

## ***Hemiodus langeanii* (Characiformes: Hemiodontidae), a new species from rio Amana, rio Maués-Açú drainage, Amazon basin, Brazil**

Hélio Beltrão<sup>1</sup> and Jansen Zuanon<sup>2</sup>

*Hemiodus langeanii*, new species, is described based on 20 specimens collected in the rio Amana, a tributary of rio Maués-Açú, rio Amazonas drainage, Brazil. The new taxon can be distinguished from its congeners by its high body (27.1-35.3%, average 32.3% SL vs. 18.8-28.5% in remaining species). The new species also exhibits a large lateral dark spot that is equal to, or greater than, the eye diameter (vs. smaller in remaining species except for *H. microlepis*). The lack of conspicuous lateral stripe or transverse bands and the low lateral line scales count (68-74) distinguish *H. langeanii* from some similar species in the genus (scale counts: 94-123 in *H. argenteus*, 124-148 in *H. microlepis*, 86-99 in *H. orthonops* and 77-92 in *H. parnaguae*). Finally, the new species can be differentiated from *H. unimaculatus* (which overlaps in the number of lateral line scales) by the higher number of scales between the lateral line and the pelvic fin origin (9-10 vs. 4-7, respectively), which are similar sized above and below lateral line (vs. scales larger below the lateral line in *H. unimaculatus*).

*Hemiodus langeanii*, espécie nova, é descrita com base em 20 espécimes coletados no rio Amana, um tributário do rio Maués-Açú na drenagem do rio Amazonas, na Amazônia Brasileira. O táxon novo pode ser diferenciado de seus congêneres devido ao seu corpo muito alto (27,1-35,3%, média 32,3% CP, vs. 18,8-28,5% nas demais espécies). A espécie nova apresenta uma grande mancha lateral escura que é igual ou maior do que o diâmetro do olho (vs. menor nas demais espécies, exceto em *H. microlepis*). A ausência de faixa longitudinal ou bandas transversais conspícuas, associada a um baixo número de escamas na linha lateral (68-74) distinguem *H. langeanii* de algumas espécies similares do gênero (94-123 em *H. argenteus*, 124-148 em *H. microlepis*, 86-99 em *H. orthonops* e 77-92 em *H. parnaguae*). Finalmente, a espécie nova pode ser diferenciada de *H. unimaculatus* (com a qual apresenta sobreposição na contagem de escamas da linha lateral) devido ao maior número de escamas entre a linha lateral e a origem da nadadeira pélvica (9-10 vs. 4-7, respectivamente), e pelo tamanho similar das escamas acima e abaixo da linha lateral (vs. maiores abaixo da linha lateral em *H. unimaculatus*).

**Key words:** Actinopterygii, Anthropogenic disturbance, Goldmining, *Hemiodus unimaculatus*, Ostariophysi.

### **Introduction**

The genus *Hemiodus* Müller, 1842 includes small to medium sized fishes (7-30 cm of standard length) that occur in the Amazon, Orinoco, Araguaia-Tocantins, Essequibo, Paraná-Paraguay and Parnaíba river basins (Langeani, 2003). The most recent revision of the genus was by Langeani (1996), which was followed by the description of only two new species, *Hemiodus tocantinensis* Langeani, 1999 and *H. jatuarana* Langeani, 2004. The species of *Hemiodus* share only one synapomorphy: medial surface of preopercle with a small ventrally angled depression, which receives the posteroventral portion of the hyomandibular (Langeani, 1998); in addition, they are also diagnosed by having small multicuspidated teeth in the upper jaw, and edentulous lower jaw.

There is no comprehensive phylogenetic study of the relationships between the species of *Hemiodus*. Nevertheless, Langeani (1996) divided *Hemiodus* in two artificial groups: a) species with more than 80 lateral line scales, and b) species with less than 80 scales along the lateral line. At present, 19 species are recognized in the genus, in addition to four undescribed species from the Amazon River basin (Langeani, 2003, 2004). *Hemiodus* species show some variation in general color pattern, however most species exhibit a round lateral dark spot and a short dark stripe along the lower lobe of caudal fin.

During an ichthyofaunal survey conducted in the Floresta Nacional do Amana reserve (FLONA do Amana) near the boundary between States of Pará and Amazonas in Brazilian Amazon we collected specimens of a species of *Hemiodus*

<sup>1</sup>Universidade do Estado do Amazonas – UEA, Coordenação de Tecnologia em Produção Pesqueira, Av. Djalma Batista, 3578, Flores, Manaus, AM, Brazil. helio\_anjos@yahoo.com.br

<sup>2</sup>Instituto Nacional de Pesquisas da Amazônia – INPA, Coordenação de Pesquisas em Biodiversidade, Av. André Araújo, 2936, Caixa Postal 478, 69060-001 Manaus, AM, Brazil. jzuanon3@gmail.com

with the typical dark lateral spot pattern, but exhibiting a conspicuous high body depth and low lateral line scale counts, which is described herein as new.

