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Pimelabditus moli, a new genus and new species of pimelodid catfish (Teleostei: Siluriformes) from the Maroni River basin of northeastern South America

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ABSTRACT.—*Pimelabditus moli*, a new genus and species of pimelodid catfish, is described from the upper Maroni River basin of French Guiana and Suriname. This distinctive catfish is diagnosed with three apomorphic anatomical complexes. Mouth ventral and transverse, supported by reoriented, much expanded premaxillae and foreshortened mandibles; premaxillae and dentaries densely covered with robust, needle-like teeth arranged in a steeply-descending, antero-posterior size series. Lateral margins of orbit and otic region elevated with textured ridges developed from the frontal, sphenotic and pterotic bones surrounding the supraorbital, otic and postotic lateralis sensory canals. Interorbital septum severely compressed as thin, apparently median, bony sheet. Among Pimelodidae *Pimelabditus moli* shares apomorphic characters that place it near the diverse *Calophysus-Pimelodus* clade.

New taxa: *Pimelabditus* Lundberg and Parisi, *Pimelabditus moli* Parisi and Lundberg

INTRODUCTION

Recent ichthyological explorations in the upper Maroni drainage basin of French Guiana and Suriname have produced specimens of a previously unseen and unusually distinctive pimelodid catfish. The first specimen was collected in October 1998 by M. Jégu during a study of the fishing methods used by indigenous people living along the Maroni River at Antecume Pata, French Guiana. The catfish was captured in moderate current near rocks without riverweed (Podostemaceae) cover (Jégu, pers. comm.). M. Jégu, S. Fisch-Muller and colleagues caught the second specimen during the "Nivrée 2000" program in the upper Tampoc River, French Guiana. In 2008 in the Tapanahony and Paloemeu rivers, Suriname, J. Montoya-Burgos, R. Covain and J. Mol collected three additional individuals. The external morphology of the first specimen was characterized and illustrated by Le Bail et al. (2000:90-91) who referred the catfish to "*Cheirocerus* sp." The main similarities of this species to *Cheirocerus* are limited to its small, ventral mouth, very large eyes and long adipose fin. Parisi (2003), in her unpublished doctoral dissertation, provided additional information on this species based on the two specimens at MNHN. Parisi questioned the alignment of this catfish with *Cheirocerus* and listed it as "New taxon 1" *Incertae Sedis* within family Pimelodidae.

The three specimens from Suriname, deposited

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in MHNG, were made available to the second author. Joining our observations, the coauthors find that the new catfish stands apart from all pimelodids in anatomically complex internal and external characters. The purpose of the present paper is to formally describe and name the odd pimelodid from upper Maroni basin as a new genus and species. An investigation of the phylogenetic position of this new catfish using molecular and morphological data is underway (Lundberg, Covain, Sullivan and Fisch-Muller, in preparation).

METHODS

Institutional acronyms are as listed on the Catalog of Fishes website at http://www.calacademy.org. We examined the external morphology and radiographs of the five known specimens of the new pimelodid, and a CTscan of one paratype. Digital radiographs of the holotype and two paratypes (MHNG 2709.100, MHNG 2709.099, ANSP 188900) were taken at ANSP with a Kevex MicroFocus X-Ray Source and Varian PaxScan image receptor. These images may be viewed at <catfishbone.ansp.org>. Digital radiograph images of the MNHN specimens are available online at coldb.mnhn.fr/Consultation?catalogue=7. A 25μm resolution CTscan of ANSP 188900 was made by M. Riccio of the Micro-CT Imaging Facility at Cornell University's, Department of Biomedical Engineering, using a General Electric eXplore CT 120. Visualizations were produced in the commercial software package VG Studio Max®. Preparation of the figures 2, 3A, and 4 in this paper utilized still frames captured from virtual 3-D surface reconstructions and were prepared using Adobe®Photoshop®CS.

Comparative material of Pimelodidae is mainly housed at ANSP and MNHN and includes alcohol preserved specimens, dry and cleared/stained skeletal preparations, and high-resolution CTscan and 2D radiographic images. This material represents all valid pimelodid genera, most valid and several undescribed species (listed in Lundberg and Parisi, 2002; Lundberg and Akama, 2005; Parisi et al., 2006; Azpelicueta et al., 2008; Aguilera et al., 2008; Lundberg and Dahdul, 2008).

Anatomical terminology, as far as possible, follows the Teleost Anatomical Ontology, TAO (www.obofoundry.org/cgi-bin/detail.cgi?id=teleost_anatomy; Dahdul et al. 2010). Measurements and counts follow Lundberg and Parisi (2002). Anatomical abbreviations used in text: HL-head length, PU1-preural centrum 1, SL-standard length, U1-ural centrum 1. To ensure consistency in published measurements, Table 1 reports only the data taken by JGL on the three MHNG specimens from Suriname. However, in the narrative description proportional (step) measurements for the MNHN French Guiana specimens reported by Le Bail et al. (2000) and Parisi (2003) are given in brackets. Radiographs were used for counting vertebrae and fin rays (n=5); branchiostegal ray and gill raker counts were made from CT reconstruction. Vertebral counts include the 6 elements incorporated into the Weberian complex; the first caudal vertebra is that immediately posterior of visceral cavity; the compound caudal vertebra (PU1+U1) is counted as one. Counts of fin rays include all rudimentary and anatomically separate lepidotrichia.

