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Myoglanis aspredinoides (Siluriformes: Heptapteridae), a new catfish from the Río Ventuari, Venezuela

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Abstract

Myoglanis aspredinoides n. sp. is described from the Río Ventuari, upper Orinoco in Venezuela. The new species is distinguished from the other species of the genus by its elongated body with 56 to 57 vertebrae, long anal fin with 32 to 35 fin rays, lanceolate caudal fin and distally serrated anterior margin of pectoral spine.

Resumen

Se describe *Myoglanis aspredinoides* n. sp. proveniente del Río Ventuari, alto Orinoco en Venezuela. La nueva especie se diferencia de las otras especies del género por poseer un cuerpo alargado con 56 a 57 vértebras, aleta anal larga con 32 a 35 radios, aleta caudal lanceolada y margen anterior de la espina pectoral aserrado distalmente.

Key words: catfish, Heptapteridae, *Myoglanis*, species description, Venezuela

Introduction

In 1987 and 1991 ichthyologists from the Universidad Central de Venezuela, Academy of Natural Sciences of Philadelphia and Field Museum of Natural History explored the lower Río Ventuari in southern Venezuela. Among the notable fishes collected (e.g. Chernoff *et al*. 2001; Fink & Machado-Allison 1992; Toledo-Piza *et al*. 1999) are a few specimens of a distinctively depressed and elongated catfish that represent an undescribed heptapterid species. In its possession of well developed subcutaneous eyes, strong pectoral spines and hypertrophied jaw musculature covering the skull roof this new catfish is at once compara-

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ble to *Myoglanis*, *Leptorhamdia* and *Brachyglanis*. In the phylogenetic framework of the Heptapteridae developed by Lundberg *et al*. (1991) and especially Bockmann (1998) we assign the new species to *Myoglanis*. *Myoglanis* is distinguished from its closest relatives *Leptorhamdia* and *Brachyglanis* by its apomorphically high numbers of caudal vertebrae and anal-fin rays, and thickened basal half of the adipose fin that is confluent with the caudal fin. *Myoglanis* currently comprises two species, the type species *M. potaroensis* Eigenmann, from the Essequibo River basin of Guyana, and *M. koepckei* Chang, from a tributary of the Río Nanay in the Peruvian Amazon basin. We recognize, nevertheless, that additional systematic work is needed on *Myoglanis*, *Leptorhamdia* and *Brachyglanis* plus *Gladioglanis* and *Phreatobius* to document character variation among the described and known yet undescribed species, to test monophyly of the genera and to clarify their interrelationships. That larger investigation is beyond the scope of this paper in which we focus on describing the new elongate species from the Río Ventuari.

Material and Methods

Measurements were taken on the left side of specimens with a digital caliper. Morphometric data are expressed as percentage of standard length (SL), or head length (HL) for elements of the cephalic region, except the barbel lengths, which were expressed as proportions of SL. Morphometric landmarks and measurement terminology follow Lundberg and McDade (1986), except those added or modified by Bockmann and de Pinna (2004). Meristics of anal and caudal fins include all elements. Counts of fin rays were made from specimens or radiographs under a stereomicroscope using transmitted light. Counts of the holotype are indicated by an asterisk. Nomenclature for supraorbital and infraorbital sensory pores follow Arratia and Huaquin (1995) and terminology corresponding to branches of the postotic region of the laterosensory cephalic system follows Schaefer and Aquino (2000). Numbering of sensory pores reflects only anteroposterior order, not implying homologies among catfishes. Due to the limited specimen sample our study of the skeleton of *M. aspredinoides* is constrained to radiographs that do not permit observation of fine details of bones or cartilages. Number of branchiostegal rays, ribs, basal radials and vertebrae, and insertion of first and last basal radials of dorsal and anal fins were established from radiographs of holotype and paratypes. Vertebral counts include the first five vertebrae in the Weberian complex and the compound caudal centrum was counted as one. Morphological data on *Myoglanis koepckei* were obtained from original description (Chang, 1999). Data on dorsal procurrent caudal-fin rays, anal-fin rays and total vertebrae for *Brachyglanis*, *Leptorhamdia* and *Myoglanis* includes counts reported by Bockmann (1998). Institutional abbreviations follow Leviton *et al*. (1985).

