

# First records of *Microdesmus longipinnis* (Weymouth, 1910) (Actinopteri, Gobiiformes, Microdesmidae) for the Brazilian semiarid coast

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**Abstract.** *Microdesmus longipinnis* was documented for the first time in the Brazilian semiarid coast. Previous occurrences of this species ranged from the Western Atlantic, North Carolina (USA) to the southeastern coast of Brazil, and there is still a substantial gap between these regions. Specimens were collected in the Curu and Pacoti estuaries, Ceará state, Brazil. These new records of *M. longipinnis* can help to fill a portion of the geographical distribution gap for species inhabiting estuaries under the semiarid climate of Brazil.

**Keywords.** Pink wormfish; New occurrence; Distribution gap; Northeastern Brazil.

## INTRODUCTION

The genus *Microdesmus* Günther, 1864 currently comprises sixteen marine species, with five of them occurring in the Western Atlantic: *Microdesmus bahianus* Dawson, 1973, *M. carri* Gilbert, 1966, *M. lanceolatus* Dawson, 1962, *M. longipinnis* (Weymouth, 1910), and *M. luscus* Dawson, 1977 (Fricke *et al.*, 2023; Froese & Pauly, 2023). These are elongated benthic fish commonly referred as wormfish, given their burrowing behavior on sandy or muddy substrates, despite also occurring in rocky bottoms (Eskinazi, 1972; Thomson *et al.*, 2000; Severi *et al.*, 2008).

Three species of the genus have occurrences in Brazil. *Microdesmus bahianus* has been recorded from Pará to Espírito Santo states (CRIA, 2023), but its distribution also encompasses Panama and Martinique (Froese & Pauly, 2023; GBIF, 2023). *Microdesmus carri* distribution encompasses southeastern Mexico to Panama (GBIF, 2023), but was record from Bahia (CRIA, 2023). *Microdesmus longipinnis* distribution ranges from North Carolina (USA) and the northern Gulf of Mexico to the Cayman Islands (Froese & Pauly, 2023; GBIF, 2023),

with records in Brazil from Pernambuco to Espírito Santo states (CRIA, 2023). Consequently, *M. longipinnis* has a significant occurrence gap, including the Brazilian semiarid coast (BSC, from Maranhão to Rio Grande do Norte states) (Soares *et al.*, 2021). BSC constitutes a distinctive coastal band directly influenced by the dry semiarid climate in low latitude and altitude, where annual precipitation can be less than 800 mm (Alvares *et al.*, 2014). The short-term rainfall season promotes hypersaline conditions in BSC estuaries (Valentim *et al.*, 2018; Soares *et al.*, 2021; Gurgel-Lourenço *et al.*, 2023a).

Estuarine ecosystems of the BSC region have been historically underexplored for scientific purposes. Only recently the ichthyofauna was more comprehensively characterized (Gurgel-Lourenço *et al.*, 2023a, b). The present paper reports the first records of *M. longipinnis* in the Brazilian semiarid coast.

## MATERIAL AND METHODS

Pink wormfish were collected in daytime expeditions in July and August 2023 in the Curu estuary

