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OCCURRENCE OF DEEP-SEA SHRIMP *Heterocarpus inopinatus* TAVARES, 1999 (CRUSTACEA: DECAPODA: CARIDEA) IN POTIGUAR BASIN, NORTHEASTERN BRAZIL

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RESUMO. *Heterocarpus inopinatus* é um membro da família Pandalidae. É uma espécie endêmica para as águas brasileiras o qual é registrado para os estados da Bahia, Espírito Santo e Rio de Janeiro. Neste trabalho, nós reportamos a ocorrência desta espécie para a Bacia Potiguar no nordeste do Brasil. A Bacia Potiguar está situada no extremo Nordeste do Brasil, entre os estados do Ceará (CE) e Rio Grande do Norte (RN) (03/05° S; 38/35° W). As amostragens foram conduzidas como parte do projeto: Avaliação da Biota Bentônica e Planctônica da Bacia Potiguar e Ceará (Bpot), patrocinado pelo Petróleo Brasileiro S/A (Petrobrás). Na campanha foram analisados 19 indivíduos, sendo 10 fêmeas, 8 machos e 1 juvenil, entre as profundidades de 150–982 m. Portanto, este estudo está aumentando a distribuição geográfica e estendendo a distribuição batimétrica da espécie para profundidades mais rasas na região Nordeste do Brasil, preenchendo as lacunas de distribuição no Atlântico Sul.

Palavras-Chave: Distribuição geográfica, Pandalidae, talude continental, novo registro.

ABSTRACT. *Heterocarpus inopinatus* is a member of the family Pandalidae. It is an endemic species from Brazilian' waters which is recorded for states of Bahia, Espírito Santo and Rio de Janeiro. In this paper, we report the occurrence of this species from extreme northeast of Brazil in Potiguar Basin. The Potiguar Basin is situated in the extreme northeast of Brazil, between the states of Ceará (CE) and Rio Grande do Norte (RN) (03/05° S; 38/35° W). Samplings were conducted as part of the project: "Avaliação da Biota Bentônica e Planctônica da Bacia Potiguar e Ceará (Bpot)" sponsored by "Petróleo Brasileiro S/A (Petrobrás)". In the campaign were analyzed 19 individuals, being 10 females, 8 males and 1 juvenile, between the depths of 150–982 m. Therefore, this study is increasing its geographic distribution and thus much extending its bathymetric distribution of the species to shallower depth for the Northeast region of Brazil, filling gaps in the South Atlantic distribution.

Keywords: Geographic distribution, Pandalidae, continental slope, new record.

INTRODUCTION

The family Pandalidae Haworth, 1825 is represented by 23 genera and 197 species worldwild; in Brazilian waters four genera are known to occur: *Pandalus* Leach, 1814; *Heterocarpus* A. Milne-Edwards, 1881; *Plesionika* Spence Bate, 1888, and *Stylopandalus* Coutière, 1905 (Ramos-Porto and Coelho, 1998; Tavares, 1999; Cabral *et al*., 2000; Cardoso and Serejo, 2007; Cardoso, 2009; Rego and Cardoso, 2010). The genus *Heterocarpus* is usually found in mud substrate from tropical oceans under depths varying from 73 to 2.834 m (Crosnier, 1988; 1999; Tavares, 1999; Chace, 1985).

In Brazilian waters five species have been recorded: *Heterocarpus dorsalis* Spence Bate, 1888; *H. ensifer* A. Milne-Edwards, 1881; *H. inopinatus* Tavares, 1999; *H. laevigatus* Spence Bate, 1888 and *H. oryx* A. Milne-Edwards, 1881 (Ramos-Porto and Coelho, 1998; Tavares, 1999; Viana *et al*., 2007; Rego and Cardoso, 2010). This paper reports the geographic distribution of deep-sea shrimp *Heterocarpus inopinatus* in Potiguar Basin located in the Northeastern of Brazil.