Myoglanis aspredinoides new species
Figs. 1–3, Table 1

Holotype. MBUCV-V-25388, 95.6 mm SL. Venezuela, Estado Amazonas, Río Ventuari, Laguna Pavón, in pool behind beach of Río Ventuari, on south side of river, ca. 12 km from its confluence with Río Orinoco; 4° 4´N, 66° 56´W; 24 January 1991; B. Chernoff, A. & D. Machado-Allison, J. Wheeler.

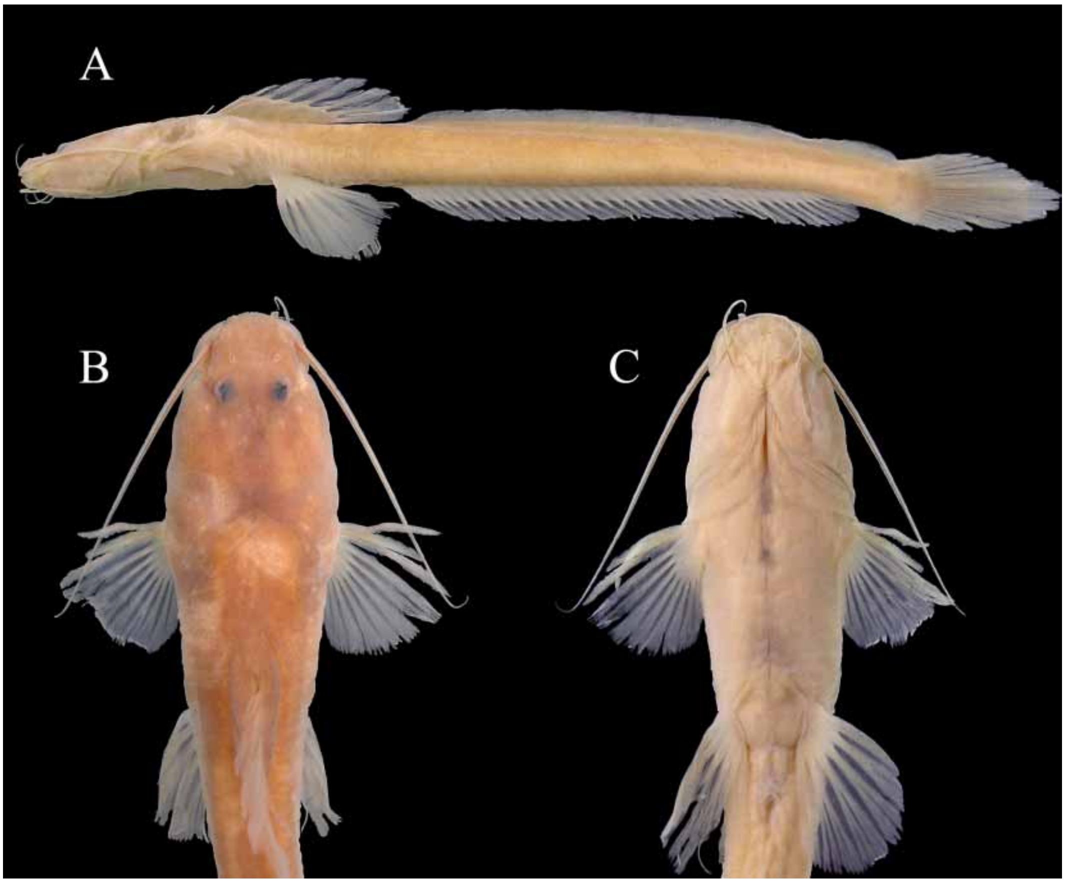

FIGURE 1. *Myoglanis aspredinoides*. Holotype MBUCV-V-25388, 95.6 mm SL. A, lateral view; B, dorsal view of head; C, ventral view of head.

Paratypes. ANSP-162492, 63 mm SL. Same locality as holotype; 25 March 1987; B. Chernoff, W. G. Saul, J. Fernández, M. E. Antonio and M. E. Gutierrez. FMNH-104481, 149.9 mm SL. Collected with the holotype.

Diagnosis. A species of *Myoglanis* with 32–35 anal-fin rays (vs. 25–28 in *M. koepckei* and 16–21 in *M. potaroensis*); caudal fin lanceolate (vs. caudal fin bifurcated in *M. koepckei* and forked, divided to the base of the rays in *M. potaroensis*); anterior margin of pectoral spine with low, retrorse serrations only distally and without erect dentations along middle and proximal end of spine (vs. erect dentations present along entire anterior margin of pectoral spine in *M. koepckei* and *M. potaroensis*) and 56–57 vertebrae (vs. 47 in *M. koepckei* and 46 in *M. potaroensis*).

