Neotropical Ichthyology, 5(1):75-78, 2007

Scientific Note

Pimelodus microstoma Steindachner, 1877, a valid species of pimelodid catfish (Siluriformes: Pimelodidae) from the upper rio Paraná drainage

Frank Raynner V. Ribeiro* and Carlos Alberto S. de Lucena**

Pimelodus microstoma, which has been treated as a junior synonym of *P. fur*, is resurrected and its type locality restricted to Irisanga (=Orissanga), São Paulo State, in the upper rio Paraná. An identification key is provided for *Pimelodus* species from the upper portions of the Paraná drainage.

Pimelodus microstoma, espécie que tem sido tratada como sinônimo júnior de *P. fur*, é revalidada e sua localidade-tipo restringida para Irisanga (=Orissanga), Estado de São Paulo, alto rio Paraná. Uma chave de identificação das espécies de *Pimelodus* da porção superior do rio Paraná é fornecida.

Key words: Natterer, Geographic distribution, Type-locality, *Pimelodus fur*.

Pimelodus microstoma Steindachner, 1877 is one of the 24 species of the paraphyletic Neotropical genus *Pimelodus* (Lundberg & Littmann, 2003). Eigenmann & Eigenmann (1888, 1890) were not able to demonstrate the validity and distinctiveness between *P. microstoma* and *P. fur* (Lütken, 1874) (type locality: Rio das Velhas [rio São Francisco basin]). Thus, subsequent authors (*e.g*. Gosline, 1945, Fowler, 1951) treated *P. microstoma* as a junior synonym of *P. fur*, a species known from the São Francisco basin.

Pimelodus microstoma was described based on three specimens collected by the Austrian naturalist Johann Natterer, who conducted many collection expeditions in Brazil from 1818 to 1835. Some *Pimelodus* specimens collected by Natterer were initially treated as *P. maculatus* La Cépède, 1803 by Kner (1858), until Steindachner (1877) recognized them as representatives of an undescribed species which he formally named *P. microstoma*. Steindachner (1877) was aware that specimens came from Natterer's collections and referred to the type locality as "Brazil, von Irisanga [=Orissanga, São Paulo], Rio Branco und Barra do Rio Negro." The occurrence of such a wide distribution (Amazon and Paraná basins) is unlikely for a *Pimelodus* species.

The examination of the type series of *P. microstoma* demonstrated that all syntypes are co-specific, and its comparison with the type series and/or specimens of *Pimelodus* species from the Amazon drainage, allowed its recognition as a valid and distinct species. *Pimelodus microstoma* is distinguished from all Amazonian *Pimelodus* species, and from recently described *Pimelodus* species from rio São Francisco (Ribeiro & Lucena, 2003), by the combination of the following characters: a deep, robust body; relatively long adipose fin, occupying at least half of the distance between the end of the dorsal-fin base and the beginning of the caudal peduncle; prominent upper jaw, allowing the visualization of nearly the whole premaxillary tooth plate; small mouth and a short maxillary barbel, usually not reaching the base of the caudal peduncle; and a gray uniform color pattern with only a few dark dots (sometimes very weak or absent) in the antero-lateral region.

The only Amazonian species with a gray color pattern is *P. blochii* (Valenciennes, 1840). However, the results of principal components analysis (PCA) corroborate the discrimination between *P. microstoma* and *P. blochii*. Plots of the second and third principal components revealed the complete

* Universidade do Estado do Pará – Núcleo de Santarém, Av. Plácido de Castro, 1399, 68040-090, Santarém, PA, Brazil. fraynner@hotmail.com
** Laboratório de Ictiologia, Museu de Ciências e Tecnologia, Pontifícia Universidade Católica do Rio Grande do Sul, Av. Ipiranga, 6681, 90619-900 Porto Alegre, RS, Brazil. lucena@pucrs.br

separation of the two species (Fig. 1). Character loadings that most strongly contributed to discrimination along PC axes are: distance between dorsal-fin base end and adipose-fin origin (0.33), distance between urogenital papilla and anal-fin base origin (0.30), adipose-fin length (0.26), adipose-fin depth (-0.37), interorbital width (-0.26), and pectoral spine length (-0.25) on second PC axis, and distance between end of dorsal-fin base and adipose-fin origin (0.54), interorbital width (0.27), anterior internarial width (0.23), adipose-fin length (-0.51), adipose-fin depth (-0.28), and internarial length (-0.21) on the third axis.

