

Tuleariocaris neglecta Chace, 1969 (Crustacea: Caridea: Palaemonidae) associated with the sea urchin *Astropyga magnifica* Clark, 1934 (Echinoidea: Diadematidae) in the Alcatraz Archipelago, southeastern Brazil

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Abstract. The caridean shrimp *Tuleariocaris neglecta* Chace, 1969, is reported from the Alcatraz Archipelago (24°S, off the coast of southeastern Brazil) in association with the sea urchin *Astropyga magnifica* Clark, 1934. This finding significantly increases the known range of this species from 20°S to 24°S. An overview of the species in *Tuleariocaris* with their respective associated host sea urchins is provided.

Keywords. Alcatraz Archipelago; São Paulo; Coastal and oceanic islands; Marine Conservation Unit.

INTRODUCTION

Tuleariocaris neglecta Chace, 1969, is a highly specialised, echinoid-associated caridean shrimp. It typically associates with the sea urchin *Diadema antillarum* (Philippi, 1845) under natural conditions (Chace, 1969; Criales, 1984). In controlled experiments, *D. antillarum* is preferred when the shrimp is given a choice among several urchin species (Castro, 1974; Hayes *et al.*, 2016). In the remote oceanic island of Trindade, southwestern Atlantic off Espírito Santo, Brazil, *T. neglecta* was found in association with *Diadema ascensionis* Mortensen, 1909 (Tavares *et al.*, 2017, as *D. antillarum*) (Fig. 1A). Occasionally, *T. neglecta* naturally associates with *Astropyga magnifica* Clark, 1934, *Arbacia lixula* (Linnaeus, 1758), and *Echinometra lucunter* (Linnaeus, 1758) (Castro, 1974; Criales, 1984; González Pérez, 1995; Giribet & Lemer, 2014).

Tuleariocaris neglecta, whose type locality is Barbados, has long been known from various other localities of the tropical northwestern Atlantic (Florida, Honduras, Panama, Colombia, Puerto Rico, Dominica, Curaçao, Gulf of Mexico) (Chace, 1969; Castro, 1974; Criales, 1984; Giribet & Lemer, 2014; De Grave & Anker, 2017) and the eastern Atlantic (Madeira, Canary Islands, São Tomé and Príncipe, Cape Verde Islands) (Wirtz, 1988; González Pérez, 1995; Wirtz, 2004; Wirtz & d'Ude-

kem d'Acoz, 2008; González, 2018). Recently, *T. neglecta* was also recorded from the southwestern Atlantic (Brazil: Salvador, Bahia, and Trindade off Espírito Santo, about 13°S and 20°S, respectively) (Tavares *et al.*, 2017). Herein, we report a female of *T. neglecta* from the Alcatraz Archipelago (24°S) off São Paulo, southeastern Brazil, significantly extending the previously known distribution range of the species further south. This opportunity is taken to provide a brief overview of the four known species of *Tuleariocaris*, with their respective associated host sea urchins.

In the material examined, the measurements correspond to the postorbital carapace length (pcl, in mm). The specimens from Alcatraz and Trindade Islands are deposited in the collection of the Museu de Zoologia, Universidade de São Paulo, São Paulo, Brazil (MZUSP).

RESULTS AND DISCUSSION

Family Palaemonidae Rafinesque, 1815

Tuleariocaris neglecta Chace, 1969 (Fig. 1A-C)

Material examined: 1 female, pcl 27 mm (MZUSP 41663), Trindade Island, Ilha da Racha, 20°30'26.5"S,

