 364 towards Vilhena, Comodoro, 13°05'08"S 59°53'32"W, 14 Jul 2004, V. A. Bertaco, J. F. P. da Silva, P. Lehmann & F. C. T. Lima.

Diagnosis. *Hemigrammus skolioplatus* is distinguished from its congeners by the possession of a black, curve, longitudinal band extending over the scale row of the lateral line from humeral spot to the inferior portion of the caudal-fin base. Additional characters to diagnose it from other *Hemigrammus* species are the possession of a black vertically elongate humeral spot, maxilla with four or five teeth, 14-16 branched anal-fin rays, 5 scale rows above and 3 scale rows below lateral line, 10-22 perforated scales on lateral line and 32-33 scales on a longitudinal series.

Description. Morphometric data summarized in Table 1. Body compressed and moderately deep; greatest body depth anterior to dorsal-fin origin. Dorsal body profile slightly convex from nostril to supraoccipital spine, convex from that point to dorsal-fin origin; posteroventrally slanted at dorsal-fin base; straight from last dorsal-fin ray to adipose-fin origin. Ventral profile of head convex. Ventral body profile convex or nearly straight from pectoral-fin origin to anal-fin origin. Body profile along anal-fin base posterodorsally slanted. Caudal peduncle elongate, nearly straight to slightly concave along both dorsal and ventral margins.

Snout convex from margin of upper lip to vertical through anterior nostrils. Head small. Mouth terminal. Maxilla extending posteriorly to under middle of orbit, slightly curved, and aligned at approximately 45 degrees angle relative to longitudinal axis of body. Anterodorsal border of maxilla concave, posterodorsal border slightly convex, anteroventral border concave, and posteroventral border convex. Maxilla slightly widened posteriorly.

Premaxilla with two tooth rows; outer row with 4-6, tricuspid teeth with central cusp larger; inner row teeth 5-6, gradually decreasing in length from first to fourth teeth, last tooth considerably smaller, with 3-5 cusps and central cusp longer and broader than other cusps. Four to 5 maxillary teeth, with 1-3 cusps, central cusp slightly longer. Four anteriormost dentary teeth larger, with 5 cusps, followed by 7-9 teeth with 1-3 cusps or conical in shape; central cusp in all teeth two to three times longer and broader than remaining cusps. Cusp tips slightly curved posteriorly and towards inside of mouth.

Dorsal-fin rays ii, 9 ($n = 8$); first unbranched ray approximately one-half length of second ray. Dorsal-fin origin located posterior to middle of SL and posterior to vertical through pelvic-fin origin. Adipose-fin located approximately at vertical through insertion of 13th to 15th branched anal-fin rays bases.

Anal-fin rays iii-iv, 14-16 (mean = 15, $n = 8$). First unbranched ray usually only apparent in cleared and stained specimens. Anal-fin profile slightly concave in some specimens. Anal-fin origin located posterior to vertical through base of last dorsal-fin ray. Pectoral-fin rays i, 9-11 (mean = 10.1, $n = 7$). Pelvic-fin rays i, 6-7 (mean = 6.7, $n = 8$). Pelvic-fin origin located anterior to vertical through dorsal-fin origin. Caudal-fin forked, with 19 principal rays (one specimen with 17). One third of initial portion of lower caudal-fin lobe scaled. Dorsal procurrent rays 11, and ventral procurrent rays 10 ($n = 1$). Smallest examined specimen (MCP 37825, 13.5 mm SL) retaining larval pectoral fin morphology.

Scales cycloid, moderately large. Lateral line incomplete, perforated scales 10-16 (mean = 14.3, only one specimen with 22, $n = 7$). Longitudinal scale series including lateral-line scales 32-33 (mean = 32.3, $n = 7$). Scale rows between dorsal-fin origin and lateral line 5 ($n = 7$); scale rows between lateral line and pelvic-fin origin 3 ($n = 7$). Predorsal scales 9-11, arranged in regular series (mean = 10, $n = 7$). Scales rows around caudal peduncle 14 ($n = 5$). Scale sheath along anal-fin base with 6-8 scales in a single series ($n = 6$), extending posteriorly to base of fourth to seventh branched rays.

