Macrozoobenthic Species as a Part of the Benthic Communities Along the Montenegrin Adriatic Coast

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Abstract Although there are abundant data on invertebrate fauna in the benthic biocenoses of the open sea of the Montenegrin coast, this is the first attempt to integrate them as a single database. The analysis comprises all available literature data as well as information from recent personal research. In total, 489 species were identified, grouped into 8 phyla, 22 classes, and 240 families. Among the species inhabiting the shelf area of the Montenegrin coast, 27 are protected by national and international legislation, while a further seven are considered to be non-indigenous species. All species are listed with indication on locations and references. Habitats of particular importance according to the European Union Habitats Directive – such as *Posidonia oceanica* meadows, coralligenous habitat, and marine caves – are present in the studied area. Among the different types of substrates on the seafloor, diverse forms of benthic communities exist. In the upper infralittoral zone extends a community of photophilic algae, although in areas susceptible to overfishing, "barren" communities are expanding. Slightly deeper in the mud and sand, typical substrate communities are developed. Considerable anthropogenic impacts are evident along

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the Montenegrin coast, leading to the destruction of communities here and the species within.

Keywords Benthic communities, Macrozoobenthos, Montenegrin coast, South Adriatic Sea

1 Introduction

The open sea area of the Montenegrin coast is characterized by diverse geological and morphological conditions. The length of the coast is approximately 300 km: the Bay of Kotor represents about 100 km of this, while the rest belongs to the open sea, including both steep rocky areas and sandy areas (beaches) such as the 12 km long Velika Plaža that are especially pronounced in the southern part [1]. The very steep limestone rocks descend more or less vertically up to 20–30 m in depth and continue as mosaics of gravel, sand, and silt. The narrow part of the coastal area represents an important economic resource and the main development zone of Montenegro [2]. Consequently, there are significant pressures on the marine ecosystem along the entire coast, with fishing and tourism as well as maritime transport making a major impact. The open coast is relatively poorly rugged with several bays and inlets and a small number of islands and cliffs. The largest part on the coast is open and exposed to the effects of the Mediterranean Sea. In addition, this part of the coast is affected by the freshwater inflow of the Bojana River.

The majority of living organisms in the Adriatic Sea belong to the littoral or coastal system. On the sea floor in the infralittoral zone are many types of substrates that predominantly define the community constituted by various organisms. In general, the marine ecosystems are divided into free water zone and seabed zone, that is, benthic and pelagic areas. Most of the living organisms belong to the phytal (littoral) or coastal system, occupying the sea bed or shelf to approximately 200 m in depth. This is characterized by the presence of benthic chlorophyll plants and dynamic connections between the plant and animal components of the benthic biocenoses [3]. With increasing depth in the seabed system, the following can be distinguished:

(a) The supralittoral zone, in which organisms that tolerate or require permanent emergence can be found. This is the zone of seawater wetting.
(b) The mediolittoral zone or tidal zone, which requires the organisms living there to undergo shifts between emersion and immersion.
(c) The infralittoral zone, which can be found between the lower boundary of the low tide towards the mediolittoral zone and the depth of the zone of sea grasses and photophilic algae. In the Mediterranean this zone reaches to a depth of about 20 m, although in some tropical regions it can extend to approximately 80 m.

(d) The circalittoral zone, which extends from the lower limit of the sea grasses or photophilic algae, to an extreme depth that is only inhabited by the algal vegetation most tolerant to low light, i.e. the most sciophilous.

Thus, these four zones whose names all contain the suffix "littoral" make up the littoral or coastal system, or given the presence of benthic chlorophyll algae, the phytal system. The underwater living world in these zones is determinated by the types of substrates present as well as the depth (i.e., the combination of the environment's physicochemical parameters suitable for life). Accordingly, appropriate biocenoses have developed over time [4].

The investigation of benthic biocenoses in the open sea area of the Montenegrin coast is of greater academic interest in the last decade. At the same time, given Montenegro's obligation to define marine protected areas, more detailed marine biodiversity research is necessary. Most data refer to the areas of Platamuni, Katiči, and Stari Ulcinj, which have been defined as three future protected zones [5–8]. In addition, data are available from other sites although they are mostly point-type and related to a narrow research area [9–11].

This paper is the first attempt to collect all existing data on the occurrence of the macrozoobenthos within the benthic biocenoses on the open sea of the Montenegrin coast in order to create a new database.

