



**FIRST REPORT OF ABDOMINAL ABNORMALITIES IN THE OCELLATED
BOX CRAB *Calappa ocellata* HOLTHUIS, 1958 (CALAPPIDAE),
COLLECTED FROM THE AMAZON CONTINENTAL SHELF**

**PRIMEIRO REGISTRO DE ANOMALIAS ABDOMINAIS NO CARANGUEJO
ENVERGONHADO *Calappa ocellata* HOLTHUIS, 1958 (CALAPPIDAE), COLETADO NA
PLATAFORMA CONTINENTAL AMAZÔNICA**

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Resumo

Reportamos a primeira observação de anomalias abdominais no “caranguejo envergonhado” *Calappa ocellata* Holthuis, 1958, coletado na plataforma continental Amazônica (PCA). O espécime de *C. ocellata* foi coletado como fauna acompanhante durante as pescarias industriais do camarão-rosa *Penaeus* (*Farfantepenaeus*) *subtilis* Pérez Farfante, 1967, ao largo da PCA, no estado do Pará (01°04'N; 047°54'O), usando uma rede de arrasto comercial, na profundidade de 44 m, em Abril de 2003. Entre quatro espécimes coletadas, apenas uma fêmea adulta (cc. 41.8 mm; lc. 51.6 mm) apresentou deformidades nos somitos abdominais e telson. A presença dessas anomalias morfológicas em *C. ocellata* pode afetar seus aspectos biológicos e reprodutivos. Em conclusão, estudos adicionais são necessários para avaliar os potenciais danos desta anomalia ao ciclo reprodutivo do animal.

Palavras-chaves: Deformidade abdominal; Norte do Brasil; Espécimes teratológicos; Anomalias em crustáceos.

Abstract

We report the first observation of abdominal abnormality in the “ocellated box crab” *Calappa ocellata* Holthuis, 1958, collected from the Amazon continental shelf (ACS). The specimen of *C. ocellata* was collected as bycatch during industrial fisheries of the southern brown shrimp *Penaeus* (*Farfantepenaeus*) *subtilis* Pérez Farfante, 1967, along the ACS, in the state of Pará (01°04'N; 047°54'W), using a commercial trawl net, at the depth of 44 m, in April 2003. Among four collected specimens, only one adult female (cl. 41.8 mm; cw. 51.6 mm) showed deformities in

abdominal somites and telson. The presence of these morphological abnormalities in C. ocellata may affect its biological and reproductive aspects. In conclusion, further studies are needed to assess the potential damage of this anomaly to the animal's reproductive cycle.

Keywords: Abdominal deformities; Northern Brazil; Teratological specimens; Anomalies in crustaceans.



Introduction

Among crustaceans, morphological abnormalities are observed in several aquatic groups, being these abnormalities associated with malformations in carapace, rostrum, telson, including absence/duplication of structures (e.g. rostrum, chelipeds and sexual appendages) (see Lupi & Spivak, 2007; Fransozo et al., 2012; Alves-Júnior et al., 2018; Martins et al., 2022; 2025 and references therein). These changes can be observed in both the larval and adult stages, which may be associated with genetic/nutritional changes or environmental pollution (Lupi & Spivak, 2007; Martins et al., 2022; Moraes et al., 2024).

Several studies have reported the presence of morphological abnormalities, primarily in shrimps (Dendrobranchiata and Caridean) (Aguirre & Hendrickx, 2005; Béguer et al., 2010; Rajkumar et al., 2016; Alves-Júnior et al., 2018; Martins et al., 2022; 2025; Barros et al., 2026), following by lobsters and crabs (Follesa et al., 2008; Martínez & Rudolph, 2010; Lira et al., 2012; 2013; Berber et al., 2024). Nevertheless, in Brazil, abnormalities in brachyuran crabs are commonly observed in estuarine and coastal species, as indicated by Mantelatto et al. (2000) for *Callinectes ornatus* Ordway, 1863, Pinheiro & Toledo (2010) and Araújo & Calado (2012) for *Ucides cordatus* (Linnaeus, 1763), and Silva & Shinozaki-Mendes (2018) in *Minuca rapax* (Smith, 1870).