### Material and Methods

Morphometric and meristic data were obtained following Langeani (1999). All morphological measurements were made with a digital caliper and expressed as proportions of standard length (SL) or head length (HL) (Table 1). Counts include lateral line (LL) scales, scales below LL to pelvic-fin origin and above LL to dorsal-fin origin, circumpeduncular and postdorsal (between dorsal and adipose fins) scales, fin rays, gill rakers on first branchial arch, branchiostegal rays, and upper jaw teeth. Whenever possible, measurements and counts were performed on the left side of specimens. In the description, counts are followed by their frequency in parentheses, with asterisks indicating the holotype. Vertebrae of the Weberian apparatus were counted as four elements and the fused PU1+U1 of the caudal region as a single element. Counts of vertebrae, gill rakers on the first branchial arch, tooth cusps, and premaxillary teeth were taken from cleared and stained specimens (c&s) prepared according to Taylor & van Dyke (1985). In the list of material examined, the total number of specimens is followed by the number of those cleared and stained (if any). Specimens were deposited at the Fish Collection of Instituto Nacional de Pesquisas da Amazônia (INPA), Manaus, Amazonas; Museu Paraense Emílio Goeldi (MPEG), Belém, Pará and at Museu de Zoologia da Universidade de São Paulo (MZUSP), São Paulo, Brazil.

### Results

#### *Hemiodus langeanii*, new species

##### Figs. 1a, 2

**Holotype.** INPA 31564, 122.4 mm SL, Brazil, Pará State, Itaituba, Floresta Nacional do Amana reserve (FLONA do Amana), rio Amana, Igarapé Porquinho, 05°06'33.0"S 57°32'08.0"W, 29 April 2008, H. Beltrão.

**Paratypes.** (All specimens from Brazil, States of Pará and Amazonas). INPA 31562, 8, 88.8-135.6 mm SL + 1 c&s, 110.5 mm SL (collected with the holotype); MZUSP 109438, 2, 115.5-126.9 mm SL; MPEG 20035, 2, 118.5-133.2 mm SL. INPA 31563, 6, 89.5-126.9 mm SL, State of Amazonas, in the northern border of the FLONA do Amana, at right margin of rio Amana, 04°46'41.0"S 57°28'25.0"W, 6 May 2008, H. Beltrão.

**Diagnosis.** *Hemiodus langeanii* differs from its congeners by its high body (27.1-35.3%, mean 32.3% SL, vs. 18.8-28.5% in remaining species, except *H. argenteus* Pellegrin, 1908, *H. microlepis* Kner, 1858, *H. orthonops* Eigenmann & Kennedy, 1903, and *H. parnaguae* Eigenmann & Henn, 1916 that have values that fall within the limits of variation of new species). *Hemiodus langeanii* shows a color pattern characterized

by absence of conspicuous longitudinal stripe along the body or transverse bands of melanophores that help distinguish it from most species in the genus (*H. thayeria* Böhlke, 1955, *H. ternetzi* Myers, 1927, *H. tocantinensis* Langeani, 1999, *H. quadrimaculatus* Pellegrin, 1908, *H. vorderwinckleri* (Géry, 1964), *H. huraulti* (Géry, 1964), *H. sterni* (Géry, 1964), *H. goeldii* Steindachner, 1908, *H. atranalis* (Fowler, 1940), *H. gracilis* Günther, 1864, *H. semitaeniatus* Kner, 1858, *H. immaculatus* Kner, 1858 and *H. jatuarana* Langeani, 2004). *Hemiodus langeanii* differs from most similar species (*H. unimaculatus* (Bloch, 1794), *H. amazonum* (Humboldt, 1821), *H. argenteus*, *H. microlepis*, *H. orthonops* and *H. parnaguae*), with a rounded lateral blotch on the flank and a dark stripe at lower caudal lobe), by its large dark lateral spot equal to, or greater than, the eye diameter (vs. smaller in remaining species except for *H. microlepis*) and lateral line scale counts 68-74 (vs. 94-123 in *H. argenteus*, 124-148 in *H. microlepis*, 86-99 in *H. orthonops*, 77-92 in *H. parnaguae*, and 51-60 in *H. amazonum*). Finally, *H. langeanii* differs from *H. unimaculatus* (which overlaps in lateral line scale counts) by a higher number of scales between the lateral line and the pelvic-fin origin (9-10), with scales of similar sizes above and below the lateral line (vs. 4-7, with scales below lateral line larger than those above it in *H. unimaculatus*).