2 Material and Methods

The data presented in the paper were compiled from all available literature data, supplemented with recent personal research. Relevant historical data are contained within the reports of the Institute of Marine Biology (IBM), scientific papers, and unpublished documents. A total of 30 literature sources were reviewed for information collection purposes. The data include 54 localities along the open coast (Fig. 1, Table 1). Recent personal research on the species inventory information of macrozoobenthos was mainly performed by the scuba diving. The taxa were checked for their present valid nomenclature and the classification was arranged according to the WoRMS (http://www.marinespecies.org/) database.

3 Results and Discussion

At about 200 km long, the open part of the Montenegrin coast represents a relatively small section of the Adriatic, but it is characterized by rich biodiversity and the presence of different types of biocenoses. Habitats of particular interest under the European Union (EU) Habitats Directive – such as *Posidonia oceanica* meadows (Fig. 2), coralligenous habitats (Fig. 3), and marine caves (Fig. 4) – are all represented here.

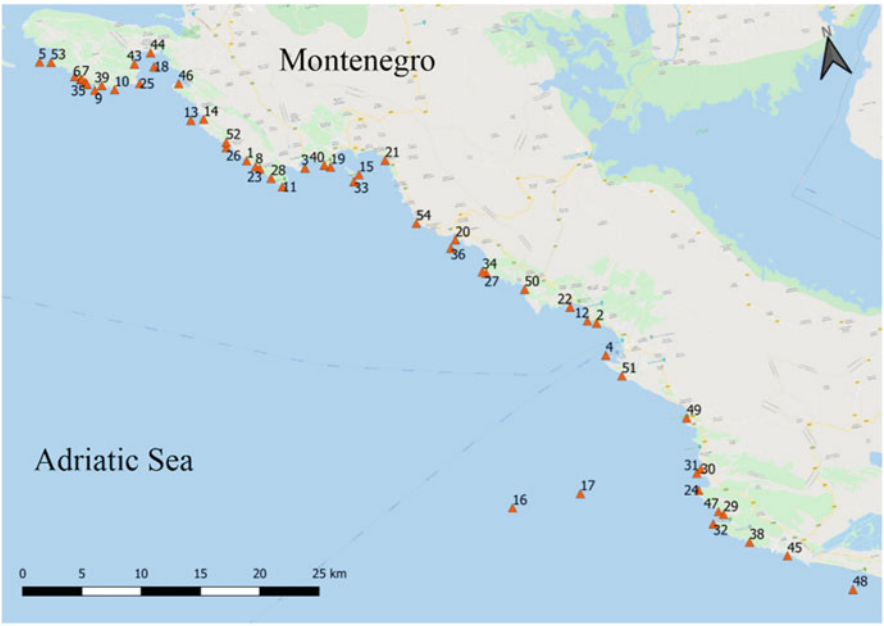

Fig. 1 An open sea area of the Montenegrin coast with designated localities

Table 1 Names of sites indicated on Fig. 1

1. Velika Krekavica	19. Mogren	37. Kruče
2. Žukotrlica	20. Petrovac	38. Opaljike cove
3. Jaz	21. Pržno	39. Tijesna Luka cave
4. Bar (Port of Bar)	22. Sutomore	40. Vrančeva seka cave
5. Mamula Island	23. Mala Krekavica	41. Franštica cave
6. Plava Špilja cave	24. Cape Rep	42. Mala gora cave
7. Niska cave	25. Cape Kućište	43. Oblatno cave
8. Krekavica cave	26. Cape Kostovica	44. Trašte cave
9. Cape Veslo	27. Cape Dubovac	45. Ulcinj caves
10. Cape Mačka	28. Sveti Nikola islet (Rock)	46. Bigova cave
11. Cape Platamuni	29. Valdanos	47. Valdanos cave
12. Cape Ratac	30. Stari Ulcinj (coast)	48. Đeran ridge
13. Seka Albaneze	31. Stari Ulcinj Island	49. Veliki pijesak cove
14. Žukovica	32. Cape Mendra	50. Čanj
15. Sveti Nikola Island	33. Galiola Ridge	51. Mikovića cave
16. ENI zone A	34. Mravinjak islet	52. Nerin cove
17. ENI zone B	35. Posejdonov Grad Cave	53. Cape Arza
18. Gulf of Trašte	36. Katič Islands	54. Cape Skočiđevojka