Precaudal vertebrae 16; caudal vertebrae 16; total vertebrae 32. Supraneurals 5. Gill-rakers; 6 on the upper branch and 10 on the lower branch of the first branchial arch ($n = 1$).

Color in alcohol. Dorsal and dorsolateral portions of head and body dark brown. Infraorbital and opercular areas covered with scattered, dark chromatophores. Scales on lateral and ventral surface of body with dark brown chromatophores, forming reticulate scale pattern. A black curved longitudinal

band over scale row of the lateral line from humeral spot to the inferior portion of the caudal-fin base. Longitudinal band approximately one scale wide, and with some upper and lower projections. A black humeral spot, narrow and vertically elongate, upper portion slightly wider, located over second to fourth lateral line scales and extending over 2-3 horizontal series of scales, including lateral line. A small rounded to oval spot on the caudal peduncle. A stripe, not very conspicuous, in the 3 middle rays of caudal-fin. All fins with small scattered dark chromatophores (Fig. 1).

Color just after fixation. Color pattern similar to described for alcohol preserved specimens, except that some specimens examined soon after fixation in formalin exhibited all fins reddish, and midlateral body silvery. Body red-orange.

Sexual dimorphism. Secondary sexually dimorphic characters were not found on examined specimens. Mature gonads were not found on the dissected c&s specimen.

Distribution. *Hemigrammus skolioplatus* is known only from two tributaries of the rio Juruena, rio Mutum and rio Doze de Outubro in the headwaters of the rio Tapajós drainage, in Chapada dos Parecis, Mato Grosso, Brazil.

Etymology. The name *skolioplatus* is from the Greek, *skolios*, meaning curved, bent, and *platus*, meaning broad stripe or border, alluding to the presence of curved stripe along of the lateral of body.

Ecological notes. All specimens of *H. skolioplatus* were collected close to the margin along semilentic stretches of a shallow river with clear water, sand and scattered small stones on the bottom, with moderately submersed and riparian vegetation. Species collected syntopically with *H. skolioplatus* were *Aequidens epae*, *Ancistrus* sp., *Cetopsorhamdia* sp., *Characidium* sp., *Corydoras concolor*, *Eigenmannia virescens*, *Erythrinus erythrinus*, *Hasemania* sp., *Hyphessobrycon hexastichos*, *Hyphessobrycon* sp., *H. aff. vilmae*, *Leporinus* sp., *Megalechis thoracata*, *Rhamdia* sp. and *Synbranchus marmoratus*.

DISCUSSION

Hemigrammus skolioplatus is described in this genus according to the definition proposed by Gill (1858) and further improved by Eigenmann (1918), which is still in use (Géry, 1977), and defines the genus by the following

combination of characters: small-sized fishes; premaxillary teeth in two rows; maxillary teeth lacking or reduced in number and restricted to the upper part of its free margin; scales in the lateral line 29-36; lateral line incomplete; caudal fin scaled.

Weitzman & Malabarba (1998) and Lucena (2003) pointed out that there is no evidence for the monophyly of *Hemigrammus*, and recognition of monophyletic lineages among *Hemigrammus* species is hastened by the obscurity relative to useful characters supporting a consistent intrageneric hypothesis of relationships. Weitzman & Malabarba (1998) pointed out that large characid genera such as *Hemigrammus* often have minimal morphological divergence useful in cladistic analyses of their species. Much of the information used to distinguish species are features such as variations in color patterns, counts and measurements, that are little informative about phylogenetic relationships.