**Description.** Morphometrics and meristics in Table 1. Largest examined specimen 133.3 mm SL. Body relatively short, deep and slightly compressed laterally. Highest body depth at dorsal fin origin. Dorsal profile of body convex to adipose fin and slightly concave from that point to anteriormost dorsal procurrent caudal fin ray. Ventral body profile slanted from snout to origin of pectoral fin, strongly convex from that point to anal-fin, slightly concave between that point to anteriormost ventral procurrent caudal fin ray. Interorbital region slightly concave and greater than snout length. Mouth subterminal, not protractile, with 17\* (n = 16) or 18 (n = 2) teeth with wide and convex crown harboring 11 cusps. Lower jaw edentulous and anteriorly rounded. Adipose eyelid well developed and covering almost entire eye, except for elongated vertical slit on median portion of pupil. Postorbital length longer than snout length. Branchiostegal rays 4 (n = 18). Gill rakers on epibranchial 34-38 (38\*) and on ceratobranchial 47-50 (47\*) of first gill arch (n = 4).

Scales cycloid and similar-sized throughout body. Lateral line with 68-74 (73\*) perforated scales, 13-15 (14\*) scales above and 9-10\* below LL series. Cleithrum followed by 4 horizontally elongate scales forming slight elevation above axillary depression. Three scales forming pelvic fin axillary process, last one distinctly elongated; vertebrae 36 (n = 4).

Dorsal-fin rays ii, 9\* (one specimen with ii, 10). Pectoral fin rays i, 18\* (i, 17-19). Pectoral fin extending halfway to pelvic-fin origin. Pelvic-fin rays i, 10\* (i, 11 in one specimen), tip of pelvic fin reaching little beyond halfway to anal-fin

**Table 1.** Morphometrics and meristics of *Hemiodus langeanii* n. sp., expressed as percent of standard length (SL) or head length (HL). SD = standard deviation.

Morphometrics	Holotype		Paratypes		
		N	Range	Mean	SD
Standard Length (mm)	122.4	18	86.9 - 133.3	116.1	13.6
	Percent of Standard Length				
Body height	31.7	18	27.1 - 35.3	32.3	2.3
Snout-dorsal fin distance	48.3	18	44.1 - 54.1	49.9	2.0
Snout-anal fin distance	83.6	18	74.3 - 87.5	83.1	2.6
Snout-pectoral fin distance	25.3	18	22.6 - 27.7	25.6	1.3
Snout-pelvic fin distance	56.6	18	53.5 - 59.1	56.2	1.4
Snout-Anus distance	79.7	18	70.4 - 83.7	80.0	3.1
Caudal peduncle length	11.4	18	10.8 - 13.6	12.6	0.7
Dorsal fin-hypural joint	55.8	18	54.6 - 59.2	56.5	1.2
Caudal peduncle height	9.7	18	9.5 - 11.0	10.3	0.4
Pectoral-fin length	17.0	18	14.6 - 20.2	17.5	1.4
Pelvic-fin length	17.6	18	13.2 - 20.9	17.4	2.5
Anal-fin base length	10.4	18	8.9 - 10.6	9.6	0.5
Adipose-fin length	6.0	18	5.6 - 6.5	6.1	0.4
Dorsal fin height	26.3	18	15.4 - 27.4	24.0	3.7
Head length	23.8	18	22.0 - 26.4	25.0	1.0
	Percent of Head Length				
Postorbital length	38.1	18	35.1 - 39.1	37.5	1.3
Interorbital distance	37.1	18	30.8 - 37.3	33.6	1.7
Snout length	29.6	18	26.5 - 34.2	30.0	1.9
Eye diameter	26.1	18	27.2 - 32.7	30.5	1.7
Mouth width	24.1	18	20.2 - 24.8	22.6	1.5
	Meristics				
Dorsal-fin rays	ii, 9	18	ii, 9 - ii, 10	-	-
Pectoral-fin rays	i, 18	18	i, 17 - i, 19	-	-
Pelvic-fin rays	i, 10	18	i, 10 - i, 11	-	-
Anal-fin rays	ii, 10	18	ii, 9 - ii, 11	-	-
Caudal-fin rays	10, 9	18	10, 9 - 10, 9	-	-
Lateral-line (LL) scales	73	18	68 - 74	-	-
Scales above LL	14	18	13 - 15	-	-
Scales below LL	10	18	9 - 10	-	-
Scales between dorsal and adipose fins	23	18	22 - 23	-	-
Circumpeduncular scales	20	18	-	-	-
Premaxillary teeth	17	18	17 - 18	-	-
Epibranchial gill rakers	38	4	34 - 38	-	-
Ceratobranchial gill rakers	47	4	47 - 50	-	-
Branchiostegal rays	4	4	-	4	-

origin. Anal-fin rays ii, 10\* (ii, 9-11). Anal-fin with distal margin concave. Principal caudal-fin rays 10, 9. Caudal fin with similar sized lobes. Adipose fin teardrop shaped and shorter than eye diameter.

