

Redescription of *Ochmacanthus batrachostoma* (Miranda-Ribeiro, 1912) (Siluriformes: Trichomycteridae): a possible case of incipient paedomorphism

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The lepidophagous stegophiline catfish *Ochmacanthus batrachostoma* (Miranda-Ribeiro, 1912) is endemic to the Paraná-Paraguai basin and is the only member of its genus in that drainage. It remains a poorly-known taxon mainly due to the historical scarcity of study specimens. The species is herein redescribed on the basis of type and non-type specimens from Brazil, Argentina and Paraguay. *Ochmacanthus batrachostoma* can be distinguished from congeners by the presence of long maxillary and rictal barbels, reduction of the posterior end of the caudal peduncle, a tadpole-like caudal fin and peduncle, among other morphometric traits and features of internal anatomy. Comparisons show that a number of unique traits of adult *O. batrachostoma* resemble conditions seen in juvenile specimens of other members of Stegophilinae. Such traits are also more pronounced in juveniles of *O. batrachostoma* itself. The species also has the smallest maximum body size in *Ochmacanthus* and among the smallest of any stegophiline. In combination, such observations suggest that the species is paedomorphic, although to a degree less extreme than seen in some other trichomycterids. This is the first possible case of paedomorphosis identified for stegophilines.

O bagre lepidofágico Stegophilinae *Ochmacanthus batrachostoma* (Miranda-Ribeiro, 1912) é endêmico da bacia Paraná-Paraguai e é único membro do gênero presente na drenagem. Permanece um táxon pouco conhecido principalmente devido à escassez histórica de espécimes para estudo. A espécie é aqui redescrita com base em espécimes tipo e não tipo provenientes do Brasil, Argentina e Paraguai. *Ochmacanthus batrachostoma* pode ser diferenciado dos congêneres pela presença de longos barbilhões maxilares e rictais, extremidade posterior do pedúnculo caudal reduzida, nadadeira e pedúnculo caudal com forma semelhante a cauda de um girino, além de outras características morfométricas e da anatomia interna. Comparações mostram que certas características exclusivas do adulto de *O. batrachostoma* se assemelham às condições observadas nos espécimes juvenis de outros Stegophilinae. Essas características são mais pronunciadas nos próprios juvenis de *O. batrachostoma*. A espécie também apresenta o menor comprimento corporal máximo entre os congêneres e é um dos menores Stegophilinae. Em combinação, essas observações sugerem que a espécie é pedomórfica, mas em grau menos extremo do que observado em outros trichomictéridos. Esse é o primeiro caso possível de pedomorfose identificado em Stegophilinae.

Keywords: Juvenile, Paraná-Paraguai drainage, Paedomorphosis, Stegophilinae, Taxonomy.

Introduction

Trichomycteridae is the second most species-rich family in the freshwater superfamily Loricarioidea, with 280 valid species in 41 genera and eight subfamilies (de Pinna, 1998; Eschmeyer & Fong, 2014), distributed throughout major river drainage basins from Costa Rica to Patagonia, on both sides of the Andes (de Pinna & Wosiacki, 2003; Datovo & de Pinna, 2014). Most trichomycterids do not surpass 100mm in standard length and feed on small invertebrates (Machado & Sazima, 1983; de Pinna & Wosiacki, 2003; Fernández & Schaefer, 2009). However, those belonging to subfamilies Vandellinae and Stegophilinae have

striking semi-parasitic habits. The former includes only hematophagous species and the latter includes species that feed on mucus, skin and scales of other fish, usually in combination (Machado & Sazima, 1983; Winemiller & Yan, 1989; Zuanon & Sazima, 2004, 2005; Leung, 2014). Such highly-specialized feeding habits are matched by extraordinary modifications of the feeding apparatus such as the large number of teeth arranged in regular rows, oral opening as a sucking disk, in combination with the presence of odontodes on the opercular apparatus typical of most trichomycterids (de Pinna, 1998; Adriaens *et al.*, 2010). The semi-parasitic forms of the Trichomycteridae are popularly known as candirus.

Ochmacanthus is one of 11 genera of Stegophilinae. The subfamily has 28 valid species currently recognized (DoNascimento, 2013, 2015; Eschmeyer & Fong, 2014) distributed throughout the drainage basins of the Amazon, Orinoco, São Francisco, Paraná-Paraguai, Atlântico Sul and Uruguay rivers (Koch, 2002). The group is traditionally characterized by a large number of fine teeth arranged in regular rows and by the modification of the oral opening into a semi-circular sucking disc (Baskin, 1973; de Pinna, 1998; DoNascimento, 2012). Despite their fascinating biological properties, the systematics of Stegophilinae is still poorly known.