Description. Morphometric data given in Table 1. Body greatly elongated (Fig. 1), depressed before dorsal fin, ellipsoidal at level of dorsal-fin origin and subquadrangular immediately in front of pelvic fin-origin, gradually more compressed caudally. Dorsal profile from snout margin to IO1 pore convex, slightly concave in preorbital and interorbital regions, flat in postorbital region, slightly convex from occipital region to dorsal-fin origin, concave along dorsal-fin base and straight to caudal-fin base. Ventral profile of head slightly convex, nearly straight from posterior margin of branchiostegal membranes to end of anal-fin base, and sloping downward along caudal peduncle. Lateral profile of head parabolic in dorsal view with a weak constriction behind rictus delimiting snout.

TABLE 1. Morphometric data for the type series of *Myoglanis aspredinoides*. Measurements 2–26 and 35–37 expressed as percentage of standard length and 27–34 as percentage of head length. *x* = arithmetic mean and SD = standard deviation.

	Holotype MBUCV-V-25388	Paratype ANSP-162492	Paratype FMNH-104481	*x*	SD
1. Standard length (mm)	95.6	63	149.9		
2. Total length	117	120.7	116.9	118.2	2.2
3. Body depth	8	7.6	7.1	7.6	0.4
4. Cleithral width	12.8	14.1	11.1	12.7	1.5
5. Predorsal length	23.2	26.2	21.7	23.7	2.3
6. Dorsal-fin base	12	11.9	10.2	11.4	1.0
7. Length of first dorsal-fin ray	7.5	8.5	6.4	7.5	1.0
8. Length of second dorsal-fin ray	10.8	12.9	9.4	11.1	1.8
9. Length of third dorsal-fin ray	15		12.1	13.5	2.0
10. Dorsal fin to adipose fin	9.5	10.9	9.3	9.9	0.9
11. Preadipose length	44.1	47.1	40.8	44.0	3.2
12. Adipose-fin length	55.8	55.5	58.2	56.5	1.5
13. Adipose-fin depth	2.6	3.3	2.5	2.8	0.4
14. Length of rigid part of first pectoral-fin ray	7.6	8.8	6.8	7.7	1.0
15. Length of first pectoral-fin ray	11.1	10.5	9.2	10.3	1.0
16. Length of second pectoral-fin ray	10	11.7	8.7	10.1	1.5
17. Length of third pectoral-fin ray	8.8		8.8	8.8	0.1
18. Prepelvic length	29.8	30.7	30.1	30.2	0.5

TABLE 1 (continued)

	Holotype MBUCV-V-25388	Paratype ANSP-162492	Paratype FMNH-104481	*x*	SD
19. Length of first pelvic-fin ray	8.1	8.5	6.8	7.8	0.9
20. Length of second pelvic-fin ray	8.5	11.5	8.3	9.5	1.8
21. Length of third pelvic-fin ray	9.9	12.4	9.4	10.6	1.6
22. Preanal length	42.9	45.2	41.2	43.1	2.0
23. Anal-fin base	47.6	45.4	48.2	47.1	1.5
24. Caudal-peduncle length	10.4	12.2	12.1	11.6	1.0
25. Caudal-peduncle depth	4	3.5	3.6	3.7	0.3
26. Head length	18.9	21.2	17.4	19.2	1.9
27. Head width	64.3	59.7	69.6	64.5	4.9
28. Head depth	33.4	34.3	36.5	34.7	1.6
29. Mouth gape	36.3	34.8	34.0	35.0	1.1
30. Anterior–Posterior nares distance	14.2	14.6	15.0	14.6	0.4
31. Width between anterior nares	13.3	13.9	14.1	13.8	0.4
32. Width between posterior nares	14.1	13.9	14.4	14.1	0.3
33. Snout length	30.6	30.5	30.3	30.5	0.2
34. Fleshy interorbital	13.5	14	17.3	14.9	2.0
35. Maxillary-barbel length	24	26.2	22.0	24.1	2.1
36. Outer mental-barbel length	9.2	10.3	6.8	8.8	1.7
37. Inner mental-barbel length	4	4	3.4	3.8	0.4