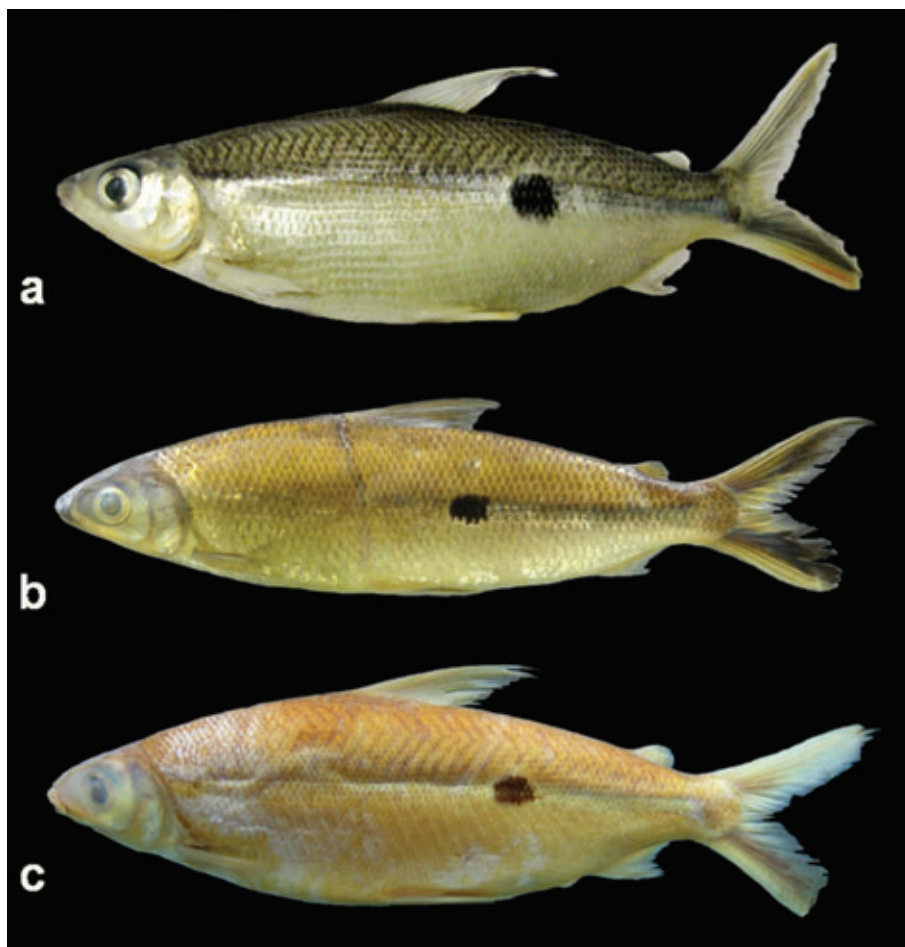
**Color in life.** Overall body color silvery with dorsum darker. Eyes yellowish with dark chromatophores forming a bar, darker at upper portion of eye. All fins orange tinted. Caudal fin orange, darker in distal portion and with coloration more evident on lower lobe. Black longitudinal stripe along each caudal lobe, with stripe of lower lobe darker (Fig. 2).

**Color in alcohol.** Overall body color pale brown to yellowish. Lateral spot black and connected to dark stripe of lower caudal lobe by inconspicuous dark midlateral band; in some specimens lateral band extending forward to dorsal portion of operculum. Upper portion of body side with 36 to 39 narrow vertically arranged V-shaped lines (chevrons). Pectoral and pelvic fins hyaline. Dorsal and anal fins with dark chromatophores almost to distal tips. Adipose fin with

dark base and light distal edge. Eye with conspicuous bar passing through pupil.

**Distribution.** Known of the type locality in the rio Amana, rio Maués-Açu drainage, near the boundary of the States of Pará and Amazonas, Brazil (Fig. 3).

**Ecological notes.** Specimens of *Hemiodus langeanii* were caught in slow-flowing stretches of the rio Amana and Igarapé Porquinho (1.0-2.5 m deep) and in artificial ponds (4.0-5.0 m deep and 40-70 m in diameter) resulting from goldmining activities. The rio Amana and its tributaries have clear water (not stained by humic acids) but turbid due to excess of fine suspended solids (clay) resulting from mining activities along river margins and/or bottom (dredging). Water at the collecting sites was turbid (vertical transparency 10-21 cm), slightly acidic (pH 6.4-6.8) with a temperature of 25.5-27.7°C; dissolved oxygen of 6.5-7.3 mg/L and 80-92% of saturation (measurements made between 9:00-11:00 am). Observations of living individuals of



**Fig. 1.** Lateral view of (a) *Hemiodus langeanii*, INPA 31564, holotype, 122,4 mm SL, rio Amana, rio Maués-Açú drainage, near the boundary of the States of Pará and Amazonas, (b) *H. unimaculatus*, INPA 25187, 178.0 mm SL (rio Madeira drainage) and (c) *H. argenteus*, INPA 25897, 197.0 mm SL (rio Uatumã drainage).



