

## Pisces, Gobiiformes, Gobiidae, *Ctenogobius boleosoma* (Jordan & Gilbert, 1882): first record for Maranhão state, northeastern Brazil

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**Abstract.** This study presents *Ctenogobius boleosoma* from the São Luis estuarine region, the first record from the state of Maranhão, northeastern Brazil. This species may have gone unrecorded from Maranhão due to the difficulties in collecting gobies by the usual sampling methods, such as gill nets, corking nets, and longlines, even when using nets with an appropriate mesh size.

**Key words.** Canal Raposa; São Luis; estuary; ichthyology; Gobiionellinae; Darter Goby

Gobiidae is one of the richest vertebrate families, comprising about 1840 valid species in 5 subfamilies (ESCHMEYER et al. 2017). Gobiids are widely distributed throughout the tropical and subtropical regions and occur in marine, estuarine and freshwater environments (NELSON et al. 2016, FROESE & PAULY 2017). The family has extensive recent literature on its taxonomy, phylogeny, and composition, although its taxonomy is not yet stabilized (see NELSON et al. 2016).

The genus *Ctenogobius* Gill, 1858 currently comprises 23 valid species, but only 6 of them are recorded for Brazil: *Ctenogobius boleosoma* (Jordan & Gilbert, 1882), *C. saepepallens* (Gilbert & Randall, 1968), *C. shufeldti* (Jordan & Eigenmann, 1887), *C. smaragdus* (Valenciennes, 1837), *C. stigmaticus* (Poey, 1860) and *Ctenogobius thovopsis* (Pezold & Gilbert, 1987) (FROESE & PAULY 2017). According to PEZOLD (2004), the lack of lobes or gill rakers on the anterior surface of the first epibranchial is the main synapomorphy of *Ctenogobius*. In addition, the genus can be diagnosed by the presence of a short lateral cephalic canal with only 2 pores; 4 or 5 gill

rakers on posterior surface of first gill arch and gill rakers short and triangle shaped; an abbreviated oculoscapular canal that terminates above the preoperculum with an 'A'BCDFH' pattern; a simple or triangulate fourth neural spine; and a diagonal posterior opercular neuromast row (SMITH 1997, MURDY & HOESE 2002, ROSS & RHODE 2004, PEZOLD 2004).

*Ctenogobius boleosoma* is distributed from North Carolina (USA), the Bahamas, and the northern Gulf of Mexico to the estuarine region of Rio Grande do Sul (Brazil). This species is known to occur in the following Brazilian states: Bahia, Ceará, Espírito Santo, Pará, Paraíba, Paraná, Pernambuco, Rio de Janeiro, Rio Grande do Norte, Rio Grande do Sul, São Paulo, and Santa Catarina (ROSA et al. 1997; ARAÚJO et al. 2000; BEZERRIL & COSTA 2001; JOYEUX et al. 2004; CLAUZET et al. 2005; SARPEDONTI et al. 2008; REIS-FILHO et al. 2010; PAIVA AND ARAUJO 2010; SPACH et al. 2010; MENEZES 2011; PASSOS et al. 2012; MACHADO 2013; COSTA et al. 2013; LIMA-FILHO et al. 2014; OLIVEIRA & PESSANHA 2014; SARMENTO-SOARES & MARTINS-PINHEIRO 2014; BORGIO et al. 2015; MOLITZAS 2015; LAMAS et al. 2016; PITRY et al. 2016; FROESE & PAULY 2017; ESCHMEYER et al. 2017). The present study presents the first record of *C. boleosoma* from the state of Maranhão, northeastern Brazil.

One specimen of *C. boleosoma* (Fig. 1) was collected at the estuary of the Canal Raposa, Raposa Municipality, north end of Ilha de São Luis, Maranhão (02°25'22" S, 044°05'21" W; leg. P. Brito and A. Ramos, 6 June 2013) (Figs. 2, 3). The water temperature was 27.9 °C; dissolved oxygen, 10.4 mg/L; water salinity, 37‰; and water depth, approximately 50 cm.

The collection was conducted during the daytime period,



**Figure 1.** *Ctenogobius boleosoma*: CICCAA 00202, 38.3 mm SL; estuary of Canal Raposa, Ilha de São Luis, Maranhão, northeastern Brazil.