Johann Natterer's journey in Brazil included many Brazilian states other than Amazonas: São Paulo, Paraná, Minas Gerais, Goiás, Mato Grosso, and Pará (Papavero, 1971). Therefore, it is possible that syntypes of *P. microstoma* were captured in the drainages of the rios São Francisco, Paraguay and Paraná. The comparison between these syntypes with *Pimelodus* specimens from the aforementioned drainages showed many differences, mainly color pattern ones. In the next paragraphs, we discuss the diagnostic characters of *P. microstoma* that warrant its validity and distinctiveness from its congeners inhabiting the rio Paraná and neighboring drainages.

Although Natterer himself did not collect specimens in the rio São Francisco drainage, Dr. J. E. Pohl, one of the scientists who joined Natterer in Brazil to form the Austrian Mission – collected around the cities of Pirapora and Barra do Rio das Velhas (currently Guaicu), both in the rio São Francisco basin (Papavero, 1971). Pohl's collections arrived in Vienna in four consignment contents, which included 42 fish specimens among other zoological groups (Riedl-Dorn, 1999).

Pimelodus microstoma and *P. fur* are quite similar but differ in the number of gill rakers (17-22 [19-20 in syntypes of *P. microstoma*] *vs.* 16-18, respectively) and width of interorbital space (19.0-26.5% of HL [22.4-22.6% of HL in the syntypes of *P. microstoma*] *vs.* 12.1-14.9% of HL, respectively). *Pimelodus microstoma* differs from *P. maculatus* (from the rio São Francisco basin) by the number of gill rakers (17-22 *vs.* 25-28, respectively) and by predorsal length (37.1-40.8% of SL [37.5-38.8 % of SL in the syntypes] *vs.* 43.2-45.8% of SL, respectively), besides several other morphometric parameters.

The results of principal components analysis (PCA) revealed a complete separation between *P. microstoma*, *P. fur* and *P. maculatus* along the second and third principal components (Fig. 2). With 5.2 % of total variation of the data, PC2 contains the main shape differences between species. Character loadings strongly contributing to discrimination along PC axes are: adipose-fin length (0.36), distance between urogenital papilla and anal-fin base origin (0.32), caudal peduncle length (0.30), interorbital width (-0.41), mouth width (-0.37) and supraoccipital process width (-0.30) on the second PC axis; and internarial length (0.48), internarial posterior width (0.37), adipose-fin length (0.26), distance between dorsal-fin base end and adipose-fin origin (-0.53), supraoccipital process width (-0.26) and horizontal eye diameter (-0.16) on the third axis.

It is important to point out that a specimen from Juazeiro, Bahia (MZUSP 24723) was found to be very similar to *P. microstoma.* Despite the large number of specimens examined from the rio São Francisco drainage, only this specimen possessed the color pattern typical of *P. microstoma*. We prefer to regard it provisionally as *Pimelodus* sp., since a more encompassing analysis is beyond the scope of this work.

Eight species were originally described or cited for the drainages of the rio Paraguay or lower rio Paraná (including the rio Iguaçu): *Pimelodus maculatus*, *P. albicans* (Valenciennes, 1840), *P. argenteus* Perugia, 1891, *P. brevis* Marini, Nichols & La Monte, 1933, *P. ortmanni* Haseman, 1911, *P.*