The PCR amplifications and sequencing of the 648-bp region of the cytochrome *c* oxidase I (COI) mitochondrial gene required for DNA barcodes were carried out by R. Covain following the methodology given in Vari and Ferraris (2009). The sequences were deposited in GenBank.

Pimelabditus, new genus Lundberg and Parisi
Figs. 1-4

Type species.—*Pimelabditus moli*, new species

Diagnosis.—Among pimelodids *Pimelabditus* is distinguished by three unique and apomorphic anatomical complexes.

1) Oral jaws and teeth. Mouth (Fig. 1) ventral, small and transverse except near rictus where angled acutely posteriorly. Premaxilla-mesethmoid joint (Fig. 2A) reoriented obliquely dorsolaterally and ventroposteriorly, involving paired, hypertrophied dorsal processes of premaxillae and adjacent mesethmoid cornua. Together premaxillae butterfly-shaped in ventral view, each premaxilla greatly expanded posteriorly and posterolaterally and, except for edentulous posterior process, densely covered by robust, needle-shaped, scarcely curved teeth arranged in a size series (Fig. 2) steeply decreasing in height posteriorly. Dentary bones with numerous teeth similar to premaxillary teeth in density, shape and steeply decreasing size series.

The mouth of most pimelodids is subterminal, wide and smoothly curved anteriorly. Also, the premaxilla-mesethmoid joint is broad and dorsoventral. The dorsal process of the premaxilla is smaller and dorsal to the bone. The premaxilla is narrowly rectangular (some with a posterolateral projection), relatively smaller, and with fewer teeth of subequal size or in a gradual size series.

2) Skull roof (Fig. 3). Lateral margins of orbit and otic region ornamented with an elevated, rugose-textured ridge. This ridge is on the frontal, sphenotic and pterotic bones and is developed from the outer wall of the bony canal containing the supraorbital, otic and postotic lateralis sensory canals. The remaining bony interorbital of the skull roof, between the paired ridges is unusually narrow, and contains slender shelves of the frontals that are interrupted on the midline by the anterior cranial fontanelle (Fig. 3B).

The frontal, sphenotic and pterotic bones of other pimelodids are not differentially ridged above the supraorbital, otic and postotic lateralis sensory canals.

3) Severely compressed interorbital septum (Fig. 4A, B). Much enlarged eyes separated by extremely thin interorbital septum composed of median vertical wall of the orbitosphenoid, and paired descending walls of frontals.