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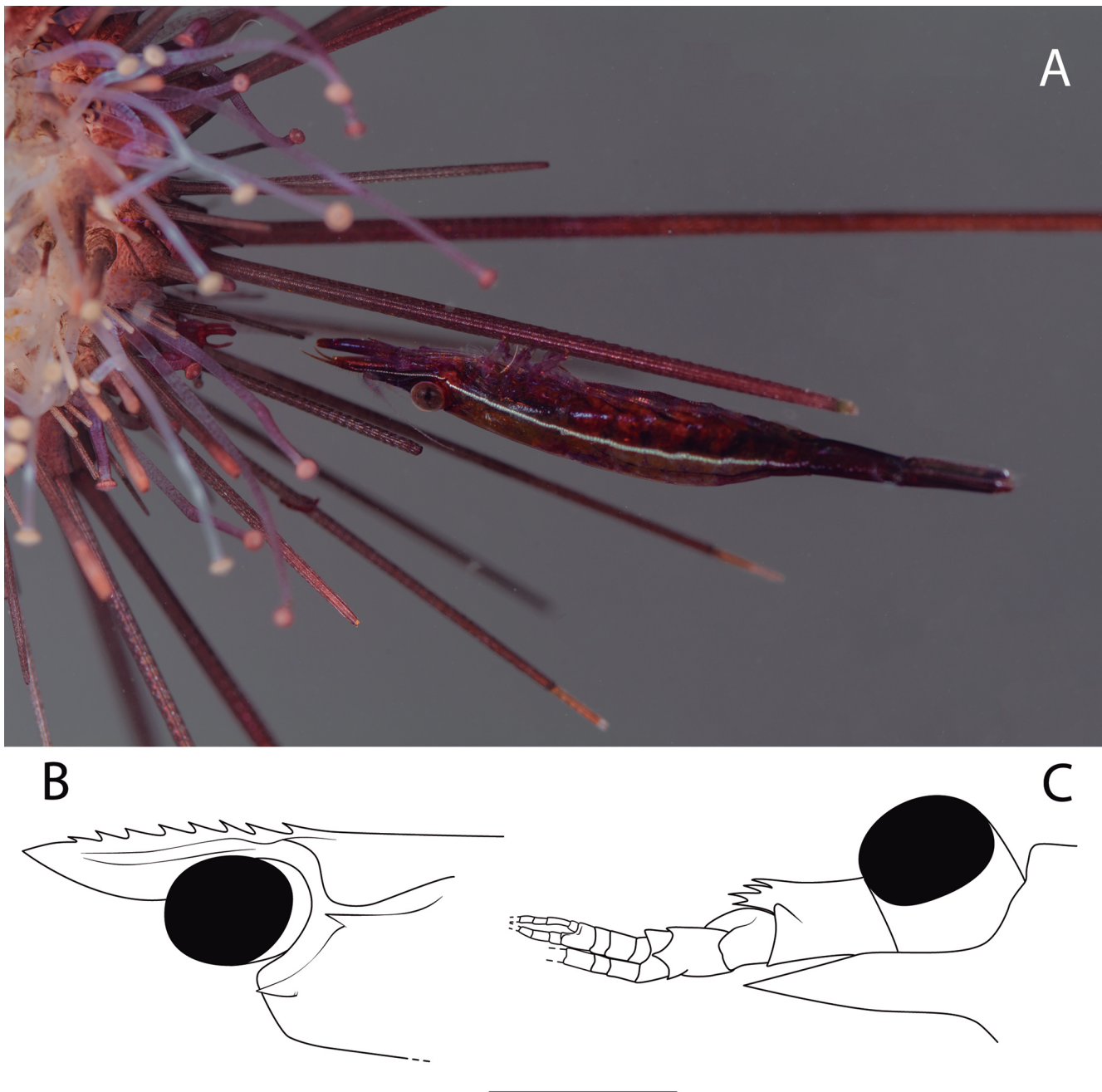


Figure 1. (A-C) *Tuleariocaris neglecta* Chace, 1969. (A) female, pcl 27 mm (MZUSP 41663). Trindade Island, associated with the sea urchin *Diadema ascensionis* Mortensen, 1909. Photograph by André Pol. B, C Female, pcl 25 mm (MZUSP 42515). Alcatraz Archipelago, off São Paulo, associated with *Astropyga magnifica* Clark, 1934. (B, C) Anterior part of body, lateral and dorsal views, respectively. Setae and dorso-rostral teeth omitted. Dorsal left side not represented in (C). Scales: B, C, 1 mm.