**Fig. 2.** Lateral view of *Hemiodus langeanii*, INPA 31563, paratype, 106.3 mm SL, freshly collected.

*Hemiodus langeanii* in its habitat revealed that the new species shows benthopelagic habits and was often caught with other characiforms such as *Pseudanos* sp., *Hoplias malabaricus* (Bloch, 1794), *Myloplus* sp. and *Serrasalmus eigenmanni* (Norman, 1929).

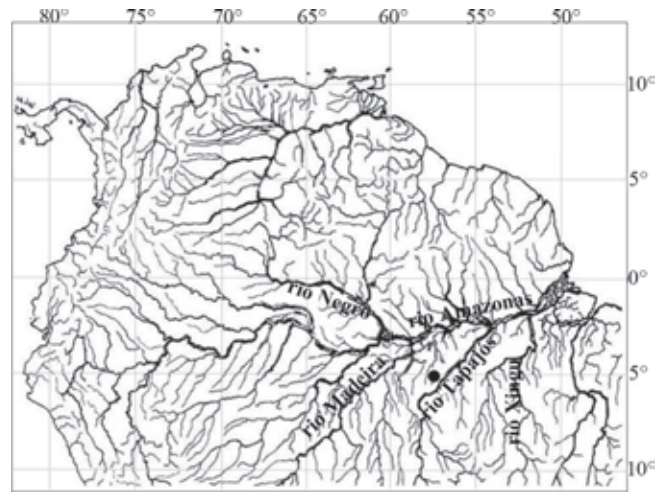
**Popular names.** In the Brazilian Amazon, species of the genus *Hemiodus* are referred to as Orana, Cubio, Charuto, and Flecheiro.

**Etymology.** Named in honour of Dr. Francisco Langeani (researcher at Instituto de Biociências, Letras e Ciências Exatas - Universidade Estadual Paulista “Júlio de Mesquita Filho”-UNESP, Brazil), for his highly relevant contributions to the knowledge of hemiodontid fishes.

**Discussion**

The new species presented herein was included in the genus *Hemiodus* based on the definition and morphological characters used by Langeani (1996). Following the artificial groups within the genus proposed by Langeani (1996), the new species is included among congeners with less than 80 perforated scales on the lateral line, which comprise 15 valid species (Langeani, 1996, 1998, 1999, 2003, 2004) and an additional possibly new form (J. Zuanon, pers. obs.).

*Hemiodus langeanii* lacks a conspicuous longitudinal stripe along the body or transverse bands of melanophores. The lack of such pigmentary features clearly diagnoses the new species from, on one hand, *H. thayeria*, *H. ternetzi*, and *H. tocantinensis*, all showing a conspicuous longitudinal stripe which extends from the distal border of operculum to the caudal fin base; and from *H. quadrimaculatus*, *H. vorderwinckleri*, *H. huraulti*, and *H. sterni*; all of which present transverse dark bands on body side. The new species can be distinguished from *H. goeldii*, *H. atranalis*, *H. gracilis*, and *H. semitaeniatus* by lacking the conspicuous longitudinal stripe extending from the lateral spot to the caudal fin base, characteristic of the latter species. The color pattern of *H. langeanii* also allows to distinguish it from *H. immaculatus* (lateral spot absent) and *H. jatuarana* (with a dark spot at caudal peduncle).

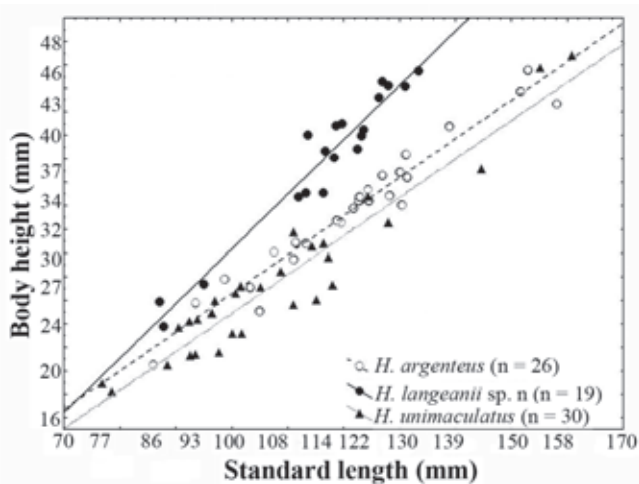


**Fig. 3.** Map of northern South America showing distribution of *Hemiodus langeanii* (circle) in Amazon basin (05°06'33.0''S 57°32'08.0''W).