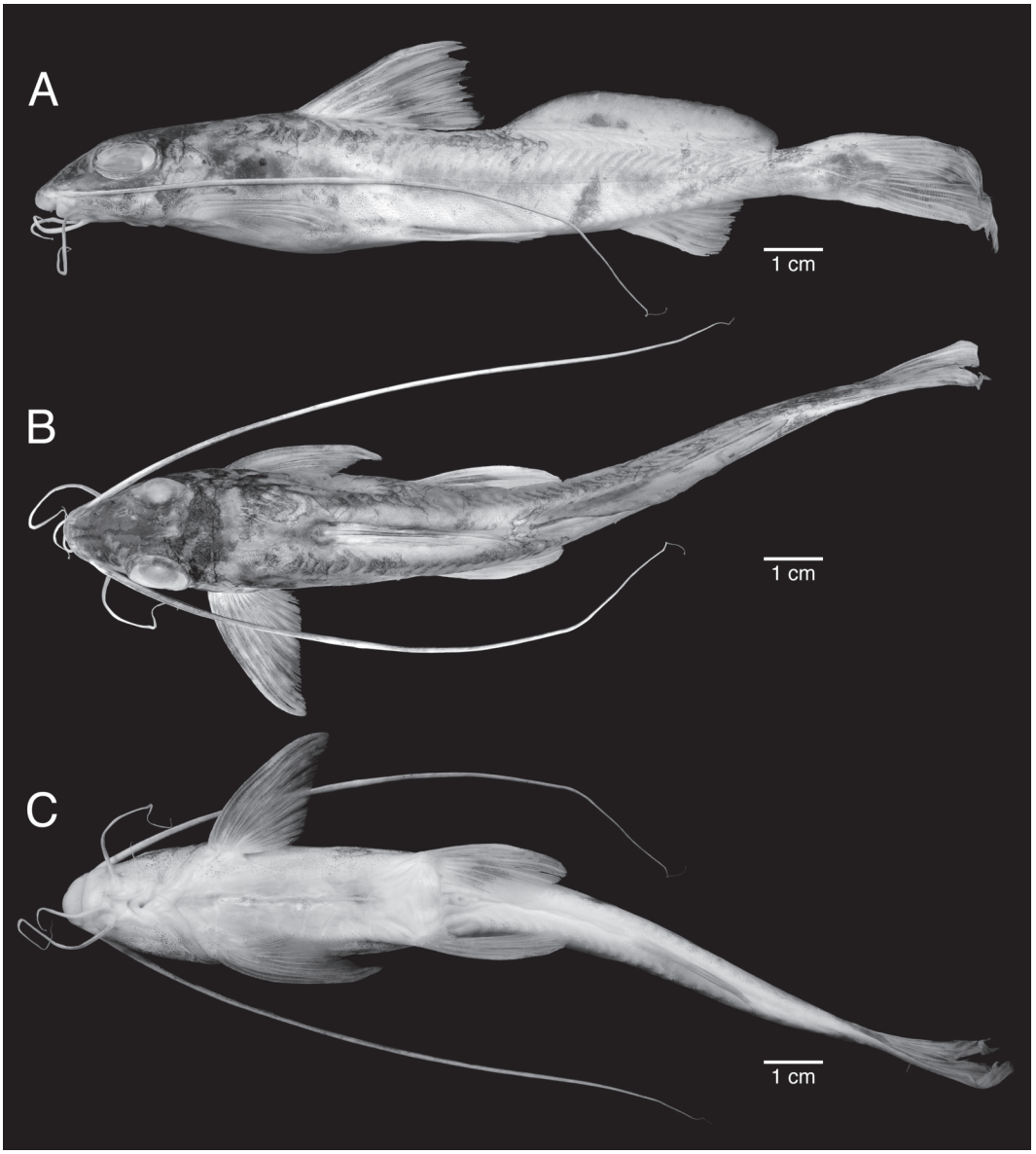

Fig. 1. *Pimelabditus moli*, MHNG2709.100, Holotype, 140.9 mm SL. A. Lateral, B. Dorsal, and C. Ventral views. Photographs by K. Luckenbill.

Steindachneridion scripta (Fig. 4C, D) exemplifies the plesiomorphic condition of the interorbital septum for Pimelodidae and siluriforms generally in which the paired vertical walls of the orbitosphenoid and frontals are wide apart and densely ossified. A thin and highly compressed interorbital septum similar to that of *Pimelabditus* is present in a group of large-eyed doradids (Sabaj Pérez et al., 2007, fig. 5, p. 163).

Additional readily observable external characters (Fig. 1, Table 1) providing a diagnostic combination for identification of *Pimelabditus* are: eye very large (horizontal diameter1.2-1.4 in snout length) and bony interorbital narrow (2.8-4.3 in snout length); snout profile steep, ca. 45° before eye; snout fleshy and projecting before small, transverse mouth; lips fleshy, lower lip scarcely plicate; maxillary barbels reaching caudal peduncle approximately below posterior insertion of adipose fin; outer mental barbels not passing depressed pectoral fin; inner mental barbels not reaching pectoral-fin insertion; supraoccipital posterior process broadly triangular, nearly flat and reaching anterior nuchal plate; dorsal-fin spinelet well developed but not exposed, dorsal-fin spine well developed, sharp and smooth-sided, continued as a thick, flexible and segmented extension about half as long as spine; adipose fin long, its base 2.9-3.2 times in SL; pectoral-fin spine well developed, sharp, with small dentations along posterior margin and continued as a thick, flexible and segmented extension a little less than half length of spine; pectoral-spine base with typical dorsal, ventral and anterior processes forming locking articulation with cleithrum; posterior cleithral process narrow, sharp, not reaching to midpoint of depressed pectoral-fin spine; trunk lateralis sensory canal reaches caudal-fin base, with prominent dendritic side branches above and below.

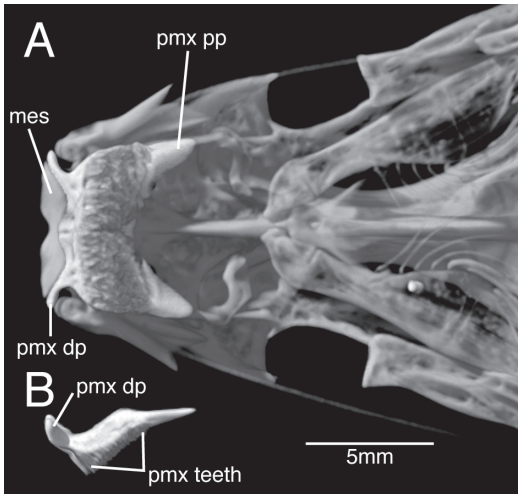

Fig. 2. (top) Cranial and upper jaw morphology of *Pimelabditus moli* based on CTscan images of paratype ANSP 188900. A. Ventral view of anterior skeleton of head with premaxillae colored light white, B. Lateral view of left premaxilla, anterior to left. Abbreviations: mes = mesethmoid cornu, pmx dp = dorsal articulating process of premaxilla, pmx pp = posterior process of premaxilla, pmx teeth = premaxillary dentition. Image processing by K. Luckenbill.

