



First record of the bicolor purse oyster *Isognomon bicolor* and the acorn barnacle *Striatobalanus amaryllis* in the coast of Sergipe, Brazil

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Abstract. This is the first report of two non-indigenous species, the bicolor purse oyster *Isognomon bicolor* and the acorn barnacle *Striatobalanus amaryllis*, in the coastal region of Sergipe state, Brazil. Both species were found attached to a floating dock in the estuarine region of the Vaza-Barris River. These findings contribute to a more comprehensive assessment of species distributions along the Brazilian coast.

Key words: Non-indigenous species; Distribution; Estuary; Fouling.

Resumo: Primeiro registro da ostra *Isognomon bicolor* e da craca *Striatobalanus amaryllis* na costa de Sergipe. Este é o primeiro registro de duas espécies exóticas, a ostra *Isognomon bicolor* e a craca *Striatobalanus amaryllis*, na costa de Sergipe. Ambas as espécies foram encontradas aderidas a um píer flutuante na região estuarina do rio Vaza-Barris. Esses registros contribuem para o preenchimento de lacunas na distribuição de ambas as espécies ao longo da costa brasileira.

Palavras-Chave: Espécies exóticas; Distribuição; Estuário; Fauna incrustante

The introduction and spread of non-indigenous species into novel environments are increasing globally due to human trade and travel (Hulme 2009, Seebens *et al.* 2016, Bailey *et al.* 2020). Non-indigenous species are considered one of the main causes of biodiversity loss, highlighting the importance of early detection of non-indigenous species. Early detection improves the effectiveness of containment and eradication measures to prevent the establishment or control the spread of invasive populations (Loebmann *et al.* 2010, Brown *et al.* 2016, Johansson *et al.* 2020).

This research note records the first occurrence of two non-indigenous species) in the coastal region of Sergipe state, Brazil: the bicolor purse oyster *Isognomon bicolor* (C. B. Adams, 1845) and the acorn barnacle *Striatobalanus amaryllis* (Darwin, 1854).

On August 20, 2020, individuals were observed attached to a floating dock made with plastic drums and wooden boards in the estuarine

region of the Vaza-Barris River (Fig. 1). Exemplars were subsequently caught by hand and send to the lab to confirm species identification. The specimens of *Isognomon bicolor* were identified according to Domaneschi & Martins (2002) and Dias *et al.* (2013), while *Striatobalanus amaryllis* was identified following Kerckhof *et al.* (2010) and confirmed by a specialist. Following identification, all individuals were fixed in ethyl alcohol 70% and deposited in the collection of the Laboratório de Ecologia Bentônica (Depaq/UFS). Water surface salinity at the time of sampling was measured with a manual refractometer, which ranged from 25 (low spring tide) to 32 (high spring tide).

The *I. bicolor* collected (Fig. 2) is characterized by having a shell higher than long, slightly inflated, with hinge straight. The external ornamentation is strongly lamellar, giving a flaky appearance to the outer surface of the shell. The outer surface is decorated with concentric, irregular, easily fractured, marginal lamellae. Color varies

