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Northernmost record of *Hacelia attenuata* (Echinodermata: Asteroidea) in the Atlantic

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Abstract

Background: The seastar *Hacelia attenuata* is present in the Mediterranean but also in the Azores, Madeira, Canary Islands, Cape Verde and Gulf of Guinea.

Methods: While scuba diving in Berlengas Archipelago (Peniche, Portugal), the author observed two individuals of this species.

Results: This expands its geographic distributions and represents the northernmost record of this species in the Atlantic.

Conclusion: Geographic boundaries of species are changing on a daily basis and it is crucial to report these new occurrences and to keep monitoring species distribution and biodynamic, in order to predict future changes.

Keywords: Seastar, Ophidiasteridae, Geographic range, Berlengas archipelago, Climate change

Background

The growing global pressures on the collection of echinoderms for various commercial enterprises have put these enigmatic invertebrates under threat (Micael *et al.* 2009). Considering that some echinoderm species are important in determining habitat structure for other species and can represent a substantial portion of the ecosystem biomass (Micael *et al.* 2011), new information on species biology and respective geographic distribution boundaries is crucial to better understand the role played by these organisms in the ecosystem.

The smooth seastar *Hacelia attenuata* Gray, 1840 is relatively common in the Mediterranean Sea occurring also in the Azores (Micael *et al.* 2012), Canary Islands, Cape Verde, Gulf of Guinea (Hansson 1999; Wirtz and Debelius 2003) and Madeira (Espino *et al.* 2006). Pérez-Ruzafa and Lopez-Ibor (1987) also reported this species for an area which the authors called “Portugal”, however, this area comprised not just the western and south coast of Portugal but also the gulf of Cadiz (Spain). More recently, it was confirmed to occur in the Gulf of Cadiz

(Rueda *et al.* 2011) and also in the Gorringe seamount (OCEANA 2014).

The species is uniformly orange to red (Rueda *et al.* 2011) and is characterized by having five cylindrical arms - provided by numerous protuberances on the aboral zone - linked by a broad base to a small disk (Bergbauer and Humberg 2000).

It is reported to occur at depths between 1 m and 150 m (Hansson 1999) but is more common below 20 m depth (Espino *et al.* 2006; Wirtz and Debelius 2003) preferably in areas with low light intensity (Bergbauer and Humberg 2000; Espino *et al.* 2006).

Like many related species, it has been targeted for ornamental reasons by the aquarium industry (Espino *et al.* 2006). Two specimens were observed at Berlengas Archipelago and a photographic register was made for one of them. Subsequent identification and bibliographic research confirmed this as a new northernmost record for this species in the Atlantic Ocean.

Results

Two specimens of *Hacelia attenuata* were observed in Berlengas Archipelago. Both individuals found were adults with approximately 20 cm in diameter.

One of the specimens was photographed side by side with a red seastar *Echinaster sepositus* (Fig. 1).

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Systematics

Class ASTEROIDEA de Blainville, 1830
 Order VALVATIDA Perrier, 1884
 Family OPHIDIASTERIDAE Verrill, 1870
 Genus HACELIA Gray, 1840
Hacelia attenuata Gray, 1840
 (Fig. 1)

Discussion

The presence of *Hacelia attenuata* at Berlengas, extends its known northern geographical range in the Atlantic, with literature referring the Azores Islands as its previous northernmost limit (Hansson 1999; Wirtz and Debelius 2003). Rueda *et al.* (2011) also reported its presence in the Gulf of Cadiz (Spain), although this is an area strongly influenced by the Mediterranean ecosystem (Coll *et al.* 2014), where it is known to be common (Wirtz and Debelius 2003).

Hacelia attenuata presents a similar reddish coloration and reaches approximately the same diameter as the red seastar *Echinaster sepositus* but also the purple seastar *Ophidiaster ophidianus* (Lamarck, 1816) and *Hacelia superba* H.L. Clark, 1921 which led to some misidentifications in the past (Nobre 1938; Rueda *et al.* 2011), and may raise doubts on its real distribution.

