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## Artigo

Submetido 18 jan 2023

Aceito 01 fev 2023

Publicado 08 fev 2023

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ISSN

2357-8068

URL

[www.actapescanews.com](http://www.actapescanews.com)

DOI da Revista

10.46732/actafish

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# NOTES ON SOME ALPHEID SHRIMPS FROM THE COAST OF PARÁ STATE: NEW RECORD AND FILLING DISTRIBUTION GAPS

## Notas sobre camarões-estalo do litoral do Estado do Pará: Novo registro e consolidando lacunas de distribuição

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### ABSTRACT

The objective of this study is to report new occurrence of snapping shrimps *Alpheus chacei* Carvacho, 1979 on the coast of Pará State, Northern region of Brazil, contribute to the knowledge of their zoogeography, since there was a divergence between their upper limit of distribution. *A. chacei* was recorded in the Urindeua river in August and December of 2013. It is verified that, after a bibliographic review, records of 14 alpheídeos in the Pará State, corresponding to three genera: *Alpheus* (seven spp.), *Synalpheus* Spence Bate, 1888 (six spp.) and *Automate* Man, 1888 (one sp.). This study contributes to the knowledge of the decapod fauna occurring in the state, but there is a need for more samplings in order to register new species, given the high diversity of (unregistered) species of the Alpheidae family worldwide.

**Keywords:** Crustacea, Caridea, snapping shrimps.

### RESUMO

O objetivo deste trabalho é relatar novas ocorrências de camarões-de-estalo *Alpheus chacei* Carvacho, 1979 no litoral do estado do Pará, região Norte do Brasil, e contribuir para o conhecimento de sua zoogeografia, visto que na literatura há divergência entre seu limite de distribuição. *A. chacei* foi registrado no rio Urindeua nos meses de agosto e dezembro de 2013. Verifica-se, após revisão bibliográfica, registros de 14 alfeídeos no estado do Pará, correspondendo a três gêneros: *Alpheus* (sete spp.), *Synalpheus* Spence Bate, 1888 (seis spp.) e *Automate* Man, 1888 (um spp.). Este estudo contribui para o conhecimento da fauna de decápodes ocorrentes no estado, mas há necessidade de mais amostragens para o registro de novas espécies, dada a alta diversidade de espécies (não descritas) da família Alpheidae em todo o mundo.

**Palavras-chave:** Crustacea, Caridea, camarões-de-estalo.

## INTRODUCTION

The Alpheidae family is composed of marine and sweet benthic shrimp, distributed in the tropical and subtropical regions, however there are records of species in temperate waters (Almeida et al., 2016; Martínez-Iglesias et al., 1996-1997; Soledade & Almeida, 2013). It stands out within the Caridea infraorder due to its high diversity, containing more than 600 species, distributed in 47 genus (Anker et al., 2006; De Grave & Fransen, 2011; Poore, 2004; Williams et al., 2001). In Brazilian waters, including the continental margin and oceanic Islands, 81 species are currently registered, distributed in 10 genus (Almeida et al., 2016). However, despite recent descriptions of taxa (Almeida et al., 2012; Almeida et al., 2013b; Anker, 2012; Anker et al., 2006; Anker et al., 2007; Cunha et al., 2015; Oliveira et al., 2015; Soledade & Almeida, 2013; Wicksten & McClure, 2002), it is verified that the diversity of alpheid with occurrence in Brazil is far from being known (Almeida et al., 2016; Cunha et al., 2015; Soledade & Almeida, 2013).

The alpheid inhabit frequent coastal environments up to 100 meters deep (Almeida et al., 2016; Anker et al., 2006; Soledade & Almeida, 2013), however, species occur in deeper environments (Almeida et al., 2016; Christoffersen, 1979; Soledade & Almeida, 2013). They live in the most diverse habitats, between consolidated sediments (for example, under rocks or within holes along the rocky shores) and not consolidated (for example, sand-mud substrates, estuaries or mangrove areas), usually in association with other organisms, such as: sponges, anemones, cnidarians, molluscs, echinoderms, annelids, fish and other crustaceans (Almeida et al., 2012; Anker et al., 2006; Kim & Abele, 1988; Oliveira et al., 2015; Poore, 2004; Williams et al., 2001).