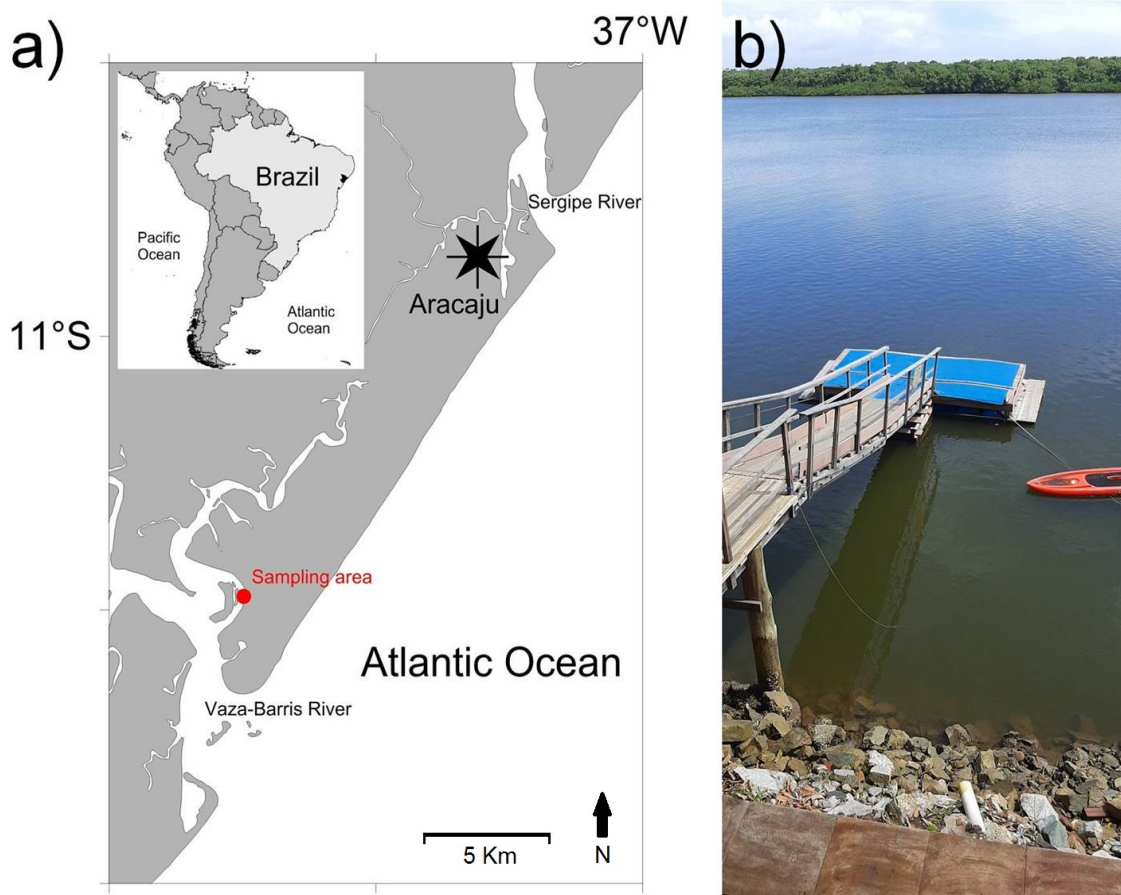


Figure 1. Map of the central portion of the Sergipe coast, indicating (a) the location where individuals were caught in the estuary of the Vaza-Barris River and (b) a view of the floating dock.

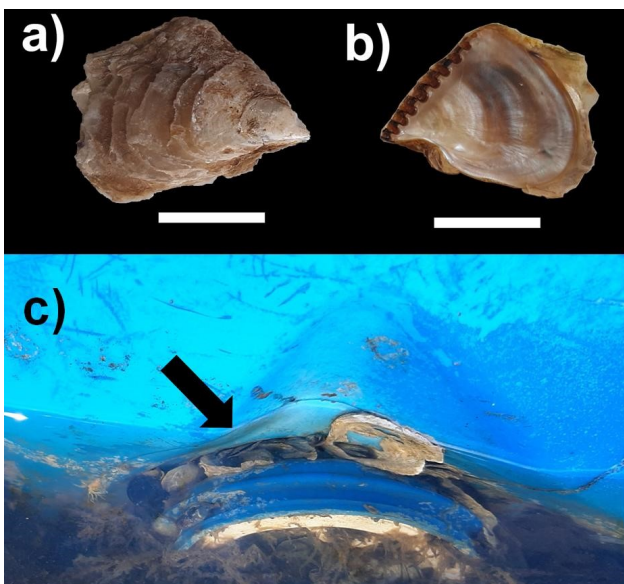


Figure 2. *Isognomon bicolor* (C. B. Adams, 1845) caught in the estuary of the Vaza-Barris River: (a) outer and (b) inner view of shell and (c) individuals attached to the plastic drum (black arrow) used as float (scale bars: 1cm).

from shades of yellow to blackish-brown, becoming lighter toward the umbo (Fig. 2a). Internally, the shell is moderately concave, covered with a bright, nacreous layer, which is abruptly delimited by a slightly concave, non-nacreous, transitional line at the shell margin. Ligament is multivincular, hinge ornamented with perpendicular grooves (Fig. 2b). All of the above characteristics agree with the species diagnosis described by Domaneschi & Martins (2002).

Isognomon bicolor is native to the Caribbean Sea, and its presence in Brazilian waters was confirmed only after an extensive review made by Domaneschi & Martins (2002). These authors previously recorded the presence of this species on the coast of the states of Rio Grande do Norte, Pernambuco, Bahia, Rio de Janeiro, São Paulo, and Santa Catarina. Later, its distribution was extended to Piauí (Loebmann *et al.* 2010), Ceará (Matthews-Cascon & Rocha-Barreira 2006), Paraíba, Alagoas (Dias *et al.* 2013), Espírito Santo (Zamprognio *et al.*

2010), Paraná (Santos *et al.* 2015), and Rio Grande do Sul (Agostini & Ozorio 2016).

Striatobalanus amaryllis (Fig. 3) is recognizable by its solid though fragile wall plates, calcareous porous basis, large-toothed orifice, and narrow oblique radii with beveled upper margins (Kerckhof *et al.* 2010). The shell is striped or clouded with a pinkish-purple or whitish tinge, sometimes yellowish. The opercular valves are pale dull purple, or reddish, the scutum is plainly striated longitudinally, the striae divide the prominent lines of growth into squarish beads (Figure 3b), and the beaked tergum has a narrow spur (Figure 3c) (Kerckhof *et al.* 2010). The specimens found in this study have the same characteristics described above.

This species is native to the Indo-West Pacific (Young 1989, Carlton *et al.* 2011) and was first reported in Brazilian waters in 1982 on the coast of the state of Piauí (Young 1989). Later, its distribution was extended to Pernambuco (Farrapeira-Assunção 1990), Bahia (Young 1995), Paraná (Neves *et al.* 2007), Maranhão, Rio Grande do Norte, and the Paraíba coast (Farrapeira 2010).

