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Pseudechidna brummeri: An unexpected discovery in the North-East Atlantic raises concerns

Joaquim Parrinha [a,b], Sónia Seixas [a,c,*]

[a] MARE - Marine and Environmental Sciences Centre/ARNET – Aquatic Research Network, Department of Life Sciences, Portugal
[b] ECOALGA – Agricultura Subaquática Sociedade Unipessoal Lda., Porto Covo, Portugal
[c] Universidade Aberta, Rua Escola Politécnica, 147, 1269-001 Lisbon, Portugal

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ABSTRACT

Global changes are currently underway, resulting in the discovery and introduction of new species in unexpected locations. One notable case involves the Indo-Pacific species *Pseudechidna brummeri*, which was observed and captured on film during a nocturnal dive in Portugal.

This situation raises the question: How did this species come to inhabit this area? Two primary explanations appear plausible:

a) The species may have been introduced through ship ballast water, a common pathway for the unintentional transport of aquatic organisms. Given the proximity of a large port, this possibility gains significance.
b) Alternatively, the species could have originated from a home aquarium, a factor that remains poorly understood. The potential for species to escape or be released from aquariums into natural ecosystems is an area that requires further investigation.

Another pertinent question to consider is whether there is only one individual of this species or if there are more individuals present?

1. Introduction

Pseudechidna brummeri species is commonly known as Brummer's moray, the white ribbon eel, and the ghost eel (more frequently encountered in aquarium hobbyists' circles).

This species has a wide distribution, spanning locations in the Western Pacific, Indian Ocean, and Western Indian Ocean, including island nations and territories such as American Samoa, Australia, Comoros, Fiji, Guam, India (Nicobar Is., Andaman Is.), Indonesia, Japan, Madagascar, Malaysia, Micronesia, Mozambique, Northern Mariana Islands, Palau, Papua New Guinea, Philippines, Seychelles, Solomon Islands, Somalia, Sri Lanka, Taiwan, Thailand, Timor-Leste, Tonga, Vanuatu, and more (Smith et al., 2019).

Is a nocturnal predator known for its ambush hunting of small fish and crustaceans.

2. Observation

During a nocturnal dive at a depth of 1–2 m, we engaged in closely observing and filming the marine biodiversity in the nighttime environment of Porto Covo, Portugal. The fishing port of Porto Covo is located at approximately 37.8500 degrees North latitude and 8.7957 degrees West longitude (Fig. 1). This is a location where we conduct annual dives.

After recording and closely monitoring the observed fish, it was determined that the specimen in question measured approximately the same length as a diver or even slightly longer, with a height of approximately 5 cm and a thickness of about 1 cm. Subsequently, it was confirmed that this specimen did indeed belong to the species *Pseudechidna brummeri*. The reported length in the literature falls within the range of 80 to 100 cm (Freeman and Pogonoski, 2022; Smith et al., 2019). The larger size could be attributed to the absence of predators.

In fact, this specie is a nocturnal predator known for its ambush

* Corresponding author at: MARE - Marine and Environmental Sciences Centre/ARNET – Aquatic Research Network, Department of Life Sciences, Portugal.
E-mail address: Sonia.Seixas@uab.pt (S. Seixas).

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Fig. 1. Images extracted from the film recorded during the dive.

hunting of small fish and crustaceans.

3. Discussion of possibilities explanations

3.1. From aquarium trade

Frequently, when discussing species introductions, there tends to be an underestimation of the significance of selling and keeping species sourced from various regions around the world in captivity. The notion persists that privately maintained saltwater aquariums at home, though well-maintained, often overlook the fact that many individuals dispose of these aquariums by releasing their inhabitants into the wild. Indeed, a multitude of animals are imported into Europe, some originating from captive breeding efforts, while others are directly harvested from their natural habitats. Although we cannot definitively ascertain whether this is the cause behind the appearance of this particular species, it would be negligent not to consider this potential source.

3.2. Ballast water

The localization is near Sines Port. Sines serves as the primary port on the Ibero-Atlantic front, and its unique geographical features have played a pivotal role in establishing it as a key national asset. It holds the distinction of being the primary energy provider for the country, handling crude oil, refined products, and natural gas. Additionally, it plays a significant role in the transportation of general and containerized cargo, showcasing considerable potential for growth with aspirations of becoming a benchmark port on both the Iberian and global scales within Europe. Certainly, the possibility of introduction through ballast water should not be overlooked in this context. Ballast water, used to stabilize ships during transport, has been a well-documented pathway for the unintentional transport of aquatic organisms from one region to another. Given the proximity of a significant port in the vicinity, the likelihood of this species being introduced through ballast water gains credibility.

It's important to acknowledge that ballast water exchange and management practices have historically been inadequate, allowing for the inadvertent transfer of various species across different marine environments. As ships load or discharge ballast water, organisms can be released into new habitats, where they may establish populations and potentially disrupt local ecosystems.

In the case of the Indo-Pacific species *Pseudechidna brummeri* appearing in Portugal, the introduction through ballast water remains a plausible explanation, considering the interconnectedness of global shipping routes and the potential for organisms to be transported across vast distances within ballast tanks.

4. What to do next

Ongoing monitoring and observation are essential for enhancing our understanding of the *Pseudechidna brummeri* species in the Atlantic Ocean off the coast of Portugal. It is necessary to determine whether there is only one example or if it has already been established in the area.

CRediT authorship contribution statement

J. Parrinha conducted the dive and filmed the footage, while S. Seixas provided identification. Both authors collaborated on writing the paper.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The video is already submitted.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.marpolbul.2023.115637.

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