

## ***RECORD OF THE PEA-CRAB *Calyptraeotheres garthi* (FENUCCI, 1975) (BRACHYURA, PINNOTHERIDAE) IN TROPICAL ATLANTIC OCEAN***

Registro do caranguejo *Calyptraeotheres garthi* (Fenucci, 1975)  
(Brachyura, Pinnotheridae) no Oceano Atlântico tropical

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### **ABSTRACT**

This study reports the occurrence of the pea-crab *Calyptraeotheres garthi* (Fenucci, 1975) for the State of Ceará, Northeastern Brazil. The crab was found associated to the calyptraeid limpet *Crepidula plana* (Say, 1822) in a *Voluta ebraea* (Linnaeus, 1758) shell occupied by the hermit crab *Petrochirus diogenes* (Linnaeus, 1758). This record represents the northernmost occurrence for the species in the Atlantic Ocean and the second for Brazilian waters. This new record increases the distribution area of *C. garthi* in about 3520 km. Taxonomic and biogeographic remarks, ecological notes and an updated distribution map are provided for this species.

**Keywords:** Pinnotherids, gastropods, tropical beach, symbiotic crustaceans.

### **RESUMO**

*Este estudo relata a ocorrência do caranguejo *Calyptraeotheres garthi* (Fenucci, 1975) no estado do Ceará, Nordeste do Brasil. O caranguejo foi encontrado associado ao molusco caliptraeídeo *Crepidula plana* (Say, 1822), em uma concha de *Voluta ebraea* (Linnaeus, 1758) ocupada pelo ermitão *Petrochirus diogenes* (Linnaeus, 1758). Essa ocorrência representa o registro mais ao norte para essa espécie no Oceano Atlântico e o segundo para as águas brasileiras. Essa nova ocorrência*

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aumenta a área de distribuição de *C. garthi* em cerca de 3.520 km. Observações taxonômicas e biogeográficas, notas ecológicas e um mapa de distribuição atualizado são fornecidos para essa espécie.

**Palavras-chave:** *Pinoterídeos, gastrópodos, praia tropical, crustáceos simbiontes.*

The pea-crabs belongs to the family Pinnotheridae De Haan, 1833 and are well known as commensals or parasites of marine invertebrates as bivalves, gastropods, equinoderms, polychaetes, equiurid worms, ascidians or other crustaceans (Schmitt *et al.*, 1973; Baeza, 2015). The genus *Calyptraeotheres* E. Campos, 1990 is composed by six species commonly found associated to limpets of the superfamily Calyptraeioidea (Fenucci, 1975; Campos, 1990, 1999; Martins & D’Incao, 1996; Hernández-Ávila & Campos, 2006; Campos & Hernández-Ávila, 2010; Ayón-Parente & Hendrickx, 2016).

*Calyptraeotheres garthi* (Fenucci, 1975) is distributed in Brazil (state of Rio Grande do Sul) and Argentina and can be found in the mantle of calyptraeid gastropods of the genera *Crepidula* Lamarck, 1799, *Bostrycapulus* Olsson and Harbison, 1953, and *Trochita* Schumacher, 1817, usually associated to shells used by the hermit crab genera *Petrochirus* Stimpson, 1858, and *Dardanus* Paulson, 1875 (Hernández-Ávila & Campos, 2006; Ayón-Parente & Hendrickx, 2016; Boschi, 2016). Taking into consideration that the pinnotherid group is still poorly known in Brazil, especially in the states of northeast (Bezerra *et al.*, 2006), the aim of this contribution is to provide the northernmost record of *C. garthi* in Atlantic Ocean, particularly in warm waters from the Northeastern Brazil.