Hull fouling (ships or oil platforms) is thought to have been the introduction vector of both species into the Brazilian coast (Young 1989, Domaneschi & Martins 2002, Ferreira *et al.* 2009, Carlton *et al.* 2011). Furthermore, in some places where these species have become established, replacement of native organisms has been observed as a consequence of interspecific competition (Oliveira & Creed 2008, Farrapeira 2010, Martinez 2012).

The Vaza-Barris River is a well-mixed, permanently open, and shallow estuary with a mean depth ranging from 3 to 8 m (Santos & Severi 2019). Tides are semidiurnal with a maximum tidal range of 2.3 m and a salt intrusion extending up to 20 km upstream (Santos & Severi 2019). The estuarine region has a low degree of urbanization, and there are no port terminals. However, the region is used for many recreational boating activities. Although there is no evidence of boat fluxes either to or from other places, biofouling on boats' hull is the most plausible pathway of the introduction of both *I. bicolor* and *S. amaryllis* into the Vaza-Barris Estuary.

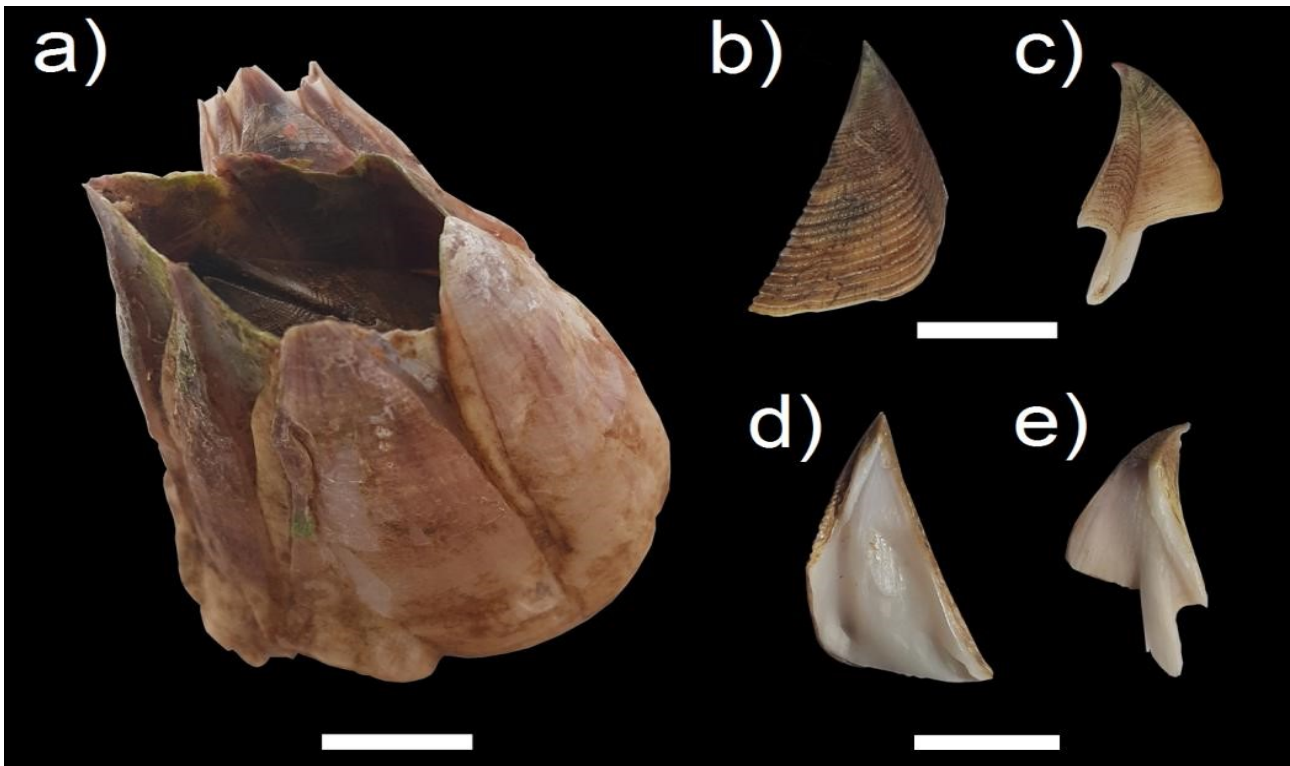


Figure 3. *Striatobalanus amaryllis* (Darwin, 1854) caught in the estuary of the Vaza-Barris River: (a) habitus of collected individual, outer views of the (b) scutum and the (c) tergum, and inner views of the (d) scutum and the (e) tergum (scale bars: 1 cm).

Although both species are considered to be established along the Brazilian coast, this record is a consequence of increasing scientific research activity in the region. These findings further contribute to filling gaps in species distribution, notably inside estuarine systems. They also underscore the need for continuous monitoring or survey programs to detect non-indigenous species as early as possible to assist with management measures.

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