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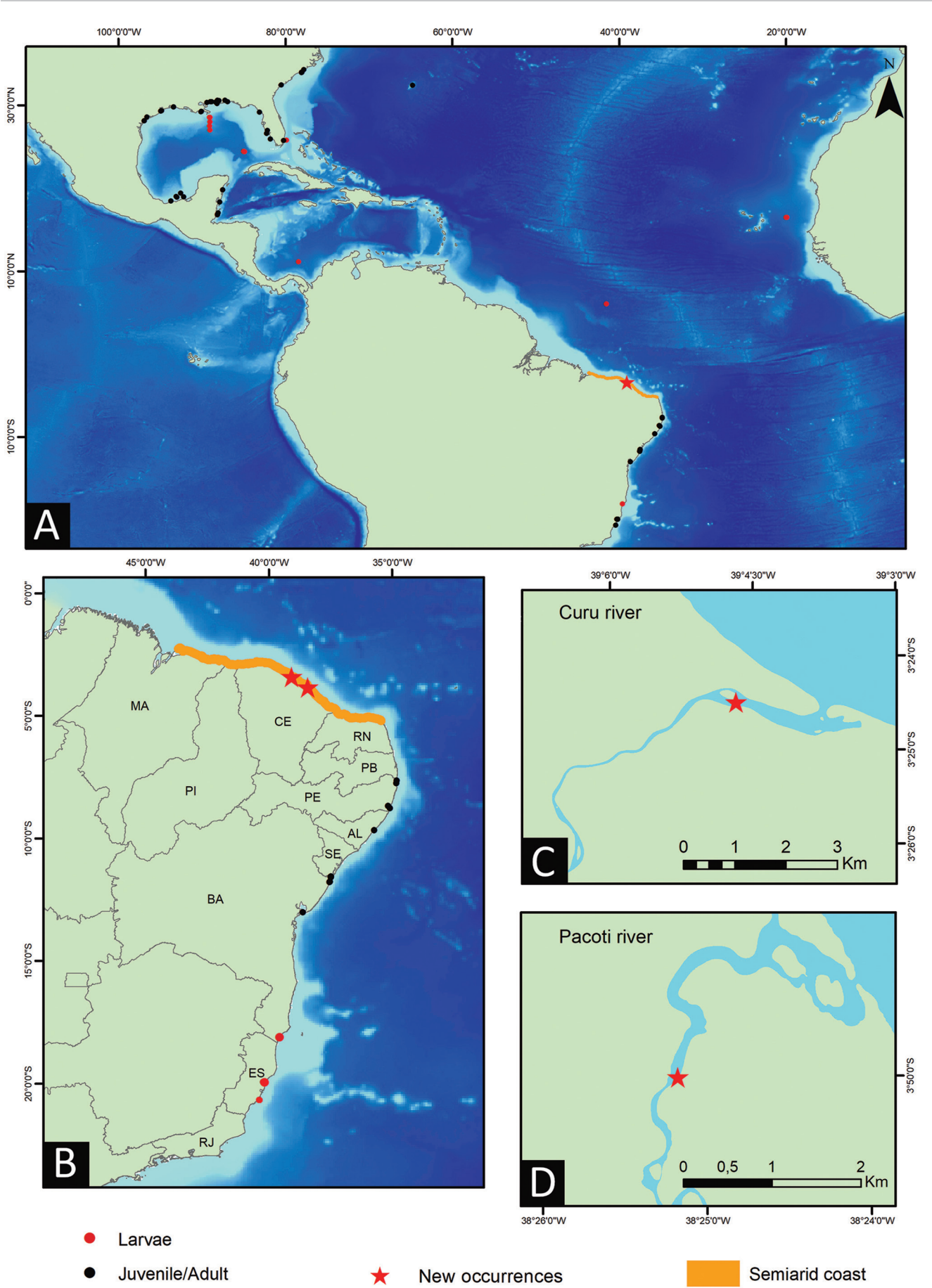
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**Figure 1.** Occurrences of *Microdesmus longipinnis* (black circles: juveniles/adults; red circles: larvae; red stars: new records of juvenile/adults in the Brazilian semiarid coast). Geographical distribution of *Microdesmus longipinnis* in the Western Atlantic based on GBIF and *speciesLink* databases (A). Emphasis on the new occurrences in the Brazilian semiarid coast (B). Recording points in the Curu (C) and Pacoti (D) rivers, Ceará state, Brazil.



(03°24'28.83"S, 39°04'40.77"W) and September 2023 in the Pacoti estuary (03°49'56.37"S, 38°25'11.07"W) (Fig. 1). Pink wormfish were found buried in the mud within the emerged region of a tidal flat in the Curu river, about 2 km from the sea, with an adjacent water body salinity of 34 ppt (Fig. 2). The specimens were collected accidentally during active sampling of benthic invertebrates with a shovel, for a period of 30 minutes, by two collectors. In the Pacoti river, the specimens were simply spot when the team moved through the environment. Fish were swimming in a temporary shallow pool at low tide, with a salinity of 34, on a sandbar about 3.5 km from the sea and were collect with plastic bags. Specimens were collect under licenses 82791-1 and 87874-1 issued by the Chico Mendes Institute for Biodiversity Conservation (ICMBio/SISBIO) and euthanized with clove oil. They were fixed in 10% formalin, preserved in 70% ethanol, and deposited in the Dias da Rocha Ichthyological Collection at the Federal University of Ceará (Fortaleza, Brazil) under voucher numbers CIDRO-B-663, 664, and 665. Body characteristics were assessed following Dawson (1974, 1977, 1979) and Harrison *et al.* (2003): 19-22 dorsal-fin spines; 62-75 dorsal-fin elements; 37-48 anal-fin elements; anal-fin origin between verticals from dorsal-fin elements 25-31.

