

## Short Communication

# Range extension of *Moenkhausia oligolepis* (Günther, 1864) to the Pindaré river drainage, of Mearim river basin, and Itapecuru river basin of northeastern Brazil (Characiformes: Characidae)

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**Abstract:** The present study reports range extension of *Moenkhausia oligolepis* to the Pindaré river drainage, of the Mearim river basin, and Itapecuru river basin, Maranhão state, northeastern Brazil. This species was previously known only from Venezuela, Guianas, and the Amazon River basins. In addition, we present some meristic and morphometric data of the specimens herein examined and discuss on its diagnostic characters.

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## Introduction

*Moenkhausia* Eigenmann, 1903 is one of the most specious characid genera, currently comprising about 80 valid species (Eschmeyer and Fricke, 2016). The genus is widely distributed in the cis-andineans river basins, not occurring only in Patagonia (Lima et al., 2003; Benine, 2009). The genus *Moenkhausia* was firstly included in the subfamily Tetragonopterinae (Eigenmann, 1903, 1917), being recently located as *incertae sedis* in Characidae (Lima et al., 2003). According to Géry (1977), Benine (2004), Benine et al. (2009) and Petrolli and Benine (2015), this genus is divided into some species complex; e.g.: *Moenkhausia chrysargyrea*, *Moenkhausia dichrourea*, *Moenkhausia eigenmanni*, *Moenkhausia grandisquanis*, *Moenkhausia lepidura*, *Moenkhausia jamesi* and *Moenkhausia oligolepis* species complexes.

*Moenkhausia oligolepis* complex is composed of species which share a set of diagnostic features, including presence of a conspicuous blotch in the caudal peduncle extending to the bases of caudal fin rays, preceded by a whitish brown area; scales of the side of body with a dark pigmentation on their

posterior margin, forming a reticulated pattern; four to five series of scales above lateral line; and two to four series of scales between lateral line and pelvic-fin origin (Eigenmann, 1903; Eigenmann, 1917; Géry, 1977; Costa 1994; Lima et al., 2007; Lima and Toledo-Piza, 2001; Benine, 2009) distinguishing from all the other congeners. *Moenkhausia oligolepis* was originally described as *Tetragonopterus oligolepis*, based on specimens collected in Guyana (Günther, 1864). The geographical distribution of *M. oligolepis* is the river drainages of Venezuela, in the Guianas and Amazon river basin, occurring in the following countries, including Brazil, French Guiana, Guyana, Peru, Suriname, and Venezuela (Lima et al., 2003; Eschmeyer and Fricke, 2016; Froese and Pauly, 2016). This species has been now found in the Pindaré river drainage, of the Mearim river basin, and Saco River of the Itapecuru river basin of northeastern Brazil showing the extension of its distribution further to west.

## Materials and Methods

The specimens of *M. oligolepis* were collected from

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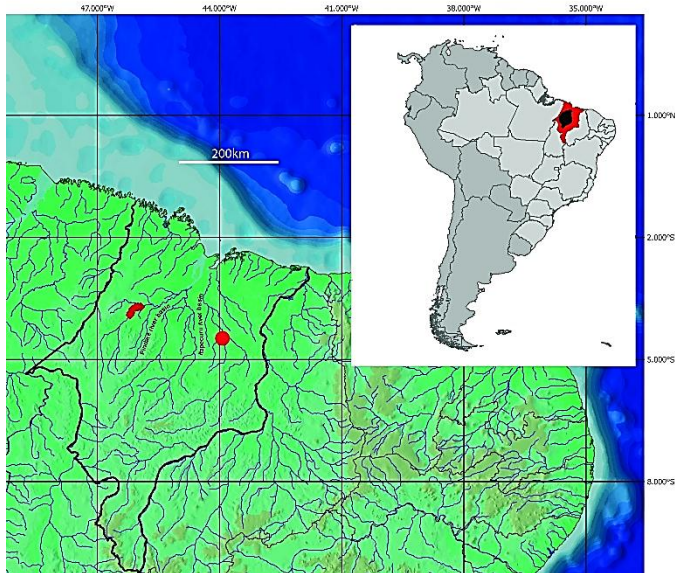


Figure 1. Distribution of *Moenkhausia oligolepis* in Pindaré river drainage, of the Mearim river basin (red lozenge), and Itapecuru river basin (red circle), Maranhão state, northeastern Brazil.