Sampling was carried out on November 2010 at the Pacheco beach, municipality of Caucaia, state of Ceará, Brazil (3°41’11.66” S 38°37’58.78” W). This area is an open beach characterized by predominance of ferruginous sandstone reefs with predominance of macro algae and a rich marine invertebrate fauna, including mainly crustaceans and mollusks (Matthews-Cascon *et al.*, 2005). One shell of *Voluta ebraea* Linnaeus, 1758, occupied by the hermit crab *Petrochirus diogenes* (Linnaeus, 1758) was obtained by a fisherman with a otter trawl in the subtidal zone. The specimen was brought to the laboratory and examined. A specimen of the limpet *Crepidula plana* Say, 1822 (Figure 1A, B, C) was removed from the *V. ebraea* shell and two pea-crabs were found below *Crepidula*’s shell (Figure 1B). The host and your symbiont crabs were photographed and posteriorly cryo-anesthetized and fixed in 70% ethanol.

The specimens of the snail and crabs were deposited respectively in the Malacological Collection Professor Henry Ramos Matthews (Série B) of the Departamento de Biologia of Universidade Federal do Ceará (CMPHRM-B 4319) and in the Carcinological Colletion of the Departamento de Zoologia, Instituto de Biociências, Universidade Federal do Rio Grande do Sul, Porto Alegre, Rio Grande do Sul, Brazil (UFRGS). Crabs were measured for the carapace width (CW) with aid of a vernier caliper (0.01 mm of accuracy).

#### SYSTEMATICS

**Infraorder Brachyura Latreille, 1802**

**Family Pinnotheridae De Haan, 1833**

**Genus *Calyptraeotheres* E. Campos, 1990**

***Calyptraeotheres garthi* (Fenucci, 1975)**

(Figures 1-2)

*Pinnotheres politus* (not Smith, 1869). – Fenucci, 1971, p. 355-367.

*Pinnotheres garthi* Fenucci, 1975, p. 167, 169-171, 178, figs. 1A-B, 3D, I; Campos, 1990, p. 365; Martins & D’Incao, 1996, p. 11-13, fig. 7, 8, 14F.

*Calyptraeotheres garthi*. – Campos, 1999, p. 537-538, figs. 1 E-F, 2B. – Bezerra *et al.*, 2006, p. 1043 [Appendix]. – Ayón-Parente & Hendrickx, 2016, p. 94 [key]. – Boschi, 2016, p. 117, 118, 120, tables 1 and 2.

**Examined material:** Brazil, state of Ceará, Caucaia, Praia do Pacheco (3°41’11.66” S 38°37’58.78” W), fisherman coll., November 2010, one male (CW 1.1 mm) and one female (CW 1.3 mm) (UFRGS 6848).

**Diagnosis.** Martins & D’Incao (1996).

**Distribution.** Southwest Atlantic: Brazil, Ceará (this contribution), Rio Grande do Sul; Argentina, Mar Del Plata, Necochea, Golfo de San Matias (Campos, 1999; Bezerra *et al.*, 2006) (Figure 2).

Figure 1 – *Calyptraeotheres garthi* (Fenucci, 1975) symbiosis. A – *Voluta ebraea* Linnaeus, 1758, shell occupied by the hermit crab *Petrochirus diogenes* (Linnaeus, 1758) and with the association of the limpet *Crepidula plana* Say, 1822 (white arrow); B – *C. plana* ventral view with two symbiotic pea-crabs; C – *C. plana* dorsal view; D – Male of *C. garthi* dorsal view; E – Female of *C. garthi* dorsal view. Scale bars: A – C = 1 cm; D, E = 1 mm.

