



## BIOMEDICAL SCIENCES

# Occurrence of *Characidium xavante* (Characiformes: Crenuchidae) in the Tapajós River basin and comments about the conservation status of the species

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**Abstract:** *Characidium xavante* was described from two tributaries of the Culuene River drainage, in the upper Xingu River basin. New samplings recorded the species for streams from the Kaaiapó River drainage (Teles Pires River drainage, upper Tapajós River basin) with additional specimens also recorded in the Xingu River basin, Paranatinga municipality, Mato Grosso State, Brazil. The new records represent an extension of the geographical distribution of the species, that from now on fits in a pattern of distribution known to be shared with other ca. 20 species of fishes. We suggest that *Characidium xavante* could be classified as Least Concern (LC), according to the International Union for Conservation of Nature Standards and Petitions Committee (IUCN).

**Key words:** Characidiinae, IUCN, new record, Xingu River.

## INTRODUCTION

*Characidium xavante* Graça, Pavanelli & Buckup, 2008 was described based on 156 specimens from two streams of the Culuene River drainage, upper Xingu River basin. The species can be recognized among congeners by a combination of a high number of dark vertical bars on its body (12-18), each bar having the width of a scale; by the absence of an adipose fin; presence of an incomplete lateral line (6-8 perforated scales); 10 scales around caudal peduncle; and by the presence of a dark blotch on the caudal peduncle (Graça et al. 2008). Citations of the species remains restricted to the Culuene River drainage in the upper Xingu River basin (Dagosta & de Pinna 2019, Fricke et al. 2021).

Recent samplings revealed the presence of *Characidium xavante* in the Kaaiapó River drainage (Tapajós River basin) and in the

Capitão Noronha River drainage (Xingu River basin) (Figure 1). All specimens were analyzed comparatively with data of the type specimens Graça et al. (2008) and no differences were found with the original description. Therefore, herein we register the occurrence of *Characidium xavante* to the Tapajós River basin and also expand the geographical distribution within the Xingu River basin. In addition, the conservation status is discussed.

The headwaters of the Kaaiapó and Capitão Noronha River drainages are localized in the region between the mountains of Roncador and Formosa (Mato Grosso State, Brazil), draining, respectively, to the upper Teles Pires River drainage (upper Tapajós River basin) and Ronuro River drainage (upper Xingu River basin). Four streams of the Kaaiapó River drainage and three streams of the Capitão Noronha River drainage were sampled (Figure 2; Table 1).

Captured specimens were anesthetized using eugenol (Fernandes et al. 2017), and fixed in 10% formalin solution. Posteriorly, some specimens were preserved in 70% alcohol and deposited in the fish collection of the Federal University of Mato Grosso, Cuiabá, Mato Grosso State, Brazil (CPUFMT 6365, 1, 26.0 mm SL; CPUFMT 6366, 20, 22.0-31.0 mm SL; CPUFMT 6367, 22, 19.0-29.0 mm SL; CPUFMT 6368, 17, 17.0-32.0 mm SL; CPUFMT 6909, 3, 20.0-23.4; CPUFMT 6911, 10, 20.2-33.4; CPUFMT 6912, 3, 20.1-23.5; Table 1). For now, *Characidium xavante* was recording in seven new sites, four in the upper Tapajós River basin and three in the upper Xingu River basin (Figure 2).

The Tapajós-Juruena and Xingu River basins were defined as distinct freshwater ecoregions based on qualitative assessments of species similarity/dissimilarity (Abell et al. 2008). However, Buckup et al. (2011) treated these areas as a single ecoregion based on the distributional pattern of ichthyofauna by sharing 155 fish species. Dagosta & de Pinna (2019) mentioned ca. 20 fish species shared exclusively between Tapajós and Xingu River basins. Despite these findings, neither Buckup et al. (2011) nor Dagosta & de Pinna (2019) mentioned any species of *Characidium* shared by the Xingu and Tapajós River basins. The unique congener known to occur in the Xingu and Tapajós River basins is *Characidium nana* Mendonça & Netto-Ferreira, 2015 (Mendonça & Netto-Ferreira 2015), but both species apparently does not occur syntopically.