the Pindaré river drainage, of the Mearim river basin, northeastern Brazil. The Pindaré river originates from the Serra do Gurupi, with a maximum altitude of about 300 m, and discharges into the Mearim River, near its mouth in the São Marcos Bay, after going through 575.59 km (Lima, 2013). The Itapecuru river originates from the Serras Cruzeiras, in the south of Maranhão, with a maximum altitude of about 530 m, and discharges into the Arraial Bay, in the southeastern of São Luis island (Lima, 2013). Specimens of *M. oligolepis* were collected in seven sampling sites of the Pindaré river drainage and one sampling station in the Itapecuru river basin (Fig. 1). The collected specimens were fixed in 10% formaldehyde, and then transferred to 70% ethanol for preservation, after 15 days.

Measurements and counts were made according to Fink and Weitzman (1974), Menezes and Weitzman (1990), Weitzman and Malabarba (1999) and Bragança et al. (2015). Counts and data related to the fin rays, branchiostegal rays, teeth, supraneurals, vertebrae and ribs were conducted in cleared and stained specimens based on Taylor and Van Dyke (1985). The Weberian apparatus was not included in the vertebrae count and the fused PU1+U1 was considered as a single element.

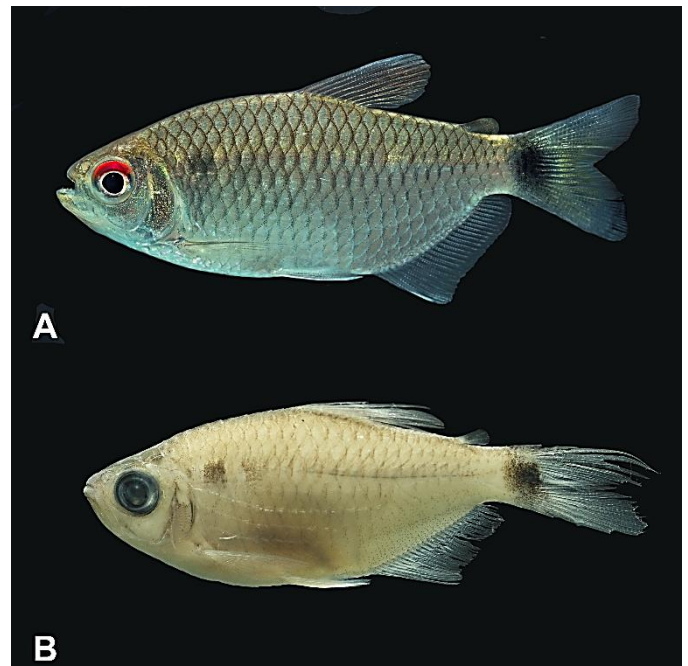


Figure 2. (A) Life specimens of *M. oligolepis*: CICCAA 00094, 48.5 SL; Codó municipality, Itapecuru river basin, Maranhão state, northeastern Brazil, and (B) Preserved specimen of *M. oligolepis*: CICCAA 00062, 50.0 mm SL; Alto Alegre municipality, Pindaré river drainage, of the Mearim river basin, Maranhão state, northeastern Brazil.

Information about other congeners was based on the literatures, including Günther (1864), Eigenmann (1903), Eigenmann (1917), Géry (1977), Costa, (1994), Lima and Toledo-Piza (2001), Lima et al. (2007), Benine et al. (2009), Sousa et al. (2010), Lima et al. (2013), Dagosta et al. (2015), and Ohara and Marinho (2016).

The collected materials were deposited in the Coleção Ictiológica do Centro de Ciências Agrárias Ambientais, da Universidade Federal do Maranhão (CICCA). Collections were made under the “Autorização de Captura e Transporte de Material Biológico, Processo IBAMA Nº 02001.007241/2004-37”.

## Results and Discussion

The examined specimens present all character states cited above for the *M. oligolepis* complex (Fig. 2) and were identified as *M. oligolepis* because they differ from the other congeners of the species complex by a set of features cited below: presence of a complete lateral line, while *M. forestii* Benine,

Table 1. Morphometric characteristics of *Moenkhausia oligolepis* specimens herein examined, (n = 30).