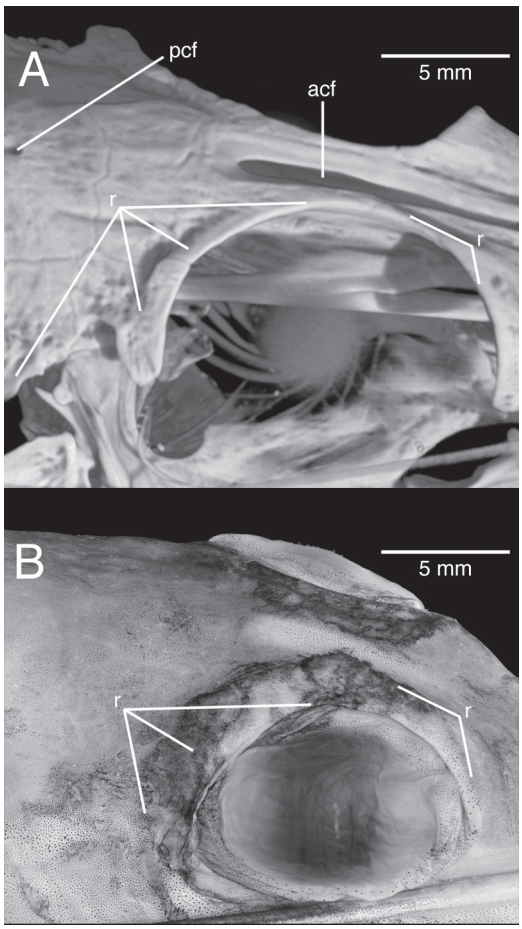

Fig. 3. (bottom) Close up dorso-lateral view images of orbital region and skull roof of *Pimelabditus moli*, paratype ANSP 188900, 139.2 mm SL. A. CTscan, B. Digital photograph. Abbreviations: acf = anterior cranial fontanelle, pcf = posterior cranial fontanelle, r = bony ridges along orbit and otic margins. Photograph and image processing by K. Luckenbill.

Etymology.—*Pimelabditus* is from *Pimelodus*, a genus of catfishes, and *abditus*, Latin, meaning hidden; gender masculine.

Pimelabditus moli, new species Parisi and Lundberg
Figs. 1-4A,B and Table 1

Holotype.—MHNG 2709.100 (specimen tag SU08-824), 1, 140.9 mm SL, Suriname, Sipaliwini District, Tapanahony River, Kumaru Konde Sula, 03°21.960'N 55°25.926'W, alt 524 ft., 27 Oct 2008. J.I. Montoya-Burgos, R. Covain, J. Mol and K. Wong Tong You.

Paratypes.—Suriname, Sipaliwini District: ANSP 188900 (ex. MHNG 2709.100, specimen tag SU08-825), 1, 139.2 mm SL, collected with the Holotype. MHNG 2709.099 (specimen tag SU08-386), 1, 110.8 mm SL, Wayu Camp, Paloemeu River, tributary of Tapanahony River, 03°11.908'N 55°24.416'W, alt 504 ft., 28 Oct 2008, J.I. Montoya-Burgos, R. Covain, J. Mol and K. Wong Tong You. French Guiana, Arrondissement St. Laurent du Maroni: MNHN 1998-1612, 1, 117.1 mm SL, Maroni River basin, Litany River, downstream of Antécume Pata, 3°18'06.4"N, 54°04'54.1"W, 14 Oct 1998, M. Jégu, field station 4. MNHN 2000-5865, 1, 114.7 mm SL, Maroni River basin, Tampoc River, Saut Pierkuru, 2°50'05.8"N, 53°32'49.3'"W, 3 Mar 2000, Campagne Nivrée 2000, M. Jégu et al., field station niv1mar3.

Diagnosis.—Same as genus.

