

RESEARCH ARTICLE

***Niphates toxifera* (Porifera, Demospongiae), a possible Lessepsian species now colonizing the coast of Turkey**

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Abstract

This paper deals with the occurrence of *Niphates toxifera* (Porifera) on the Levantine coast of Turkey. This species was originally described from the coast of Lebanon and was known to be confined to a restricted area (Beirut-Syria-Israel). In February 2019, three specimens of this species were photographed and collected at 10-15 m on rocks (including cave walls) off Samandağ, near İskenderun Bay (north-east Levantine Sea), indicating its northwards spread. The distributional pattern and on-going range expansion trend of this species indicate the possibility of a Lessepsian species. This species is also a new record for the marine fauna of Turkey. The morphological and distributional features of the species are presented.

Keywords: Sponges, alien species, biodiversity, distribution, Levantine Sea, Turkey, eastern Mediterranean

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Introduction

The sponge fauna of the Levantine Sea has been relatively poorly studied and almost 89 sponge species have been reported up to date (Evcen and Çınar 2012; WPD 2020). The species richness of this group in the region is low when compared to that (215 species) of the neighboring sea, the Aegean Sea, where intense efforts to assess the sponge diversity have been made (e.g. Saritaş 1972, Voultziadou 2005; Evcen and Çınar 2015; Voultziadou *et al.* 2016). This situation

is also similar on the coasts of Turkey. Up to date, 51 and 82 sponge species have been reported from the Levantine and Aegean coasts of Turkey, respectively (Topaloğlu and Evcen 2014).

The Mediterranean Sea is known to be a hot spot for the introduction of alien species as it is characterized with more than one pathway of introduction, including the corridor, the Suez Canal (Çinar *et al.* 2011; Zenetos *et al.* 2012; Çinar 2013). Only one invasive alien sponge species (*Paraleucilla magna* Klautau, Monteiro & Borojevic 2004) has been reported from the Mediterranean Sea up to date (Longo *et al.* 2007; Zammit *et al.* 2009; Guardiola *et al.* 2011; Evcen and Çinar 2020; Katsanevakis *et al.* 2020). In addition, one specimen of *Agelas linnaei* De Voogd, Parra-Velandia and van Soest, 2008, which is endemic to the Indonesian coast (De Voogd *et al.* 2008), was recently reported from the coast of Latakia (Syrian coast) by Ammar and Fadel (2017). However, as the taxonomic identity of this species was not adequately presented, the occurrence of this species in the Mediterranean is highly questionable. Alien sponge species (possibly Lessepsian species) were previously mentioned in the Mediterranean Sea by Burton (1936), Tsumamal (1969) and Vacelet *et al.* (2007). Burton (1936) reported three sponge species, *Cinachyrella australiensis* (Carter, 1886) (cited as *Cinachyra australiensis*), *Amphimedon chloros* Ilan, Gugel & van Soest, 2004 (cited as *Haliclona viridis*) and *Didiscus placospongioides* Dendy, 1922, off Alexandria (Egypt). Tsumamal (1969) found four species, *Geodia micropunctata*, *Chrotella cavernosa* (accepted as *Levantiella levantinensis* (Vacelet, Bitar, Carteron, Zibrowius & Pérez, 2007)), *Damiriana schmidti* (accepted as *Lissodendoryx (Waldoschmittia) schmidti* (Ridley, 1884)) and *Heteronema erecta* (accepted as *Hyrtios erectus* (Keller, 1889)), on the Israeli coast and classified them as probable Lessepsian species. However, as these species have not been adequately described and presented by the authors, and have not been subsequently reported from the region, their presence in the Mediterranean was considered as doubtful and excluded from the alien species list of the Mediterranean (Zenetos *et al.* 2005). However, *Geodia micropunctata*, which was identified by the same author (Tsumamal 1969) both from the Mediterranean and from the Suez Port, was regarded as a possible Lessepsian species (Vacelet *et al.* 2007). The specimens identified as *Haliclona viridis* (Keller, 1889) by Burton (1936) along the Mediterranean coast of Egypt were re-identified as *Amphimedon chloros* Ilan, Gugel and van Soest, 2004, which is a Red Sea species and could also be a Lessepsian species (Ilan *et al.* 2004).

