

## Preliminary inventory of marine fouling invertebrates' community in Abu-Qir Port, Alexandria, Egyptian Mediterranean Sea

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Notes on non-indigenous species (NIS), and the questionable species, recorded from Abu-Qir Port, Alexandria, Egypt, through a rapid assessment survey

### PORIFERA

#### *Paraleucilla magna* Klautau, Monteiro & Borojevic, 2004

*Paraleucilla magna* is a calcareous sponge, typically inhabiting shallow depths. Its native geographical origin is still undetermined (Klautau *et al.*, 2004). However, the genus *Paraleucilla* was unknown outside the Indo-Pacific, indicating that it should be considered non-indigenous to the Mediterranean Sea (Klautau *et al.*, 2004; Longo *et al.*, 2007). This sponge was first recorded as a NIS from the south-western Atlantic coast of Brazil (Rio de Janeiro) (Klautau *et al.*, 2004). *Paraleucilla magna* is also known as a NIS from the eastern Atlantic (Azores Archipelagos, Madeira Island, Portugal, and the Iberian Peninsula) (Guardiola *et al.*, 2016), the Sea of Marmara (Topaloğlu *et al.*, 2016), and the Mediterranean basin. In the Mediterranean, *P. magna* was first recorded from Spain in 2000 (Frotscher & Uriz, 2008). By the beginning of the 21<sup>st</sup> century, *P. magna* had been reported from several areas along the Italian coastline: the Ionian, the Tyrrhenian, and the southern Adriatic Seas (Longo *et al.*, 2004, 2007). It has also been recorded from Sicilian and Sardinian waters (Ulman *et al.*, 2017; Tempesti *et al.*, 2022a; Tiralongo *et al.*, 2022). Furthermore, it was recorded from Cyprus, Greece, Montenegro, Croatia, Slovenia, Malta, and France (Ulman *et al.*, 2017 and references therein; Katsanevakis *et al.*, 2020 and references therein; Tempesti *et al.*, 2022a). In the southern Mediterranean region, *P. magna* is known from Syria (Ammar, 2023), Lebanon (Ramos-Esplá *et al.*, 2017), Libya (Katsanevakis *et al.*, 2020), Tunisia (Chebaane *et al.*, 2019; Sghaier *et al.*, 2019), Algeria (Bachetarzi *et al.*, 2019; Bensari *et al.*, 2020), and Morocco (El Moussaoui *et al.*, 2024). The present work reports the occurrence of *P. magna* for the first time from the south-eastern Mediterranean waters (Alexandria, Egypt).

*Paraleucilla magna* was likely introduced to the Mediterranean Sea via mussel farming and aquaculture (Longo *et al.*, 2007). The *r*-selected reproductive strategy of *P. magna* (Longo *et al.*, 2012), and its resilience to polluted habitats are advantages that have allowed this species to become established in the Mediterranean basin (Longo *et al.*, 2007; Evcen & Çınar, 2020). Although *P. magna* negatively impacts commercial mussel farms (Longo *et al.*, 2007), the economic benefits of this sponge as a source of alternative natural antifouling products should be considered (Longo *et al.*, 2021).

### ANNELIDA (POLYCHAETA)

#### *Linopherus canariensis* Langerhans, 1881

The fireworm *Linopherus canariensis* is an amphinomid known from the north Atlantic, with type locality in the Canary Islands (Núñez *et al.*, 1991). The species has been reported from Panama, Mexico, and Cuba (Cosentino & Giacobbe, 2011). The species has also been recorded as a NIS from Rio de Janeiro (south-east Brazil) (Peixoto & Santos, 2015). *Linopherus canariensis* was already known as a NIS in the south-eastern Mediterranean. It was first recorded in Lebanon (Laubier, 1966) and Israel (Ben-Eliahu, 1976) as *L. acarunculatus* (Monro, 1937) (see Çınar, 2009), then it appeared along the Turkish and Cypriot waters (reported as *Pseudeurythoe acarunculata* (Ergen & Çınar, 1997; Çınar, 2005a; Çınar, 2009), and in Greece (Chatzigeorgiou *et al.*, 2016). In the western Mediterranean, it is only known from the southernmost part of Italian waters (Cosentino & Giacobbe, 2011; Occhipinti-Ambrogi *et al.*, 2011; Langeneck *et al.*, 2020). The species is also known from Alexandria, Egypt, first observed in 2005 (Dorgham *et al.*, 2014; Dorgham & Hamdy, 2015) and can be considered an established NIS.

*Linopherus canariensis* can tolerate stressed, hypoxic and dystrophic environmental conditions, with its invasion

potential enhanced by its physiological tolerance, ecological flexibility and the ability to reproduce asexually (Cosentino & Giacobbe, 2011).

### ***Dorvillea similis* (Crossland, 1924)**

*Dorvillea similis* is a species originally described from the Gulf of Suez (Crossland, 1924) and subsequently reported from the Red Sea, the Indian Ocean and the western Pacific Ocean (Imajima, 1992). It was first observed in the Mediterranean along the Lebanese Levantine coast in 2002 (Toso *et al.*, 2024), and it is now widespread, with established populations in shallow water habitats along the southern Turkish coasts (Çinar, 2009). In addition, it was observed in Cyprus (Rousou *et al.*, 2023), Egypt (Elebiary, 2022; Abdelsalam & Elebiary, 2023; Hamdy *et al.*, 2023), the eastern Aegean Sea (Rhodos Island, Greece) (Corsini-Foka *et al.*, 2015), and various localities in Italy (Ragazzola *et al.*, 2021; Langeneck *et al.*, 2024 and references therein). The appearance of *D. similis* in the eastern Mediterranean basin is likely to be associated with a Lessepsian invasion (Çinar, 2009), through a natural dispersal mechanism across the Suez Canal. *Dorvillea similis* could be present in other Mediterranean countries; however, the detection of its presence could be hindered by the close similarity between this species and the native *Dorvillea rubrovittata* (Dragičević *et al.*, 2019).

### ***Leodice antennata* Savigny in Lamarck, 1818**

*Leodice antennata*, previously reported as *Eunice antennata*, has its type locality in the Red Sea (Savigny, 1826). This species is a well-known Lessepsian invader in the eastern Mediterranean region; it was recorded from Türkiye, Antalya Bay (Ergen & Çinar, 1997; Kurt Şahin & Çinar, 2009), and from the Aegean Sea, Ildir Bay (Çinar *et al.*, 2021), with dense populations causing changes in the benthic communities of the Levant coast of Türkiye (Kurt Şahin & Çinar, 2009). It was also recorded from Egypt, Alexandria (Abd-Elnaby, 2005; Dorgham *et al.*, 2014), Tunisia (Ounifi-Ben Amor *et al.*, 2015a), and recently from Lebanese waters (Fortič *et al.*, 2023) and Cyprus (J. Langeneck, *unpublished*). Conversely, its occurrence in Italian waters (Cantone *et al.*, 1993) is questionable (Langeneck *et al.*, 2020) and probably represents a misidentification with the native *Eunice vittata* (Delle Chiaje, 1828).