Ochmacanthus currently includes five valid species (DoNascimento, 2013, 2015; Eschmeyer & Fong, 2014). It is easily distinguished from other stegophilina genera by the pronounced compression of the caudal peduncle, which is also expanded dorsally and ventrally by numerous large accessory caudal-fin rays (Baskin, 1973; DoNascimento, 2015). Eigenmann (1912) described *Ochmacanthus* with only one species, *O. flabelliferus*. Three months later, Miranda-Ribeiro (1912) described the genus *Gyrinurus* along with its single species, *Gyrinurus batrachostoma*. In 1918, Eigenmann synonymized *Gyrinurus* under *Ochmacanthus* (though retaining the former as a subgenus and its sole species as valid) and included *Stegophilus reinhardtii* Steindachner, 1882 therein. Myers (1927) described two additional species of *Ochmacanthus*, *O. alternus* and *O. orinoco* from the Rio Orinoco drainage. The most recent study of phylogenetic relationships within Stegophilinae considered *Ochmacanthus* as monophyletic, and as sister-group to *Haemomaster* (DoNascimento, 2013, 2015).

Since Eigenmann (1918), there has been practically no additional information published on *Ochmacanthus batrachostoma*. The species has not been included in more recent and general papers on trichomycterid systematics because of a lack of study material. Its description from a single specimen was made more than a century ago, and is severely outdated. The morphology of the species remains poorly known, and its mention in the literature is restricted to catalogues, checklists, faunistic lists or range extensions.

Herein, we redescribe *Ochmacanthus batrachostoma* from newly collected and previously-available material. Our taxonomic account includes new data on morphology, intraspecific variation and geographical distribution. We also include a discussion on incipiently paedomorphic traits in *O. batrachostoma*, which may be the first such case reported for stegophilines.

Material and Methods

The holotype and 27 additional alcohol-preserved or cleared and stained (c&s) specimens were examined. Morphometric measurements were taken according to standards normally followed in trichomycterid

taxonomy (Tchernavin, 1944), with some modifications to fit morphological modifications typical of stegophilines (e.g., following de Pinna & Britski, 2001; DoNascimento & Provenzano, 2006; DoNascimento, 2012). All measurements were straight-line, taken with digital calipers to the nearest 0.1mm. Measurements are expressed as proportions of standard length (SL), except for subunits of the head, which are expressed as proportions of head length and the depth of the distal end of the caudal peduncle, which is given as proportion of body depth at the vertical through the posterior end of dorsal fin. Cephalic pore nomenclature follows Arratia & Huaquin (1995). Meristics follow Baskin (1973) and de Pinna & Britski (1991). In the caudal fin counts, the first number indicates the number of principal rays on the dorsal lobe and the second the numbers of principal rays on the ventral lobe. Counts of vertebrae and pleural ribs were taken from c&s specimens and digital radiographs. Counts of haemal arches were taken only from c&s specimens. Cleared and stained preparations were done according to Taylor & Van Dyke (1985).

Institutional abbreviations are: Academy of Natural Sciences of Drexel University (ANSP), Philadelphia (formerly Academy of Natural Sciences of Philadelphia); Field Museum of Natural History (FMNH), Chicago; Museu Nacional do Rio de Janeiro (MNRJ), Rio de Janeiro; Museu de Zoologia da Universidade de São Paulo (MZUSP), São Paulo; Coleção Ictiológica do Núcleo de Pesquisas em Limnologia, Ictiologia e Aquicultura da Universidade Estadual de Maringá (NUP), Maringá; Royal Ontario Museum (ROM-ICH), Ontario; Senckenberg Forschungsinstitut und Naturmuseum (SMF), Frankfurt; Universidad Central de Venezuela (UCV), Caracas; University of Michigan Museum of Zoology (UMMZ), Ann Arbor; National Museum of Natural History, Smithsonian Institution (USNM), Washington, D.C.

Results

Ochmacanthus batrachostoma (Miranda-Ribeiro, 1912)

Figs. 1-2

Gyrinurus batrachostoma Miranda-Ribeiro, 1912:28, pl. (type-locality: Brazil, Mato Grosso, Corumbá, rio Paraguai at São Luiz de Cáceres. Holotype: MNRJ 786).

Ochmacanthus batrachostoma. -Eigenmann, 1918:511 [generic reallocation]. -Gosline, 1945: 65 [catalogue]. -Eschmeyer, 1990:273 [catalogue]. -Casciotta & Almirón, 1996: 25 [occurrence in rio Paraná, Argentina]. -Winemiller, 1996: 109 [ecological notes]. -Eschmeyer *et al.*, 1998: 204 [catalogue]. -de Pinna & Wosiacki, 2003: 276 [checklist]. -Ferraris *et al.*, 2007: 409 [checklist]. -DoNascimento, 2012: 487 [general comments]. -Santos Neto, 2014 [generic revision, phylogenetic position].