Recent advances in the knowledge of the geographical distribution of Amazonian fish have allowed for more refined biogeographic testing (Dagosta & de Pinna 2018). The new records of *Characidium xavante* in the upper sections of the Tapajós and Xingu River basins are in accordance with the pattern of distribution named “Tapajós and Xingu” by Dagosta & de Pinna (2019), along with other 20 species shared exclusively by the two river

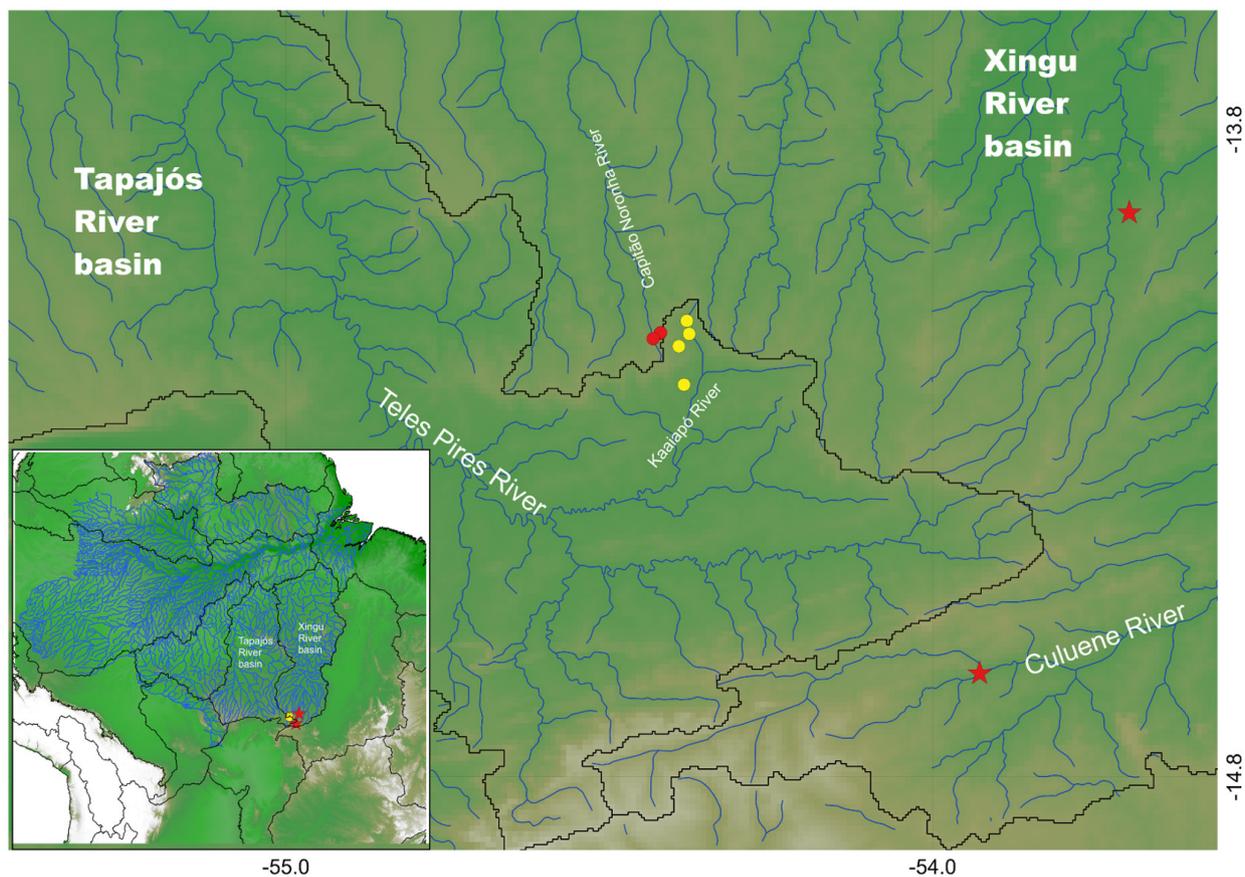
basins. According to Dagosta & de Pinna (2017), Amazonian drainages from the Brazilian Shield, such as the Tapajós and Xingu River basins, do not form a monophyletic group by themselves, once their upper portions share a number of species not shared with the remaining portions of each of the basins. This fact is explained as a possible result of a high degree of historic hybridity, due to the biotic dispersion between their headwaters, consequently enabling the possibility of ichthyofaunistic sharing (Dagosta & de Pinna 2017). The distribution of *Characidium xavante* revealed herein possibly represents one more case of dispersion between nearby headwaters of the Xingu and Tapajós basins. Based solely on the information available in the original description and following the IUCN criteria, *Characidium xavante* was categorized as Data Deficient (DD) (ICMBio 2018). However, the expansion of the distribution proposed herein and the increase in the number of localities where the species can be found suggest a reassessment of the conservation status of *C. xavante*. With the recent collection of 40 specimens from the upper Teles Pires, Capitão Noronha, and 276 specimens from the upper Culuene River basins, the Occurrence Extension calculation is larger than the 20,000 km<sup>2</sup> required by the IUCN to list a species in a threat category. Additionally, although the sites of occurrence of *Characidium xavante* are inserted in a matrix dominated by pastures and agriculture, their riparian forest is relatively preserved. Therefore at this moment, we are not conceited to incite any threat or locations that render the species at risk of extinction. Thus, we suggest that *Characidium xavante* could be categorized as Least Concern (LC), according to the International Union for Conservation of Nature Standards and Petitions Committee (IUCN 2019).