### ***Pseudonereis anomala* Gravier, 1899**

*Pseudonereis anomala* is considered one of the most common NIS in the Mediterranean basin (Çinar & Ergen, 2005; Kurt *et al.*, 2021), having entered from the Red Sea through the Suez Canal (Fauvel, 1927; Ben-Eliahu, 1991). It was observed as early as the early 20<sup>th</sup> century in the Mediterranean off Alexandria, Egypt (Fauvel, 1937). Since then, its distribution expanded widely to cover the entire Levantine and Aegean seas (Laubier, 1966; Çinar & Ergen, 2005; Kambouroglou & Nicolaidou, 2006a, b; Corsini-Foka *et al.*, 2015), the Ionian coasts of Italy (D'Alessandro *et al.*, 2016; Langeneck *et al.*, 2024), Algeria (Kurt *et al.*, 2021), and recently the Sea of Marmara (Ragkousis *et al.*, 2023).

In the eastern Mediterranean, *P. anomala* is considered a crucial component of shallow water benthic community (Çinar & Altun, 2007; Dorgham *et al.*, 2013). It competes with other native species for niche and food (Ben-Eliahu, 1989; Çinar & Ergen, 2005). In Egypt, *P. anomala* is commercially important, usually sold as live bait to fishermen and sea anglers (Hamdy *et al.*, 2014).

### ***Oenone fulgida* (Savigny in Lamarck, 1818)**

*Oenone fulgida* is a species that inhabits the tropical Indo-West Pacific waters, the Red Sea and the Suez Canal (Amoureux *et al.*, 1978; Abd-Elnaby, 2009); it is also known in the Somali waters (Cantone, 1982). It was first recorded in the Mediterranean from the Tyrrhenian Sea, Sicily, Italy in 1987 (Cantone, 1996; Langeneck *et al.*, 2020), and later from Lebanon (Toso *et al.*, 2024), Israel (Langeneck *et al.*, 2020), and Cyprus, as a questionable species (Çinar, 2005a). *Oenone fulgida* is a thermophilous taxon, possibly corresponding to a species complex (Langeneck *et al.*, 2020; Toso *et al.*, 2024), but it is likely to be a NIS in the Mediterranean, although some records could refer to other species (Langeneck *et al.*, 2020). Still unreported within the Egyptian Mediterranean polychaetes checklist (Abd-Elnaby, 2009), this species is reported here from Abu-Qir Port, Alexandria, Egypt, for the first time.

### ***Hydroides dirampha* Mörch, 1863**

*Hydroides dirampha* is a tropical western Atlantic species, first described from the US Virgin Islands (Zibrowius, 1971). It is considered a circumtropical species known from the Gulf of Mexico, the Caribbean, the West Indies, Brazil,

Australia, and the Red Sea (Zibrowius, 1971; Bastida-Zavala & ten Hove, 2002, 2003; Bastida-Zavala, 2008; Sun *et al.*, 2015).

*Hydroides dirampha* has been reported in the Mediterranean basin since the 1860s; it probably arrived through accidental transfer by ship hulls. The species was first recorded as *Eupomatus lunifer* from the Gulf of Naples, Italy (Claparède, 1870); it was then observed in Spain in 1923 (Zibrowius, 1973). The species was later recorded from the southern Mediterranean, first in Egypt (Zibrowius, 1973), then in Lebanon (Zibrowius & Bitar, 1981), Israel (Ben-Eliahu & ten Hove, 1992), Tunisia (Zibrowius, 1978), and Algeria (as *H. lunulifera* - Rebzani-Zahaf, 2003 in Bensari *et al.*, 2020). Along the north-eastern and central Mediterranean, *H. dirampha* has also been observed in Cyprus, Türkiye, Greece, the Adriatic coasts of Montenegro and Italy, and Malta (Çinar, 2006; Corsini-Foka *et al.*, 2015; Ulman *et al.*, 2017 and references therein; Spagnolo *et al.*, 2019). Experimental studies showed that *H. dirampha* is more resistant to elevated temperature and salinity stress than the congener *H. elegans* (Liu *et al.*, 2020). This physiological tolerance could help *H. dirampha* dominate communities in some regions (Liu *et al.*, 2020).

### ***Hydroides elegans* (Haswell, 1883)**

The serpulid *Hydroides elegans* is a circumtropical species, the distribution of which is nowadays almost circumglobal, extending to warm-temperate areas. In the first half of the 19<sup>th</sup> century, *H. elegans* was introduced to the Mediterranean through ship hulls (Zibrowius, 1991). The species was first recorded in the Gulf of Naples, Italy, as *Eupomatus pectinatus* (Philippi, 1844), but the description provided does not allow for a clear discrimination between *Hydroides norvegica* Gunnerus, 1768 and *H. elegans*. In fact, the identification of *H. elegans* mostly relies on its ecology, as it is very common in shallow environments close to ports, rather than in the deep environments typical of *H. norvegica*. In the Mediterranean, *H. elegans* has been usually observed in port environments, growing mainly on man-made structures (Claparède, 1870; Bianchi, 1981; Koçak *et al.*, 1999; Galil & Gevili, 2014), thus supporting the assumption that it is to be considered non-indigenous (Carlton & Schwindt, 2024). Based on molecular data, *H. elegans* is a species complex, with more than one lineage in the Mediterranean basin (Grosse *et al.*, 2021). In Egypt, *H. elegans* was first recorded in Alexandria from the East Harbour (Selim, 1978) and is considered a dominant serpulid in this port (Ramadan *et al.*, 2006; Hamdy & Dorgham, 2019). The physiological tolerance to different environmental factors, such as salinity and temperature fluctuations, and its short planktonic larval stage, which lasted for about one week before settlement (Qiu & Qian, 1997), give this species the advantage of being one of the most widespread fouler invaders in the basin (Koçak *et al.*, 1999; Sun *et al.*, 2015; Ulman *et al.*, 2017).

### ***Hydroides operculata* (Treadwell, 1929)**

*Hydroides operculata* was originally described as *Eupomatus operculatus* from East Africa and the Gulf of Aden. It is a known complex of morphologically similar and widely distributed species (Sun *et al.*, 2015, 2017). The identity of individuals sampled in the Mediterranean Sea has never been checked through molecular means, leading to some taxonomic uncertainty. Nevertheless, the native serpulid fauna of the Mediterranean Sea is well-known and has been the subject of several revisions, and *H. operculata* should be considered non-indigenous in the Mediterranean Sea.

