



First observation of chiton *Ischnochiton striolatus* as an inquiline on the swimming crab *Callinectes* sp.

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Abstract: Inquilinism is an ecological relationship in which one organism, known as the inquiline, benefits by inhabiting or utilizing the resources of another organism, the host, without significantly harming it. In this study, we report for the first time the occurrence of inquilinism between the polyplacophoran mollusk *Ischnochiton striolatus* and a swimming crab of the genus *Callinectes* on the northeastern coast of Brazil. It is possible that crab's carapace can act as an alternative micro-habitat for the chiton, providing shelter and possible access to food resources. The discovery highlights the diversity of symbiotic interactions in marine environments and expands our knowledge of the ecology of Polyplacophora.

Keywords: inquilinism, symbiosis, Polyplacophora.

Primeiro registro do quíton *Ischnochiton striolatus* como inquilino do siri *Callinectes* sp.

Resumo: O inquilinismo é uma relação ecológica na qual um organismo, denominado inquilino, se beneficia ao habitar ou utilizar os recursos de outro organismo, o hospedeiro, sem prejudicá-lo significativamente. Neste estudo, relatamos pela primeira vez a ocorrência de inquilinismo entre o molusco polyplacóforo *Ischnochiton striolatus* e um siri do gênero *Callinectes* na costa nordeste do Brasil. A carapaça do siri pode atuar como um micro-habitat alternativo para o quíton, proporcionando abrigo e possível acesso a recursos alimentares. A descoberta destaca a diversidade de interações simbióticas em ambientes marinhos e amplia nosso conhecimento sobre a ecologia dos Polyplacophora.

Palavras-chave: inquilinismo, simbiose, Polyplacophora.

Ecological interactions are fundamental to the organization of marine ecosystems, shaping the distribution, behavior, and adaptation of organisms to environmental conditions (Lang & Benbow, 2013). Among these interactions, inquilinism stands out as a relationship in which one organism inhabits another without direct dependence or significant harm to the host (Fraaye & Jäger, 1995; Landman *et al.*, 2014). Although inquilinism has been reported for several marine taxa, its occurrence between Polyplacophora and Decapoda remains rarely documented. Chitons (Mollusca: Polyplacophora) are benthic organisms typically associated with solid substrates

such as rocks and sandstone reefs (Piercy, 1987; Moreira *et al.*, 2007; Barros *et al.*, 2013). However, recent studies indicate that some species can also occupy mobile substrates, including bivalve and gastropod shells, particularly where consolidated habitats are scarce (Grayson & Chapman, 2004; Lima *et al.*, 2016; Lopes *et al.*, 2020). *Ischnochiton striolatus* has been observed living on gastropods of the genus *Turbinella* and other mollusks, likely as an adaptive response to substrate limitation (Lopes *et al.*, 2020). Here, we document the first record of *I. striolatus* living on the carapace of *Callinectes* sp., suggesting a case of inquilinism involving a chiton and a deca-

pod crustacean. e 28°C. The specimen was found on unconsolidated sediment at Presídio Island, on the northern coast of Rio Grande do Norte Estate, Brazil (5°05'50.4" S, 36°18'49.2" W), between Galos Beach and the mouth of the Piranhas-Açu River. The region has a tropical semi-arid climate with mean annual temperatures above 27 °C and rainfall concentrated between February and May (INMET, 2025). Tides are semi-diurnal, with an average range of 2.5 m, influenced by the South Equatorial Current transporting warm, nutrient-rich waters (Piola *et al.*,

1999). During sampling, salinity was 36 and temperature 28 °C (BRASIL, 2025). The geomorphology includes barrier islands, tidal deltas, mangroves, and sandy spits, shaped by strong coastal dynamics and controlled by the faulted structure of the Potiguar Basin (Pessoa Neto *et al.*, 2007). During the expedition, an individual of *Ischnochiton striolatus* was found on the carapace of a specimen of *Callinectes* sp., which was on unconsolidated sediment at the time (Fig. 1).



Figure 1. *Ischnochiton striolatus* on the carapace of a *Callinectes* sp. swimming crab, observed on a sandy bottom.

The chiton showed no signs of parasitism or damage to the host. This association likely represents an adaptive strategy that allows *I. striolatus* to exploit mobile substrates as alternative habitats. Among these interactions, inquilinism is an interspecific association that allows the inquilin to use the host as a support or shelter without causing significant harm (Fraaye & Jäger, 1995; Landman *et al.*, 2014). The observation of *Ischnochiton striolatus* inhabiting the crab *Callinectes* sp. confirms the adaptive capacity of this mollusk to explore mobile substrates as an alternative habitat. Previous studies have shown that chitons prefer consolidated substrates, such as rocks, sandstone reefs, and invertebrate shells, due to their need for stable support for attachment (Piercy, 1987; Moreira *et al.*, 2007; Barros *et al.*, 2013). However, the occurrence of *I. striolatus* on a crustacean represents an unusual adaptation, suggesting that mobile substrates can also be exploited under certain environmental conditions. The choice of the crab's carapace as a microhabitat may provide protection and dispersal advantages. Swimming crabs frequently bury themselves in sediment, which could offer shelter from visual predators (Kaas & Van Belle, 1990; Smith & Otway, 1997), while their mobility may help the inquilin reach areas with higher food availability, such as biofilms and diatoms essential to chiton diets (Langer, 1983). Although the benefit to *I. striolatus* is apparent, the impact on *Callinectes* sp. remains uncertain. The interaction could even be mutually beneficial if the chiton helps remove epibionts from the crab's surface, resembling "cleaning mutualism" observed in other mollusk–crustacean associations (Todt *et al.*, 2009; Goto *et al.*, 2016). This finding broadens the understanding of ecological plasticity in Polyplacophora and highlights the ability of chitons to exploit non-traditional substrates. When consolidated surfaces are scarce, these organisms may adhere to alternative substrates, including living hosts, to maintain their position in benthic communities (Lima *et al.*, 2016; Lopes *et al.*, 2020). Furthermore, this record emphasizes the need for further research on inquilinism in tropical marine environments, where symbiotic relationships influence benthic community dynamics.

Ethical statement

Sampling was conducted under permit No. 61564-1, issued by the Biodiversity Authorization and Information System (SISBIO) of the Chico Mendes Institute for Biodiversity Conservation

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