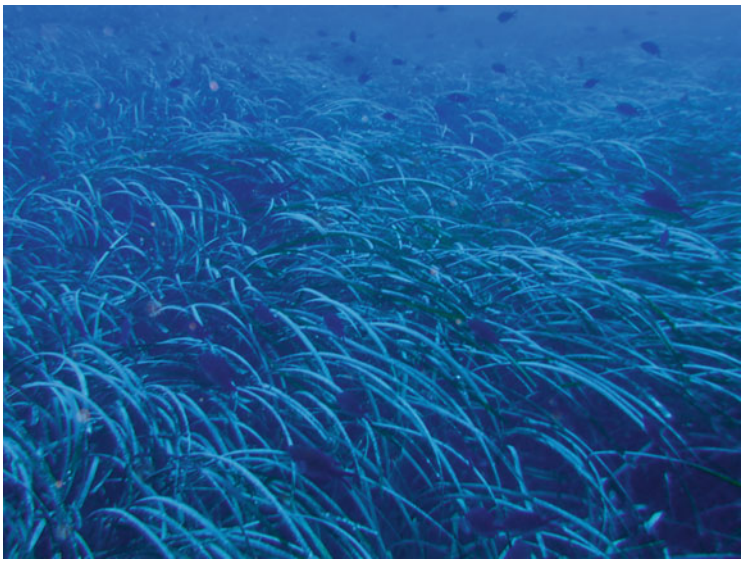

Fig. 2 Meadows of *Posidonia oceanica* (source: S. Petović)

Fig. 3 Coralligenous habitat (source: S. Petović)

On the hard bottom in the upper infralittoral zone extends a community of photophilic algae (Fig. 5), while in areas characterized by overfishing, a large number of the urchins *Paracentrotus lividus* and *Arbacia lixula* can be found.

Fig. 4 Marine cave (source: S. Petović)

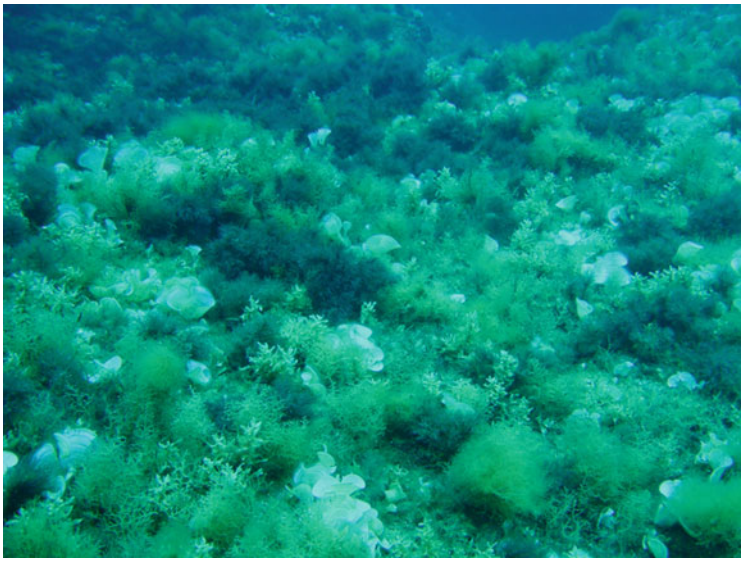

Fig. 5 Biocoenoses of photophilic algae in the upper infralittoral zone (source: S. Petović)

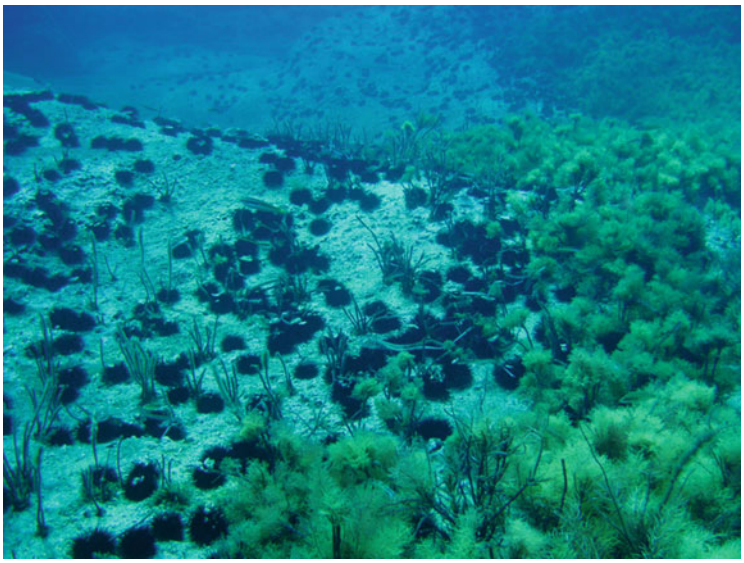

Fig. 6 Barren communities on the rocky substrate (source: S. Petović)

Fig. 7 Sandy-muddy substrate (source: S. Petović)

Therefore, in these zones one can identify very well-developed "barren" community types (Fig. 6).