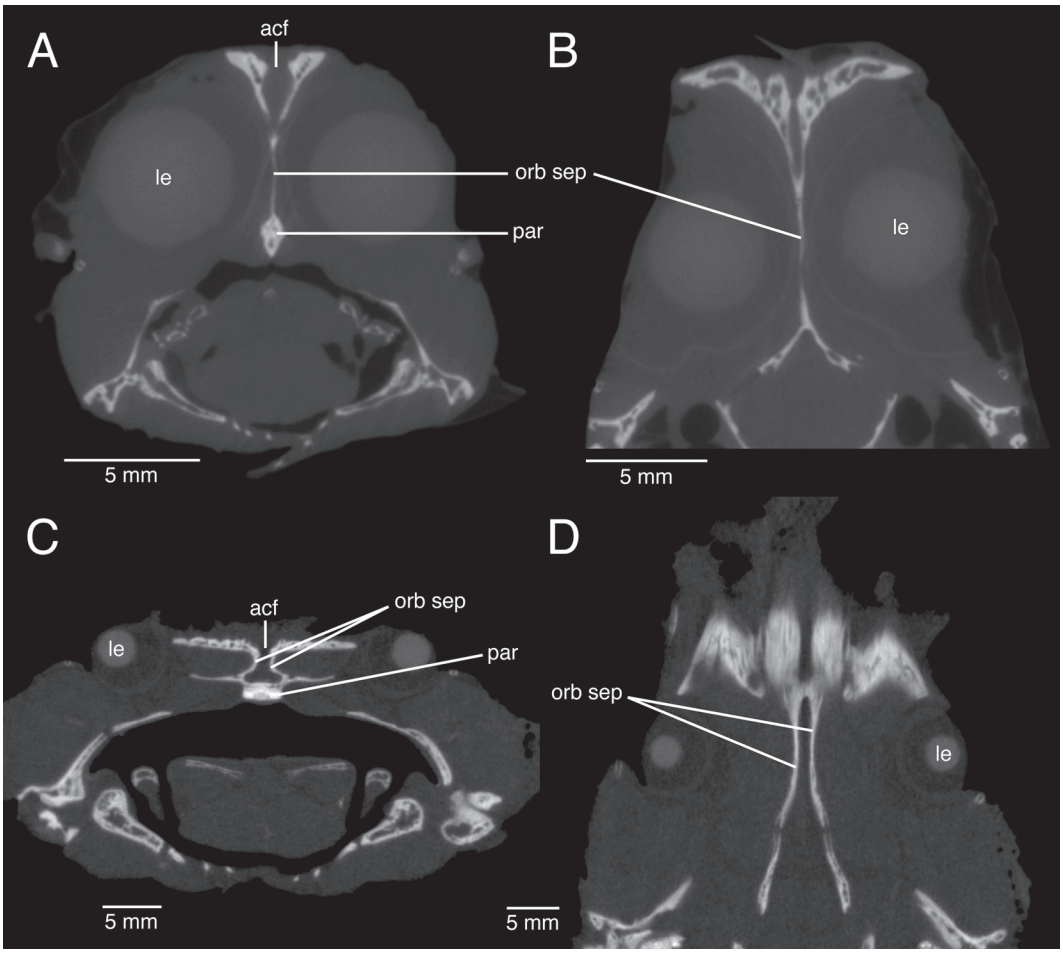

Fig. 4. Bony interorbital morphology based on CTscan images of A, B. *Pimelabditus moli*, paratype ANSP 188900, 139.2 mm SL, and C, D. *Steindachneridion scripta*, ANSP 168862. A and C. Transverse sections at middle of eye. B and D. Frontal sections at middle of eye. Abbreviations: acf = anterior cranial fontanelle, le = lens, orb sep = bony interorbital septum of frontal and orbitosphenoid bones, par = parasphenoid. Image processing by K. Luckenbill.

Description.—A small species, largest specimen (holotype) 140.9 mm SL. Body slender and spindle-shaped, maximum depth at insertion of dorsal fin contained 6.4-7.3 [6.3] times in SL; maximum body width across pectoral-spine insertions contained 6.5-9.3 [6] times in SL, head depth at occiput and body width nearly equal body depth. Head small, its length is contained 4.2-4.4 [4.4, 4.5] times in SL.

Dorsal profile rising steeply (ca. 45°) from snout tip to above anterior portion of eye then gently and nearly straight to dorsal fin, scarcely convex at and below dorsal and adipose fins, slightly concave along caudal peduncle. Ventral profile convex along bulging snout to mouth, straight along head, a little convex along abdomen, then straight to anal-fin origin, rising along anal-fin base and weakly concave along caudal peduncle. Cross-sectional shape ovoid through snout, deeply trapezoidal at eyes with orbital rims slightly bulging upward, subcircular between occiput and dorsal fin, and increasingly compressed caudally.

Snout 2.2-2.3 [2.3] in HL, fleshy, bulbous in front of mouth and at anterior tip, projecting before mandibular symphysis a distance equal to half the gape width. Mouth ventral, opening anteriorly, when closed 2-4 rows of premaxillary teeth exposed. Upper lip smooth, lower lip slightly plicate; both lips separated from premaxillary tooth band by a deep sulcus. Gape transverse across midline, then near rictus abruptly angled posteriorly; gape width at ricti equal to distance from snout tip to posterior nostril. Rictus in front of a vertical through anterior margin of posterior nostril. Rictal fold broad, posteriorly adnate to snout below maxillary barbel; ventral to rictal fold, a thin, submandibular groove extends less than halfway to mandibular symphysis.

Premaxilla (Fig. 2) and dentary with many, densely packed, strong, villiform teeth arranged in size series steeply decreasing in height posteriorly. Premaxillary teeth in about 8-9 irregular rows; dentary teeth with about 8 irregular rows near the midline and narrowing to a few rows on base of coronoid process. Palate without teeth.

Maxillary barbel dorsoventrally flattened, proximally stiff or leather-like, tip falling along caudal peduncle usually before a vertical through end of adipose base. Maxillary barbel inserted lateral to anterior nares; a shallow but obvious groove accommodates maxillary barbel below eye and dorsal to rictal fold extending anteriorly to origin of maxillary barbel. Head of maxilla forming visible knob on upper side of snout. Mental barbels flexible, laterally compressed and thickened proximally. Inserted well behind mandible, a little closer to gular fold. Outer mental barbel nearly reaching tips of middle pectoral-fin rays, exceeding tips of inner rays. Inner mental barbels extend just posterior to pectoral girdle, scarcely onto inner pectoral-fin rays.

Anterior nostril in a depression on dorsum of snout medial to anterior limit of maxilla and behind snout margin by twice its own diameter. Anterior nostril rim produced as a short tubule, with an elevated posterior margin. Posterior nostril equidistant between anterior nostril and margin of eye. Posterior nostril aperture transverse, its rim anteriorly forming a thin cutaneous fold. Distance between posterior nostrils twice greater than that between the anterior nostrils.