Diagnosis. *Ochmacanthus batrachostoma* is easily distinguished from remaining species of its genus by any of the following characters: presence of long maxillary and rictal barbels (vs. short barbels), the former reaching the base of the pectoral fin and the latter more than half that length (vs. maxillary barbel not reaching beyond the interopercular patch of odontodes and rictal barbel not longer than the associated labial fold); the caudal peduncle expanded into a

paddle-like shape by numerous large procurrent rays, with markedly convex dorsal and ventral profiles (vs. caudal peduncle approximately rectangular in shape, with straight or gently convex dorsal and ventral profiles); the muscular portion of the caudal peduncle tapering markedly posteriorly (vs. tapering gently to caudal fin), so that its posterior depth is 20-25% of its anterior depth (vs. more than 25%); the caudal fin shorter than 10% of SL (vs. longer than 10% of SL).



Fig. 1. *Ochmacanthus batrachostoma*, holotype, MNRJ 786 (29.15 mm SL), Brazil, Mato Grosso, Corumbá, rio Paraguai at São Luiz de Cáceres.

Description. Morphometric data are presented in Table 1.

Body relatively elongate, depressed in cross section close to head and gradually more compressed towards tail. Dorsal body profile nearly straight on head, gently convex until end of dorsal fin and straight on caudal region, exclusive of accessory caudal rays. Ventral body profile gently convex until origin of anal fin and straight along caudal region, exclusive of accessory caudal rays. Body deepest at origin of dorsal fin. Dorsal and ventral profiles of caudal peduncle extremely expanded on proximal half, due to presence of well-developed procurent caudal-fin rays and gradually less deep on distal half. Caudal peduncle profile exclusive of procurent rays conical, with extremely fine tip, its depth approximately one fifth that at base. Head profile not perfectly continuous with trunk due to presence of opercular patch of odontodes. Myotomes visible along almost whole body, most prominently along posterior portion of trunk.

Head broad and semicircular in dorsal view, depressed in lateral view. Length nearly equal to width. Snout short and rounded anteriorly. Mouth inferior, as broad as head, its corners directed posteriorly, forming sucker-like semicircular disc. Lower lip forming broad continuous arc not divided in right and left halves, its postero-lateral

folds short and strongly flattened against head. Upper lip forming broad continuous arc. Numerous small lumps present on internal surface of lower and upper lips. Jaw teeth extremely numerous. Upper jaw with 3 complete convex rows of teeth and another 3 incomplete and irregular rows medial to complete rows. Upper jaw teeth conical, long, thin and sinuous. Lower jaw teeth in 2 or 3 anterior incomplete rows and 2 posterior complete ones. Number of teeth of incomplete rows increasing posteriorly, with first and second rows very small (maximum 10 teeth each) and third surpassing the midpoint of complete row. Lower jaw teeth arched and directed laterally. Total number of teeth in excess of two hundred on both upper and lower jaws, all attached to respective bone. Branchiostegal membranes united to isthmus along its entire ventral region, laterally forming free fold of short length. Eyes round and located dorsally, their surface continuous with that of remainder of head. Interopercle with 8-12 small claw-like odontodes, arranged in 2 rows. Interopercular fold of skin thick and long. Opercular patch of odontodes with 8-12 odontodes in roundish arrangement, shaped similarly to those on interopercle. Gill opening extending from ventral margin of opercular odontode patch to median portion of interopercular odontode patch.

Table 1. Morphometrics of *Ochmacanthus batrachostoma* and a juvenile of *O. alternus*, FMNH 99611. Range values of *O. batrachostoma* are for holotype and non-type material.