*Hydroides operculata* was recorded in the eastern Mediterranean as a Lessepsian invader, first from Israel in 1972 (Ben-Eliahu, 1976), and subsequently from Beirut Port, Lebanon (as *H. operculatus*) (Zibrowius & Bitar, 1981), Türkiye (Çinar, 2006), and more recently in Egypt, from Miami beach in Alexandria, colonizing the shell of the non-indigenous pearl oyster *Pinctada radiata* (Abdelsalam & Elebiary, 2023). The present paper provides an additional record of *H. operculata* from Abu-Qir Port, Alexandria, indicating its establishment along the Alexandria coast.

### ***Spirobranchus cf. kraussii* (Baird, 1865)**

*Spirobranchus kraussii*, known previously as *Pomatoleios kraussii*, was originally described from South Africa (Baird, 1865), with its distribution expanding to the Indo-Pacific (Straughan, 1967), the southern part of the Persian Gulf from Kuwait to Saudi Arabia (Crisp, 1977), the Suez Canal (Fauvel, 1927), and the Suez Bay (Ghobashy *et al.*, 1986). However, the original description refers to individuals sampled in temperate waters, suggesting that reports from tropical/sub-tropical regions might refer to different species (Simon *et al.*, 2019).

*Spirobranchus kraussii* has been considered as a NIS in the Mediterranean, probably entering via the Suez Canal, first reported from the coasts of Israel (Ben-Eliahu, 1991), then from Egypt at Port Said (Heaba, 1987), Lebanon (Zibrowius & Bitar, 2003), Syria (Bitar, 2005), and Türkiye (Çinar, 2006; Çinar *et al.*, 2017).

*Spirobranchus kraussii* has been recently considered as a complex of species, based on phylogenetic analysis of DNA (Simon *et al.*, 2019) and should be revised. The Levantine population, even if possibly corresponding to an undescribed species/lineage reported here as *Spirobranchus cf. kraussii*, would maintain its non-indigenous status in the Mediterranean (Zenetos & Galanidi, 2020).

### ***Spirobranchus arabicus* Monro, 1937**

According to Kupriyanova *et al.* (2025), this is the correct name for the species historically reported from the Mediterranean Sea as *Spirobranchus tetraceros* (Schmarda, 1861). *Spirobranchus tetraceros* s.s. is currently known with certainty only from the eastern coast of Australia (Kupriyanova *et al.*, 2022). *Spirobranchus arabicus* has been known from the Mediterranean since the mid-20<sup>th</sup> century; it ranked among the 100 worst invasive species (Streftaris & Zenetos, 2006). It was first recorded from Lebanon (Laubier, 1966), as *Spirobranchus giganteus coutierei* (Gravier, 1905). After that record, the species was collected from different Mediterranean countries, including Syria, Israel, Cyprus, Türkiye, Egypt, Greece, and France (Ben-Eliahu, 1972; Amoureux, 1976; Zibrowius, 1979; Ben-Eliahu, 1991; Bitar *et al.*, 2003; Çinar *et al.*, 2006). Since 2016, *S. arabicus* has undergone a westward expansion, being recorded as *S. tetraceros* in Italy (Sicily; Ulman *et al.*, 2017) and Spain (Valencia port; Palero *et al.*, 2020).

*Spirobranchus arabicus* was assumed to have entered the Mediterranean basin via the Suez Canal (Çinar, 2013). However, based on recent data, *S. arabicus* is not present in the Red Sea, and its native range is restricted to the Arabian Gulf and western Indian Ocean, supporting the hypothesis of a ship-mediated introduction (Kupriyanova *et al.*, 2025).

### ***Branchiosyllis exilis* (Gravier, 1900)**

Due to its type locality in the Red Sea (Gravier, 1900), *B. exilis* is considered a NIS in the Mediterranean Sea. However, due to its widespread distribution in the Mediterranean and the Atlantic regions, it was later excluded from the Mediterranean NIS list (Zenetos *et al.*, 2005). Most *B. exilis* records in the Mediterranean Sea likely do not refer to this species, but rather to *Branchiosyllis cirropunctata* (Michel, 1909), a species with type locality in the Mediterranean and historically synonymized with *B. exilis*, which however possesses some distinct morphological features and was recently reinstated (San Martín *et al.*, 2008). Materials from Alexandria match closely the redescription of *B. exilis* given by Lucas *et al.* (2017) from Socotra Island, at the same latitude and approximately 300 km east of the type locality. Re-examination of other preserved Mediterranean materials is advisable, to determine whether it corresponds to *B. cirropunctata* or to *B. exilis*.

### ***Syllis ergeni* Çinar, 2005**

*Syllis ergeni* is a syllid species most likely native to the Red Sea, described 20 years ago from the Turkish coast of the Aegean Sea (Alsancak Harbour; inner part of Izmir Bay), on specimens associated with *Mytilus galloprovincialis* mussel beds and *Hydroides* spp. (Çinar, 2005b). Five years later, it was found on the Mediterranean coast of Egypt, at El Alamein, Matrouh (Abd-Elnaby & San Martín, 2011) and Alexandria (Dorgham *et al.*, 2014), and recently in Cyprus (Rousou *et al.*, 2023). Initially considered endemic to the Mediterranean basin, *Syllis ergeni* was recently included in the Mediterranean NIS list (Çinar *et al.*, 2021) based on its distribution restricted to the Levantine Sea, its dominance of the benthic communities in this area, and its presence in the Red Sea and Pacific Ocean (Çinar *et al.*, 2017; San Martín *et al.*, 2024). Its introduction into the Mediterranean could be associated with migration through the Suez Canal or transport through ballast waters and/or ship fouling (Çinar, 2005b; Çinar *et al.*, 2021).

### ***Syllis crassicirrata* (Treadwell, 1925)**

*Syllis crassicirrata* is distributed along the Pacific and Indian Oceans, and is well known in Hawaii, Polynesia, New Zealand, Australia, Northern Colombia, and the Socotra Archipelago (Hartmann-Schröder, 1991; Magalhães & Bailey-Brock, 2014; Álvarez-Campos *et al.*, 2015; Rodríguez *et al.*, 2020; Castro *et al.*, 2021). In 2016, the species was first recorded along the Jeddah coast, Red Sea (Ba-Akdah *et al.*, 2018) based on 15 individuals on artificial submerged panels. These animals showed five different colour patterns; molecular studies confirmed that they represented more than one lineage (Ba-Akdah *et al.*, 2018). The species was also recorded from Lebanon based on materials collected since 2002 (Toso *et al.*, 2024) and in Greece since 2020 (Chatzigeorgiou *et al.*, 2022; Zenetos *et al.*, 2025). Its introduction to the Mediterranean as a Lessepsian migrant was confirmed by genetic analysis (Toso *et al.*, 2024). The more than 25 individuals from Abu-Qir Port, Alexandria, Egypt confirm the presence of *S. crassicirrata* in the south-eastern Mediterranean basin.