Head ~1.5 times longer than wide, dorsally covered by thick skin. Adductor mandibulae muscles prominent on cheeks and extending dorsally over skull roof posterior to eyes. Snout long and wide with dorsolateral groove accommodating maxillary barbel immediately posterior to its insertion and extending posteriorly to about midpoint of eye. Mouth terminal with fleshy, coarsely plicate lips and broad rictal folds. Mouth corners extending posteriorly along sides of head. Lips with conspicuous sulci dividing each lip in two folds. Upper jaw projecting slightly beyond lower jaw. Premaxilla with a longitudinally wide subrhomboidal patch of villiform and minute teeth arranged in up to six irregular series, its posterolateral corners strongly projected posteriorly. Lower jaw with similar dentition disposed in up to six irregular rows and continued posterolaterally. Maxillary barbel ellipsoidal in cross-section and short, extending to distal margin of pectoral fin. Outer mental barbel inserted slightly behind inner mental barbel, and short, its distal tip reaching groove at posterior margin of second lateral-most branchiostegal ray. Inner mental barbel inserted anterior to apex of gular fold and its distal tip reaching half again its length beyond apex. Branchiostegal membranes free, joined to isthmus only at gular apex and not overlapping medially, with six branchiostegal rays. Anterior nares tubular and immediately above margin of upper lip. Posterior nares closer to eye than anterior nares, longitudinally elongated, and surrounded by an elevated fleshy rim, highest along its anterior border and notched posteriorly. Eye ovoid and small, completely dorsal and protruding, closer to snout tip than opercle margin, subcutaneous without a free orbital margin, but with a superficial lateral fold, skin covering eye thin and translucent.

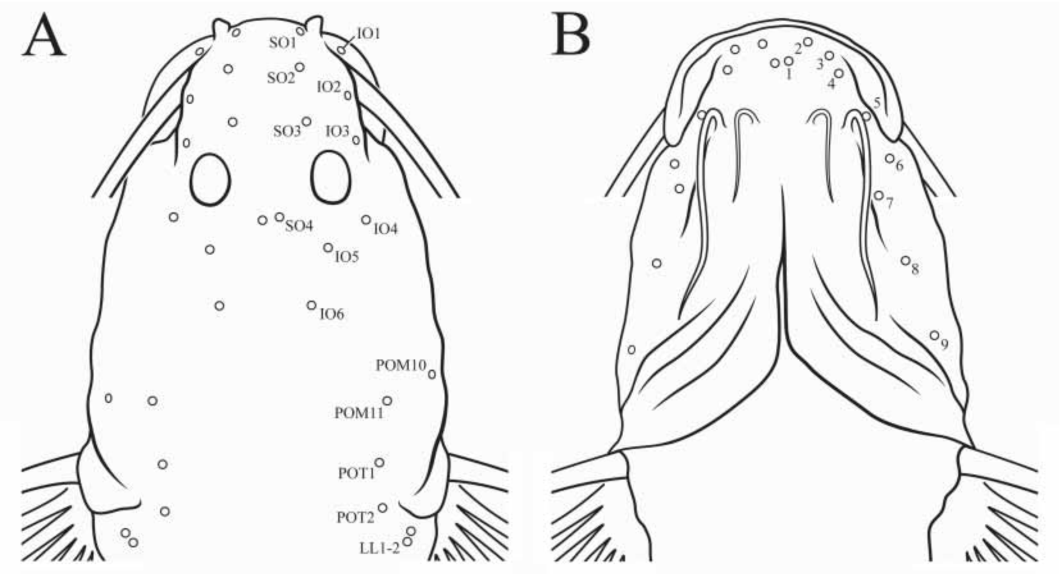

FIGURE 2. A, dorsal and B, ventral views of head of *Myoglanis aspredinoides*. Holotype MBUCV-V-25388, 95.6 mm SL, showing cephalic sensory pores (pores not draw at scale). Abbreviations: A. IO1–6, infraorbital pores 1–6; LL1–2, lateral line pores 1–2; POM 10–11; preoperculomandibular pores 10–11; POT1–2 postotic pores 1–2 and SO1–4, supraorbital pores 1–4; B. 1–9, preoperculomandibular pores 1–9.