29°20'48.0"W, J.B. Mendonça coll., 30.vii.2018, 23 m, associated with *Diadema ascensionis*. 1 female, pcl 25 mm (MZUSP 42515), Alcatraz Archipelago, 24°5'53.10"S, 45°41'18.56"W, V.J.G. Fernandes coll., 15.xii.2019, 7.5 m, associated with *Astropyga magnifica* Clark.

Remarks: The single female of *T. neglecta* from Alcatraz agrees well with the descriptions and illustrations of Chace (1969), and also displays all distinguishing characters of the species provided by Berggren (1994). The dorsal surface of the rostrum of the Alcatraz female is armed with 8 dorsal teeth (range: 7-11 teeth); the ventral surface of the rostrum is unarmed, whereas it usually bears 1 to 4 minute teeth (Chace, 1969); and the distolateral lobe

of the first antennular article is armed with 4 well-developed spines (range: 2-4) (Fig. 1B, C).

In Alcatraz, *T. neglecta* was found in association with the sea urchin *Astropyga magnifica*, although *D. antillarum*, its more typical host, is also known to occur in this archipelago (A. Migotto *pers. comm.*). In Trindade, males and females (several ovigerous) were all found in association with *D. ascensionis* (Martins *et al.*, 2016; Tavares *et al.*, 2017) (Table 1), whereas the urchin host for the single male and the two ovigerous females from Salvador was not recorded.

AUTHORS' CONTRIBUTIONS: **MT:** Conceptualization; **JBM:** Data curation; **MT, JBM:** Writing – review & editing.

Table 1. Overview of the shrimp species of the genus *Tuleariocaris* with their respective host sea urchins. ¹ Indo-Pacific; ² Amphi-Atlantic; ³ Indo-West Pacific.

Shrimp species	Echinoid-associated host	References
<i>Tuleariocaris holthuisi</i> ¹ Hipeau-Jacquotte, 1965	<i>Diadema mexicanum</i> Agassiz, 1863 <i>Astropyga radiata</i> (Leske, 1778); <i>Echinothrix diadema</i> (Linnaeus, 1758); <i>Stomopneustes variolaris</i> (Lamarck, 1816); <i>Echinometra mathaei</i> (De Blainville, 1825)	Wicksten & Hernández, 2000; Marin & Anker, 2009 Bruce, 1982 Bruce, 1982 Hipeau-Jacquotte, 1965; Bruce, 1982 Hipeau-Jacquotte, 1965; Bruce, 1982
<i>Tuleariocaris neglecta</i> ² Chace, 1969	<i>Diadema antillarum</i> (Philippi, 1845) <i>D. ascensionis</i> Mortensen, 1909 <i>Astropyga magnifica</i> Clark, 1934 <i>Echinometra lucunter</i> (Linnaeus, 1758) <i>Arbacia lixula</i> (Linnaeus, 1758)	Chace, 1969; Criales, 1984; Wirtz, 1988; González Pérez, 1995; Wirtz, 2004; Wirtz & d'Udekem d'Acoz, 2008; Tavares et al., 2017 Tavares et al., 2017 (as <i>D. antillarum</i>) Castro, 1974; this report Giribet & Lemer, 2014 González Pérez, 1995
<i>Tuleariocaris sarec</i> ³ Berggren, 1994	<i>Echinometra mathaei</i> (De Blainville, 1825)	Berggren, 1994
<i>Tuleariocaris zanzibarica</i> ³ Bruce, 1967	<i>Astropyga radiata</i> (Leske, 1778) <i>Diadema savignyi</i> (Audoin, 1809) <i>Diadema setosum</i> (Leske, 1778) <i>Echinothrix calamaris</i> (Pallas, 1774) <i>Echinothrix diadema</i> (Linnaeus, 1758)	Bruce, 1967; 1982 Bruce, 1982 Bruce, 1967; 1982 Bruce, 1982 Bruce, 1982

All authors actively participated in the discussion of the results, they reviewed and approved the final version of the paper.

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