## RESULTS

Fish captured (four in each river) ranged from 27.2 to 170.0 mm standard length (SL). Live specimens displayed

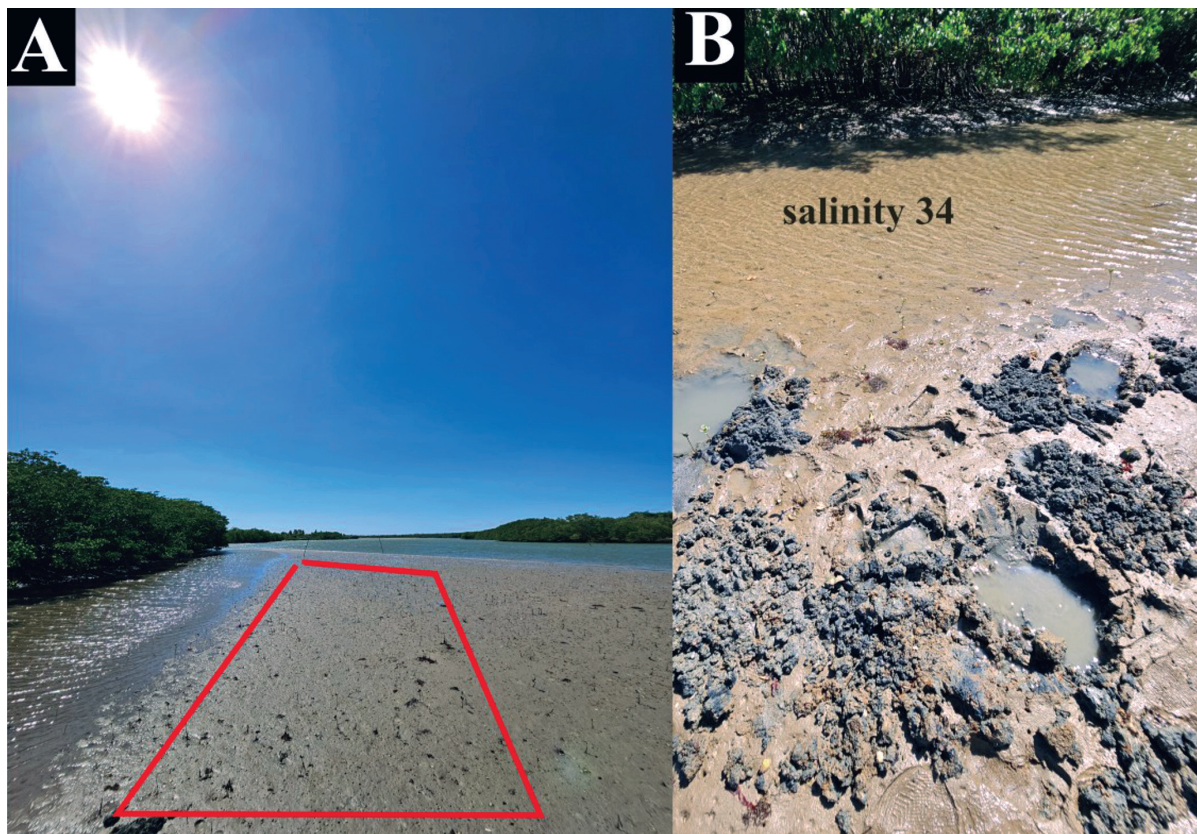
**Table 1.** Characteristics of *M. longipinnis* specimens collected in the Curu (CU) and Pacoti (PA) estuaries, Semiarid Coast of Brazil. SL: standard length; BD: body depth as a percentage of SL; PR: number of pectoral-fin rays; PV: number of pelvic-fin spine and rays; DS: number of dorsal-fin spines; DR: number of dorsal-fin rays; TDE: total number of dorsal-fin elements; TAE: total number of anal-fin elements; AO: anal-fin origin between verticals from dorsal-fin elements 28-31. \*Ovate female.