Cephalic sensory canals simple (Fig. 2). Supraorbital canal with four pores. SO1 broad, medially adjacent to anterior naris. SO2 posteromedial to anterior naris, approximately at mid-distance of internarial length. SO3 at posteromedial corner of posterior naris. SO4 (epiphyseal) pores paired, close together near midline, located at level of posterior ocular border. SO5 and SO6 (parietal) pores absent. Infraorbital canal with six pores. IO1–3 wide like SO1. IO1 at posterolateral corner of anterior naris. IO2 above maxillary groove, just behind maxillary barbel base. IO3 above maxillary groove, at level of anterior ocular border. IO4 slightly posterolateral to eye. IO5 behind eye. IO6 posterior and dorsal on head. Preoperculomandibular canal with 11 pores, those from preopercle with wide foramina. Mandibular symphyseal pores paired. Anteriormost three pores of the mandibular branch wide like SO1 and IO1. Postotic canal with two pores above opercle and gill opening. Lateral line canal complete, reaching hypurals. First two pores of main canal close together, second pore right above first pore, both pores on short membranous branches, remaining pores located just above canal.

Dorsal fin margin convex and containing eight lepidotrichia, the first a reduced spinelet, completely covered by skin and not visible externally, associated with supraneural. Second lepidotrich or first dorsal-fin ray (homologous with dorsal-fin spine) unbranched, its basal third ossified and distally segmented; six remaining dorsal-fin rays branched, third and fourth longest. Distal tips of adpressed posterior rays reaching adipose-fin origin. Base of dorsal fin, including basal parts of rays, covered by thick skin. Seven basal radials supporting dorsal fin, first basal radial associated with neural spine of vertebra 6 and last basal radial above vertebra 14. Neural spines of vertebrae 9 to 15, below dorsal fin oriented almost horizontally. Adipose fin elongate and low, originating at about 40% of SL and above anal-fin origin. Adipose fin united to dorsal margin of caudal fin, its posterior lobe obsolete except for a slight notch. Basal half of adipose fin covered by a conspicuous thick layer of adipose tissue. Anal fin elongate with 32 to 35* rays, first two or three rays simple. Anal fin supported by 32 to 33* basal radials, first basal radial inserted posterior to haemal spine of vertebra 18* or 19 and last basal radial inserted anterior to haemal spine of vertebra 45* or 46. Caudal fin lanceolate with i,15,i* or i,16,i principal rays, seven branched rays articulating with upper hypural plate and eight branched rays associated with lower hypural plate, 8* to 10 dorsal procurrent rays and 9* to 13 ventral procurrent rays. Caudal skeleton with three separate hypural plates: parhypural; hypurals 1+2; hypurals 3+4+5 (both paratypes with a separate hypural 5).

Pectoral fin with a strong sharp spine (Fig. 3) and 8 to 9* branched rays (FMNH paratype with eight rays on the left side and seven rays on the right side). Spine with three to five retrorse regular serrae along distal portion of anterior margin and three to five erect dentations along proximal portion of posterior margin. Pelvic fin with i,5 rays, anterior margin of first ray and anterior branch of second ray pinnate, lepidotrich segments with long antrorse extensions, fourth ray longest, pelvic-fin origin in a vertical through base of fourth branched dorsal-fin ray.

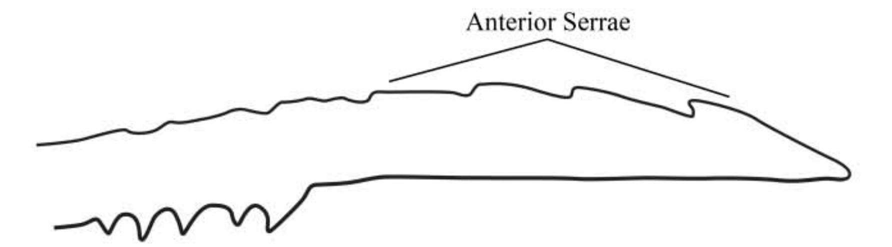

FIGURE 3. *Myoglanis aspredinoides*. Dorsal view of right pectoral spine. Holotype MBUCV-V-25388, 95.6 mm SL.

Total vertebrae 56* to 57, 15* or 16 precaudal and 41caudal, lateral processes of first nine* or ten free vertebrae supporting ribs.