Géry (1977) proposed five artificial *Hemigrammus* species-groups based on color pattern. *Hemigrammus skolioplatus* could be included in group "d", whose species possess one or two humeral spots, absence or presence of the caudal spot, and usually a narrow longitudinal stripe along body. But none of the species included in the aforementioned groups has a black curved longitudinal band in the midlateral body located over the scale row of the lateral line from humeral spot to caudal-fin base as found in *H. skolioplatus*. The longitudinal line present in those other species runs from the humeral region to the caudal peduncle, along the longitudinal body axis.

Current diagnosis of *Hemigrammus* versus *Hyphessobrycon* lies on the presence of scales covering the caudal fin of the former. The lack of a phylogenetic definition for *Hyphessobrycon* makes it possible that *Hemigrammus skolioplatus* might be more closely related to one of the species of this genus than to other *Hemigrammus* species. However, no *Hyphessobrycon* species possess a color pattern similar to that of *H. skolioplatus*. Among small characids, *Inpaichthys kerri* Géry & Junk, *Nematobrycon lacortei* Weitzman & Fink and *N. palmeri* Eigenmann share with *H. skolioplatus* the presence of a black longitudinal body band, below the midlateral portion of body. However these species differ from *H. skolioplatus* by presenting a nearly straight, broad and densely pigmented band versus relatively narrow, curved and little pigmented along lateral line row of scales. No other character was found that could suggest some similarity between these taxa.

Hemigrammus skolioplatus possesses a low number of branched anal-fin rays (14-16), while most of the forty three species of the genus have more

than twenty branched anal-fin rays. This count differs *H. skolioplatus* from all the congeners with exception of *H. analis* (12-14), *H. hyanuary* Durbin, 1918 (14-15), *H. iota* Durbin, 1909 (15-17), *H. rhodostomus* Ahl, 1924 (14-15) and *H. tridens* Eigenmann, 1907 (16-19), that are distinguished by the color pattern and meristic characters (see diagnosis).

Only three species of *Hemigrammus* are referred to the rio Tapajós drainage: *H. elegans* (Steindachner, 1882), *H. analis* Durbin, 1909 and *H. orthus* Durbin, 1909, the latter two species restricted to the lower rio Tapajós drainage (Lima *et al.*, 2003). These species, as well as all remaining species included in *Hemigrammus*, do not possess a black and curve longitudinal band over the scale row of the lateral line from humeral spot to caudal-fin base, as exhibited by *H. skolioplatus*.

The ichthyofauna of the rio Tapajós drainage is poorly known. Reports on the ichthyofauna composition of the drainage are inexistent. In the last four years four new species of *Hyphessobrycon* were described for the upper portions of this drainage (*H. heliacus* Moreira, Landim & Costa, 2002; *H. moniliger* Moreira, Lima & Costa, 2002; *H. scutulatus* Lucena, 2003; and *H. hexastichos* Bertaco & Carvalho, 2005). During the collecting expedition to several affluents of rio Tapajós, rio Madeira, rio Purus and rio Paraguay drainages, *H. skolioplatus* was collected only in two tributaries of the rio Juruena, upper rio Tapajós drainage.

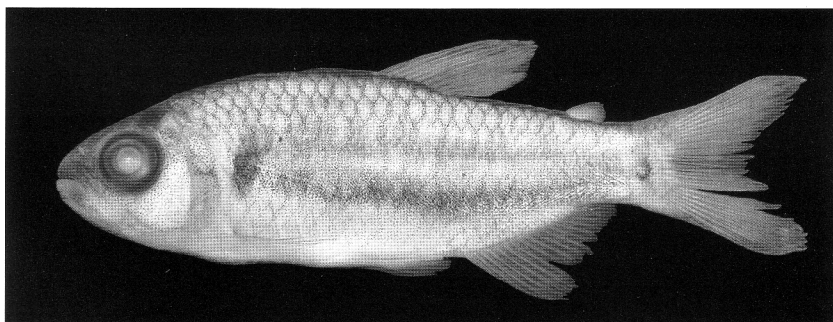


Figure 1. *Hemigrammus skolioplatus*, MCP 38389, holotype, 33.7 mm SL; Brazil, Mato Grosso, Comodoro, rio Doze de Outubro, tributary of rio Juruena, upper rio Tapajós drainage.