Measurement	<i>Ochmacanthus batrachostoma</i>				Juvenile of <i>Ochmacanthus alternus</i>	
	N	Holotype	Range	Mean	N	Values
Standard length (<i>Ls</i> ; mm)	28	29.15	24.60 - 31.35	28.16	1	16.37
Total length (mm)	28	31.00	26.82 - 33.01	29.99	1	17.16
% <i>Ls</i>						
Predorsal length	28	61.58	58.72 - 66.18	61.87	1	65.55
Preanal length	28	65.69	59.59 - 71.38	64.93	1	65.67
Prepelvic length	28	58.87	50.69 - 62.52	56.64	1	55.77
Caudal peduncle length	28	25.21	25.21 - 31.08	28.18	1	32.01
Body depth	28	9.74	7.18 - 9.28	8.18	1	23.58
Caudal peduncle depth	28	8.23	8.23 - 12.00	10.16	1	19.43
Dorsal fin length	27		11.57 - 16.53	13.29	1	22.60
Anal fin length	28	11.90	11.10 - 15.38	13.10	1	22.17
Pelvic fin length	28	7.89	7.72 - 10.29	8.72	1	19.00
Pectoral fin length	28	11.15	9.79 - 15.60	13.00	1	26.08
Caudal fin length	27		5.78 - 8.40	7.18	1	17.59
Head length (<i>Lh</i>)	28	15.13	15.13 - 18.91	17.11	1	30.30
% <i>Lh</i>						
Head width	28	100.94	89.68 - 107.60	99.85	1	91.33
Head depth	28	43.62	41.08 - 53.52	45.69	1	64.31
Maxillary barbel length	28	53.29	44.95 - 68.39	53.89	1	90.93
Rictal barbel length	28	23.36	23.36 - 38.62	32.46	1	64.52
Breadth of mouth	28	70.30	58.32 - 73.98	69.00	1	64.72
Snout length	28	27.07	23.82 - 31.61	28.59	1	50.60
Horizontal length of eye	28	27.05	20.18 - 29.33	25.56	1	46.77
Interocular distance	28	24.20	16.21 - 28.82	24.40	1	44.35

Maxillary barbel thin and long, reaching origin of pectoral fin. Rictal barbel extending to slightly beyond midlength of maxillary one. Rictal barbel inserted almost entirely on postero-lateral fold of lower lip. Internal cartilage-like cores present in both barbels. Nasal barbels absent.

Nares large and conspicuous. Anterior nares directed dorsally and surrounded by a prominent flange of integument. Posterior nares larger than anterior ones, widely open, elliptic with posterior depression on flange. Posterior internarial width much smaller than anterior internarial width, slightly shorter than interorbital width.

Sensory cephalic pores s1 and s2 of supraorbital channel located between anterior and posterior nares, on small protuberance of skin. Pore s3 slightly posterior to eyes. Pore of infraorbital canal positioned between eyes and interopercle. Pore of preopercle canal immediately anterior to opercular odontodes. Lateral line short, not surpassing one third of trunk length and with only three pores. First lateral-line pore near posterodorsal margin of opercular odontode patch, second immediately dorsal to axillary gland, and third posterior to second.

Pectoral fin with 6 rays, first unbranched and slightly shorter than those following. Pectoral-fin origin located low on trunk, at horizontal through interopercular odontodes. Axillary gland forming large sack with thin distal tip and

large pore on anterior half, located immediately posterior to pectoral-fin origin. Pelvic fin with 5 rays, first unbranched. Distal tip of pelvic fin not reaching anal-fin origin. Pelvic-fin origin slightly anterior to vertical through dorsal-fin origin. Pelvic splint absent. Dorsal-fin rays 8 (20; dorsal fin damaged in holotype) or 9 (8), first two rays unbranched, shorter and thinner than those following, except eighth and ninth. Two or three small procurent rays at anterior of dorsal fin. Anal-fin rays 9 (28), first two unbranched, shorter and thinner than those following, except eighth and ninth. Two (9) or three (19) small procurent rays at anterior of anal fin. Caudal fin small, parabolic in lateral view. Principal caudal rays 5/6 (20; holotype) or 5/7 (8) always with fourth and fifth longest. Caudal-fin procurent rays 58 (2), 60 (23; holotype) or 61 (3) dorsally and 58 (25; holotype) or 59 (3) ventrally. Procurent rays well-developed, increasing in length until slightly anterior to middle of series and then gradually shorter to caudal-fin origin, making entire caudal region trowel-like. First complete haemal arch on sixth (2) or seventh (1) post-Weberian vertebra; Post-Weberian vertebrae 44 (1), 46 (10), 47 (13; holotype) or 48 (5). Ribs 2 (left side of two specimens, right side of one specimen) or 3 (both sides of 25 specimens).

Pharyngeal dentition composed of 4-6 small teeth on fifth ceratobranchial and 16-17 on dorsal pharyngeal tooth-plate.