Unlike *Ophidiaster ophidianus* and *Hacelia superba*, which do not occur in this area, the red seastar *E. sepositus* is relatively common in Berlengas (Rodrigues *et al.* 2008) - occurs from Roscoff (France) to Ghana, including island groups except Azores and also in the Mediterranean (Wirtz and Debelius 2003) - and one specimen was also found when these underwater records were made. Both species were photographed side by side and differences are notorious (Fig. 1). The coloration of *H. attenuata* is more yellowish than *E. sepositus* and, although is not very clear in the photo, the aboral pattern and texture is distinctively different. The presence of *H.*

attenuata in Berlengas represents also the first record of a species of the Ophidiasteridae family for the region.

The Berlengas archipelago is located at the top of the escarpment of the Nazaré Canyon, an important submarine canyon in the transition zone between the Mediterranean and European subregions (Mendes *et al.* 2011). It is influenced by coastal upwelling (Álvarez-Salgado *et al.* 2003; Peliz *et al.* 2002) and characterized by a remarkable productivity and diversity of marine species and habitats (Rodrigues *et al.* 2008). These factors may lead to the settlement of non-local species that reach the area and manage to thrive (e.g. larvae driven by oceanic currents, ballast waters). Rodrigues (2012) reported various new species records for the area, most of which new northernmost records. Global warming is one possible reason for driving tropical and sub-tropical species to migrate to regions where previous climate was not warm enough (Afonso *et al.* 2013). However, the same author, recorded new southernmost limits for other species in the same study area, suggesting that this may also reflect the reduced number of underwater surveys when compared to other places worldwide. Surveys from the Mediterranean to Berlengas area would help clarifying the presence of this species in latitudes where it was not known to occur until now.

Conclusions

In a time where geographic distribution boundaries of species are being redesigned almost every day (Abecasis *et al.* 2006; González-Wangüemert and Borrero-Pérez 2012), and major faunal changes are more and more probable, the Portuguese shore will be one of Europe's best places to investigate and predict the course of ecological perturbations, due to its transitional nature (Almada *et al.* 2001).

It is, therefore, crucial to develop more studies in this area, to register these new occurrences and to keep monitoring species distribution and biodynamic, in order to predict future changes and to act accordingly, while ensuring the species survival and sustainability.

Methods

The records of *Hacelia attenuata* here reported were done using underwater photography while scuba diving in Berlengas Archipelago (N 39°28', W 9°32') (offshore Peniche, West of Portugal), at approximately 20 m depth. Both animals were foraging on the top of an irregular rocky reef - mostly covered by sessile biota including algae, sponges, hydrozoans, anemones and bryozoans - separated about 200 m from each other, at moderately exposed sites.

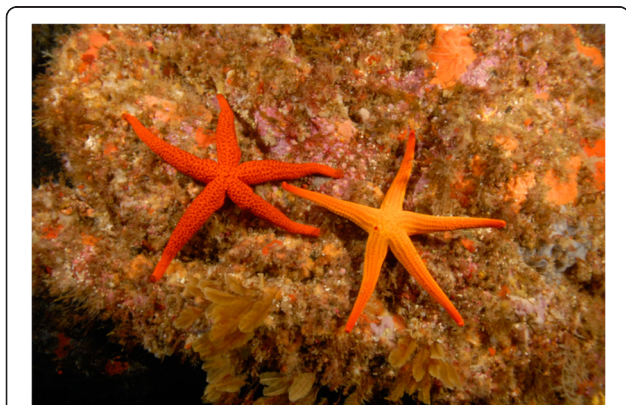


Fig. 1 Red seastar, *Echinaster sepositus* (left) and smooth seastar, *Hacelia attenuata* (right)

Competing interests

The author declares that he/she has no competing interests.

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