Specimen	SL (mm)	BD (%)	PR	PV	DS	DR	TDE	TAE	AO	Voucher
1 – CU	170.0	3.5	13	1,3	21	54	75	47	29/30	CIDRO-B-663
2 – CU	155.7	4.3	13	1,3	20	53	73	42	28/29	CIDRO-B-664
3 – CU	101.4	4.1	13	1,3	20	53	73	44	29/30	CIDRO-B-664
4 – CU	88.3	3.7	13	1,3	21	47	68	44	28/29	CIDRO-B-664
5 – PA	68.0	4.2	13	1,3	22	50	72	41	29/30	CIDRO-B-665
6 – PA*	55.1	4.9	13	1,3	22	51	73	47	28/29	CIDRO-B-665
7 – PA*	51.3	5.8	13	1,3	23	53	76	48	29/30	CIDRO-B-665
8 – PA	27.2	5.7	13	1,3	23	54	77	48	30/31	CIDRO-B-665

a reddish coloration with melanophores scattered across flanks and dorsum. Along with other body traits (Table 1), all the mentioned characteristics allowed the identification as *M. longipinnis* (Fig. 3). Two mature females were collect in the Pacoti estuary (51.3 and 55.1 mm SL) (Table 1; Fig. 3C).

## DISCUSSION

The present study provides the first records of *M. longipinnis* within a substantial gap in its distribution and



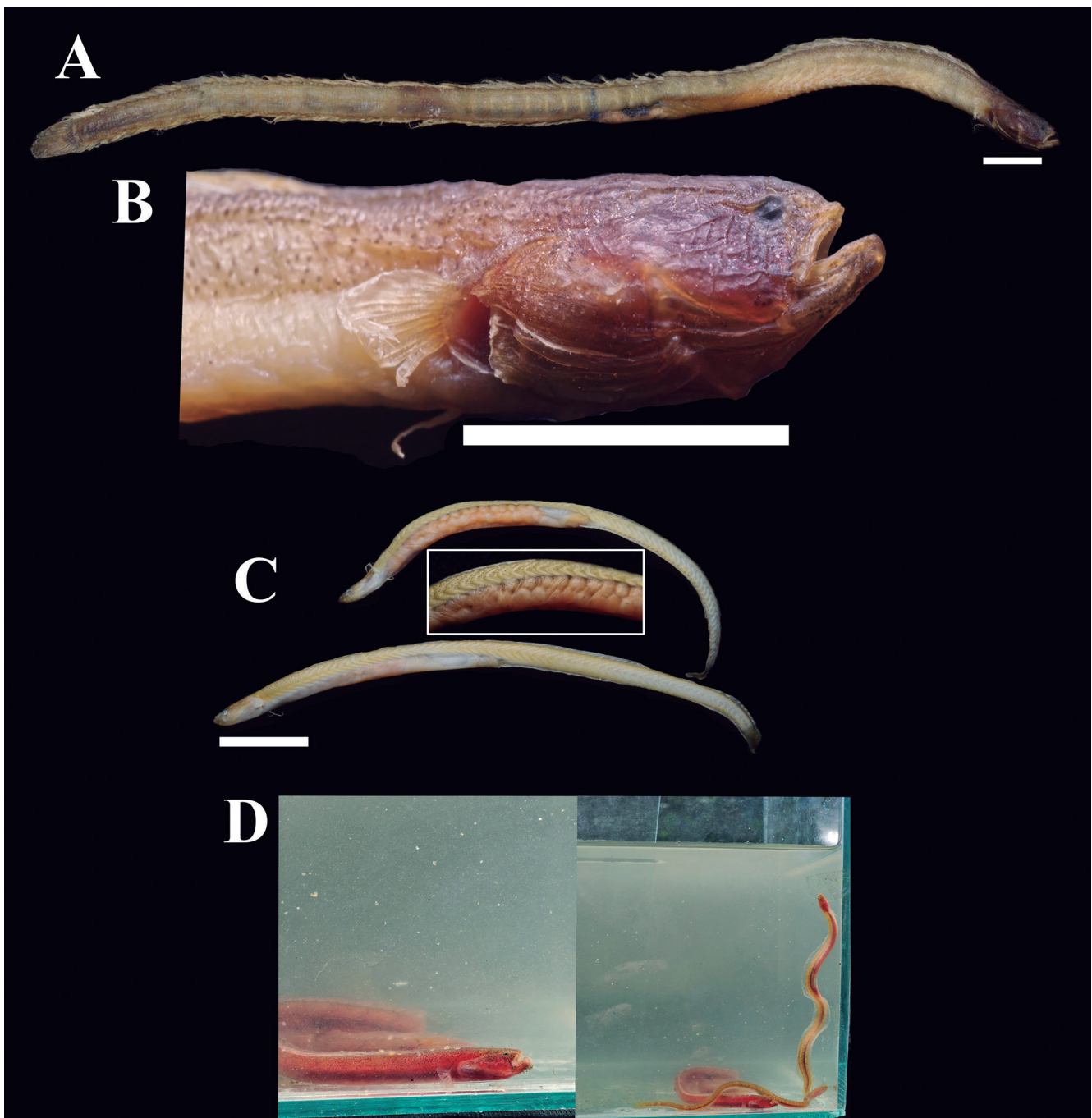
**Figure 2.** Location of *M. longipinnis* occurrence in the Curu river, Ceará state, Brazil. Highlighted in red the tidal flat where individuals were found buried in the substrate (A). Example of substrate excavation for specimens capture and the salinity of the adjacent water body (B).