## MOLLUSCA (BIVALVIA)

### *Brachidontes pharaonis* (Fischer, 1870)

The Red Sea mussel *Brachidontes pharaonis*, originating from the Indo-Pacific region, is a small Lessepsian bivalve and among the earliest-recorded Mediterranean NIS. Seven years after the Suez Canal opening, *B. pharaonis* was recorded from Port Said, Egypt (Fuchs, 1878), and has since colonized the entire eastern Mediterranean basin (Rilov *et al.*, 2004; Zenetos *et al.*, 2004) and spread westwards to recently reach the Iberian Peninsula (Murcia-Requena *et al.*, 2020). Its spreading and establishment have been favoured by its broad tolerance to thermal and salinity ranges, its physiological plasticity, and its life history traits, including high fecundity, planktonic larval stages, and early gonadal maturation (Sarà *et al.*, 2000).

*Brachidontes pharaonis* is a highly competitive species for food and space (Safriel *et al.*, 1980), able to change the community structure in many areas of the Israeli coast by displacing the native mussel *Mytilaster minimus* (Rilov *et al.*, 2001, 2004), and forming “mytilid beds” in rocky mediolittoral zones (Rilov *et al.*, 2004). Such mussel beds provide a suitable substratum for many epibionts (Lohse, 1993), and increase species richness compared to barren grounds (Borthagaray & Carranza, 2007), but on a regional scale, they might cause a decline in species diversity (Lodge, 1993).

## CRUSTACEA (AMPHIPODA)

### *Ampithoe bizseli* Özaydinli & Coleman, 2012

The peracarid *Ampithoe bizseli* probably originates from the Indian Ocean and the Red Sea area. This species was first recorded as a new amphipod species from the west coast of Türkiye, with one confirmed record for the Red Sea, possibly occurring off Tanzania (Özaydinli & Coleman, 2012). The only further Mediterranean record is from Cyprus (Ulman *et al.*, 2017). Probably, *A. bizseli* distribution is wider than currently known, since some specimens may have been historically misidentified as *Ampithoe ramondi* Audouin, 1826, a species described from Egypt with a cosmopolitan distribution in warm and temperate seas (Griffiths, 1973). However, materials from the Mediterranean basin showed some variations between *A. ramondi* and *A. bizseli*, mainly in the morphology of the second gnathopod (Schellenberg, 1928; Özaydinli & Coleman, 2012). The current finding from Alexandria, Egypt, represents the first evidence of *A. bizseli* occurrence in the south-eastern Mediterranean basin, although it has probably already present but misidentified (i.e., as *A. ramondi*). *Ampithoe bizseli* was likely introduced to the Mediterranean through the Suez Canal.

### *Bemlos leptochirus* (Walker, 1909)

*Bemlos leptochirus* is native to the Indian Ocean, the Red Sea, and the Suez Canal (Schellenberg, 1928). Until recently, it was known in the Mediterranean from the coasts of Egypt, with single records from Port Said and Alexandria (Schellenberg, 1928; Bellan-Santini *et al.*, 1998). The species was later recorded from two marinas in Greece (Ulman *et al.*, 2017), Israel (Lo Brutto & Iacofano, 2020) and Lebanon (Mancini *et al.*, *in press*), where it was presumably transported through hull and biofouling. The present record from Abu-Qir, Alexandria, suggests the persistence of *B. leptochirus* in an area where it was already known. The introduction of this species to the Egyptian Mediterranean coast is via the Suez Canal.

### *Caprella scaura* Templeton, 1836

*Caprella scaura* is one of the most widely distributed NIS species globally (Galil *et al.*, 2014; Ramalhosa & Canning-Clode, 2015; Chebaane *et al.*, 2018), originally described from Mauritius and likely native to the Indian Ocean (El Kamcha *et al.*, 2020).

*Caprella scaura* first occurrence in the Mediterranean was from Taranto, Italy, in 1989 (Scipione, 2015). Subsequently, its distribution expanded to reach Türkiye, Greece, Croatia, Slovenia, Malta, France, and Spain (El Kamcha *et al.*, 2020, and references therein). In the southern Mediterranean, *C. scaura* was reported from Tunisia (Ben Souissi *et al.*, 2010; Chebaane *et al.*, 2018) and Morocco (Ros *et al.*, 2014; El Kamcha *et al.*, 2020), while this is its first record from the Levantine Sea.

*Caprella scaura* is a highly spread caprellid species (Ros *et al.*, 2015), and more than 70% of its Mediterranean records are from man-made substrates in harbours and marinas (El Kamcha *et al.*, 2020), supporting the hypothesis of shipping as its main introduction pathway (Ruiz *et al.*, 2000; El Kamcha *et al.*, 2020). In addition, *C. scaura* is usually found associated with the bryozoans *Bugula neritina* and *Amathia verticillata*, which are main components of fouling communities (Ros *et al.*, 2014; Marchini *et al.*, 2015; Tempesti *et al.*, 2022b). It has been observed that *C. scaura* can

easily travel on recreational boats, associated with different sessile species, including the above-mentioned bryozoans (Ulman *et al.*, 2019).

### ***Laticorophium baconi* (Shoemaker, 1934)**

*Laticorophium baconi* is a species originating from the north-eastern Pacific (Shoemaker, 1934, 1949; Bousfield & Hoover, 1997), and was first described from California (Shoemaker, 1934). Since then, it has been reported from the Hawaiian Islands (Barnard, 1970, 1971), Hong Kong, the China Sea (Hirayama, 1986), British Columbia (Otte, 1975), Brazil (Valério-Berardo & De Souza, 2009), Australia (Ahyong & Wilkens, 2011; Guerra-García *et al.*, 2023), the Atlantic coast of the Iberian Peninsula (Saenz-Arias *et al.*, 2022), New Caledonia, and Saudi Arabia (Red Sea) (Guerra-García *et al.*, 2023). The first record of *L. baconi* in the Mediterranean Sea dates back to 2010, from preserved materials collected in Spain (marina of La Línea, Cádiz, and fish farms of Guardamar del Segura, Alicante), and Italy (Olbia and La Spezia ports) (Guerra-García *et al.*, 2023). Many individuals were further recorded recently from different locations along the Mediterranean basin, including Egypt, Greece, Italy, Tunisia, France, Spain, and Morocco (Guerra-García *et al.*, 2023).

In the Mediterranean, *L. baconi* was mostly recorded from marinas and ports with high suspended organic matter, suggesting its introduction via ship fouling (Marchini & Cardeccia, 2017; Gouillieux & Sauriau, 2019).