Along the Brazilian continental shelf, the box crab *Calappa ocellata* Holthuis, 1958 (Calappidae) is widely distributed in continental shelf areas, especially in gravel substrata, covering depths from 30 to 80 m (Melo, 1996); however, although common, there are no records in literature of morphological changes for this species. Based on that, herein, we report the first observation of the abdominal abnormalities in *C. ocellata* collected from the Amazon continental shelf.

Material and Methods

The specimen of *C. ocellata* was collected as bycatch during industrial fishery operations of the southern brown shrimp *Penaeus* (*Farfantepenaeus*) *subtilis* Pérez Farfante, 1967, along the Amazon continental shelf (ACS) in the state of Pará (01°04'N, 047°54'W) (Figure 1), using a commercial trawl net, at the depth of 44 m, in April 2003. The fishing activities were monitored and supervised by the Centro Nacional de Pesquisa e Conservação da Biodiversidade Marinha do Norte – CEPNOR/ICMBio” (SISBIO Number: 44915–3).



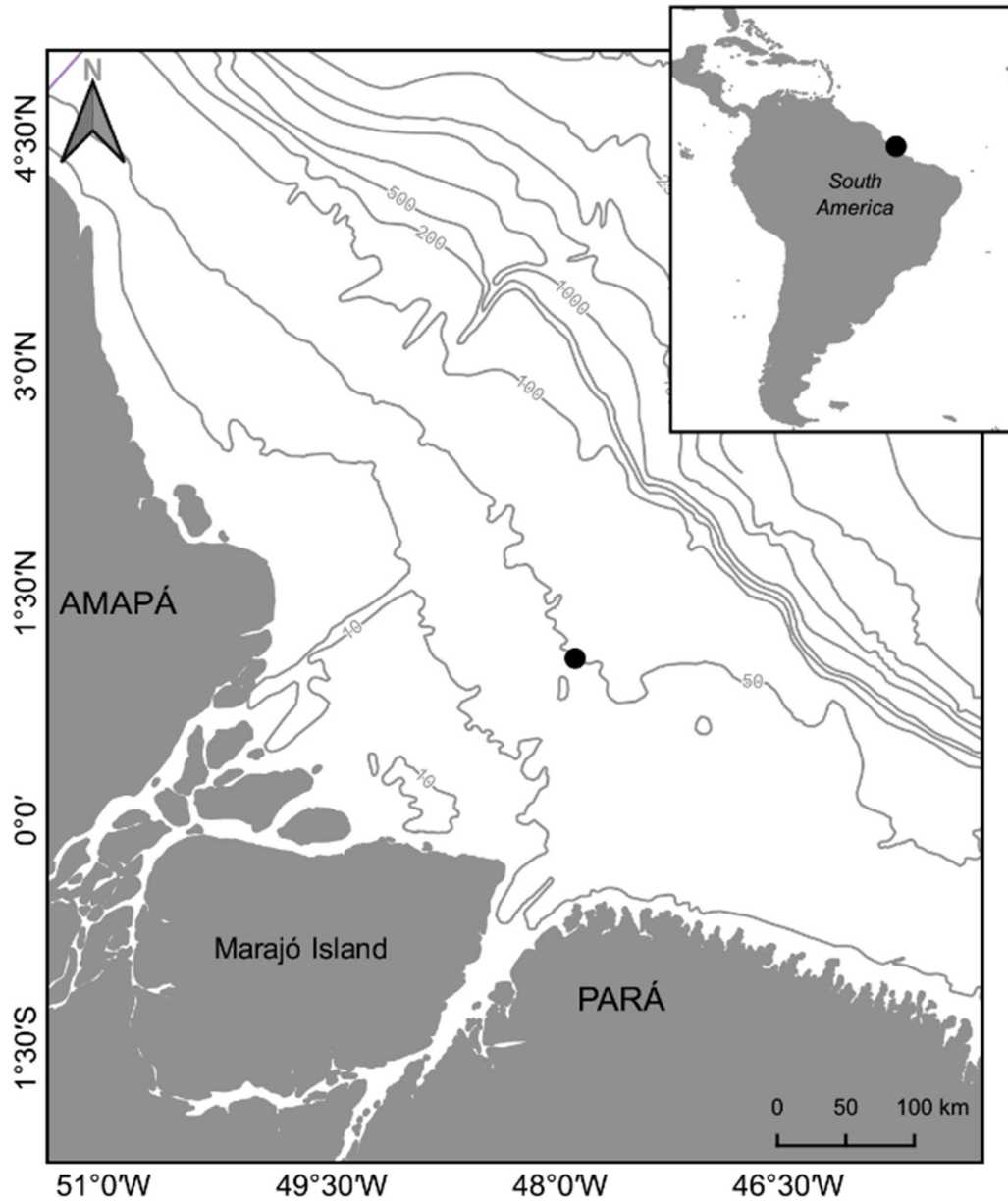


Figure 1. Map showing the sampling location of *Calappa ocellata* Holthuis, 1958 in the Amazon continental shelf. The black circle (●) indicates the collection site of the specimen with abdominal anomalies.

After sampling, all bycatch was sorted out, and the collected crustaceans were transported to *Laboratório de Crustáceos* (LabCrus), at *Universidade Federal Rural da Amazônia* - UFRA. The brachyuran crabs were identified following (Melo, 1996), with the anomalous specimen being sexed, photographed and measured using an analogic calliper (0.05 mm) in carapace length (cl.) and carapace width (cw.). After the procedures, the anomalous specimen was deposited at the Carcinological collection of the (LabCrus-UFRA), under voucher number: LABCRUS: 1.1.1A.

Results and Discussion

We collected four specimens of *C. ocellata*, only one of which was an adult female showing abdominal abnormality (cl. 41.8 mm; cw. 51.6 mm). The abdominal

margin is curved in its mid-distal portion, with malformations in the sixth somite and telson (Figure 2 A-C). In this scenario, these abnormalities may hinder the animal's excretion, as well as its reproductive process, especially egg incubation.



Figure 2. *Calappa ocellata* Holthuis, 1958. (A) Dorsal view; (B) Ventral view; (C) Detail of the abdominal abnormalities. Scale bar = 10 mm.