Anus located approximately equidistant from medial edge of pelvic-fin base and anal-fin origin. Urogenital papilla elongated and separate from anus, located slightly in advance of mid distance between center of anus and anal-fin origin.

Color in alcohol. A lightly pigmented species with an overall light tan ground color on body and head plus fine, darker brown chromatophores scattered on dorsum, sides and on head onto lips and rictal fold. Lowermost sides and venter immaculate. No lateral stripes, spots, or differential pigmentation of tympanic area over swimbladder. Eyes black. Dorsal and adipose fins hyaline except for finely peppered thick skin along fin bases. Caudal-fin rays lightly peppered most densely along the longest middle rays. Anal and paired fins hyaline.

Distribution and habitat. *Myoglanis aspredinoides* is recorded only from the Río Ventuari, a tributary of the upper Orinoco river basin in Venezuela, in stagnant pools formed by rocks and around 2 m of maximum depth, with clear waters and sandy and muddy bottom.

Etymology. The specific epithet makes allusion to the remarkable resemblance in external appearance of this species to species of the catfish genus *Aspredo* of the family Aspredinidae.

Discussion

Eigenmann (1912) created the genera *Brachyglanis*, *Myoglanis* and *Leptoglanis* for new species of small catfishes from Guyana. The last of these, being preoccupied by *Leptoglanis* Boulenger (1902), was replaced by *Leptorhamdia* Eigenmann (1918). The fishes in Eigenmann's genera are similar in having a thick layer of jaw adductor muscle on the skull roof, strong pectoral-fin spines and subcutaneous eyes. As diagnosed by Eigenmann, *Brachyglanis*, *Myoglanis* and *Leptorhamdia* differ primarily in degree of spine-like ossification of the dorsal spine, length of the adipose fin and its contact with the caudal, and caudal-fin shape. The taxonomic histories of *Myoglanis* and *Leptorhamdia* are checkered with their synonymy by Gosline (1941) followed by renewed recognition by Lundberg *et al*. (1991), Bockmann (1998) and Bockmann and Guazelli (2003).

Brachyglanis, *Leptorhamdia* and *Myoglanis* along with *Gladioglanis* and the members of the *Nemuroglanis* subclade (Ferraris 1988) were assigned by Lundberg *et al*. (1991) to a large unnamed monophyletic group characterized by the loss of a free orbital rim around the eye. This group excludes the genera *Brachyrhamdia*, *Pimelodella* (with its synonyms *Caecorhamdella* and *Typhlobagrus*), *Rhamdella* and *Rhamdia* (including *Caecorhamdia*). Because of their plesiomorphic retention of a strong pectoral spine *Gladioglanis*, *Brachyglanis*, *Leptorhamdia* and *Myoglanis* are excluded from the *Nemuroglanis* subclade in which the spine is reduced to a segmented, unbranched ray. Moreover, *Gladioglanis*, *Leptorhamdia* and *Myoglanis* each share different synapomorphic characters with the *Nemuroglanis* subclade, the resulting pattern of incongruence resulted in an unresolved arrangement at this level with *Brachyglanis* in a lower level because of its plesiomorphic condition for all of those characters. Lundberg *et al*. (1991) also advanced a hypothesis of possible monophyly of *Brachyglanis*, *Leptorhamdia* and *Myoglanis* based on the invasion of the adductor mandibulae muscle onto the skull roof, an obvious derived condition for Siluriformes (Lundberg 1982; Grande & Lundberg 1988).