Beyond the rocky surface are fine sand and silt areas inhabited by faunistic organisms typical of such environmental conditions (Fig. 7).

The compilation of the available data reveals that in the benthic biocenoses in the open sea area of the Montenegrin coast live 489 species of invertebrates (Appendix). Of the total number of species recorded, the group of sponges contains 64 species, cnidarians 49 species, molluscs 193 species, annelids 27 species, arthropods 16 species, bryozoans 49 species, echinoderms 63 species, and tunics 29 species. The species identified can be grouped into a total of 240 families, 22 classes, and 8 phyla.

The biocenosis of the photophilic algae includes the part of the littoral zone in which light varies in terms of both amount and intensity from the upper to the lower limit of the infralittoral zone [4]. Within the algae layer are numerous representatives of macrozoobenthos. Moreover, within this biocenosis we can find representatives of all invertebrate phyla. For instance, the sponges group contains an abundant population of *Chondrosia reniformis*, including species from order Ircinia, *Spongia officinalis*, *Aplysina aerophoba*, *Antho (Antho) inconstans, Spirastrella cunctatrix.* In the cnidarians group the dominant representatives are *Aiptasia mutabilis*, *Anemonia viridis, Balanophyllia europea.* Among annelids, common species include *Serpula vermicularis* and *Sabella spallanzanii*. Molluscs and echinoderms represent the most abundant phyla. From the molluscs group, *Bolinus brandaris*, *Cerithium vulgatum*, *Hexaplex trunculus, Haliotis tuberculata, Patella caerulea, Rocellaria dubia*, and *Mytilus galloprovincialis* all frequently appear, while the most numerous echinoderms are species from order Holothuria, *Echinaster sepositus*, *Marthasterias glacialis*, *Coscinasterias tenuispina*, *Paracentrotus lividus*, *Arbacia lixula*, and *Sphaerechinus granularis*. Furthermore, on the rocky bottom, sea urchins *Paracentrotus lividus* and *Arbacia lixula* are common. Given the associated role of overfishing (as fish are predators of sea urchins), these dynamics have led to the regression of algal surfaces, the spread of bare rocky substrates, and the formation of barrens.

On the seafloor along the Montenegrin coast, meadows of the seagrasses *Posidonia oceanica* are mostly found on sandy substrate. Within these meadows, many species of sponges, molluscs, echinoderms, and tunicates are present. There are a large number of epiphytes on the grass leaves, dominated by hydrozoans and bryozoans. Of the macrozoobenthic species, *Chondrosia reniformis, Clathria (Clathria) compressa, Clathrina clathrus, Crambe crambe, Ircinia spp., Sarcotragus spinosulus, Spirastrella cunctatrix, Aglaophenia pluma, Alicia mirabilis, Cladocora caespitosa, Balanophyllia (Balanophyllia) europaea, Hermodice carunculata, Protula sp., Sabella spallanzanii, Serpula sp, Arca noae, Bolinus brandaris, Bolma rugosa, Aporrhais pespelecani, Thracia phaseolina, Tonna galea, Turritella communis, Venus verrucosa, Marthasterias glacialis, Paracentrotus lividus, Arbacia lixula, Astropecten sp., Echinaster sepositus, Holothuria tubulosa, Sphaerechinus granularis, Ascidia sp.*, and *Halocynthia papillosa* can all be found.