During a scientific expedition to Lebanon, several sponge specimens were collected and identified by Vacelet *et al.* (2007). Among the material, they described five new species belonging to five different genera of tropical and subtropical affinities, of which three genera, namely *Euryspongia*, *Liosina* and *Niphates*, were new to the Mediterranean fauna. The species belonging to these genera were not classified as Lessepsian species, but as possible remnants of an ancient thermophilous fauna (Miocene relicts). Among the species, only *Niphates*

toxifera Vacelet *et al.* (2007) was found in the polluted harbour environment and natural substrata both on the coasts of Lebanon and Syria (Latakia). In addition, this species was reported as one of the characteristic species in the shallow and deepwater rock substrata (including coralligenous habitats) in Lebanon (SPA/RAC–UNEP/MAP 2017). The present study reports on the presence of *Niphates toxifera* from the Levantine coast of Turkey for the first time and discusses its zoogeographic affinity.

Materials and Method

Three specimens of *Niphates toxifera* were collected and photographed on rocky bottoms and a cave wall in shallow waters (at 15 m depth) on 25 February 2019 by scuba diving off Samandağ (Levantine Sea coast of Turkey: 36°10'43.3"N 35°52'26.4"E) (Figure 1). The samples were fixed in 4% formalin solution in the field and preserved in 70% ethanol in the laboratory. The specimens were deposited at the second author's collection.

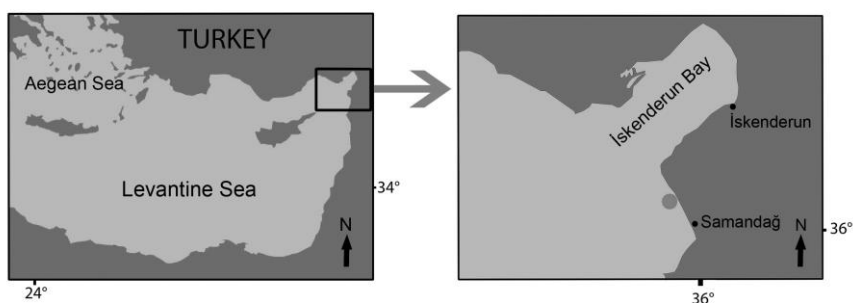


Figure 1. Map of the study area and location of the sampling site

Results

Short Description

A total of three specimens were found in the area, alone with a distance of 20-30 m from each other. The specimens of *Niphates toxifera* were branched and erected, approximately 30 cm in height. The branches (10-30 mm in diameter) were anastomose. Numerous oscules (1.5–3 mm in diameter) were conspicuous, located on the upper line of the branches and aligned in one row. The surface was hispid. The consistency was firm and compressible. The colour of alive specimens was reddish-brown (Figure 2).

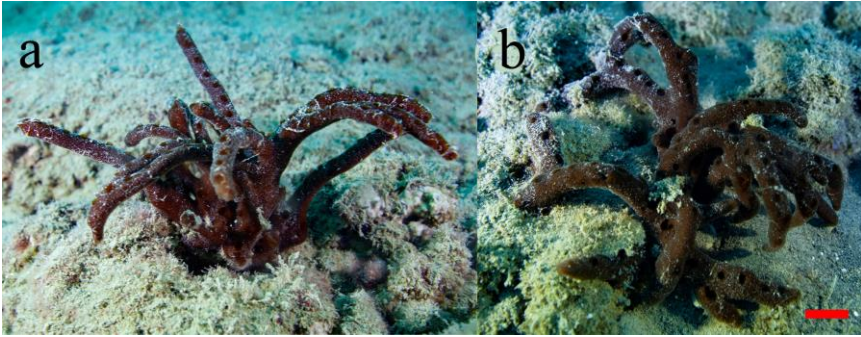


Figure 2. Underwater photographs of *Niphates toxifera* (at 15 m, off Samandağ, Levantine Sea, Turkey, scales: a. 60 mm, b. 50 mm)

Other sponge species found in the area

A total of six sponge species [*Petrosia* sp.; *Haliclona* (*Halichoclona*) *fulva* (Topsent, 1893), *Spirastrella cunctatrix* Schmidt, 1868; *Axinella polypoides* Schmidt, 1862; *Phorbast fictitius* (Bowerbank, 1866) and *Crambe crambe* (Schmidt, 1862)] were observed and photographed on the vertical or subvertical rocky surfaces and cave walls in the study area. Three of them, *H. (H.) fulva*, *C. crambe*, and *P. fictitius*, were very common on the cave wall. All these species are native to the Mediterranean Sea (WPD 2020).