According to Wakida-Kusunoki et al. (2020) and Barros et al. (2026), the presence of morphological abnormalities in crustaceans may affect the animal's life cycle, increasing its susceptibility to predation. Regarding abdominal deformities, the presence of parasites such as *Rhizocephala* (Cirripedia) can be associated with alterations in the host abdominal morphology (Høeg, 1995; Alvarez & Calderón, 1996); however, no parasites were observed in our specimen.

A study by Berber et al. (2024) on aquatic organisms indicated that agonistic behaviors may contribute to morphological abnormalities within the population, as territorial combat and competition for females often result in injuries. In this scenario, failed predation may also cause morphological abnormalities, especially in invertebrates, which may exhibit abnormal regenerated structures.

Additionally, the presence of morphological anomalies in marine crustaceans may be associated with environmental stress (e.g. oil spills, metals, climate change, ocean acidification, marine litter, overfishing, among other impacts); moreover, biological factors such as genetic alterations or nutritional deficiencies, especially during ecdysis, may contribute to the occurrence of morphological deformities (Weis



et al., 1992; Pinheiro & Toledo, 2010; Alves-Júnior et al., 2018; Martins et al., 2022; Moraes et al., 2024).

Historically, reports of morphological anomalies in crustaceans are common; available data focus primarily on decapods, with a large number of observations in shrimps, including alterations in rostrum and telson structures (Aguirre & Hendrickx, 2005; Rajkumar et al., 2016; Martins et al., 2022; 2025). However, these anomalies may also affect several groups, such as copepods and Branchiopoda (Von Vaupel Klein & Koomen, 1993; Pandourski & Evtimova, 2009), lobsters (Dexter, 1954; Costa, 1966; Follesa et al., 2008; Martínez & Rudolph, 2010), anomuran crabs (Heerebout, 1969; Lira et al., 2003) and brachyuran crabs (Motoh & Toyota, 2003; Pinheiro & Toledo, 2010; Araújo & Calado, 2012; Lira et al., 2013).

Conclusion

This study expands the current knowledge on morphological anomalies in crustaceans by providing the first record of abdominal anomalies in *C. ocellata*. Based on our observations, the possible causes of anomalies in this box crab may be related to genetic alterations or nutritional changes, leading to abnormalities during ecdysis. Nevertheless, further studies are required to assess the primary causes of such abnormalities in crustaceans in the Amazon region, as well as their potential impact on species biology.

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