MATERIAL AND METHODS

The Potiguar Basin is situated in the extreme northeast of Brazil, between the states of Ceará (CE) and Rio Grande do Norte (RN) (03/05° S; 38/35° W) (Alves-Júnior *et al*., 2016). Samples were collected in two different moments: first on board of the R/V Luke Thomas at station "Arrasto Malha Talude (AR#)" in 2009, and in a second moment by the R/V Seward Johnson at stations referred to "Malha Talude (MT#)" in 2011. Both deployments were conducted as part of the project "Avaliação da Biota Bentônica e Planctônica da Bacia Potiguar e Ceará (Bpot)" sponsored by "Petróleo Brasileiro S/A (Petrobrás)". Bottom trawls using net (otter trawl semi-balloon with 50 mm mesh size and 18 m of mouth opening) were conducted on the continental slope along isobaths of 389–2068 m. Specimens were preserved in 70% ethanol for further analysis.

In the laboratory, crustaceans were sorted and identified to species level by observing the diagnostic morphological characters following Tavares (1999), Cardoso and Serejo (2007) and Rego and Cardoso (2010). All material was deposited in the Carcinological Collection of the "Museu de Oceanografia Prof. Petrônio Alves Coelho (MOUFPE)", at Federal University of Pernambuco in Recife, Brazil. Total length (TL) and carapace length (CL) were measured by using a digital caliper (0.01 mm).

RESULTS

Systematics.
Order Decapoda Latreille, 1802
Infraorder Caridea Dana, 1852
Family Pandalidae Haworth, 1825

Genus *Heterocarpus* A. Milne-Edwards, 1881
Specie *Heterocarpus inopinatus* Tavares, 1999