**Figure 1.** *Characidium xavante*, CPUFMT 6368, 31.0 mm SL, unnamed stream from the Kaaiapó River drainage, tributary of the Teles Pires River, upper Tapajós River basin, Paranatinga municipality, Mato Grosso State, Brazil.

**Table I.** Geographical distribution and number of individuals (N) of *Characidium xavante* sampled at new sites in the upper Tapajós and upper Xingu River basins, all from Paranatinga municipality, Mato Grosso State, Brazil. All collected by Hugmar Pains da Silva (UFMT).

Site	Coordinate	Locality	Date	Voucher	N
1	14°5'43.04"S 54°22'48.01"W	Unnamed stream from the Kaaiapó River drainage, Tapajós River basin	September 9, 2019	CPUFMT 6909	3
2	14°6'56.14"S 54°22'34.91"W	Unnamed stream from the Kaaiapó River drainage, Tapajós River basin	September 9, 2019	CPUFMT 6365	1
3	14°7'22.67"S 54°25'55.89"W	Unnamed stream from the Capitão Noronha River drainage, Xingu River basin	September 8, 2019	CPUFMT 6911	10
4	14°8'4.50"S 54°23'32.02"W	Unnamed stream from the Kaaiapó River drainage, Tapajós River basin	September 9, 2019	CPUFMT 6912	3
5	14°11'38.38"S 54°23'4.11"W	Unnamed stream from the Kaaiapó River drainage, Tapajós River basin	September 9, 2019	CPUFMT 6368	17
6	14°6'53.21"S 54°25'17.09"W	Unnamed stream from the Capitão Noronha River drainage, Xingu River basin	September 8, 2019	CPUFMT 6367	22
7	14°6'48.87"S 54°25'13.24"W	Unnamed stream from the Capitão Noronha River drainage, Xingu River basin	September 8, 2019	CPUFMT 6366	20



**Figure 2.** Geographical distribution of *Characidium xavante* in the Amazon basin in Brazil. Red stars = type specimens; Red dots = new records in the Capitão Noronha River drainage, Ronuro River drainage, upper Xingu River basin; Yellow dots = new records in the Keaiapó River drainage, Teles Pires River, upper Tapajós River basin.

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Weferson J. da Graça study design, data analysis and interpretation, manuscript composition, overall and final revision; Hugmar P. da Silva fish collection, data analysis and interpretation, manuscript composition; Augusto Frota data analysis and interpretation, manuscript composition; Izaias M. Fernandes study design, data analysis and interpretation, manuscript composition; and Rodrigo P. Barcelos data analysis and interpretation, manuscript composition.