Eye large; orbital rim free. Horizontal eye diameter contained 2.9-3.1 [2.6] times in HL, 1.2-1.4 times in snout length, equal to distance from anterior margin of eye to base of maxillary barbel, and greater than post-ocular length. Interorbital very narrow: bony interorbital distance, contained in horizontal eye diameter 2-3.3 times, in snout 2.8-4.3 times; fleshy interorbital distance contained in horizontal eye diameter 1.5-1.7 times, in snout 2.1-2.2 times. Eye centered a little behind middle of head and a little above mid-depth, entirely visible from above, not from below; eye oval, its vertical diameter 66-72% of horizontal diameter, dorsal margin more strongly curved than ventral margin.

Anterior part of supraorbital sensory canal and mandibular canal with unbranched side canals. Otherwise, head sensory canals with dendritic auxiliary branches, increasingly branched toward and on operculum, occiput and nape. Trunk sensory canal complete, terminating over bases of caudal-fin rays. Trunk sensory canal with long dendritic side branches to below adipose fin and in some to its posterior terminus, those side branches above main canal reaching half way or more to dorsal-fin base, branches below main canal reaching less than half way to venter.

Gular fold defining a deep groove in front of hyoid arch, its sides meeting in an acute angle. Gill membranes free from isthmus and each other, overlapping posterior to apex, supported by 8 branchiostegal rays. Gill rakers on first two branchial arches well ossified and slender, in ANSP 188900 7 rakers on upper limb, 19 rakers on lower limb, total 26. Le Bail et al. (2000) also report about 26 gill rakers on the first arch in MNHN 1998-1612.

Skull-roofing bones and anterior cranial fontanelle partly visible below thin, usually darkly pigmented skin. Anterior cranial fontanelle (Fig. 3A) open from behind a transverse line at posterior nostrils

Table 1. Measurement data for the three Suriname specimens of *Pimelabditus moli* expressed in thousandths of the standard dimensions given in parentheses: ADL-adipose fin length, AFB-anal fin base, CPL-caudal peduncle length, EDH-horizontal eye diameter, HL-head length, SL-standard length, SN-snout length.

Measurement	Holotype	Mean	Range
SL mm	140.9	130.3	110.6-140.9
Predorsal length (SL)	333	337	329-350
Prepectoral length (SL)	186	196	186-210
Body depth (SL)	156	147	137-156
Body width (SL)	144	135	108-154
Head length (SL)	228	231	228-236
Dorsal-fin base (SL)	132	141	132-152
Dorsal-spine length (SL)	133	142	133-150
Adipose-fin length (SL)	343	327	317-343
Adipose-fin height (ADL)	108	144	108-169
Caudal peduncle length (SL)	195	189	184-195
Caudal peduncle depth (CPL)	280	291	280-299
Anal-fin base (SL)	102	109	101-123
Anal-fin height (AFB)	1347	1310	1169-1414
Pectoral-spine length (SL)	131	140	131-151
Pelvic-fin length (SL)	170	172	165-182
Bony interorbital (HL)	162	124	104-162
Bony interorbital (SN)	359	280	234-359
Fleshy interorbital (HL)	215	206	198-215
Eye diameter horizontal (HL)	327	335	327-349
Eye diameter horizontal (SN)	724	759	724-809
Eye diameter vertical (EDH)	667	684	663-722
Snout length (HL)	452	442	431-452
Internarial length (HL)	153	154	152-157
Internarial anterior width (HL)	87	89	87-90
Internarial posterior width (HL)	171	178	168-196
Mouth width at rictus (SN)	655	654	645-662

to epiphyseal bar before a transverse line at posterior margin of eyes; fontanelle length about equal to horizontal eye diameter, its width less than one-third bony interorbital. Posterior cranial fontanelle (Fig. 3A) a small circular opening in supraoccipital. Orbital margin along frontal and sphenotic raised as a low, rounded supraorbital crest (Fig. 3). Frontals posterior to epiphyseal bar and posteriorly adjacent supraoccipital form a low, flat platform raised a little above adjacent sphenotic and pterotic. Supraoccipital posterior process broadly triangular, its base and sides approximately equal, and scarcely rounded in section, nearly flat, articulated to anterior nuchal plate. Anterior nuchal plate flat and broad, approximating an equilateral triangle.

Dorsal-fin origin at first third of SL and at a vertical through tips of adpressed inner pectoral-fin rays; its posterior insertion at a vertical at about 45% of SL. Eight dorsal-fin lepidotrichia: spinelet, spine, and six branched rays; bases of last two rays separately articulating with pterygiophores 6 and 7 (last). Spinelet well developed and not tightly bound to dorsal-fin spine or sharply curved in section. Dorsal-fin spine straight, slender, round in section and pungent, continued as

a filamentous ray about half as long as spine; dorsal spine 2.3-2.5 times in predorsal length, nearly equal to pectoral-spine length. Spine smooth, lacking ridges and dentations. First dorsal-fin soft ray a little shorter than spine plus its filamentous extension; last dorsal-fin ray less than one-half length of anterior rays; distal margin of dorsal fin nearly straight.

Adipose fin elongate, its base contained 2.9-3.2 [3.3] times in SL, its origin at a 56-57% of SL, behind tip of depressed dorsal fin and before a vertical through pelvic-fin margin; its posterior insertion behind a vertical through tip of depressed anal fin. Adipose-fin margin smoothly convex, with a short free posterior lobe, and relatively high, adipose-fin height contained 5.9-9.3 times in its length.