Characters	Range	Mean
Standard Length	34.5-58.8	41.5
<b>Standard Length %</b>		
Body length	37.2-44.3	41.3
Head length	22.8-27.9	26.1
Head depth	18.3-27.7	21.8
Predorsal distance	31.0-56.7	52.1
Prepectoral distance	24.1-31.5	28,3
Prepelvic distance	40.0-52.0	48.7
Preanal distance	16.8-24.6	21
Caudal peduncle depth	10.5-14.1	12.1
Dorsal-fin base length	9.3-17.0	12.9
Anal-fin base length	21-33.3	28.8
Pectoral-fin length	20.6-31.4	24.8
Pelvic-fin length	16.0-32.2	21.3
Dorsal-fin length	29.6-37.4	32.4
Anal-fin length	13.6-25.7	20.7
Caudal peduncle length	6.9-12.2	9,4
Distance between dorsal and adipose fin	34.4-38.8	34.6
Distance between orbit and dorsal fin	23.8-53.4	37.1
Distance between dorsal fin and caudal peduncle	48-55.5	51.8
<b>Head Length %</b>		
Horizontal eye diameter	21-47.1	34.5
Snout length	20.1-38.7	26.2
Least interorbital width	16.9-30.9	23.5
Upper jaw length	15.9-35.4	25.8

Mariguela & Oliveira, 2009, *M. pyrophthalma* Costa, 1994, *M. cosmops* Lima, Britski & Machado 2007, *M. diktyota* Lima & Toledo-Piza 2001 and *M. sanctaefilomenae* (Steindachener, 1907) have an incomplete or interrupted lateral line; presence of five series of scales between lateral line and dorsal-fin origin and four series of scales between lateral line and pelvic-fin origin, while *M. australe*, (Eigenmann, 1908), *M. sanctaefilomenae* and *M. cosmops* have four and two to three, respectively; presence of 28-30 perforated scales in the lateral line, while *M. sanctaefilomenae* and *M. forestii* have 22-24 and 23-26, respectively; absence of longitudinal series of dark dots on body, while *M. lineomaculata* Dagosta, Marinho & Benine, 2015, *M. cotinho* Eigenmann, 1908, *M. parecis* Ohara & Marinho 2016, *M. petymbuaba* Lima and Birindelli, 2006 and *M. plumbea* Sousa, Netto-Ferreira and Birindelli, 2010 possess these series; and presence a dorsally

and ventrally extended caudal peduncle blotch occupying its entire height, while *M. pumbea*, *M. lineomaculata* and *M. parecis* have a caudal peduncle spot centralized, not extended dorsally and ventrally.

The present study extends the distribution of *M. oligolepis* for the Pindaré river drainage, of the Mearin river basin, and Itapecuru river basin, northeastern Brazil. In addition, our results confirm the brief descriptions and diagnostic features of the species previously proposed by Günther (1864), Planquette et al. (1996) and Lima et al. (2013). Some morphometric and meristic information of the specimens herein examined are presented in the (Tables 1 and 2).

**Examined material:** Brazil: Estado do Maranhão: Município de Alto Alegre do Pindaré: CICA 00057, 1, C&S, 41.1 mm SL; Igarapé Arapapá, 3°42'22.66"S 46°0'20.92"W; E. Guimarães and C.

Table 2. Meristic data of *Moenkhausia oligolepis* specimens herein examined.

Characters	N	Range
Number of dorsal-fin rays	5	ii+9
Number of anal-fin rays	5	Iv+24 – v25
Number of pectoral-fin rays	5	i+12
Number of pelvic-fin rays	5	I+7
Number of perforated scales of upper lateral line	29	28 - 30
Number of scales serie above lateral line	30	5
Number of scales serie between lateral line and pelvic fin origin	30	4
Number of predorsal scales	5	11
Number of maxillary teeth	5	2
Number of teeth in the outer row of premaxilla	5	4
Number of teeth in the inner row of premaxilla	5	4
Number of teeth in the dentary	5	13 -14
Number of branchiostegal rays	5	4
Number of supraneurals	5	4
Number of principal caudal-fin rays	5	ii+19
Number of dorsal procurrent rays	5	7
Number of ventral procurrent rays	5	8
Number of vertebrae (precaudal + caudal)	5	27–28 (12+15–16)
Number of rib pairs	5	11–12 (9–10 larger s+ 2 smaller)