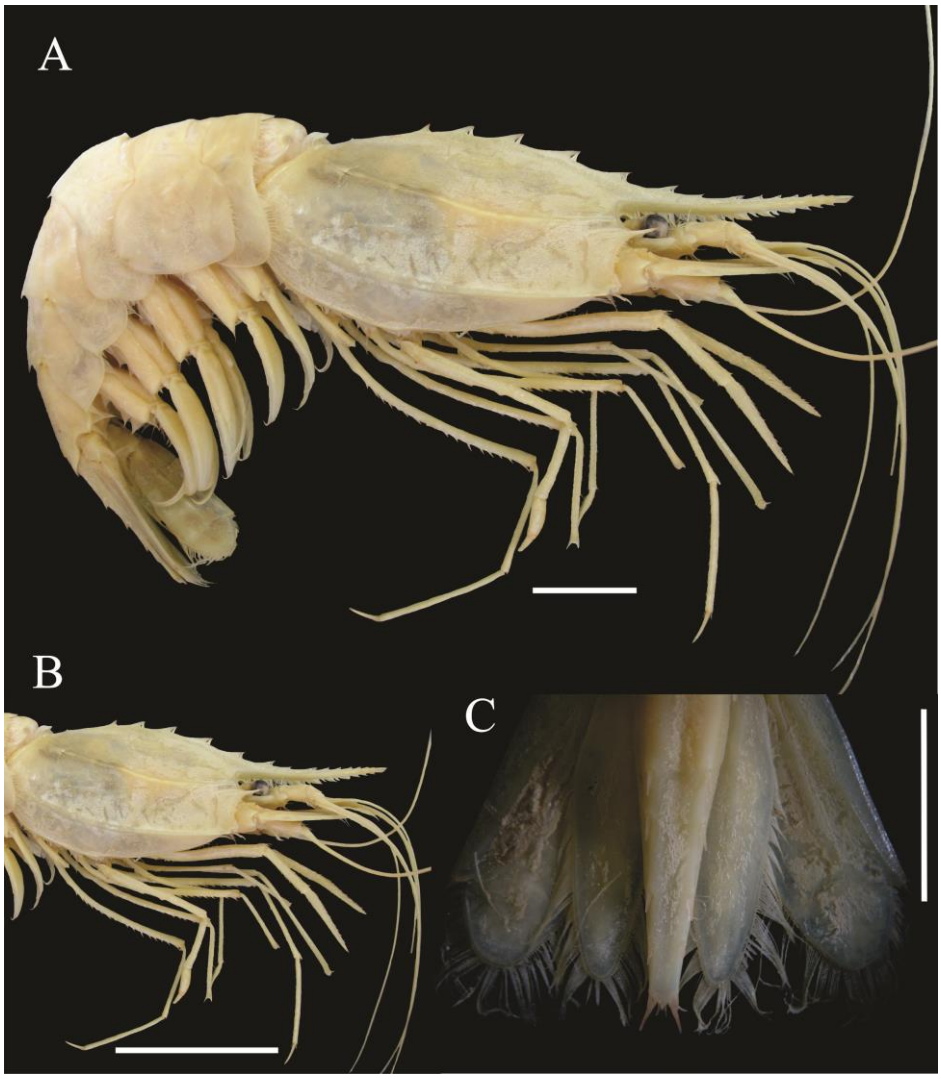

Figure 1. *Heterocarpus inopinatus* Tavares, 1999, total view (A), carapace view (B) and telson and uropods (C), female (Bpot-Talude #MT- 71; MOUFPE 15689), from northeastern Brazil. Scale bar = 1 cm

Material examined. 5 individuals, 1 juveniles (TL: 64.2 mm; CL: 14.1 mm), 2 Females (TL: 85.8–89.6 mm; CL: 19.2–21.3 mm) and 2 Males (TL: 92.6–98.4 mm; CL: 22.4–25.2 mm), Potiguar Basin, AR# 55, 04º33’ S – 036º54’ W, 150 m, 12 August 2009, MOUFPE: 15.691. 1 Female, (TL: 78.5 mm; CL: 16.4 mm), Potiguar Basin, AR# 51, 04º33’ S – 036º54’ W, 150 m, 20 May 2011, MOUFPE: 17.601. 6 individuals, 2 females (TL: 96.7–98.1 mm; CL: 23.1–23.8 mm) and 4 male (TL: 94.3 mm; CL: 22.8 mm), Potiguar Basin, MT# 71-2, 04°45' S – 036°8' W, 985 m, 20 May 2011, MOUFPE: 15.694. 3 individuals, 2 Females (TL: 96.8–110.5 mm; CL: 21.6–25.6 mm) and 1 Male (TL: 88.4 mm; CL: 21.1 mm), Potiguar Basin, MT# 72, 04°40' S – 036°23' W, 969 m, 07 May 2011, MOUFPE: 15.687. 4 individuals, 3 females (TL: 95.4–99.1 mm; CL: 24.4–26.2 mm) and 1 male (TL: 98.4 mm; CL: 23.8 mm), Potiguar Basin, MT# 73-2, 04°37' S – 036°30' W, 982 m 16 May 2011, MOUPFE: 15.688.

Type-locality. Western Atlantic: Brazil, Espírito Santo (19°38'S, 038°43'W), 960 m deep.

Distribution. Brazil: Ceará, Rio Grande do Norte, Bahia, Espírito Santo and Rio de Janeiro (Fig. 2). (Tavares, 1999; Cardoso and Serejo, 2007; Serejo *et al*., 2007; Rego and Cardoso, 2010).