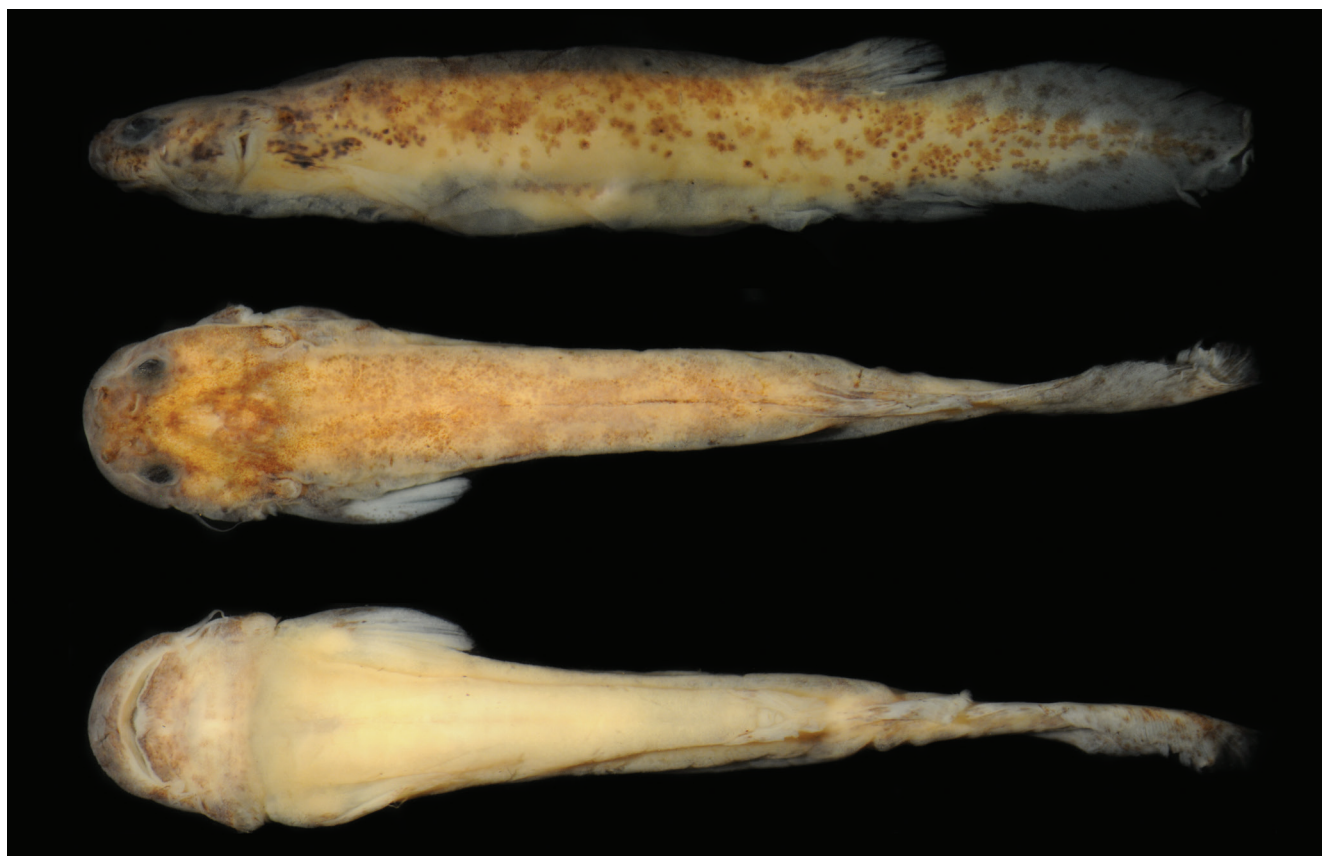


Fig. 2. *Ochmacanthus batrachostoma*, MZUSP 59340 (25.25 mm SL), Brazil, Mato Grosso do Sul, Corumbá, dead arm of Abobral 3.

Color in alcohol. Overall body color light tan, becoming slightly darker on dorsal portion. Ventral surface mostly white, except for few chromatophores forming thin bifurcated line near pectoral girdle and some chromatophores on pelvic-fin base. Sides of body covered with brown blotches, forming poorly defined longitudinal stripes mainly on caudal peduncle. Lateral brown blotches coalesce mainly on anterior portion of body.

Overall color of head similar to that of body. Mid-dorsal region of head, corresponding to central portion of neurocranium, darker and more uniformly colored. Conspicuous brown blotches present below each eye and on preopercular region. Snout darker than rest of head. Ventral surface of head with many chromatophores concentrated on lips. Median portion of lower lip white. Upper lip uniformly pigmented. Interopercular and opercular patch of odontodes darkly-pigmented. Maxillary and rictal barbels white. Pectoral-fin base dark, with dark chromatophores extending along first ray. Pelvic fins almost totally white, with only one or two chromatophores at base. Dorsal fin with few scattered chromatophores on basal half, denser distally. Anal fin pigmented at base with few scattered chromatophores between fin rays. Dorsal caudal-accessory rays with irregular fields of chromatophores. Ventral caudal-accessory rays with sparse chromatophores scattered on basal half. Caudal fin with dark line at median portion and scattered brown chromatophores concentrated on distal half.

Sexual dimorphism. None detected.

Distribution. Endemic to, and widely distributed in, the Paraná-Paraguai drainage, in Argentina, Brazil and Paraguay. Absent from the Upper Paraná and from the Prata drainage (Fig. 3).