The Alexandria record of *L. baconi* is the only one from the Levantine basin. *Laticorophium baconi* is morphologically similar to the cryptogenic species *Apocorophium acutum* (Chevreux, 1908), whose records might partly correspond to misidentifications of *L. baconi*. Regular monitoring is recommended for corophiid species in Mediterranean marinas and ports to accurately assess the extent of *L. baconi* spread in the basin.

### ***Dulichella fresnelii* (Audouin, 1826)**

To date, 20 species of the genus *Dulichella* are known, nine of which occurring in the Atlantic Ocean, ten in the Indian and Pacific regions, and only one in the Suez Canal and the Egyptian part of the Red Sea (Lowry & Springthorpe, 2007; Tomikawa & Komatsu, 2012; Alves *et al.*, 2014; Paz-Ríos & Ardisson, 2014; Wongkamhaeng *et al.*, 2014; Myers, 2016; Cummings *et al.*, 2021).

Males of *Dulichella* are characterised by a distolateral crown of spines (2, 3, or 4) on the propodus of gnathopod 2, and by the pattern of dorsolateral spines on the pleosomites and urosomites (Lowry & Springthorpe, 2007).

*Dulichella fresnelii* is a marine epibenthic species mainly known from the Red Sea and the Little Bitter Lake, Suez Canal, and has so far remained unrecorded from the Mediterranean basin. During the current study, several males and non-ovigerous females of this species were found for the first time in Mediterranean waters, indicating the establishment of *D. fresnelii* in the southern Levantine basin.

The introduction of *D. fresnelii* to the Mediterranean basin is presumably due to fouling associated with vessels. However, regular monitoring in the south-eastern Mediterranean ports and marinas is needed to examine the distribution, ecology, feeding behaviour, and reproduction of this NIS.

### ***Stenothoe georgiana* Bynum & Fox 1977**

*Stenothoe georgiana* was originally described in the western Atlantic (Bynum & Fox, 1977), from where it successfully extended to the southern Pacific coast of Australia, and the eastern Atlantic coasts of Macaronesia and Portugal (Martínez-Laiz *et al.*, 2020). Since 2010, *S. georgiana* has been recorded from the Mediterranean, where the species was found associated with algae, sea anemones, and mussels in Alicante and Murcia, Spain (Fernandez-Gonzalez & Sanchez-Jerez, 2017). *Stenothoe georgiana* was later reported from various localities in Slovenia, Italy, Malta, and France (Ferrario *et al.*, 2017, 2018; Ulman *et al.*, 2017).

The present work revealed unexpected additional records in the eastern Mediterranean, from Alexandria, Egypt, which add to its occurrence in North African, in Ceuta waters (Martínez-Laiz *et al.*, 2020).

*Stenothoe georgiana* is likely to have been introduced by a combination of vectors and pathways (Carlton & Ruiz, 2005), among which aquaculture, shipping fouling, ballast waters, and recreational boats have been recognised (Fernandez-Gonzalez & Sanchez-Jerez, 2017; Ulman *et al.*, 2017). The pathways of *S. georgiana* introduction to Egyptian waters are still unknown, but are likely related to maritime navigation. Continuous sampling efforts in Egyptian ports and marinas are necessary to obtain more information on the species.

## CRUSTACEA (CIRRIPEDA)

### *Amphibalanus eburneus* (Gould, 1841)

*Amphibalanus eburneus* originates from the western Atlantic (Kaplan, 1988; Fofonoff *et al.*, 2018). This species has been introduced worldwide to other regions including the North Pacific, the Indian Ocean, and the north-eastern Atlantic. Since the 1900s *A. eburneus* has been reported from the Mediterranean and the Black Seas, with a first record from the Adriatic coast of Italy (Chiereghin, 1818), then from Egypt in 1958 (Banoub, 1960), followed by others in many Mediterranean countries, including Türkiye, Greece, Albania, Montenegro, Croatia, Slovenia, Italy, Tunisia, and France (Bishop, 1951; Kattoulas *et al.*, 1972; Zenetos *et al.*, 2011; El Lakhrah *et al.*, 2012; Spagnolo *et al.*, 2019; Travizi *et al.*, 2019; Osca & Crocetta, 2020 and references therein; Çinar *et al.*, 2021). However, due to the lack of taxonomic expertise on Cirripedia, the distribution of *A. eburneus* in the Mediterranean remains unclear.

*Amphibalanus eburneus* is a common fouling organism that has costly impacts on ships (Visscher, 1927; Haderlie, 1984). Its spreading presumably happens via maritime navigation, mainly through fouling.

### *Balanus trigonus* Darwin, 1854

The triangle barnacle, *Balanus trigonus*, is native to the Indian and Pacific Oceans. The species was first described from the Pacific (Darwin, 1854), and its distribution ranges from California to the Peru coastline, including the Gulf of California (Pitombo & Ross, 2002). It is also known from Japan, Australia, New Zealand, and the Red Sea. In the 1860s, *B. trigonus* was recorded from the western Atlantic, on the Brazilian coast as non-indigenous (Zullo, 1992). Between the 1950s and 1960s, *B. trigonus* extended its range to reach the Atlantic, where it was recorded from North America, and the eastern Atlantic from the Azores to South Africa (Moore & McPherson, 1963; Gittings, 1985). In the Mediterranean basin, this taxon was first observed in 1927 in the Gulf of Catania, Italy (Patanè, 1927), later reaching the Italian Tyrrhenian, Ionian and Adriatic coasts (Relini, 1968), and other northern Mediterranean countries, including Cyprus (Ulman *et al.*, 2017), Greece (Koukouras & Matsa, 1998), Croatia (Igić, 2007), Slovenia (Mavrič *et al.*, 2010), and France (Arnaud *et al.*, 1979). *Balanus trigonus* has also been found in Egypt since 1933 (Broch, 1935; Ghobashy, 1976), Türkiye (Koçak *et al.*, 1999), Syria (Bitar, 2005), and Lebanon (Bitar & Kouli-Bitar, 2001). The introduction of *B. trigonus* is likely related to aquaculture with specimens transported as epibionts on other marine fauna, mainly on mussels and decapod crustaceans (Zullo, 1992; Hendrickx & Ramírez-Félix, 2019).