Costa, 03 Dec. 2015. CICCA 00058, 1, C&S, 49.8 mm SL; Igarapé Araparizal, 3°54'31.68"S 46°12'3.04" W, E. Guimarães and C. Costa, 03 Dec. 2015. CICCA 00059, 1, C&S, 39.1 mm SL; Igarapé Araparizal; 3°54'31.68"S 46°12'3.04"W; E. Guimarães and C. Costa, 03 Dec. 2015. CICCA 00060, 1, C&S, 38.9 mm SL; Igarapé do Fausto, 3°42'47.45"S 46°3'26.26"W, E. Guimarães and C. Costa, 03 Dec 2015. CICCA 00061, 1, C&S, 47.1 mm SL; Igarapé do Fausto, 3°42'47.45"S 46°3'26.26"W, E. Guimarães and C. Costa, 03 Dec 2015. CICCA 00062, 4, 41.2-58.8 mm SL; Igarapé do Fausto, 3°42'47.45"S 46°3'26.26"W, E. Guimarães and C. Costa, 03 Dec 2015. CICCA 00063, 1, 46.3 mm SL; Igarapé do Fausto, 3°42'47.45"S 46°3'26.26"W, E. Guimarães and C. Costa, 03 Dec 2015. CICCA 00064, 3, 37.9-44.8 mm SL; Igarapé do Fausto, 3°42'47.45"S 46°3'26.26"W, E. Guimarães and C. Costa, 03 Dec 2015. CICCA 00065, 2, 39.8-44.3 mm SL; Igarapé Jenipapo, 3°51'15.77"S 46°11'6.19"W, E. Guimarães and C. Costa, 03 Dec 2015. CICCA 00066, 4, 38.6-40.1 mm SL; Igarapé Arapapa, 3°42' 22.66"S 46°0'

20.92" W, E. Guimarães and C. Costa, 03 Dec 2015. CICCA 00067, 3, 38.0-52.3 mm SL; Igarapé Igarapé, Bacia do rio Mearim; 3°45'46.38"S 46°8'11.67"W, E. Guimarães and C. Costa, 03 Dec 2015. CICCA 00068, 1, 55.5 mm SL; Igarapé Brejinho, 3°42' 27.54"S 46°1'17.00"W, E. Guimarães and C. Costa, 03 Dec 2015. CICCA 00069, 4, 34.5-44.6 mm SL; Igarapé Brejinho, 3°42'27.54"S 46°1'17.00"W, E. Guimarães and C. Costa, 03 Dec 2015. CICCA 00070, 3, 39.6-41.2 mm SL; Igarapé Mineirão, 3°42'26.96"S 45°56'15.12"W, E. Guimarães and C. Costa, 03 Dec 2015. Município de Codó: CICCA0094, 48.5 SL; rio Saco, 04°31'48.2"S 43°56'09.5"W, E. Guimarães and F. Ottoni.

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### References

Benine R.C. (2004). Análise filogenética do gênero *Moenkhausia* (Characiformes: Characidae) com uma