the first records in the Brazilian semiarid coast. Costa *et al.* (2020) reported *Microdesmus* sp. larvae in the waters adjacent to the coast of Ceará, Brazil, without specifying the species that could be *M. bahianus* or *M. carri*. Furthermore, prior to this study, there were no records of juveniles or adults of *M. longipinnis* in this region, thus contributing to filling a geographical gap in the species distribution and enhancing our understanding of the ichthyofauna inhabiting the estuaries of this coastal band.

Previous records of *M. longipinnis* in the Global Biodiversity Information (GBIF, 2023) totalize 151 occurrences, predominantly from the United States (80.1%). Other reports are from Caribbean locations (14.5%, including Belize, Bermuda, Trinidad and Tobago, Mexico, and

Panama), two from Cape Verde, one from Senegal, and five from Brazil (Pernambuco to Bahia states). In the *speciesLink* database (CRIA, 2023) there are 20 documented occurrences of the species in Brazil, distributed from Pernambuco (four records), Alagoas (one), Bahia (seven), and Espírito Santo (eight). Additionally, Souza-Conceição *et al.* (2013) reported larvae of the species in an estuary in the southern state of Santa Catarina, Brazil.

Previous fish sampling campaigns employing beach seining and cast netting at the same sampling points of the present paper did not register the pink wormfish (Gurgel-Lourenço *et al.*, 2023b and references). In fact, the first record happened accidentally during a benthic invertebrate sampling in the Curu estuary using a shov-



**Figure 3.** *Microdesmus longipinnis* collected in the Curu and Pacoti rivers, Brazilian semiarid coast, Northeastern Brazil. Whole specimen (170 mm SL) (A), close-up of the head (B), mature gonads of ovate females (C) and live specimens (D). White bar scale: 10 mm.



el. The rarity of the species in past samplings can be explained by its burrowing behavior, slender morphotype, and nocturnal habits (Eskinazi, 1972; Dawson, 1990; Rosa et al., 1997; Thomson et al., 2000). Dawson (1990) reported individuals swimming near the surface at night, and Rosa et al. (1997) collected a *Microdesmus* sp. larva during nighttime sampling. Thus, nighttime sampling could be an approach to better characterize the BSC ichthyofauna. Our investigation indicates that other sampling techniques involving the exploration of emerged substrates are essential for a comprehensive understanding of estuarine ichthyofauna. This consideration is especially pertinent due to the need to understand the potential impacts of global changes on estuarine fauna, in light of temperature and salinity fluctuations.

Several new fish species have been described from the Western Atlantic in recent years (Marceniuk et al., 2019, 2020; Carvalho et al., 2020; Chao et al., 2021; Araujo et al., 2023). While the systematics advance through the molecular techniques and integrative taxonomy (Araujo et al., 2022), first records of *M. longipinnis* from the BSC properly cataloged in an official collection can serve for possible studies that review the taxonomic identity in the region, which could generate new descriptions of distinct species from the Caribbean, separated by the Amazon-Orinoco Barrier. However, the significant gap in the distribution of the pink wormfish may be currently explained by the scarcity of studies in the region. The record in the present study represents another location where the species can be collected to test the hypotheses raised here.

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