## CRUSTACEA (ISOPODA)

### *Mesanthura romulea* Poore & Lew-Ton, 1986

Members of the genus *Mesanthura* are distinguished based on the pigmentation pattern on their dorsal side; although further morphological characters are also considered in their identification (Lorenti *et al.*, 2009). On the Mediterranean scale, the genus *Mesanthura* was first reported from El Burollus Lake, Egypt (as *Mesanthura* sp.; Samaan *et al.*, 1989); however, the morphological description of this record was incomplete, thus limiting the comparison of materials due to the absence of taxonomic details (Ulman *et al.*, 2017). Presently, two species of *Mesanthura* are known from the Mediterranean, namely *Mesanthura romulea* Poore & Lew-Ton, 1986, described from south-eastern Australia, and *Mesanthura pacoi* Castelló, 2017, described and only known from Lebanon and Cyprus (Castelló, 2017).

*Mesanthura romulea* was first recorded in 2000 from the Ionian and the Tyrrhenian Seas, Italy (Lorenti *et al.*, 2009), subsequently from ports of Cyprus, Greece, Malta, France “Corsica”, and Spain (Ulman *et al.*, 2017; Tempesti *et al.*, 2025), and recently from Egypt (Alexandria) attached to shells of the non-indigenous oyster *P. radiata* (Abdelsalam & Elebiary, 2023). Initially reported as *M. cf. romulea*, due to morphological uncertainties, the identity of the species was subsequently confirmed by the original author of the species (Gary Poore), after analysis of Mediterranean specimens (M. Lorenti, A. Marchini pers. comm.).

*Mesanthura romulea* reported in the present study is similar to the specimens described from Australia (Poore & Lew-Ton, 1986) and other individuals reported as *M. cf. romulea* from the Mediterranean Sea (Ulman *et al.*, 2017). Since the description of *M. romulea* from Australia was based on two specimens only and its intraspecific variability is poorly understood, it is unclear whether all *Mesanthura* specimens sampled in the Mediterranean correspond to this species, with consequent uncertainties regarding the origin of these populations. Nonetheless, this species is very characteristic and was completely unknown in the Mediterranean Sea before the 21<sup>st</sup> century, supporting the hypothesis of an anthropogenic introduction.

### ***Paranthura japonica* Richardson 1909**

*Paranthura japonica* is a paranthurid isopod described by Richardson (1909) from materials collected from Muroran, North Japan and its origin is located between Japan, eastern Russia, and eastern China (Nunomura, 1975, 1977; Che & Morton, 1991; Moshchenko & Zvyagintsev, 2004). In 1993, it was recorded as non-indigenous from the Pacific US coasts (San Francisco Bay) (Cohen & Carlton, 1995). It was introduced to Europe most likely via aquaculture (Lavesque *et al.*, 2013). It was reported from the Mediterranean basin in several localities of Italy (in 2005, and between 2010 and 2012) (Marchini *et al.*, 2014), from the Iberian Peninsula (2011), the Strait of Gibraltar (2017) (Martínez-Laiz *et al.*, 2018), and further records exist in Greece, Slovenia, Malta Tunisia, Algeria, France, Spain, and Morocco (Marchini *et al.*, 2014, 2015; Tempesti *et al.*, 2016; Ulman *et al.*, 2017; Ragkousis *et al.*, 2020; Kacimi, 2023; Taybi *et al.*, 2025). *Paranthura japonica* is considered one of the most widespread NIS in the Mediterranean Sea (Ulman *et al.*, 2017), and the current study documents its arrival in Egyptian Mediterranean waters and the southern Levantine basin.

*Paranthura japonica* has probably entered the Mediterranean waters via several pathways and vectors (Ulman *et al.*, 2017) and its introduction in Egypt most likely occurred through hull fouling, rather than ballast waters from ship tanks. Like other peracarid crustaceans, this species lacks planktonic larval stages, and prefers clinging on hard substrates rather than burrowing in soft muddy sediments, due to the absence of statocysts that reduce its orientation abilities (Negoescu & Wägele, 1984).

### ***Paracerceis sculpta* (Holmes, 1904)**

*Paracerceis sculpta* is native to the north-eastern Pacific region, from the California to Mexico coastline (Hewitt & Campbell, 2001). It has been observed in many locations including Hawaii (Miller, 1968), Australia (Pires, 1980), Hong Kong (Bruce, 1990), Brazil (Harrison & Holdich, 1982), and North Arabian Sea off Pakistan (Yasmeen & Javed, 2001), the Azores (Marchini *et al.*, 2018), as well as the Suez Canal (Shalla, 1991).

*Paracerceis sculpta* was reported from the Mediterranean Sea since 1978, first from Tunisia (Rezig, 1978), and later from Greece, Rhodes (Ulman *et al.*, 2017), and several Italian sites (Forniz & Sconfiatti, 1983; Ferrario *et al.*, 2017, and references therein). In the Levantine basin, *P. sculpta* was reported from Cyprus, Türkiye (Ulman *et al.*, 2017), and Egypt: Port Said (Ramadan, 1986) and Alexandria (Ramadan *et al.*, 1998). *Paracerceis sculpta* was also reported in Greece (Katsanevakis *et al.*, 2014), Slovenia (Ferrario *et al.*, 2018), Malta (Ulman *et al.*, 2017), Algeria (Bensari *et al.*, 2020), France (Marchini *et al.*, 2015), Spain, Morocco (Martínez-Laiz *et al.*, 2018), and is considered common near the Strait of Gibraltar (Castelló & Carballo, 2001). The wide global distribution of this species is related to its ability to withstand harsh environmental conditions (Espinosa-Pérez & Hendrickx, 2002). In all cases, *P. sculpta* was collected in ports, confirming the occurrence of this species in biofouling communities and supporting ship-mediated transport.

#### ***Sphaeroma walkeri* Stebbing 1905**

*Sphaeroma walkeri* is a globally distributed thermophilic isopod, native to the Indian Ocean. It has been widely reported from warm and warm-temperate ports (Carlton & Iverson, 1981; Galil, 2008).

The first Mediterranean record from ship hulls in Port Said, Egypt, dates back to 1924 (Omer-Cooper, 1927), followed by Alexandria, Egypt (Larwood, 1940). This species is believed to have entered the Mediterranean through the Suez Canal. Afterwards, it expanded its distribution range to reach Türkiye, France, and Spain (Kocatas, 1978; Jacobs, 1987; Zibrowius, 1991). At the beginning of the 21<sup>st</sup> century, *S. walkeri* was recorded in Tunisia (Ben Souissi *et al.*, 2003), where it is currently considered established (Ounifi-Ben Amor *et al.*, 2010). The species is also recorded from Lebanon (Castelló *et al.*, 2020), Israel (Galil, 2008), Greece (Ulman *et al.*, 2017), and Italy (Lodola *et al.*, 2012). *Sphaeroma walkeri* is a wood-boring species, observed occasionally in wood, stones, and empty skeletons of barnacles (Ounifi-Ben Amor *et al.*, 2010, 2015b). The Mediterranean population is seemingly able to breed throughout the year in some areas, although its reproductive biology is mainly affected by water temperature, salinity, and turbidity (Ounifi-Ben Amor *et al.*, 2015b).