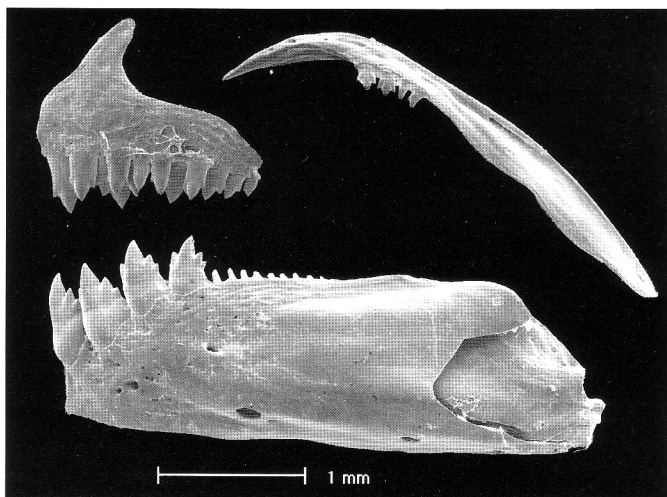


Figure 2. *Hemigrammus skolioplatus*, MCP 37825, paratype, 25.9 mm SL. Scanning electronic microscopy of left side upper and lower jaws.

Table 1. Morphometric data of holotype (H) and paratypes of *Hemigrammus skolioplatus* from the upper rio Tapajós drainage, Comodoro, Mato Grosso, Brazil (n = 7 including the holotype; SD = standard deviation).

| Measurements | H | Range | Mean | SD |
|-----------------------------|------|-----------|------|-------|
| Standard length (mm) | 33.7 | 15.5-33.7 | 22.2 | 7.211 |
| Percents of Standard length | | | | |
| Predorsal distance | 59.9 | 56.6-60.2 | 59.1 | 1.234 |
| Prepelvic distance | 55.2 | 52.0-58.6 | 55.4 | 1.951 |
| Prepectoral distance | 30.9 | 30.4-33.5 | 32.0 | 1.160 |
| Preanal distance | 74.5 | 69.7-74.5 | 71.9 | 1.518 |
| Depth at dorsal-fin origin | 35.0 | 31.0-35.9 | 34.0 | 1.792 |
| Caudal peduncle depth | 13.6 | 11.0-14.0 | 13.0 | 0.996 |
| Caudal peduncle length | 11.3 | 10.3-11.6 | 11.1 | 0.529 |
| Anal-fin base | 22.0 | 20.6-24.5 | 22.3 | 1.459 |
| Dorsal-fin length | 28.2 | 26.8-29.4 | 28.2 | 0.797 |
| Pelvic-fin length | 17.8 | 15.6-17.8 | 16.7 | 0.760 |
| Pectoral-fin length | 21.7 | 17.3-22.0 | 19.8 | 1.929 |
| Head length | 31.5 | 31.5-35.2 | 33.1 | 1.317 |
| Percents of Head length | | | | |
| Snout length | 23.6 | 17.5-25.3 | 22.6 | 2.643 |
| Upper jaw length | 50.0 | 46.2-50.0 | 47.7 | 1.265 |
| Orbital diameter | 34.9 | 34.9-41.7 | 37.2 | 2.388 |
| Interorbital width | 33.0 | 25.0-33.0 | 30.0 | 3.744 |

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APPENDIX

Comparative material: *Hemigrammus unilineatus*, MCP 37587 (131, 15.7-35.8 mm SL), tributary of rio Una, Pacatuba, Paraíba, Brazil. *Nematobrycon palmeri*, CAS 70883 (43, 2 c&s, 10.2-28.2 mm SL), rio Condoto, tributary of rio San Juan, Chocó, Colombia.

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