Coralligenous biocenoses are mainly developed on the hard substrate of the circalittoral step. They are characterized by both calcified and non-calcified algae with an abundance of invertebrate species. The characteristic builders of coralligenous communities from the animal groups are sponges, anthozoans, and bryozoans. The predominant sponge species are *Chondrilla nucula, Axinella*

damicornis, Petrosia (Petrosia) ficiformis, Phorbas tenacior, Chondrosia reniformis, Agelas oroides, Sarcotragus spinosulus, Cliona celata, Cliona viridis, Dysidea fragilis, Antho (Antho) incostans, Axinella cannabina, Axinella verrucosa, Axinella polypoides, Spongia (Spongia) officinalis, Pleraplysilla spinifera, Spirastrella cunctatrix, Clathria (Clathria) compresa, Haliclona poecillastroides, and *Clathrina clathrus*. Common cnidarians comprise *Madracis pharensis, Cerianthus membranaceus, Eudendrium racemosum*, and *Cladocora caespitosa*. Of the annelidas group, *Hermodice carunculata* is very common, while the bryozoans group includes *Pentapora fascialis, Myriapora truncata, Cellaria salicornioides*, and *Reteporella grimaldii*. Among echinoderms, *Echinaster sepositus, Holothuria (Holothuria) tubulosa, Sphaerechinus granularis, Ophidiaster ophidianus, Paracentrotus lividus, Arbacia lixula, Centrostefanus longispinus, Cidaris cidaris* are very frequent, while the most common ascidian is *Halocynthia papillosa*.

Soft substrates consist of different mud and sand fractions. They are disadvantageous to sessile organisms because they do not allow them to become attached to the seabed. They represent a rich world of infauna as well as epifauna, that is, species that inhabit and move on the surface. Such substrates are largely represented at depths greater than 30 m where the rocky coast is finished, while in areas where beaches are present, soft substrate starts from the coastline and descends deeper and deeper. Among animal species we can find soft coral species (*Alcyonium palmatum*, *Veretillum cynomorium*, Pennatula sp.), *Condylactis aurantiaca*, *Actinia sp*, *Cerianthus membranaceus*, *Chamelea gallina*, *Ruditapes decussatus*, *Venus verrucosa*, *Callista chione*, *Tonna galea*, *Aporrhais pespelecani*, *Cerithium vulgatum* as well as many annelids and arthropods. Also numerous are the irregular sea urchins *Spatangus purpureus*, *Echinocyamus pusillus*, *Echinocardium cordatum*, and *Ova canaliferus*, starfish from order Astropecten, sea cucumbers from order Holothuria as well as *Eostichopus regalis*.

Marine caves are very specific habitats. Given their lack of light, only sciafilic organisms can survive the environmental conditions they provide. Moreover, typical macrozoobenthic species include *Acanthella acuta, Agelas oroides, Aplysina cavernicola, Axinella damicornis, Axinella verrucosa, Chondrosia reniformis, Clathrina clathrus, Haliclona fulva, Haliclona mucosa, Dysidea fragilis, Dysidea avara, Ircinia sp., Petrosia ficiformis, Phorbas tenacior, Scalarispongia scalaris, Spirastrella cunctatrix, Terpios fugax, Sarcotragus foetidus, Leptopsammia pruvoti, Polycyathus muellerae, Madracis pharensis, Eudendrium sp., Serpulorbis arenarius, Filograna, Protula sp, Hermodice carunculata, Serpula vermicularis, Rocellaria dubia, Adeonella calveti, Reteporella sp., Pentapora fascialis, Schizobrachiella sanguinea, Myriapora truncata, Crisia sp., Smittina cervicornis, Ophidiaster ophidianus, Hacelia attenuata, Holothuria sanctori*, and *Halocynthia papillosa*.

Within the invertebrate species inhabiting the seabed of the Montenegrin shelf are 30 species protected by national and international regulations. Among these, the *Pinna nobilis* shell has been mentioned in the literature, although recent studies have

confirmed the extinction and therefore loss of this protected species from the study area.

In addition to native species extending within their ecological niches, alien species introduced here have been recorded, some of which have already become established with large populations.

4 Threats to Zoobenthic Diversity and Protection

The benthic biocenoses of the open part of the Montenegrin coast are influenced by anthropogenic impacts, albeit to differing degrees depending on the area and the depth. Considering that along the coast there are three cities (Budva, Bar, and Ulcinj) as well as many smaller towns, it is unsurprising that the impact from the land to the sea is considerable. Most of the populated area lacks a centralized sewer system, so large quantities of household wastewater are discharged into the sea. Furthermore, even where a sewer system does function, very often the drainage pipes do not meet the technical requirements, i.e. they do not finish at the adequate distance and depth from the shore. The impact of wastewater is especially evident during the summer period, when the population in the coastal area is several times higher than during the rest of the year. The increase in wastewater brings a large amount of nutrients, leading to the greater development of micro and macro algae, which are indicators of the state of the marine environment.