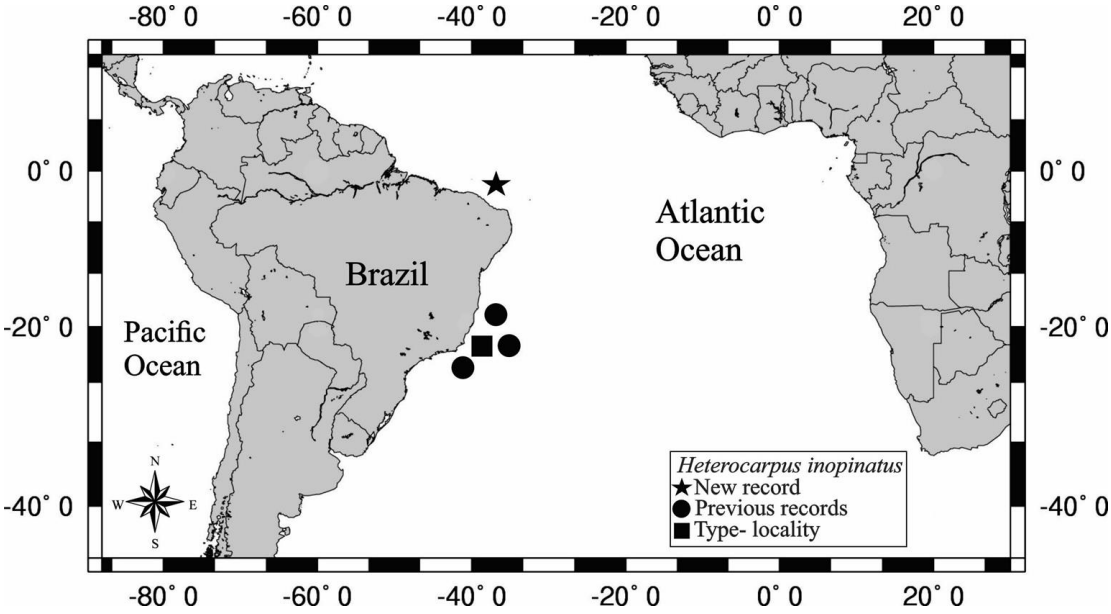

Figure 2. Geographic distribution of *Heterocarpus inopinatus* Tavares, 1999. Black circles = previous records; star = new record.

Bathymetric Distribution. In Potiguar Basin, the specimens were found between 150–982 m deep, the previous record were between 278–1.718 m (Tavares, 1999; Cardoso and Serejo, 2007; Serejo *et al*., 2007; Rego and Cardoso, 2010).

DISCUSSION

The present material does not show many differences when compared with the original species description of Tavares (1999), Cardoso and Serejo (2007), Rego and Cardoso (2010). Specimens from Potiguar Basin show the presence of 4 dorsal spines and 3 pars of terminal spines (Fig. 1, C), the latter character differs from the original description of *H. inopinatus*, which mentions the occurrence of 2 terminal pairs of spines (Tavares, 1999). However, the presence of 3 pairs of terminal spines has already been reported to *H. inopinatus* found along states of Bahia and Rio de Janeiro (Cardoso and Serejo, 2007; Rego and Cardoso, 2010).

The closest species of *H. inopinatus* also occurring in Brazilian waters is *H. dorsalis* and *H. oryx*. The first can be distinguished from *H. inopinatus* by a dorsal tooth on carapace reaching 2/3 of the carapace while the tooth reaches only 1/3 of carapace in H. dorsalis. On the other hand

H. oryx differs from *H. inopinatus* by the absence of the exopod of the third maxilliped in the first while it is short and distinct in *H. inopinatus* (Tavares, 1999; Rego and Cardoso, 2010).

Exemplars of the *H. inopinatus* did not abundantly occur along of the continental slope of Potiguar Basin, it was just collected by bottom trawls, but great abundance of this species was collected during Program REVIZEE/Score Central using mid-water and bottom trawls (Rego and Cardoso, 2010). The species of the genus *Heterocarpus* are benthopelagic, showing nocturnal vertical migrations to the water column, so being more susceptible to be better collected in mid-water trawls. The species *Heterocarpus inopinatus* was previously known to occur on Bahia, Espírito Santo and Rio de Janeiro (Tavares, 1999; Rego and Cardoso, 2010). Therefore, this study is increasing its geographic distribution and thus much extending its bathymetric distribution to shallower depth for the Northeast region of Brazil, filling gaps in the South Atlantic distribution.

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