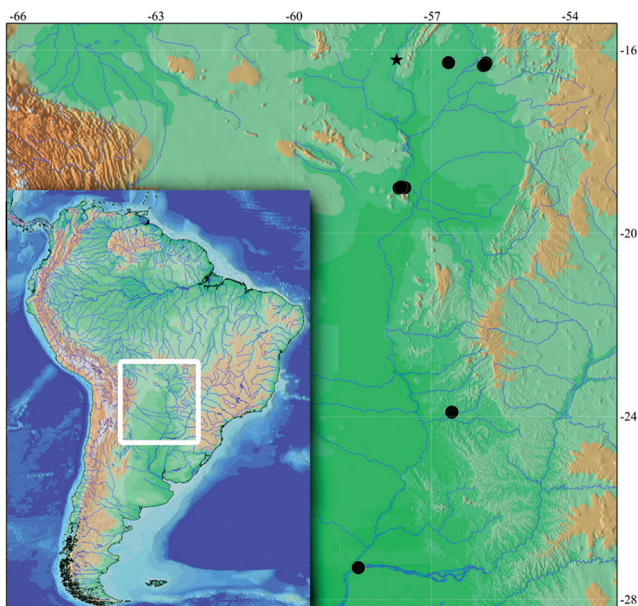


Fig. 3. Geographic distribution of *Ochmacanthus batrachostoma* (black star, holotype; black circle, non-type material).

Conservation status. Not present in any national or international lists of threatened species. According to the International Union for Conservation of Nature (IUCN) categories and criteria (IUCN Standards and Petitions Subcommittee, 2014), *Ochmacanthus batrachostoma* can be classified as Least Concern (LC).

Material examined. Total of 28 specimens. **Holotype.** MNRJ 786, Mato Grosso, Cáceres, rio Paraguai, 16°13'S 57°45'W, 1, 29.2 mm SL. **Non-type. Argentina.** SMF 9012, Corrientes, Paso de la Patria, 1, 30.3 mm SL. **Brazil.** MNRJ 15399, Mato Grosso, Cáceres, Baía do Campo, district of Porto Esperidião, 1 alc., 28.7 mm SL; MZUSP 95012, Mato Grosso, Barão do Melgaço, rio Paraguai drainage, rio Mutum 16°19'30"S 55°49'59"W, 5, 1 c&s, 26.4-27 mm SL; MZUSP 59678, Mato Grosso do Sul, Corumbá, rio Paraguai drainage, rio Abobral 2, 1, 27 mm SL; MZUSP 59340, Mato Grosso do Sul, Corumbá, rio Abobral 3, braço morto, 7, 17.6-25.4 mm SL; MZUSP 36351, Mato Grosso do Sul, Corumbá, Ladário, CODRASA, 3, 27-29.7 mm SL; MZUSP 42150, Mato Grosso, Barão de Melgaço, Barra de Sá Mariana, rio Mutum, 1, 26.1 mm SL; MZUSP 38183, Mato Grosso, Poconé, rio Pixaim, 2, 24.7-25.4 mm SL; NUP 2879, Mato Grosso, Chacororé, 6, 27-29.4 mm SL; ANSP 174744, without locality, 1, 1 c&s, 23-23.6 mm SL. **Paraguay.** UMMZ 206670, San Pedro 23°54'30"S 56°33'W, 1, 31 mm SL.

Discussion

There is some uncertainty about the limits and validity of the various *Ochmacanthus* species. The taxonomic descriptions are all old and based on limited material, and therefore lack information on intraspecific variation and detailed morphology. Material representing *Ochmacanthus* is nowadays extremely abundant in museums. The geographic distribution of the genus is now known to be vastly broader than when its constituent nominal species were first described. Examination of new material and attempts at identification readily reveal many forms that do not obviously match the existing descriptions, demonstrating the inadequacies of the available taxonomy of *Ochmacanthus* and that the genus is clearly in need of revisionary work. Despite that, no reasonable doubt remains about the validity of *Ochmacanthus batrachostoma*, the most distinctive species in the genus. Characters included in the diagnosis above clearly differentiate the species from its congeners by qualitative and quantitative traits.

Two of those characters deserve further discussion: the long rictal and maxillary barbels and the tadpole-like caudal region. Such traits, while diagnostic to *O. batrachostoma*, resemble conditions seen in juveniles of other species in the Stegophilinae-Vandelliinae clade. Normally, adults of species in that clade have short or very short maxillary and rictal barbels that clearly differ from the long barbels typical of other trichomycterids. Juveniles of Stegophilinae and Vandelliinae, however, seem to have much longer barbels than their respective

adults. Unfortunately, juveniles of those two subfamilies are exceedingly rare in collections. We have been able to locate and examine only two samples (*Ochmacanthus alternus*, FMNH 99611 and *Vandellia cirrhosa*, UCV 3120) which contain such juveniles. In both cases, the maxillary and rictal barbels are proportionally longer than in their respective adults. Although any conclusive discussion will require a more detailed analysis of the relative barbel length in various parasitic and non-parasitic trichomycterids, as well as additional material representing juveniles across various clades, it is likely that a shortening of the maxillary and rictal barbels in adults is synapomorphic for the Stegophilinae plus Vandelliinae. The long condition in adult *O. batrachostoma* is a specialization of that species and perhaps associated with some degree of paedomorphosis.