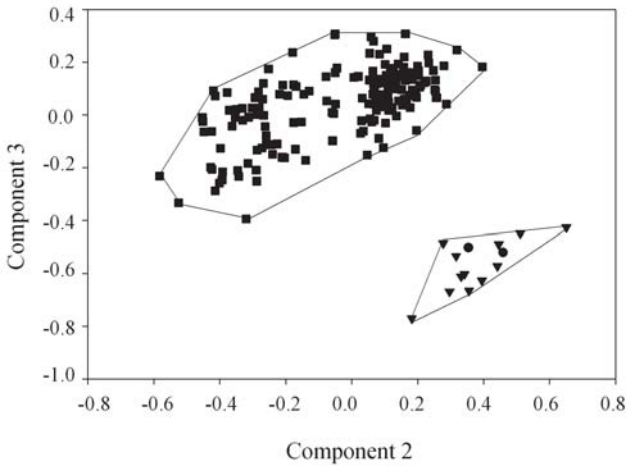

Fig. 1. Principal components analysis on covariance matrix of log-transformed measurements of *Pimelodus microstoma* from the upper Paraná (inverted triangles), syntypes of *Pimelodus microstoma* (dots), and *Pimelodus blochii* species-group (squares).

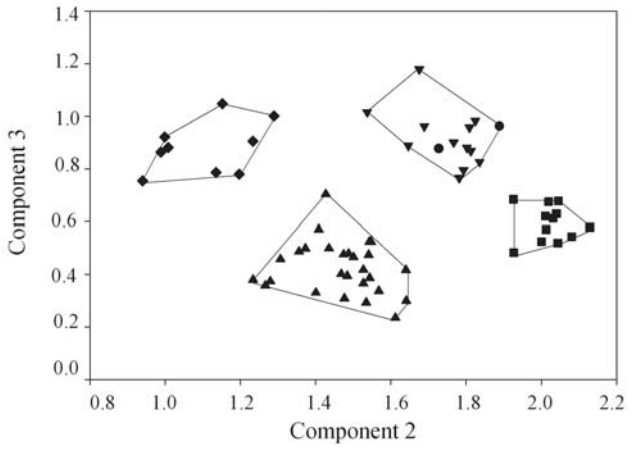

Fig. 2. Principal components analysis on covariance matrix of log-transformed measurements of *Pimelodus microstoma* from the upper Paraná (inverted triangles), syntypes of *Pimelodus microstoma* (dots), *Pimelodus maculatus* (diamonds), *Pimelodus fur* (squares), and *Pimelodus* sp. (triangles).