Caudal fin of holotype intact, damaged in others; deeply cleft with acutely rounded lobes, outer principal caudal rays longest, 2.3-2.5 times longer than shortest inner rays, lower lobe a little longer and broader than upper lobe. Principal caudal-fin rays 1,7-8,1 (1,8-8,1 in 1), procurrent caudal-fin rays 10-15 in upper lobe, 13-16 in lower.

Anal fin quadrangular, with 4 simple and 8 branched fin rays, its margin nearly straight along branched fin rays, first branched rays 1.2-2.3 times longer than anal-fin base, anal-fin base contained 8.1-9.9 times in SL. Anterior insertion of anal fin at 70% of SL and a vertical though first third of adipose fin, its posterior insertion a little behind 80% of SL and a vertical through last third of adipose fin; its depressed rays fall in advance of posterior insertion of adipose fin. Anal-fin pterygiophores 11.

Pectoral fin inserted below posterior half of opercle. Pectoral-fin lepidotrichia I, 10; its margin obliquely truncate, with a low fleshy membrane along medial edge of inner ray; tips of longest pectoral-fin soft rays reach a vertical at fourth dorsal-fin soft ray. Pectoral-fin spine strong, sharp, gently curved, shorter than outer 3 soft rays and with a filamentous projection reaching just beyond tip of first soft ray. Pectoral-spine length equal to dorsal-spine length and contained 2.3-2.5 times in predorsal length. Pectoral-spine shaft smooth-sided; posterior margin with numerous (20-25 in Suriname specimens), regularly spaced, erect to slightly retrorse unicuspid dentations; no anterior distal serrae, small dentations along anterior margin. Posterior cleithral process tip reaches to about 25-35% of adpressed spine length; slender, sharp, ventral edge nearly straight from spine insertion to posterior tip and proximally stepped above adjacent cleithral surface; posterior cleithral process dorsoposterior margin concave; process bowed convexly outward above adjacent integument, surface ornamented with a few anastomosing ridges. No axillary pore below posterior cleithral process.

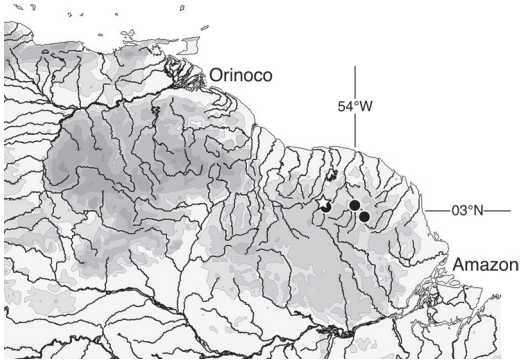

Fig. 5. Spot map of collection localities of *Pimelabditus moli*, star indicates type locality. Locality elevations are above 200 m contour. Base map of drainages and elevations provided by Conservation Science Program, World Wildlife Fund USA.

Pelvic fin inserted near 43% of SL and below penultimate dorsal-fin ray; containing 6 rays, first simple, second and third longest, reaching to below anterior part of adipose fin; a fleshy membrane along medial edge of inner ray; pelvic-fin margin obliquely truncate between rounded outer and inner corners; pelvic-fin length contained 5.5–6.1 times in SL and separated from anal-fin origin by about half its length. Pelvic splint absent.

Total vertebrae 46–47; 17 precaudals and 29-30 caudals. Ribs 10-11 pairs, first rib on 6th vertebra. Transverse processes of vertebrae 4 and 5 separated by a gap for about half their distal length.

Coloration in alcohol.—Color and pigmentation pattern poorly and variably preserved in all specimens. Nevertheless, the species clearly has a dark brown to dark gray dorsum and sides, whitish venter and abruptly demarcated countershading low on the flanks and head. Tympanic region in most specimens is darker than adjacent sides. Dorsal and caudal fins and upper surface of pectoral fins dark; anal and pelvic fins light, hyaline. All rayed fins have chromatophores more densely concentrated on fin rays than on interradial membranes. Leading edges and sides of dorsal- and pectoral-fin spines covered with dark skin. Adipose fin with a dark margin and base, otherwise hyaline with a peppering of dark chromatophores. Maxillary barbel strongly countershaded; mental barbels mostly pallid or with light peppering of chromatophores. Nasal bones visibly black through overlying skin.

Distribution and habitat.—Known only from upper tributaries above 200 m of the Maroni river system of French Guiana and Suriname (Fig. 5). Captured in large rivers with swift currents and bedrock to boulder-strewn substrates.

Etymology.—The species is named for Dr. Jan Mol for his contributions to the knowledge of Suriname's fishes.

Barcodes.—GenBank accession numbers for the cytochrome *c* oxidase I nucleotide sequences are: holotype (MHNG 2709.100): GU181205, paratype (ANSP 188900): GU181206, paratype (MHNG 2709.099): GU181207.