Due to its beauty, the coastal area is attractive for real estate investment, leading to excessive urbanization in this part of the country. This is resulting in damage to the natural coastline and the creation of large amounts of waste, which ultimately reaches the sea owing to investor neglect. Consequently, the benthic communities in the area are under threat.

The development of tourism along the coast is occurring alongside the accelerated development of maritime tourism. Greater maritime traffic is exacerbating the threats faced by the marine ecosystem. Waste water, fuel, noise, and often solid waste accompany yachts, boats, and other vessels. Anchoring on the seafloor physically endangers benthic communities, whether these be Posidonia meadows or the coralligenous habitats that have developed here.

In addition, there is an international port in Bar that accommodates ships from all over the world, so its environmental impact is evident in terms of vector inputs for new non-native species [12]. Along the coast there are also many marinas both big and small that provide berths to a large number of vessels, whose activity affects the quality of the sea environment.

Marine organisms in demersal communities are also greatly affected by overfishing. Moreover, the harvesting of the protected species (*Lithophaga lithophaga*) is also present, while the use of prohibited fishing tools exacerbates the situation [2].

5 Conclusions

The Montenegrin coast lies on the south-eastern part of the Adriatic Sea. It is a link between the Mediterranean and the Adriatic and is strongly influenced by Mediterranean water. The 200 km long coastline is characterized by a variety of geomorphological features. Indeed, its coastline is adorned by steep cliffs rising to 50 m in depth, while to the south lies the Velika Plaža, a 12 km long beach. The coast is poorly rugged, so it is characterized by smaller bays and several little islands.

The coastal seabed is characterized by zones in the littoral area. Where the coast slightly enters into the sea, these zones are more evident and take up a wider belt, while where steep rocks vertically descend into the sea, the shift from one zone to another is less pronounced. Regarding to existing data we can conclude that littoral zone is well studied. Montenegro's obligation to define marine protected areas has resulted in increased study of the marine ecosystem, primarily in the areas designated for protection. Therefore, most information pertains to the benthic biocenoses and dominant species for the areas of Platamuni, Katič, and Stari Ulcinj. Data are also available from other sites, although they are mostly point-type and related to a narrow research area.

Along the Montenegrin coast, habitats of particular interest under the EU Habitats Directive – such as *Posidonia oceanica* meadows, coralligenous habitats, and marine caves – can be found. In the shallower part on hard substrate, biocenoses of photophilic algae are present. In areas where the illegal fishing of the shellfish *L. lithophaga* and the use of illegal fishing gear remain ongoing, environmental damage can be observed. As a consequence of these activities, the degradation of the present biocenoses and the multiplication of sea urchins *P. lividus* and *A. lixula* are contributing to the creation of the so-called barren communities.

Our analysis of the macrozoobenthos in this area has revealed the presence of 489 species grouped into eight phyla, 22 classes, and 240 families. Of the invertebrate species inhabiting the seabed of the Montenegrin shelf, 27 are protected by national and international regulations. In addition to native species extending within their ecological niches, the presence of introduced alien species has been recorded, some of which have already become established with widespread populations.

This very rich marine life is exposed daily to various pressures from the land and the sea. Sewage inflows, coastal erosion, concreting the coast, anchoring, overfishing, and maritime transport are just some of the negative impacts on the marine ecosystem.

Appendix

List of macrozoobenthic species recorded along the Montenegrin coast according to literature data

Phylum	Class	Family	Species name	Not specified location	Location	Reference
Porifera	Calcarea	Clathrinidae	*Clathrina clathrus*		3, 4, 8, 9, 18, 21, 39, 44	[9, 13–17, 20]
Porifera	Calcarea	Clathrinidae	*Clathrina sp.*		15, 19, 23, 24, 25, 30, 31, 35, 36, 37	[18]
Porifera	Demospongiae	Agelasidae	*Agelas oroides*		1, 4, 6, 7, 8, 9, 10, 11, 12, 13, 15, 19, 20, 21, 24, 26, 27, 29, 30, 31, 32, 34, 35, 36, 37, 39, 41, 42	[7, 9, 11, 14–16, 18–22]
Porifera	Demospongiae	Aplysinidae	***Aplysina aerophoba***		18	[23]
Porifera	Demospongiae	Aplysinidae	***Aplysina cavernicola***		8, 9	[14, 20]
Porifera	Demospongiae	Axinellidae	***Axinella cannabina***		4, 8, 12, 15, 24, 25, 27, 29, 31, 37, 48	[9, 18, 20, 24]
Porifera	Demospongiae	Axinellidae	***Axinella damicornis***		3, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 19, 24, 25, 31, 37, 50, 53, 54	[5, 9, 11, 14, 20, 24, 25]
Porifera	Demospongiae	Axinellidae	***Axinella polypoides***		4, 18, 25, 36	[9, 17, 24]
Porifera	Demospongiae	Axinellidae	*Axinella sp.*		11, 13, 15, 18, 19, 25, 30, 37	[7, 17, 18]
Porifera	Demospongiae	Axinellidae	*Axinella vaceleti*		8	[20]
Porifera	Demospongiae	Axinellidae	***Axinella verrucosa***		3, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 19, 24, 25, 27, 29, 26, 50, 51, 52	[9–11, 14, 20, 21, 24, 25]