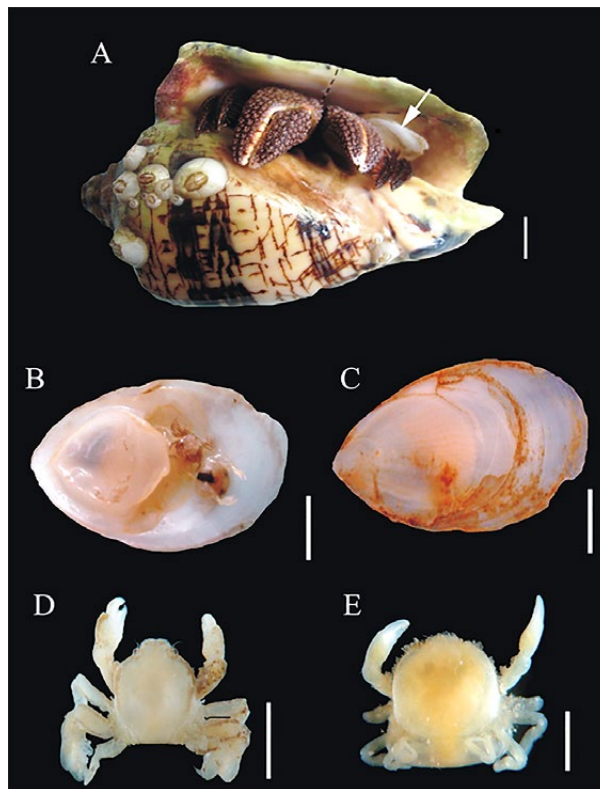


Figure 2 - Updated distribution map of *Calyptraeotheres garthi* (Fenucci, 1975). Black circles indicate old records and red circle indicates new record. Abbreviations: CE - Ceará; RS - Rio Grande do Sul.



## ECOLOGICAL NOTES

In Argentina, *C. garthi* is ubiquitous and it already recorded in almost all naturally occurring calyptraeid species, e.g. *Crepidula argentina* Simone, Pastorino & Penchaszadeh, 2000, *C. cachimilla* Cledón, Simone & Penchaszadeh, 2004, *C. plana*, *Bostrycapulus odites* Collin, 2005 and *Trochita pileus* (Lamarck, 1822) (Fenucci, 1975; Ocampo *et al.*, 2012). In Brazil, this species was found associated with the species *C. protea* (d'Orbigny, 1841) in the state of Rio Grande do Sul (Martins & D'Incao, 1996) and with *C. plana* in the state of Ceará (present contribution).

## REMARKS

The genus *Calyptraeotheres* was erected to include the species *Fabia granti* Grassel, 1933, based on the carapace with sharp-edged anterolateral margins and the third maxilliped palp with two articles, carpus longer than propodus and pleon of seven free somites (Campos, 1990). *Calyptraeotheres garthi* (as *Pinnotheres garthi* Fenucci, 1975) was registered in Brazil for the first time by Martins & D'Incao (1996) in the municipality of Rio Grande, state of Rio Grande do Sul.

Three years later, Campos (1999) included *P. garthi* and *P. politus* (Smith, 1869) within *Calyptraeotheres* and improved the genus diagnosis'. Bezerra *et al.*, (2006) provided the first record of Pynnotheridae in the state of Ceará, listing the presence of three species, *Austinixa bragantina* Coelho, 2005; *A. leptodactyla* (Coelho, 1997) and *Zaops ostreum* (Say, 1817).

However, the studies on this family are still very scarce from Brazil. This record represents the northernmost occurrence for the species in the Atlantic Ocean, being the first record of *C. garthi* from Northeastern Brazil and the second for Brazilian waters. This new record increases the distribution area in about 3520 km.

The initial distribution indicated that the species was restricted to cold waters, being a species of the Argentinian Province following the biogeographic classification of Boschi (2000), where the surface temperature ranges from 8° to 23 °C in the south sector (Bueno Aires) and from 12.5° to 25 °C in the northern sector in southern Brazil (Hereu, 1999). However, the present record in tropical waters extends the distribution of the species and includes it as a species occupying also the Brazilian Province, where temperatures vary from 22 °C in the south to 30 °C in the north limits of the Province. According to Boschi (2000), the Argentinian Province can be characterized as a warm temperate province with 330 species, 42 of which are endemic while in the Brazilian Province the estimated number of decapod crustacean species is 572, 64 of which are endemic.

The present record of *C. garthi* in the Brazilian province extends its distribution to both provinces, as other species of Brachyura such as *Apiomithrax violaceus* (A. Milne-Edwards, 1868), *Arenaeus cribrarius* (Lamarck, 1818), among others. The host species *Crepidula plana* also occurs in both provinces (Rios, 2002).

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