## **BRYOZOA**

### ***Tricellaria inopinata* d'Hondt & Occhipinti-Ambrogi, 1985**

*Tricellaria inopinata* is probably native to the Pacific coast of North America (Dyrynda *et al.*, 2000; De Blauwe & Faasse, 2001). Described from the Lagoon of Venice in the Mediterranean more than 40 years ago (d'Hondt & Occhipinti-Ambrogi, 1985), the species is known as a NIS from New Zealand and is considered cryptogenic in Australia, Japan, the western Pacific, the European Atlantic coast, and Norwegian coastal waters (Occhipinti-Ambrogi & d'Hondt, 1994; Dyrynda *et al.*, 2000; Porter *et al.*, 2015).

In European waters, *T. inopinata* has active reproductive colonies with multiple broods almost all year round. Its ability for both sexual and asexual reproduction, its fast settlement, its lecithotrophic swimming larvae with rapid metamorphosis, and its wide temperature tolerance explain the success of this species in invading new regions (Occhipin-

ti-Ambrogi & d'Hondt, 1994; Marchini *et al.*, 2007; Johnson *et al.*, 2012).

Besides Italy, *T. inopinata* extends its range to six Mediterranean countries, Türkiye, Greece, Slovenia, Tunisia, Algeria, and France (Ulman *et al.*, 2017, and references therein; Fortič *et al.*, 2019; Tiralongo *et al.*, 2022; Bensari *et al.*, 2025). The present Alexandria finding represents the south-easternmost distribution of the species in the Mediterranean Sea, and its occurrence in a port suggests an introduction via maritime shipping.

#### ***Calypsotheca alexandriensis* Abdelsalam, Taylor & Dorgham 2017**

The genus *Calypsotheca* Harmer, 1957 is typical of the Indo-Pacific where it includes five species described from the Red Sea (Dumont, 1981). In the Mediterranean Sea, this genus is represented by two species only, namely *Calypsotheca rugosa* (Hayward, 1974), reported from Greece, and *Calypsotheca obscura* (Osburn, 1952), observed in the Strait of Gibraltar (Harmelin *et al.*, 1989). A third species *C. alexandriensis* (Abdelsalam *et al.*, 2017) was described from Alexandria, Egypt based on colonies collected in 2015, and considered a NIS with unknown origin.

The record of *C. alexandriensis* from Abu-Qir Port is the second record for this species, at only ~23 km from its first locality. *Calypsotheca alexandriensis* forms huge colonies with a striking dark orange colour. Its dispersal across Alexandria ports might be linked to recreational and small fishery boats (Abdelsalam *et al.*, 2017). Recent monitoring studies from the East Harbour of Alexandria revealed that *C. alexandriensis* acts as a bio-constructor, providing habitat and shelter to many taxa (Hamdy & Dorgham, 2019). Nevertheless, information about the ecology and reproduction of this bryozoan is still lacking and needs further studies.

#### ***Celleporaria brunnea* (Hincks, 1884)**

The north-eastern Pacific *Celleporaria brunnea* is a cheilostome bryozoan, with a native area extending from British Columbia (Canada) to the Galapagos Islands (Ecuador), and the Panama Canal (O'Donoghue & O'Donoghue, 1926; Hastings, 1929; Soule, 1961; Soule & Soule, 1965; Osman & Haugsness, 1981; Keough & Downes, 1982). *Celleporaria brunnea* is also known as a NIS from the north-western Pacific Ocean (South Korea) (Seo & Min, 2009), and the north-eastern Atlantic (Portuguese and French shores), and recently from Madeira (Canning-Clode *et al.*, 2013; André *et al.*, 2014; Souto *et al.*, 2023).

In the Mediterranean Sea, *C. brunnea* was first observed off Lebanon in 2003 (Harmelin, 2014) and in 2004 in Izmir Bay (Türkiye) as a fouler on *Mytilus galloprovincialis* (Koçak, 2007), and then subsequently widely recorded along southern Turkish coasts (Ulman *et al.*, 2017). *Celleporaria brunnea* is also known from Greece: Crete (Ulman *et al.*, 2017), Croatia (Marić *et al.*, 2016), Slovenia (Fortič *et al.*, 2019), several Italian ports (Lezzi *et al.*, 2015; Lodola *et al.*, 2015; Ulman *et al.*, 2017), Malta (Ulman *et al.*, 2017), Algeria (Bensari *et al.*, 2025), France, and Spain (Ulman *et al.*, 2017).

The current record from Egypt is the second for North Africa. Hull fouling is probably one of the main vectors of introduction and dispersal of *C. brunnea* in the Mediterranean and Atlantic regions (Lezzi *et al.*, 2015; Lodola *et al.*, 2015). The present finding on artificial structures inside a port suggests it may have entered the Egyptian waters via maritime traffic.

### **ECHINODERMATA**

#### ***Ophiactis savignyi* (Müller & Troschel, 1842)**

*Ophiactis savignyi* is native to the Indo-Pacific region and the Red Sea. It has been introduced to the Mediterranean Sea likely via the Suez Canal as a Lessepsian migrant (Çinar *et al.*, 2002; Galil, 2007). It was first recorded from Egypt in 1924 (Mortensen, 1926), and subsequently spread along the Levantine basin, where it was recorded from Syria (Ammar, 2023), Lebanon (Tortonese, 1966), Israel (Tortonese, 1953), Cyprus (Zibrowius, 2002; Katsanevakis *et al.*, 2020 in Supplementary material), and Türkiye (Çinar *et al.*, 2005). *Ophiactis savignyi* is also known from the Turkish and the Greek Aegean Sea (Çinar *et al.*, 2002; Pancucci-Papadopoulou *et al.*, 2005), and from the central Mediterranean of Tunisia (Ben Souissi & Zaouali, 2007). A single specimen was reported from the north-western Mediterranean of France, which is considered a casual record (Guille, 1969).

### **TUNICATA**

#### ***Ascidia cannelata* Oken, 1820**

*Ascidia cannelata* is native to the Indo-Pacific Ocean and the Red Sea (Pérès, 1958a, b), it has probably reached the Mediterranean via the Suez Canal. It seems established but remains localized, having so far as been recorded off Israel in 1955 (Pérès, 1958a, b; Izquierdo-Muñoz *et al.*, 2009; Shenkar & Loya, 2009) and Egypt (Abdel Messeih, 1994), where it

inhabits both artificial and natural habitats at a depth of up to 15 m.