More recently Bockmann (1998) presented a comprehensive hypotheses of phylogenetic relationships and diagnoses for heptapterid genera and higher subgroups. Bockmann (1998) presented phylogenetic evidence for a sister group relationship between *Leptorhamdia* and *Myoglanis* within a clade also including *Brachyglanis*. In our study we located two additional informative characters that corroborate the *Leptorhamdia* - *Myoglanis* pair. First, the anteriormost cutaneous sensory pores of supraorbital (SO1), infraorbital (IO1) and mandibular branch (MA1-3 in *Leptorhamdia* and *Myoglanis aspredinoides*; MA1-5 in *Myoglanis* sp) are wider than remaining pores. In the case of *Myoglanis potaroensis* only SO1 and IO1 are considerably wider than the others and the pores of preoperculomandibular canal are relatively wide but of similar diameter. A widened condition of cutaneous sensory pores in the head is also found in *Gladioglanis*, but in this case all the pores of each canal exhibit the same diameter and are therefore considered different from the asymmetric condition of *Leptorhamdia* and *Myoglanis*. Second, the anterior margin of first and second pelvic-fin rays are pinnate (Fig. 4), with long anterior extensions of the lepidotrich segments. In Heptapteridae a similar but less developed condition is present in *Cetopsorhamdia* sp., where the lepidotrich segments are restricted to the distal margin. Elsewhere in Siluriformes the glyptosternoid fishes of the family Sisoridae exhibit an extreme pinnate condition both in pectoral and pelvic fins that has apparently evolved independently and is associated with the torrential stream habitat of glyptosternoids (Hora & Silas 1952). Table 2 summarizes these and other characters varying among *Myoglanis*, *Leptorhamdia* and *Brachyglanis*. Thus, in the latest authoritative treatments, *Myoglanis* is considered both valid and monophyletic. Within this framework, the diagnostic synapomorphies of *Myoglanis* are: ossified portion of dorsal spine greatly reduced; first dorsal-fin basal radial inserted posterior to neural spine of vertebra 6; 46 or more total vertebrae (vs. 47 or fewer); 16 or more anal-fin rays (vs. 17 or fewer); lower half or more of adipose fin thickened (vs. base only thickened); adipose fin reaching and broadly confluent with caudal fin (vs. adipose fin not reaching caudal fin or if close adipose retains a free posterior lobe); upper procurrent rays of the caudal fin reduced to 8-13 (vs. 12 or more). Within the genus, *M. aspredinoides* exhibits the most highly derived conditions of total vertebral, dorsal procurrent caudal-fin ray and anal-fin ray counts, and matches its congeners in the dorsal and adipose fin synapomorphies.