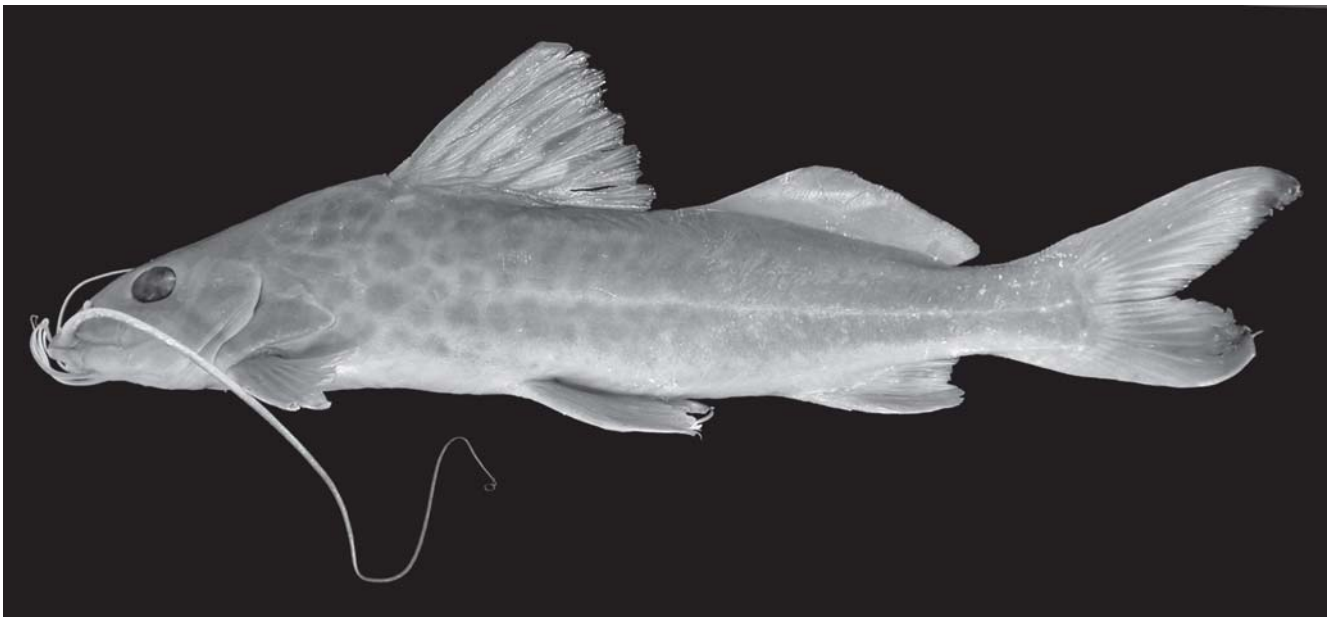

Fig. 3. *Pimelodus microstoma*, MZUSP 23204, Jupiá dam, upper rio Paraná, 120.0 mm SL.

absconditus Azpelicueta, 1995, *P. mysteriosus* Azpelicueta, 1998, and *P. atrobrunneus* Vidal & Lucena, 1999. *Pimelodus maculatus* has a spotted body (*vs.* gray or few spots restricted to the antero-dorsal region of the body in *P. microstoma*). Like *P. microstoma, Pimelodus albicans* has teeth on the vomer but can be distinguished by the longer maxillary barbels, reaching the middle of anal fin, and a uniform brownish color pattern or, according to Eigenmann & Eigenmann (1890), by three dark longitudinal stripes in young specimens. *Pimelodus brevis* has a short body, smaller eye (6.4 *vs.* 3.7-3.8 times in HL) and does not exhibit dots on the body flanks (the holotype is missing, and thus comparative analysis was according to Marini *et al*., 1933). *Pimelodus ortmanni* has comparatively longer dots, forming 3-5 rows on the lateral surface of the body, and on fins. *Pimelodus absconditus* has thick and fleshy, well-developed lips. *Pimelodus mysteriosus* has spots in three or four rows along the body and a very long maxillary barbel, reaching the tip of caudal-fin lobes. *Pimelodus argenteus* and *P. atrobrunneus* do not have a spotted body.

Three species were originally described for the upper rio Paraná – *P. paranaensis* Britski & Langeani, 1988, *P. heraldoi* Azpelicueta, 2001, and *P. platicirris* Borodin 1927. *Pimelodus microstoma* can also be distinguished from these species by the same combination of characters cited above. *Pimelodus heraldoi* has dots arranged irregularly on the body, forming 8-9 rows. *Pimelodus platicirris* has 3-5 rows of dots on lateral surface of the body and dorsal and caudal fins. *Pimelodus paranaensis* has very small dots on the body sides and a premaxillary tooth plate with pointed postero-lateral corners (*vs.* rounded in *P. microstoma*).

During survey analyses of *Pimelodus* specimens housed in the fish collection of MZUSP, the senior author concluded that some upper rio Paraná specimens (see Material Examined) are very similar to the syntypes of *P. microstoma* (see Morris & Sabaj, 2006 for images of the syntype NMW 45824.1) regarding morphometrics, meristics, and chromatic features (Fig. 3). Therefore, we assigned these specimens the species name *P. microstoma* and restricted its type locality to Orissanga, São Paulo State, upper rio Paraná basin (thereby removing the species from the list of the fishes of the rio Amazonas drainage). Below we provide a provisional key to *Pimelodus* species from the upper rio Paraná.