- revisão dos táxons do alto Rio Paraná. [unpublished report]., São Paulo, Universidade Estadual Paulista, São Paulo, 358 p.
- Benine R.C., Mariguela T.C., Oliveira C. (2009). New species of *Moenkhausia* Eigenmann, 1903 (Characiformes: Characidae) with comments on the *Moenkhausia oligolepis* species complex. *Neotropical Ichthyology*, 7(2): 161-168.
- Bragança P.H.N., Ottoni F.P., Rangel-Pereira F.S. (2015). *Hyphessobrycon ellisae*, a new species from northeastern Brazil (Teleostei: Characidae). *Ichthyological Exploration of Freshwaters*, 26(3): 255-262.
- Costa W.J.E.M. (1994). Description of two new species of the genus *Moenkhausia* (Characiformes: Characidae) from the central Brazil. *Zoologischer Anzeiger*, 232(1-2): 21-29.
- Dagosta F.C.P., Marinho M.M.F., Benine R. (2015). A new species of *Moenkhausia* Eigenmann (Characiformes: Characidae) from the upper rio Juruena basin, Central Brazil. *Zootaxa*, 4032: 417-425.
- Eigenmann C.H. (1903). New genera of South American fresh-water fishes, and new names for old genera. *Smithsonian Miscellaneous Collections*, 45: 144-148.
- Eigenmann C.H. (1917). The American Characidae (Part 1). *Memoirs Museum of Comparative Zoology*, 43: 1-102.
- Eschmeyer W.N., Fong J.D. (2016). Species of Fishes by family/subfamily. Available from: <http://research.calacademy.org/research/ichthyology/catalog/SpeciesByFamily.asp>. Retrieved 14/04/2016.
- Fink W.L., Weitzman S.H. (1974). The so-called Cheirodontin fishes of Central America with descriptions of two new species (Pisces: Characidae). *Smithsonian Contributions to Zoology*, 172: 1-46.
- Froese R., Pauly D. (2016). FishBase. World Wide Web electronic publication. Available from: <http://www.fishbase.org>. Retrieved 19/04/16.
- Günther A. (1864). Catalogue of the fishes in the British Museum. Catalogue of the Physostomi, containing the families Siluridae, Characinidae, Haplochitonidae, Sternoptychidae, Scopelidae, Stomiatidae in the collection of the British Museum. *Cat. Fishes*. V.5, 455p.
- Lima F.C.T., Malabarba L.R., Buckup P.A., da Silva J.F.P., Vari R.P., Harold A., Benine R.C., Oyakawa O.T., Pavanelli C.S., Menezes N.A., Lucena C.A.S., Reis R.E., Langeani F., Casatti L., Bertaco V.A., Moreira C.R., Lucinda P.H.F. (2003). *Genera Incertae Sedis* in Characidae. Pp. 106-169. In: R.E. Reis, S.O. Kullander, C.J. Ferraris Jr. (Eds.). *Check List of the Freshwater fishes of South and Central America*. Edipucrs, Porto Alegre, 729 p.
- Lima F.C.T., Britski H.A., Machado F.A. (2007). A new *Moenkhausia* (Characiformes: Characidae) from central Brazil, with comments on the area relationship between the upper rio Tapajós and upper rio Paraguai systems. *Aqua, International Journal of Ichthyology*, 13(2): 45-54.
- Lima F.C.T., Toledo-Piza M. (2001). New Species of *Moenkhausia* (Characiformes: Characidae) from the Rio Negro of Brazil. *Copeia*, 4: 1058-1063.
- Lima A.S. (2013). Análise geomorfológica da bacia hidrográfica do rio Mearim-MA a partir do quadro geológico regional. Tese de doutorado não publicada, Universidade Federal de Minas Gerais, Belo Horizonte. 142 p.
- Lima F.C.T., Pires T.H.S., Ohara W.M., Jerep F.C., Carvalho F.R., Marinho M.M.F., Zuanon J. (2013). Characidae. In: L.J.G. Torrente-Vilara, W.M. Ohara, T.H.S. Pires, J. Zuanon, C.R.C. Doria (Eds.). *Peixes do rio Madeira*. Vol. I, São Paulo, Diaeto. pp: 213-395.
- Menezes N.A., Weitzman S.H. (1990). Two new species of *Mimagoniates* (Teleostei: Characidae: Glandulocaudinae), their phylogeny and biogeography and a key to the glandulocaudin fishes of Brazil and Paraguay. *Proceedings of the Biological Society of Washington*, 103: 380-426.
- Ohara W.M., Marinho M.M.F. (2016). A new species of *Moenkhausia* Eigenmann (Characiformes: Characidae) from the upper rio Machado at Chapada dos Parecis, rio Madeira basin, Brazil. *Neotropical Ichthyology*, 14(1): e150041.
- Petrolli M.G., Benine R.C. (2015). Description of three new species of *Moenkhausia* (Teleostei, Characiformes, Characidae) with the definition of the *Moenkhausia jamesi* species complex. *Zootaxa*, 3986(4): 401-420.
- Planquette P., Keith P., Le Bail P.Y. (1996). *Atlas des poissons d'eau douce de Guyane* (Tome 1). Muséum National d'Historie Naturelle, Ministère de l'Environnement, Paris. 1-429.
- Sousa L.M., Netto-Ferreira A.L., Birindelli J.L.O. (2010). Two new species of *Moenkhausia* Eigenmann

(Characiformes: Characidae) from Serra do Cachimbo, Pará, northern Brazil. Neotropical Ichthyology, 8: 255-264.

Taylor W.R., VanDyke G.C. (1985). Revised procedures for staining and clearing small fishes and other vertebrates for bone and cartilage study. Cybium, 9: 107-119.

Weitzman S.H., Malabarba L.R. (1999). Systematics of *Spintherobolus* (Teleostei: Characidae: Cheirodontinae) from eastern Brazil. Ichthyological Exploration of Freshwaters, 10(1): 1-43.