The morphology of the alpheid prawns is very peculiar, resembling usually a lobster (Anker et al., 2006). Another characteristic is the reduced face, being absent in some species, with the frequently reduced or vestigial eyes and covered by the anterior margin of the carapace (Almeida et al., 2016). They present asymmetry in the first pair of pereopods, with one more developed than the other, being able to emit a popping sound (Lohse et al., 2001; Poore, 2004; Spence & Knowlton, 2008), which characterizes a common name for the family, snapper prawns. Despite this common name attributed to the alpheid, only the genus *Alpheus* Fabricius, 1798, *Metalpheus* Coutière, 1908, *Pomagnathus* Chace, 1937, *Racilius* Paul'son, 1875, and *Synalpheus* Spence Bate, 1888 are able to reproduce this sound (Almeida et al., 2016).

The *Alpheus* genus features more than 300 species worldwide (Almeida et al., 2016; Cunha et al., 2015; Kim & Abele, 1988; Soledade & Almeida, 2013; Williams et al., 2001), with 52 species recorded in the Western Atlantic (Almeida et al., 2013a; Anker, 2012), and of these, 34 species occurring in Brazilian waters (Almeida et al., 2016; Anker et al., 2016; Soledade & Almeida, 2013). Williams et al. (2001), presents *Alpheus* phylogenies and suggests that specialized ecological requirements and modified morphologies evolved independently several times, favor the wide distribution of specimens throughout the globe, as well as symbiotic associations.

In this study, we report the occurrence of *Alpheus chacei* Carvacho, 1979 in the Urindeua River, contributing to the knowledge of its geographical distribution and contributes to the knowledge of the decapod fauna occurring in the Pará State.

## MATERIALS AND METHODS

The 13 specimens were collected in association with mangrove oyster farming *Crassostrea tulipa* (Lamarck, 1819), on the Urindeua River (0°41'50.39"S, 47°22'12.45"O, Figure 2), Eastern Amazon, in the north of Brazil, in August and December 2013. The individuals presented a cephalothorax length of 16,42±5,24 mm (Mean±SD) and total biomass of 2,83 g. The collected material is deposited in the Museu de Zoologia da Universidade Federal Rural da Amazônia, with the registration voucher MZUFRA Crus185 and in the Museum für Naturkunde - Leibniz Institute for Evolution and Biodiversity Science in Berlin, with the registration voucher ZMB Crust 29697 (available on link <http://zmb.sesam.senckenberg.de>).

## RESULT AND DISCUSSION

### *Systematics*

Order Decapoda Latreille, 1802

Suborder Pleocyemata Burkenroad, 1963

Infraorder Caridea Dana, 1852

Superfamily Alpheoidea Rafinesque, 1815

Family Alpheidae Rafinesque, 1815

Genus *Alpheus* Fabricius, 1798

*Alpheus chacei* Carvacho, 1979 (Figure 1)

### *Synonyms*

*Alpheus maxilliplanus* Christoffersen, 1979

### *Remarks*

The process of identification of alpheid shrimp is difficult due to the taxonomic and morphological complexity of the family, as well as the lack of keys for identification and illustrations of the diagnostic characters for regional faunas and the constant loss of biological material (for example, the larger ones) field sampling (Poore, 2004; Soledade & Almeida, 2013; Spence & Knowlton, 2008). Currently there are aldehyde identification keys (Almeida et al., 2013a; Soledade & Almeida, 2013), which provide images of specimens of alpheid, allowing the correct taxonomy through the colors of the specimens, for example (Spence & Knowlton, 2008). The illustrations of *A. chacei* were available only Christoffersen (1979), when describing *A. maxilliplanus*, but recently Soledade and Almeida (2013) photographic records that aid in identification.