### ***Ciona robusta* Hoshino and Tokioka, 1967**

*Ciona robusta* is most likely originated from the north-western Pacific region (Bouchemousse *et al.* 2016; Shenkar *et al.*, 2018). Since the 19<sup>th</sup> century, *C. robusta* has been introduced to the Mediterranean basin, first from the Egyptian waters early in 1816, as *Phallusia intestinalis* (Savigny 1816), and later spread to reach most of the Mediterranean countries, where it was reported as *Ciona intestinalis* (Dybern, 1965; Caputi *et al.*, 2015; Bouchemousse *et al.*, 2016). Brunetti *et al.* (2015) identified within *C. intestinalis* two cryptic species, referred to as type A (*C. robusta*) and type B (*C. intestinalis*), which can be morphologically differentiated by the occurrence of tubercular protuberances on the tunic near the siphons. *Ciona robusta* predominantly inhabits artificial substrates such as pilings, buoys, and aquaculture facilities (Wilson *et al.* 2022) and is seldom recorded on natural rocky habitats (Dumont *et al.*, 2011). This species is known to negatively affect the diversity of sessile assemblages (Robinson *et al.*, 2017), causing substantial impacts on mussel farms (Madariaga *et al.*, 2014), and competing for available substrates with reef-building corals (Shenkar *et al.*, 2018). Although it is widely distributed and abundant in ports and marinas of warm regions, a reduction in its abundance during the hot season has been documented (Kim *et al.*, 2019).

### ***Didemnum perlucidum* F. Monniot, 1983**

This species has a circumtropical distribution (Monniot & Monniot, 1996). Although it was originally described in the Caribbean (F. Monniot, 1983), its native origin remains unknown (Dias *et al.*, 2016). In the Mediterranean Sea, *D. perlucidum* seems established after its recent introduction via the Suez Canal. Since 2018 it has been recorded in Türkiye (Karahan *et al.*, 2023), Israel (Novak & Shenkar, 2020) and now in Egypt (Elgendy *et al.*, 2025), backdating its first record in the latter country to 2022 (this study). Previous studies showed that *D. perlucidum* is resistant to a wide range of temperatures and salinities, being highly reproductive throughout the year (Lambert, 2002; Muñoz & McDonald, 2014). Therefore, its further spread throughout the Mediterranean basin is expected.

### ***Polyclinum constellatum* Savigny, 1816**

*Polyclinum constellatum* has a circumtropical distribution (Van Name, 1945; Kott, 1992), and has recently been introduced into the Mediterranean Sea, probably via the Suez Canal, becoming established in the basin. It has been reported in Egypt in 1994 (Abdel Messeih, 1994; Halim *et al.*, 1995), subsequently in Türkiye (Aydin-Onen, 2018; Karahan *et al.*, 2023), Syria (Ammar, 2023), Greece and Italy (Montesanto *et al.*, 2022). The present record extends its distribution in Egypt by about 250 km west of its first record area, namely Port Said.

### ***Herdmania momus* (Savigny, 1816)**

*Herdmania momus* is native to the Indo-Pacific and the Red Sea and has been introduced to the Mediterranean area, where it is considered to be well-established in the Levantine basin, via the Suez Canal (Shenkar and Loya, 2008, 2009). In the Mediterranean, it was first recorded from Alexandria, Egypt (Harant, 1939), from where it spread (Zenetos *et al.*, 2012) to Syria (Bitar *et al.*, 2003), Lebanon ((Bitar & Kouli-Bitar, 2001; Monniot, 2002), Israel (Pérès, 1958a), Cyprus (Monniot, 2002; Nishikawa, 2002), Türkiye (Çinar *et al.*, 2006), the Greek waters, including Rhodes (Katsanevakis *et al.*, 2014; Stamouli *et al.*, 2017), and Malta (Evans *et al.*, 2013). The species was found attached to artificial as well as natural hard substrates (Çinar *et al.*, 2006; Bitar *et al.*, 2007; Shenkar & Loya, 2008; Gewing *et al.*, 2014).

### ***Microcosmus exasperatus* Heller 1878**

*Microcosmus exasperatus* is a solitary ascidian whose origin is unknown, and it is globally distributed in tropical and sub-tropical regions (Van Name, 1945; Kott, 1985; Monniot, 2002; Rocha *et al.*, 2012). *Microcosmus exasperatus* is considered to be non-indigenous in the Mediterranean, having been introduced through the Suez Canal since the 1990s, when the species was first reported from Lebanon in 1991 (Bitar & Bitar-Kouli, 1995) and later observed in further localities of the eastern basin (Méliane, 2002; Izquierdo-Muñoz *et al.*, 2009; Shenkar & Loya, 2009; Ramos-Esplá *et al.*, 2013; Gewing *et al.*, 2016; Ulman *et al.*, 2017; Golanski *et al.*, 2025). It is well-established, showing a reproductive period from late summer to late autumn (Rajzman-Nagar & Shenkar, 2016). Here, we report the occurrence of *M. exasperatus* from Egyptian Mediterranean water, which backdates the record of Elgendy *et al.* (2025) in 2023 from Port Fouad by a year.

### ***Styela plicata* (Lesueur, 1823)**

*Styela plicata* is a cosmopolitan fouling species. Although it was originally described on the warm temperate coast of the north-western Atlantic (Lesueur, 1823), and potential native origin is likely to be located in the north-western Pacific (Locke, 2009) or not known with certainty (Pineda *et al.* 2011). The species inhabits mostly harbours and marinas of warm and temperate waters, with high densities on artificial substrata (Gewing & Shenkar, 2017; Novak *et al.*, 2017), and is considered a major risk to aquaculture facilities (Barros *et al.*, 2009). *Styela plicata* has been introduced to the Mediterranean since the 19<sup>th</sup> century, first recorded from the Gulf of Naples, Italy (Heller, 1877). Its distribution later extended to several Mediterranean countries (Ulman *et al.*, 2017; references therein; Spagnolo *et al.*, 2019). The species was recorded along the Mediterranean coast of Egypt in 1927 (Harant, 1939). Genetic studies suggest that the wide distribution of this species is driven by human-mediated introductions, mainly through hull fouling (Barros *et al.*, 2009).

### ***Symplegma* sp.**

Due to the contraction state and the bad preservation of zooids, it has been impossible to identify this colonial ascidian at species level. The genus *Symplegma* is widely distributed throughout the eastern basin, reaching the Tyrrhenian Sea (Ulman *et al.*, 2017; Mastrototaro *et al.*, 2019; Ramos-Esplá *et al.*, 2020). To date, two species of the genus *Symplegma* have been found in the Mediterranean, both of which are considered non-indigenous. They are *S. brakenhielmi* (Michaelsen, 1904), which has been established in Egypt since 1988 (Halim & Abdel Messeih, 2016; Sghaier *et al.*, 2019), and *S. rubra* Monniot C., 1972 recently recorded only from the Tunisian coast (Pistevos *et al.* 2026).

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