**Figure 2.** Records of *Ctenogobius boleosoma* in Brazil: red state – Maranhão state, the new documented state where the species occurs; green states – Brazilian states where the species was previously recorded according to the literature cited below; red circle – new record for the Canal Raposa, Maranhão state; and green circles – records based on the literature (ROSA et al. 1997, ARAÚJO et al. 2000, BIZERRIL & COSTA 2001, JOYEUX et al. 2004, CLAUZET et al. 2005, SARPEDONTI et al. 2008, REIS-FILHO et al. 2010, PAIVA & ARAÚJO 2010, SPACH et al. 2010, PASSOS et al. 2012, MACHADO 2013, COSTA et al. 2013, LIMA-FILHO et al. 2014, OLIVEIRA & PESSANHA 2014, SARMENTO-SOARES & MARTINS-PINHEIRO 2014, BORGIO et al. 2015, MOLITZAS 2015, LAMAS et al. 2016, PETRY et al. 2016, FROESE & PAULY 2017, ESCHMEYER et al. 2017).

using a manual trail-net (20 m long × 5 m high; mesh size, 5 mm). This net was trailed by 2 collectors, each one at one extremity of the net, through salt marshes of *Spartina alterniflora* Lousiel (Fig. 3). The collected specimen was fixed in 10% formalin immediately after capture and after 15 days transferred to 70% alcohol for preservation. This material is deposited in the Coleção Ictiológica do Centro de Ciências Agrárias e Ambientais da Universidade Federal do Maranhão (CICCAA 00202). Sampling was conducted under permit

("Autorização para atividade com finalidades científicas", No. 30346-1). Counts and measurements were made according to MURDY & HOESE (2002), and the classification follows NELSON et al. (2016).

The species was identified as *C. boleosoma* (Fig. 1) based on the presence of the following diagnostic characters according to the literature (MURDY & HOESE 2002; PEZOLD 2004; FROESE & PAULY 2017): predorsal area naked; no circular spots on sides of head; 5 round or elongate dark blotches along



**Figure 3.** Collecting site of *Ctenogobius boleosoma*; estuary of Canal Raposa, Ilha de São Luis, Maranhão state, northeastern Brazil.

midside; 31 scales on lateral row; canine teeth smaller than those of its congeners; and diagonal marks extending upward to form V-shapes. Some meristic and morphometric data of the examined specimen of *C. boleosoma* are presented in Table 1.

The new record is the first documented occurrence of *C. boleosoma* in the estuary of Ilha de São Luis (Figs. 2, 3), as well as the first known occurrence from Maranhão, and helps fill in the gaps in the geographical distribution of this goby species. This new record is significant due to the relative scarcity of knowledge of the ichthyofauna of Maranhão to other states in southern and southeastern Brazil. Most of the ichthyofaunal inventories in Maranhão, including those in marine and estuarine habitats, have used gill nets, corking nets, and longlines, which usually focus on larger species that are important for fisheries but not efficient ways to collect small specimens (e.g., MARTINS-JURAS et al. 1987; ROCHA AND ROSA 2001; ARAUJO-JUNIOR et al. 2005; NETA & CASTRO 2008; NUNES et al. 2011).

**Table 1.** Meristic data of *Ctenogobius boleosoma* from the estuary of Canal Raposa, Ilha de São Luis, Maranhão state, northeastern Brazil (CICCAA 00202).

Character	
Standard length (SL)	<b>38.3 mm</b>
Percents of standard length	
Head length (HL)	24.7
Body	12.3
Head depth	13.5
Predorsal distance	34.5
Prepectoral distance	21.7
Prepelvic distance	19.6
Preanal distance	48.8
Percents of head length	
Horizontal eye diameter	17.2
Counts	
Second dorsal-fin total elements	11
Pectoral-fin total elements	16
Anal-fin total elements	13
scales on lateral row	31

Thus, *C. boleosoma* could have gone unrecorded from Maranhão because of this species' small size (maximum total length, 7.5 cm; FROESE & PAULY 2017). However, even with nets with an appropriate mesh size, it is often difficult to collect *C. boleosoma* over muddy bottoms because this species burrows into the bottom to avoid capture. Rotenone remains the best method to assess the diversity and quantify abundance of gobies, and the hesitation to allow use it is major reason why we have gaps in our knowledge of goby distributions.

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