Porifera	Demospongiae	Chalinidae	*Dendroxea sp.*		8	[20]
Porifera	Demospongiae	Chalinidae	*Haliclona (Halichoclona) fulva*		8, 9, 13, 15	[11, 14, 20]
Porifera	Demospongiae	Chalinidae	*Haliclona (Soestella) mucosa*		6, 7, 8, 9, 10, 13	[14, 15, 19, 20]
Porifera	Demospongiae	Chalinidae	*Haliclona poecillastroides*		4	[9]
Porifera	Demospongiae	Chondrillidae	*Chondrila sp.*		1, 5, 11, 13, 15, 19, 23, 25, 27, 28, 30, 33, 35, 36	[18]
Porifera	Demospongiae	Chondrillidae	*Chondrilla nucula*		5, 15, 18, 19, 20	[10, 11, 17, 21, 22, 25]
Porifera	Demospongiae	Chondrosiidae	*Chondrosia reniformis*		2, 3, 4, 5, 8, 9, 15, 18, 19, 20, 21, 22, 43, 44	[9–11, 13–17, 20–22, 25–27]
Porifera	Demospongiae	Chondrosiidae	*Chondrosia sp.*		1, 5, 13, 15, 19, 25, 26, 27, 29, 33, 34, 35, 36, 37	[18]
Porifera	Demospongiae	Clionaidae	*Cliona celata*		2, 4, 5, 8, 13, 45	[9, 10, 15, 20, 25, 26]
Porifera	Demospongiae	Clionaidae	*Cliona rhodensis*		6, 7, 8, 15	[11, 19, 20]
Porifera	Demospongiae	Clionaidae	*Cliona schmidtii*		8, 13	[20]
Porifera	Demospongiae	Clionaidae	*Cliona sp.*		6, 8, 11, 12, 13, 39, 40, 41, 43, 45	[15, 19, 20]
Porifera	Demospongiae	Clionaidae	*Cliona viridis*		4, 5, 10, 11, 13, 15, 18	[9–11, 14, 17, 20, 25]
Porifera	Demospongiae	Clionaidae	*Clionidae*		5, 13, 15, 19, 23, 24, 25, 26, 27, 28, 29, 30, 32, 36, 37, 38	[18]
Porifera	Demospongiae	Crambeidae	*Crambe Crambe*		3, 5, 9, 10, 11, 13, 15, 19, 20,	[11, 13, 14, 18, 21, 22, 25]

(continued)