DISCUSSION

Pimelabditus moli possesses nested synapomorphic characters that successively place this taxon in the family Pimelodidae, the "Group A" clade of Lundberg et al. (1988) and Nass (1991), and near the *Calophysus-Pimelodus* clade of Lundberg et al. (1991). Supporting Pimelodidae, four unambiguous synapomorphies have been identified (Lundberg et al., 1991; de Pinna, 1998; Lundberg and Littmann, 2003). *Pimelabditus* possesses all of these. 1) Uniquely elongated articulation surfaces of the lateral ethmoid-autopalatine joint; 2) dendritic arrangement of lateralis sensory canals of the head and anterior trunk; 3) deeply interdigitating, sutural joint between the fifth and sixth centra; and 4) bifurcated, dorsolateral process of the premaxilla.

The "Group A" clade is based on a single feature, the synapomorphic presence of a bony canal enclosing the aorta on the midventral side of the Weberian centra (Howes, 1983). The diverse "Group A" contains all pimelodid genera, including now *Pimelabditus*, except *Steindachneridion*, *Phractocephalus* and *Leiarius* (including *Perrunichthys*). These three genera lack the aortic canal and instead have the plesiomorphic condition of a widely open midventral aortic groove on the Weberian centra. Molecular evidence substantiates monophyly of "Group A" and the deep positions in the family of *Steindachneridion*, *Phractocephalus* and *Leiarius* (Hardman and Lundberg, 2006; Sullivan et al., in prep.).

The *Calophysus-Pimelodus* clade is based on four synapomorphies. Using the 3D tomographic images and radiographs of *Pimelabditus* we find two of these present and two absent. Present are: 1) sharply down-turned mesethmoid cornua above their contact with premaxillae, and 2) steeply, elevated coronoid process of the dentary and anguloarticular bones. Absent are: 3) postemporo-supracleithrum-cleithrum joint with a "cleithral ring" built of two elongated ventral processes of the supracleithrum plus an elongated posterolateral extension of anterior limb of fourth transverse process, and 4) ossified ventral surface of mesethmoid (ethmoid plate) with nearly straight, parallel sides and squarish or rounded-inward posterolateral corners. Instead, *Pimelabditus* has an incomplete cleithral ring in which the latero-ventral process of the supracleithrum and posterolateral extension of anterior limb of fourth transverse process fail to articulate, leaving a small gap. Also, in *Pimelabditus* the lateral margins of the ventral surface of the mesethmoid are concave inward and the posterolateral corners are drawn out laterally to contact the autopalatines anterior to the autopalatine-lateral ethmoid joints.

Pimelabditus does not share the diagnostic characters of either the *Calophysus* group (Lundberg et al., 1991) or the *Pimelodus* group (Lundberg et al., 1991). Further, *Pimelabditus* does not share unique or unequivocally derived characters with any of the demonstrably monophyletic genera of the *Calophysus-Pimelodus* clade (Stewart, 1986; Lundberg et al., 1991; Lundberg and Dahdul, 2008; Parisi et al., 2006; Rocha et al., 2007). Based on the foregoing *Pimelabditus* is near but not within the *Calophysus-Pimelodus* clade.

The first identification of *Pimelabditus moli* as "*Cheirocerus* sp." was made explicitly provisional by Le Bail et al. (2000). There are superficial similarities between these genera such as the small ventral mouth, large eye, and long adipose fin. The mouths of *Pimelabditus* and *Cheirocerus* are similar in position and size, but internally their oral jaws and dentitions are completely distinct. In contrast to the enlarged, heavily toothed upper jaw of *Pimelabditus*, the premaxillae of *Cheirocerus* are exceedingly thin, lyre-shaped and edentulous blades that curve lateroventrally to contact the maxilla-autopalatine joint, and each dentary is a thin blade with at most a single row of minute teeth. Eye size is highly variable at the species level within and among genera of Pimelodidae. *Pimelabditus* may have the largest eye relative to head size in the family. Beyond large-eyed *Cheirocerus*, however, similar large eyes are found in the *Calophysus-Pimelodus* clade in *Iheringichthys*, *Parapimelodus* and some *Pimelodus*. Much elongated adipose fins are informative apomorphies for some pimelodid subgroups (*Calophysus* group without basal *Megalonema*; *Exallodontus* and *Propimelodus*; *Cheirocerus*) but this feature is demonstrably homoplasious among these taxa. *Cheirocerus* shares none

of the diagnostic synapomorphies of *Pimelabditus*. Reciprocally, *Pimelabditus* does not have the many apomorphic features of *Cheirocerus* reported by Stewart and Pavlik (1985): the mouth and upper jaw noted above, pectoral-spine base lacking enlarged processes and the locking-joint mechanism, absence of the posterior cleithral process and branchial arch papillae, and reduction of the dorsal-fin spinelet, dorsal-fin locking mechanism and stiffness of the dorsal-fin spine.

This first taxonomic assessment, therefore, places *Pimelabditus* as the sister-group of the *Calophysus-Pimelodus* clade. A combined molecular and morphological phylogenetic study of *Pimelabditus* is in progress that should further resolve its systematic position. Whatever the outcome, the discovery of *Pimelabditus* adds a novel catfish group to Pimelodidae and to the aquatic fauna of the eastern Guiana Shield. In view of the long and ongoing history of ichthyological exploration of the region, the late discovery of such a distinctive catfish as *Pimelabditus moli* is perhaps a surprise. But the hidden nature of a small fish species living in the difficult-to-collect rocky bottoms of swift, large rivers is not altogether unexpected.

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