Along the same line, we have observed that the caudal peduncle of a juvenile specimen of *Ochmacanthus alternus* (13.5 mm SL, FMNH 99611, Table 1) in the region bearing procurent rays is proportionally larger than in adult specimens of that species, resembling the condition in adult *O. batrachostoma* (Fig. 4). Such ontogenetic evidence, in combination with the small body size of *O. batrachostoma* relative to congeners and other stegophilines, suggests a case of developmental truncation in that species. If confirmed, this will be the first case of paedomorphosis in the subfamily Stegophilinae. The degree of possible paedomorphosis in *O. batrachostoma*, however, is not be as extreme as that known in other trichomycterids such as in species of *Ammoglanis*, *Trichomycterus anhangá* and several glanapterygines (de Pinna 1989; Schaefer *et al.*, 2005; Dutra *et al.*, 2012).

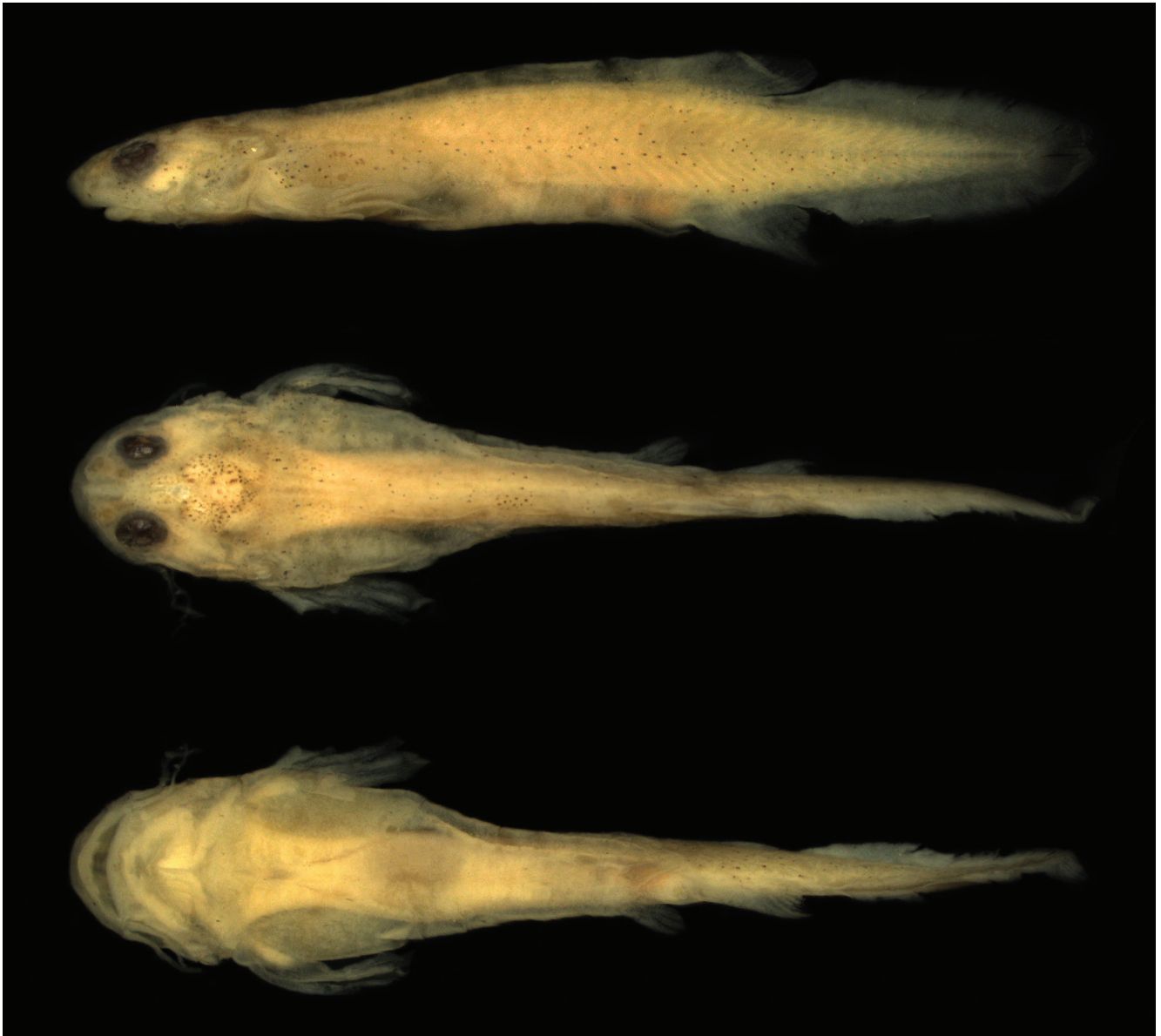


Fig. 4. Juvenile of *Ochmacanthus alternus*, FMNH 99611 (13.50 mm SL), Ecuador, Napo, tributary of Shushufindi River.

Comparative material examined. Total of 133 specimens. *Ochmacanthus alternus*: **Brazil**: MZUSP 30474, Amazonas, rio Negro, Anavilhanas, Igapó, 3, 47.5-48.2 mm SL; MZUSP 30464, Roraima, Rio Branco, Lake of Maguari, 3, 45.6-53 mm SL; MZUSP 30463, Roraima, Rio Branco, Marará, 7, 31.4-56.6 mm SL. **Colombia**: UF 26139, Meta, Yucao, 7, 28.2-35.1 mm SL. **Ecuador**: FMNH 99611, Napo, tributary of Shushufindi River, 4, 13.5-35.3 mm SL. **Guyana**: SMF 4984, Litany ou tampoc, Crique, 1, 34.3 mm SL; ANSP 175853, 04°30'16"N 58°31'38"W, 3, 40.6-44.4 mm SL; ROM-ICH 61980, Shimiri (Yawiri) Creek. Kurupukari downriver, 1, 51.5 mm SL. **Venezuela**: UCV 16328, 11, 2 c&s, 33.6-40.5 mm SL; MZUSP 48109, Portuguesa, Caño