1. Premaxillary tooth plate with pointed postero-lateral corners; dorsal-spine length 55-64% of HL ..... *P. paranaensis*
1'. Premaxillary tooth plate with rounded postero-lateral corners; dorsal-spine length 67-92% of HL 2
2. Eight or 9 irregular rows of dots on body sides... *P. heraldoi*
2'. Three to 5 rows of dark blotches on body sides or gray uniform color pattern with only a few small dark dots on the antero-lateral region, sometimes very weak or absent 3
3. Gray uniform color pattern with only a few small dark dots in the antero-lateral region, sometimes very weak or absent; predorsal length 37.1-40.8% of SL; 17-22 gill rakers on first branchial arch .....…….…. *P. microstoma*
3'. Three to 5 rows of dark blotches on body sides; predorsal length 42.3-52.0% of SL; 21-25 gill rakers on first branchial arch 4
4. Three rows of dark blotches on body sides; caudal-fin lobes hyaline; anal-fin length 16.0-17.2% of SL; head depth 61.1-72.1% of HL; interorbital width 25.3-29.9% of HL .....……. *P. maculatus*
4'. Three to 5 rows of dark blotches on body sides; spotted caudal-fin lobes; anal-fin length 14.4-16.9% of SL; head depth 50.5-64.4% of HL; interorbital width 21.9-26.9% of HL .....…….. *P. platicirris*

Acknowledgments

We are grateful to the following people: Osvaldo Oyakawa and José Figueiredo (MZUSP) for the support given to the first author during the examination of the collection and for the loan of *Pimelodus* specimens; Helmut Wellendorf (NMW) for the loan of the syntypes of *P. microstoma* and for taking photographs; and John Lundberg (ANSP) for data and photographs of pimelodids. The All Catfish Species Inventory Project supported the visit of FRVR to MZUSP. The manuscript was improved by suggestions from Paulo Lucinda. Photograph in Fig. 3 was taken by José P. Silva (MCP). John Lundberg and an anonymous reviewer provided important suggestions in the manuscript.

Literature cited

Eigenmann, C. H. & R. S. Eigenmann. 1888. Preliminary notes on South American Nemathognathi I. Proceedings of the California Academy of Sciences, 1(2): 119-172.

Eigenmann, C. H. & R. S. Eigenmann. 1890. A revision of the South American Nemathognathi or cat-fishes. Occasional Papers of the California Academy of Sciences, 1: 1-508.

Fowler, H. W. 1951. Os peixes de água doce do Brasil. Arquivos de Zoologia do Estado de São Paulo, 6: 404-625.

Gosline, W. A. 1945. Catálogo dos Nematognatos de água doce da América do Sul e Central. Boletim do Museu Nacional, 33: 1-138.

Kner, R. 1858. Ichthyologische Beiträge. II. Abtheilung. Sitzungsberichten der kaiserlichen Akademie der Wissenschaften, mathematisch-naturwissenschaftiche Klasse, 26: 373-448.

Lundberg, J. G. & M. W. Littmann. 2003. Family Pimelodidae (Long-whiskered catfishes). Pp. 432-446. *In* : Reis, E. R., S. O. Kullander & C. J. Ferraris Jr. (Eds.). Check List of the Freshwater Fishes of South and Central America. Porto Alegre, Edipucrs, 729 p.

Marini, T., J. Nichols & F. La Monte. 1933. Six new eastern South American fishes examined in the American Museum of Natural History. American Museum Novitates, 618: 1-7.

Morris, P.J. [programmer] and M.H. Sabaj [editor], 2006. ACSImagebase: A digital archive of catfish images compiled by participants in the All Catfish Species Inventory. [WWW image Database] URL http://acsi.acnatsci.org/base. Accessed on December 20, 2006.

Papavero, N. 1971. Essays on the history of Neotropical dipterology, with special reference to collectors (1750-1905). Volume 1. São Paulo, Museu de Zoologia da USP, 216p.

Ribeiro, F. R. V. & C. A. S. Lucena. 2006. A new species of *Pimelodus* LaCépède, 1803 (Siluriformes: Pimelodidae) from the rio São Francisco drainage, Brazil. Neotropical Ichthyology, 4(4):411-418.

Riedl-Dorn, C. 1999. Johann Natterer e a Missão Austríaca. Petrópolis, Editora Index, 192p.

Steindachner, F. 1877. Die Süsswasserfische des südöstlichen Brasilien (III). Sitzungsberichten der kaiserlichen Akademie der Wissenschaften, mathematisch-naturwissenschaftiche Klasse, 74(1): 559-694.

Received September 2006
Accepted December 2006