Among the *Hemiodus* species with fewer than 80 lateral line scales, *H. unimaculatus* and *H. amazonum* are the most similar to *H. langeanii*, both regarding to body shape as well as color pattern (*i. e.*, a rounded lateral blotch on the flank and a dark stripe at lower caudal lobe). Nevertheless, *H. langeanii* differs from *H. amazonum* by the higher number of lateral line scales (68-74 vs. 51-60, respectively) and from *H. unimaculatus* (which overlaps the new species in lateral line scales counts) by the presence of 9-10 transverse rows of scales below LL (vs. 4-7 transverse rows of scales below LL), and for having body scales similarly sized (vs. scales on body below LL distinctly larger than those above LL) (Table 2). Other congeneric species such as *H. argenteus*, *H. microlepis*, *H. orthonops*, and *H. parnaguae* also show a very similar color pattern and body height to that found in the new species, but differ from it mainly due to higher LL scales counts (77-148 vs. 68-74 in *H. langeanii*; Table 2). Finally, the new species has a high body depth (mean 32.5% SL), which is higher than in other tall-bodied congenics

**Table 2.** Lateral Line and transverse series scales counting in *Hemiodus langeanii* and in congeneric species with a similar colour pattern (n = number of analyzed specimens); meristic data extracted from Langeani (1996).

Species	n	Lateral line scales											Scales above lateral line						Scales below lateral line						
		50	60	70	80	90	100	110	120	130	140	150	8	12	16	20	24	28	32	36	4	8	12	16	20
<i>H. amazonum</i>	12	51—60											9—12						4-5 <sup>1/2</sup>						
<i>H. unimaculatus</i>	78	61—77											10—15						4—7						
<i>H. langeanii</i> sp. n	18	68—74											13—15						9-10						
<i>H. parnaguae</i>	22	77—92											15—20						10-13						
<i>H. orthonops</i>	35	86—99											17—22						8-10						
<i>H. argenteus</i>	27	94—123											19—29						13—21						
<i>H. microlepis</i>	16	124—148											29—36						21—26						



**Fig. 4.** Body height as a function of the standard length in *Hemiodus langeanii* n. sp. compared to *H. argenteus* and *H. unimaculatus*.

such as *H. microlepis* and *H. argenteus* (28.6 and 26.3% SL, respectively; Langeani, 1996), and distinctly higher than *H. unimaculatus* (mean 25.6% SL) (Fig. 4).

*Hemiodus* species are generally widespread, common fishes often exploited by artisanal and commercial fisheries and ornamental fish trade in the Brazilian Amazon (Ferreira *et al.*, 1998; Ruffino *et al.*, 2005; 2006; Beltrão *et al.*, 2009). *Hemiodus langeanii*, however, is known so far only from rio Amana and some of its small tributaries upstream from a main waterfall (10-12m high) in the river course. Although we have sampled several aquatic environments associated to the rio Amana inside the FLONA do Amana, as well as other water courses nearby, it was not possible to register the occurrence of the new species beyond the type locality. The waterfall in the rio Amana possibly represents a natural barrier for this species, but more intensive collecting efforts are necessary to determine if the new taxon is truly endemic to the rio Amana basin.

*Hemiodus langeanii* apparently has a low abundance in the sampled habitats, which include artificial lakes resulting from goldmining activities, as well as the rio Amana and its small tributaries, which already have signs of strong anthropogenic disturbances (Fig. 5). Therefore, the conservation status of the new species, although uncertain, already gives some causes for concern. The high content of suspended colloidal clay and the large sand



**Fig. 5.** Igarapé Porquinho, a tributary of rio Amana, habitat of *Hemiodus langeanii* (a); a stretch of igarapé Porquinho with signs of anthropogenic disturbances of the environment (b); detail of a river channel deviation for goldmining (c); goldminers dismantling the river bank with pressured water jet (d, lower left corner of image).

and mud deposits carried to the bottom of the river and streams may result in siltation and further decrease of the water transparency, which can put in risk the survival of the new species.