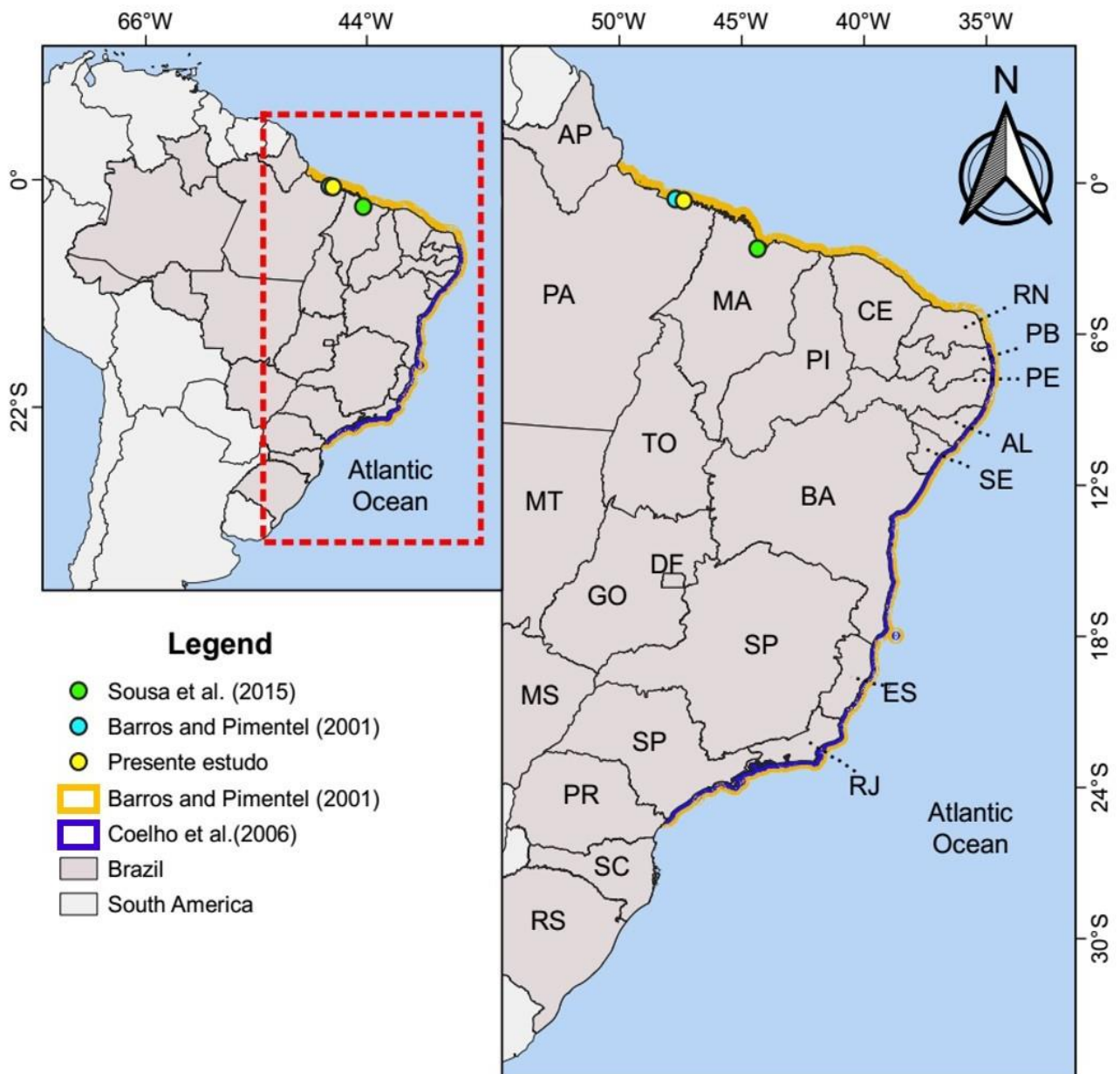
**Figure 1.** *Alpheus chacei* collected at Urindeua River, Pará State, north of Brazil. Scale: 5 mm.

### *Habitat*

*A. chacei* inhabits exclusively in estuarine areas that present mud bottoms, between 18.67 and 31° C of surface water temperature, salinity of 24 to 31 and depth of up to two meters (Almeida et al., 2012; Christoffersen, 1979; Martínez-Iglesias et al., 1996-1997). There is a record of *A. chacei* in association with among decapod crustaceans s (Almeida et al., 2012; Oliveira et al., 2015), however, it is the first record associated with bivalve mollusks.