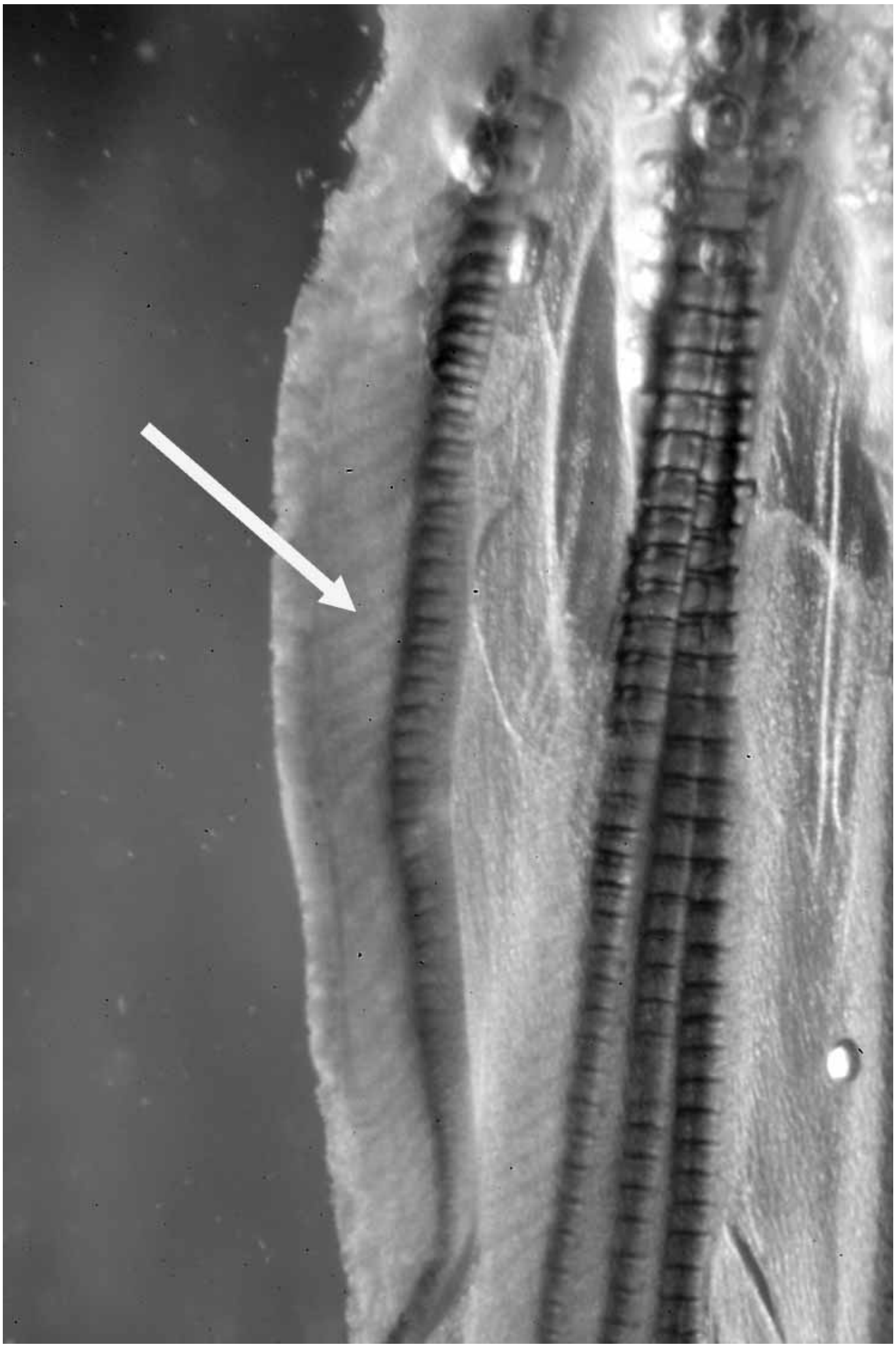

FIGURE 4. Ventral view of first two rays of right pelvic fin of *Leptorhamdia* sp. ANSP-153614, 74.8 mm SL, C&S specimen. Arrow pointing to a single pinna in the anterior margin of first ray.

TABLE 2. Comparative list of characters for *Brachyglanis*, *Leptorhamdia* and *Myoglanis*. (0 = absence or an alternative different condition and 1 = presence).

	Brachyglanis	*Leptorhamdia*	*Myoglanis*
Sensorial pores SO1, SO2, IO1 and anterior most pores of the mandibular branch of preoperculomandibular canal wider	0	1	1
Symphyseal pore single	0	1	0
Dorsal spine segments largely unfused	0	0	1
First dorsal-fin basal radial associated with vertebrae posterior to fifth vertebra	0	0	1
Number of anal-fin rays	11–12	14–17	16–35
Posterior lobe of adipose fin confluent with caudal fin	0	0	1
Basal half of adipose fin thickened	0	0	1
Number of dorsal procurrent caudal-fin rays	12	20	8–13
Anterior margin of first and second pelvic-fin rays pinnate	0	1	1
Number of vertebrae	33–36	39–47	46–57

Comparative material

Acentronichthys leptos ANSP-174017 (2 ex. Alc.); *Brachyglanis* sp ANSP-160672 (6 ex. Alc.), ANSP-165535 (1 ex. Alc.); *Brachyrhamdia imitator* ANSP-135601 (20 ex. Alc.); *Cetopsorhamdia* sp ANSP-172132 (1 ex. Alc.); *Goeldiella eques* ANSP-175772 (3ex. Alc.); *Gladioglanis machadoi* ANSP-162493 (399 ex. Alc. 6 ex. C&S); *Heptapterus mustelinus* ANSP-67783 (1 ex. Alc.); *Imparales panamensis* ANSP-151053 (1 ex. Alc.); *Imparfinis minutus* ANSP-172122 (9 ex. Alc.); *Leptorhamdia essequibensis* ANSP-153191 (1 ex. Alc.); *Leptorhamdia* sp. ANSP-153614 (13 ex. Alc. 1 ex. C&S), ANSP-162487 (3 ex. Alc.), ANSP-162488 (10 ex. Alc.); *Mastiglanis* sp ANSP-177250 (33 ex. Alc.); *Myoglanis potaroensis* DU-F-2011 (1 ex. Alc. 1 ex. C&S); *Myoglanis* sp ANSP-160730 (2 ex. Alc); *Nanoglanis fasciatus* ANSP-128696 (16 ex. Alc. 2 ex. C&S); *Nemuroglanis pauciradiatus* ANSP-162179 (20 ex. Alc.); *Phenacorhamdia* sp ANSP-161719 (1 ex. Alc.); *Pimelodella cristata* ANSP-175791 (1 ex. Alc.); *Rhamdella* sp ANSP-139060 (1 ex. Alc.); *Rhamdia quelen* ANSP-141578 (5 ex. Alc.).

Acknowledgments

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