Maraca, 8°25'30"N 69°27'40"W, 10, 27.5-30.7 mm SL; UCV 77812, Bolívar, Tabaro River at Camp Dedemai, 1, 28.4 mm SL. *Ochmacanthus orinoco*: **Brazil**: MZUSP 24160, Pará, rio Tocantins, Lagoon near Channel Capitariquara, near Jatobal, 4, 1 c&s, 20.4-34.6 mm SL; MZUSP 113696, Roraima, Caracará, rio Negro drainage, rio Jufari, Paricá Beach, 1°8'41"S 61°59'57"W, 8, 31.7-34.3 mm SL; MZUSP 30478, Amazonas, rio Negro drainage, rio Arirará, 2, 25.1-27.1 mm SL. **Venezuela**: MZUSP 106069, Portuguesa, Orinoco, rio Bocono, 2, 33.8-38.6 mm SL; FMNH 105575, Orinoco River, 5h upstream of Atapabo, 1, 31.6 mm SL; UCV 23041, 8, 37.9-40.1 mm SL; UCV 53071, 8, 2 c&s, 31.3-44 mm SL. *Ochmacanthus reinhardtii*: **Brazil**: MZUSP 94362, Mato Grosso, Gaúcha do Norte, rio Xingú drainage, marginal lagoon rio Culuene, 13°30'51"S 53°05'49"W, 15, 19.1-39 mm SL; MZUSP 94145, Mato Grosso, Gaúcha do Norte, rio Xingu drainage, rio Culuene, 13°30'53"S 53°05'40"W, 5, 20-33.9 mm SL; MZUSP 72876, Roraima, rio Branco drainage, tributary of rio Bem Querer, Bem Querer Waterfall, 1, 25 mm SL; INPA 4163, Maranhão, rio Xingu, Bobaquara Island, 7, 20.7-26.8 mm SL; INPA 4121, Pará, Arroz Cru, rio Xingu, Palmeiras Beach, 5, 1 c&s, 27.1-32.5 mm SL. **Guyana**: ROM-ICH 61981, 1, 43.5 mm SL; ROM-ICH 61977, 1, 1 c&s, 33.5-43 mm SL; ROM-ICH 61969, 1, 41 mm SL; ROM-ICH 61976, 2, 29-32 mm SL; ROM-ICH 61975, 1, 31 mm SL; ROM-ICH 61972, 1, 35 mm SL. **Suriname**: USNM 225897, Nickerie, Corantijn River drainage, 03°36'N 57°37'W, 3, 33.2-42.2 mm SL; USNM 225896, Nickerie, Corantijn River drainage, 03°35'N 57°39'W, 2, 1 c&s, 42.1-45.5 mm SL; USNM 225899, Nickerie, Corantijn River drainage, 03°42'N 57°42'W, 2, 48.7-48.8 mm SL.

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