## Distribution

The distribution of *A. chacei* is restricted to the Western Atlantic (Anker et al., 2016), with occurrences in the French Antilles (Guadeloupe) (Christoffersen, 1998; Martínez-Iglesias et al., 1996-1997) it's in Brazil. However, in Brazilian waters there are two aspects of its distribution, Barros and Pimentel (2001) records the occurrence of *A. chacei* in its survey of decapod crustaceans on the coast of the Pará State, but without specifying the place of occurrence, since Coelho et al. (2006), studying the density and diversity of marine and estuarine prawns of the North and Northeast, did not record *A. chacei*, and cites the distribution of this species from Paraíba, as well as other authors (Almeida et al., 2012; Christoffersen, 1979, 1998; Martínez-Iglesias et al., 1996-1997). Recently Sousa et al. (2015) recorded the first occurrence of *A. chacei* in the Buenos Aires igarapé, in Maranhão. Other records of *A. chacei* in Brazilian waters are: Paraíba (Christoffersen, 1979, 1998; Coelho et al., 2006), Pernambuco (Coelho et al., 2006; Souza et al., 2011), Sergipe (Christoffersen, 1998; Coelho et al., 2006; Melo et al., 2003), Bahia (Almeida et al., 2012; Almeida et al., 2013a; Almeida et al., 2013b; Christoffersen, 1979), Rio de Janeiro (Christoffersen, 1998) and São Paulo (Christoffersen, 1979, 1998) (Figure 2).



**Figure 2.** Map of the *Alpheus chacei* registry location on the coast of Pará State and distribution of the species on the Brazilian coast

After literature review and access to the digital platforms of the Brazilian Biodiversity Information System - SiBBr (Sistema de Informação sobre a Biodiversidade Brasileira – SiBBr) (<http://gbif.sibbr.gov.br/>) and SpeciesLink (<http://splink.org.br/>), it was verified the occurrence of 14 alpheid in the Pará State, corresponding to three genus: *Alpheus* (seven spp.), *Synalpheus* Spence Bate, 1888 (six spp.) and *Automate* de Man, 1888 (one sp.).

Among the alpheid with identified occurrence are: *Alpheus estuariensis* Christoffersen, 1984, in the estuary of Marapanim (Marques, 2009) and in the Furo Grande, Caeté Bay, Bragança (Pires et al., 2008), *Alpheus heterochaelis* Say, 1818 on the Camará River, Marapanim and Fortaleza Island (Barros & Pimentel, 2001; Christoffersen, 1998; Coelho et al., 2006; Coelho & Ramos, 1972) and *Alpheus pontederiae* de Rochebrune, 1883, in the estuary of Augusto Corrêa (Barros & Pimentel, 2001; Christoffersen, 1998; Coelho et al., 2006). Other alpheid occurring in the Pará State, but without specific place are: *Alpheus macrocheles* (Hailstone, 1835) (Barros & Pimentel, 2001; Christoffersen, 1998; Coelho et al., 2006; Ramos-Porto et al., 1996), *Alpheus intrinsecus* Spence Bate, 1888 (Coelho & Ramos, 1972), *Alpheus normanni* Kingsley, 1878, *Synalpheus brooksi* Coutière, 1909 (Barros & Pimentel, 2001; Christoffersen, 1998; Ramos-Porto et al., 1996), *Synalpheus apioceros* Coutière, 1909 (Barros & Pimentel, 2001; Christoffersen, 1998; Coelho et al., 2006), *Synalpheus minus* (Say, 1818), *Synalpheus townsendi* Coutière, 1909 (Ramos-Porto et al., 1996), *Synalpheus agelas* Pequegnat & Heard, 1979, *Synalpheus curacaoensis* Schmitt, 1924 and *Automate evermanni* Rathbun, 1901 (Coelho et al., 2006).

## CONCLUSION

It should be emphasized that the importance of studies on the composition of marine aquatic invertebrates, with emphasis on crustaceans. Here, a new occurrence of the alpheid shrimp *Alpheus chacei* Carvacho, 1979 on the coast of Pará State and a brief characterization of the alpheid shrimp occurring in the state was presented. In this context, the present study contributes to the knowledge of the decapod fauna occurring in the state, but there is a need for more sampling to register new species, given the high diversity of (unrecorded) species of the Alpheidae family all over the world.

## ACKNOWLEDGMENTS

To the Coordination of Superior Level Staff Improvement (“Coordenação de Aperfeiçoamento de Pessoal de Nível Superior – CAPES”) for the research grant given to the author’s R.A. das Chagas (2019/20), T.C.C. de Carvalho, W.J.P. dos Santos, M.R.F. Barros. We thank Dr. Arthur Anker for the guidance in the taxonomic identification of the specimen of this study.

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