#### Comparative material (All from Brazilian Amazon):

*Hemiodus amazonum*: Amazonas: INPA 28407, 3, 136.5-149.0 mm SL, lago Amanã. INPA 28408, 133.0 mm SL, igarapé Baré - lago Amanã. INPA 26127, 160.1 mm SL, rio Sucunduri - rio Madeira. INPA 26679, 175.7 mm SL, rio Sucunduri - rio Madeira. *Hemiodus argenteus*: Amazonas: INPA 17339, 5, 104.8-188.0 mm SL, Furo do Sacado - rio Purus. INPA 9797, 85.9 mm SL, Parque Nacional do Jaú - rio Negro. INPA 11724, 127.0 mm SL, rio Madeira. INPA 25923, 3, 181.0-203.0 mm SL, rio Uatumã. INPA 25897, 197.0 mm SL, Hidrelétrica Balbina - rio Uatumã. INPA 26837, 2, 152.0-175.0 mm SL, Hidroelétrica Balbina - rio Uatumã. INPA 27372, 2, 152.9-200.0 mm SL, rio Pitinga - lago UHE - rio Uatumã. INPA 28409, 141.2 mm SL, lago Amanã. INPA 25820, 130.3 mm SL, lago Marutu - rio Solimões. Pará: INPA 3752, 21, 103.0-227.5 mm SL, rio Curuá-Una. INPA 3517, 7, 93.4-128.1 mm SL, rio Curuá-Una. INPA 18472, 11, 98.6-138.8 mm SL, rio Curuá-Una. Tocantins: INPA 11604, 121.7 mm SL, Itupiranga, rio Tocantins. INPA 11602, 4, 113.2-140.1 mm SL, rio Tocantins. INPA 11615, 18, 55.8-180.6 mm SL, rio Tocantins. *Hemiodus cf. argenteus*: Amazonas: INPA 25603, 130.0 mm SL, UHE Balbina - rio Uatumã. *Hemiodus atranalis*: Amazonas: INPA 9996, 5, 87.4- 95.2 mm SL, rio Jaú - rio Negro. INPA 27348, 6, 65.0-72.3 mm SL, rio Pitinga - rio Uatumã. INPA 25564, 2, 80.4- 88.9 mm SL, Cachoeira Morena - rio Uatumã. *Hemiodus gracilis*: Amazonas: INPA 13174, 4, 45.7-52.0 mm SL, lago Tupé - rio Negro. INPA 26123, 2, 110.0-112.0 mm SL, rio Sucunduri - rio Madeira. INPA 26618, 3, 31.0-62.0 mm SL, igarapé Tarumã-Mirim - rio Negro. INPA 13165, 21, 42.0-50.0 mm SL, lago Tupé - rio Negro. Pará: INPA 3349, 3, 80.0-82.0 mm SL, lago Abuí - rio Trombetas. *Hemiodus immaculatus*: Amazonas: INPA 12075, 5, 90.6-96.7 mm SL, lago Tupé - rio Negro. INPA 25188, 4, 150.0-205.4 mm SL, rio Aripuanã - rio Madeira. Pará: INPA 3296, 5, 220.0-245.5 mm SL, lago Tapagem- rio Trombetas. *Hemiodus microlepis*: Amazonas: INPA 17032, 2, 143.2-152 mm SL, Cachoeira do Miriti - rio Uatumã. Rondônia: INPA 21771, 4, 160.0-205.0 mm SL, rio Guaporé. Tocantins: INPA 21357, 4, 83.9-129.1 mm SL, rio Araguaia. INPA 21536, 3, 109.4-138.7 mm SL, lago Manchete - rio Araguaia. INPA 21334, 2, 116.7-116.8 mm SL, Parque Estadual do Cantão, rio Araguaia. INPA 21257, 3, 97.1-110.2 mm SL, Parque Estadual do Cantão, rio Araguaia. INPA 21503, 88.5 mm SL, lago do Casé, rio Araguaia. INPA 17010, 6, 81.3-90.3 mm SL, Tucuruí - rio Tocantins. *Hemiodus* sp. Amazonas: INPA 25615, 3, 135.0-152.3 mm SL, lago Catalão, confluência dos rios Solimões e Negro. INPA 17241, 200.0 mm SL, Furo do Sacado - rio Purus. INPA 29757, 192.0 mm SL, RDS Uacari - rio Juruá. INPA 28931, 130.0 mm SL, RDS Uacari - rio Juruá. INPA 17219, 5, 175.0-180.0 mm SL, lago Surara - rio Purus. *Hemiodus orthonops*: Mato Grosso: INPA 2024, 109.0 mm SL, rio Piraim - Barão de Melgaço. INPA 2025, 131.0 mm SL, lago Croara - Barão de Melgaço. *Hemiodus quadrimaculatus*: Pará: INPA 11288, 2, 85.0-88.0 mm SL, igarapé Caxipacoré - rio Trombetas. INPA 7059, 121.1 mm SL, rio Jamanxim - rio Tapajós. INPA 4101, 4, 95.0-127.0 mm SL, Ilha de Babaquara - rio Xingu. *Hemiodus semitaeniatus*: Amazonas: INPA 3305, 3, 151.0-170.0 mm SL, barragem Paranapanema, rio Uatumã. INPA 25892, 3, 86.0-135.0 mm SL, Cachoeira do Miriti - Presidente Figueiredo.