Discussion

The distribution of *Niphates toxifera* in the Mediterranean Sea is confined to a very restricted area. It was found at 3–43 m depths along the Lebanese, Syrian, and Israeli coasts (Vacelet *et al.* 2007; SPA/RAC–UNEP/MAP 2017; Idan *et al.* 2018). The finding of this species off Samandağ is noteworthy and might indicate its northward spread. The Levantine coast of Turkey was previously studied in detail within the framework of a large project coordinated by ME Çinar (TUBITAK project no. 104Y065). In this project, many dives (both scuba and snorkelling) were performed along the coast including Samandağ and its vicinity in 2005. All sponge data were previously published by Evcen and Çinar (2012). Among the material, however, *N. toxifera*, which has very characteristic body shape and colour, was absent. In addition, this species was absent from the north-eastern part of Levantine Sea (i.e. around Fethiye Bay) where intense diving efforts have been implemented during large projects like CIGESMED (www.cigesmed.eu) and the biodiversity of Fethiye-Gocek Specially Protected Area. In Fethiye Bay, two of the species that were described from Lebanon by Vacelet *et al.* (2007), namely *Ciocalypta carballoi* Vacelet, Bitar, Carteron, Zibrowius & Pérez 2007 and *Levantiniella levantinensis* (Vacelet, Bitar, Carteron, Zibrowius & Pérez 2007) (reported as: *Cinachyrella levantinensis*), were present, but they were sparsely distributed.

It seems that *N. toxifera* is not a Miocene relic as suggested by Vacelet *et al.* (2007), confined to a restricted area in the Mediterranean, but more apparently it behaves like an invader, tending to expand its distributional range in course of time. As being a newly described species there is not enough data to assess its origin. However, because of the anti-clockwise current regime of the Levantine Sea, sessile Lessepsian invaders like serpulid polychaetes tend to expand their distributional range from the Egyptian coast northwards (Çinar 2006). It seems that *N. toxifera* follows the same route. However, its occurrence in other parts of the Levantine Sea like the Egyptian coasts as well as in the Red Sea should be investigated.

The genus *Niphates* is only known from the eastern Levantine Sea within the Mediterranean Sea, but this genus occurs in the Red Sea and is represented by three species: *N. furcata* (Keller, 1889), *N. obtusispiculifera* (Dendy, 1905) and *N. rowi* Ilan, Gugel & van Soest, 2004. When compared to the Red Sea species of *Niphates*, *N. toxifera* has a characteristic morphology and colour, so its presence in the region can be easily spotted and distinguished from other *Niphates* species.

The presence of *N. toxifera* in the polluted harbours of Beirut and Tripoli provides evidence that this species can survive in anthropogenically altered environments and attach to artificial substrata like piers (Vacelet *et al.* 2007). Such ability is common for the ship-transferred species. This makes us to think that this species might have been transferred to the area by shipping, as larvae in the ballast water or adult in hull fouling.

This is not the first case that a newly described species turns out to be an alien for the region. For example, a polychaete species *Syllis ergeni* was originally described from the Aegean Sea and later proved to be a Lessepsian species (Çinar 2005; Çinar *et al.* 2019).

In conclusion, the sudden appearance of this species on the Levantine coast of Turkey indicates that *N. toxifera* could be an alien species for the Mediterranean Sea, tending to expand its distributional range northwards like other sessile Lessepsian species. Its occurrence in harbour environments might indicate that its spread might also be associated with ship traffic. The on-going surveillance programs or citizen-science initiatives in the Mediterranean and Red Sea would undoubtedly provide more distribution data to unveil its alien status, origin, and invasive potential.

Muhtemel Lesepsiyen tür *Niphates toxifera* (Porifera, Demospongiae) Türkiye kıyılarına yerleşiyor

Öz

Bu makale, *Niphates toxifera*'nın (Porifera) Türkiye'nin Levanten (Doğu Akdeniz) kıyılarında bulunmasını ele almaktadır. İlk olarak Lübnan kıyılarında tanımlanmış olan bu türün kısıtlı bir alanda (Beyrut-Suriye-İsrail) yayılım gösterdiği biliniyordu. Bu türün Şubat 2019'da kuzeye doğru yayıldığını gösteren üç örneği İskenderun Körfezi (kuzeydoğu Levanten Denizi) yakınlarında Samandağ açıklarındaki kayalar üzerinden (mağara duvarları dâhil) 10-15 m'de fotoğraflanarak toplandı. Bu türün dağılım modeli ve devam eden yayılım genişletme eğilimi, Lesepsiyen- tür olma olasılığına işaret etmektedir. Bu tür aynı zaman Türkiye sünger faunası için yeni bir kayıttır. Türün morfolojik ve dağılım özellikleri sunulmuştur.

Anahtar kelimeler: Süngerler, yabancı türler, biyolojik çeşitlilik, dağılım, Levanten Denizi, Türkiye, Doğu Akdeniz

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