INPA 23029, 2, 121.0-137.0 mm SL, rio Uatumã. *Hemiodus ternetzi*: Tocantins: INPA 11295, 2, 60.0-61.0 mm SL, igarapé Jatobal - rio Tocantins. INPA 24005, 23, 59.0-115.0 mm SL, igarapé Canoal - rio Tocantins. INPA 12219, 6, 33.0-60.0 mm SL, igarapé Valentim - rio Tocantins. *Hemiodus thayeria*: Amazonas: INPA 6549, 6, 95.0-155.0 mm SL, rio Daraá - rio Negro. INPA 9175, 3, 75.0-99.0 mm SL, Morro dos Seis Lagos, São Gabriel da Cachoeira. INPA 12188, 2, 49.0-65.0 mm SL), lago Tupé - rio Negro. *Hemiodus unimaculatus*: Amazonas: INPA 11226, 19, 50.5-60.6 mm SL, rio Jamari - rio Madeira. INPA 26698, 2, 170.0-185.0 mm SL, rio Sucunduri - rio Madeira. INPA 6554, 2, 235.0-300.0 mm SL, rio Daraá - rio Negro. Pará: INPA 7135, 2, 163.0-168.0 mm SL, lago Verde - Alter do Chão - rio Tapajós. INPA 105, 6, 95.0-115.0 mm SL, Ilha Arapujá - rio Xingu. INPA 7028, 10, 76.0-140.0 mm SL, rio Jamanxim - rio Tapajós. Tocantins: INPA 11186, 15, 60.4-70.8 mm SL, Poço do Paulo - rio Tocantins. *Hemiodus vorderwinkleri*: Pará: INPA 15744, 3, 100.0-103.0 mm SL, rio Xingu. INPA 14894, 92 mm SL, Furo do Ramiro - rio Xingu. INPA 3970, 5, 84.0-104.0 mm SL, praia do Pedral - rio Xingu.

#### Acknowledgements

We thank the Instituto Chico Mendes de Conservação da Biodiversidade - ICMBio, and STCP Engenharia de Projetos for financial and logistic support for collecting in the FLONA do Amana; to IBAMA/Brasília for the collecting permit (13344-1). We are grateful to L. Rapp Py-Daniel, Marcelo Rocha, Renildo de Oliveira, and Rafaela Ota (INPA) for improvements to the manuscript and the discussions about hemiodontids anatomy and morphological characters. JZ receives a productivity grant from CNPq (process: 307464-2009-1).

#### Literature Cited

- Beltrão, H. D. A., R. M. S. Amorim, J. A. Siqueira & C. R. Anjos. 2009. Exportação de peixes ornamentais do estado do Amazonas, bacia Amazônica, Brasil. *Boletim do Instituto da Pesca*, 35: 259-274.
- Ferreira, E. J. G., J. Zuanon & G. M. Santos. 1998. Peixes Comerciais do Médio Amazonas: Região de Santarém, Pará, Ed. IBAMA, Brasília, 211p.
- Langeani, F. 1996. Estudo filogenético e revisão taxonômica da família Hemiodontidae Boulenger, 1904 (*sensu* Roberts, 1974) (Ostariophysi, Characiformes). Unpublished Ph.D. Dissertation, Universidade de São Paulo, São Paulo, 171p.
- Langeani, F. 1998. Phylogenetic study of the Hemiodontidae (Ostariophysi: Characiformes). Pp. 145-160. In: Malabarba, L. R., R. E. Reis, R. P. Vari, Z. M. Lucena & C. A. S. Lucena (Eds.). *Phylogeny and Classification of Neotropical Fishes*, Porto Alegre, Edipucrs, 603p.
- Langeani, F. 1999. New species of *Hemiodus* (Ostariophysi, Characiformes, Hemiodontidae) from the Rio Tocantins, Brazil, with comments on the color pattern and tooth shapes within the species and genus. *Copeia*, 3:718-722.
- Langeani, F. 2003. Family Hemiodontidae (Hemiodontids). Pp. 96-100. In: Reis, R. E., S. O. Kullander & C. J. Ferraris (Eds.). *Check list of the freshwater fishes of South and Central America*, Porto Alegre, Edipucrs, 729p.

- Langeani, F. 2004. *Hemiodus jatuarana*, a new species of Hemiodontidae from the rio Trombetas, Amazon Basin, Brazil (Teleostei, Characiformes). *Zootaxa*, 546: 1-6.
- Ruffino, M. L., U. Lopes-Jr, E. C. Soares, C. O. Silva, R. B. Barthem, V. Batista, G. Estupinán, V. Issac, S. Fonseca & W. Pinto. 2005. Estatística Pesqueira do Amazonas e Pará 2002. Pró-Várzea, IBAMA, Manaus, 84p.
- Ruffino, M. L., E. C. Soares, C. O. Silva, R. B. Barthem, V. Batista, G. Estupinán & W. Pinto. 2006. Estatística Pesqueira do Amazonas e Pará 2003. Pró-Várzea, IBAMA, Manaus, 76p.
- Taylor, W. R. & G. C. van Dyke. 1985. Revised procedures for staining and clearing small fishes and other vertebrates for bone and cartilage study. *Cybium*, 9: 107-119.

Submitted June 27, 2011

Accepted March 16, 2012

Published June 29, 2012