Phylum	Class	Family	Species name	Not specified location	Location	Reference
					24, 25, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38	
Porifera	Demospongiae	Crellidae	*Crella (Crella) elegans*		8	[20]
Porifera	Demospongiae	Crellidae	*Crella (Grayella) pulvinar*		8, 13	[20]
Porifera	Demospongiae	Dictyonellidae	*Acanthella acuta*		8, 9, 15, 21	[11, 14, 16, 20]
Porifera	Demospongiae	Dictyonellidae	*Dictyonella incisa*		2, 4, 19, 21	[9, 16, 21, 26]
Porifera	Demospongiae	Dysideidae	*Pleraplysilla spinifera*		4, 8, 15	[9, 11, 20]
Porifera	Demospongiae	Dysideidae	*Dysidea avara*		4, 8, 18	[9, 14, 20, 23]
Porifera	Demospongiae	Dysideidae	*Dysidea fragilis*		4, 8	[9, 14, 20]
Porifera	Demospongiae	Dysideidae	*Dysidea sp.*		8, 18, 22	[17, 20, 27]
Porifera	Demospongiae	Geodiidae	*Penares helleri*		8	[20]
Porifera	Demospongiae	Hymedesmiidae	*Hemimycale columella*		18, 19	[17, 21]
Porifera	Demospongiae	Hymedesmiidae	*Phorbas sp.*		5, 11, 15, 19, 25, 26, 27, 30, 33, 34, 35, 36, 37	[7, 18]
Porifera	Demospongiae	Hymedesmiidae	*Phorbas tenacior*		4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 18, 19, 39, 40, 42, 44	[9, 11, 14, 15, 17, 19–21, 23, 25]
Porifera	Demospongiae	Irciniidae	*Sarcotragus fasciculatus*		15	[11]
Porifera	Demospongiae	Irciniidae	***Sarcotragus foetidus***		6, 8, 9, 12, 13, 39	[14, 15, 19, 20]
Porifera	Demospongiae	Irciniidae	*Sarcotragus spinosulus*		3, 4, 5, 8, 13, 15, 18, 19, 20, 21, 22	[9–11, 13, 16, 20–23, 25, 27]

Porifera	Demospongiae	Irciniidae	*Ircinia oros*		4, 5, 6, 7, 8, 18, 22, 39, 40, 43	[9, 10, 15, 19, 20, 23, 25, 27]
Porifera	Demospongiae	Irciniidae	*Ircinia retidermata*		18	[17]
Porifera	Demospongiae	Irciniidae	*Ircinia spp.*	X	2, 3, 8, 9, 11, 13, 15, 18, 19, 20, 21, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38	[13, 14, 16–18, 22, 26, 28]
Porifera	Demospongiae	Irciniidae	*Ircinia variabilis*		6, 8, 12, 18	[15, 20, 23]
Porifera	Demospongiae	Microcionidae	*Antho (Antho) inconstans*		2, 4, 5, 13, 15, 19, 20, 21, 22	[9–11, 16, 20–22, 25–27]
Porifera	Demospongiae	Microcionidae	*Clathria (Clathria) compressa*		3, 4, 5, 15, 18	[9, 11, 13, 23, 25]
Porifera	Demospongiae	Petrosiidae	*Petrosia (Petrosia) ficiformis*		3, 4, 5, 6, 7, 8, 9, 10, 12, 15, 19, 20, 21, 24, 26, 27, 28, 29, 30, 31, 33, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 46	[9–11, 13–16, 18–22, 25]
Porifera	Demospongiae	Phloeodictyidae	*Calyx nicaeensis*		18	[17]
Porifera	Demospongiae	Poecilosclerida	*Poecilosclerida*		8	[20]
Porifera	Demospongiae	Poecilosclerida	*Poecilosclerida n.i.*		8	[20]
Porifera	Demospongiae	Raspailiidae	*Raspaciona aculeata*		19, 20, 21	[16, 21, 22]
Porifera	Demospongiae	Spirastrellidae	*Spirastrella cunctatrix*		1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 15, 18, 19, 20, 21, 25, 27, 28, 30, 31, 32, 33, 34, 35, 37, 38, 39,	[9, 11, 13–22, 26]

(continued)

Phylum	Class	Family	Species name	Not specified location	Location	Reference
					40, 41, 42, 43, 44, 47	
Porifera	Demospongiae	Spongiidae	***Spongia (Spongia) officinalis***		4, 8, 12, 15	[9, 11, 20]
Porifera	Demospongiae	Suberitidae	*Suberites domuncula*	X	18	[17, 28]
Porifera	Demospongiae	Suberitidae	*Terpios fugax*		8, 9	[14, 20]
Porifera	Demospongiae	Suberitidae	*Terpios gelatinosus*		8, 18	[17, 20]
Porifera	Demospongiae	Tethyidae	***Tethya aurantium***	X	7	[19, 28]
Porifera	Demospongiae	Tethyidae	***Tethya citrina***	X		[28]
Porifera	Demospongiae	Thorectidae	*Cacospongia mollior*		8, 18	[17, 20]
Porifera	Demospongiae	Thorectidae	*Fasciospongia cavernosa*		8	[20]
Porifera	Demospongiae	Thorectidae	*Scalarispongia scalaris*		8, 9, 12, 18	[14, 20, 23]
Porifera	Demospongiae	Timeidae	*Timea unistellata*		2,	[26]
Porifera	N/A	N/A	*Porifera n.i.*		1, 5, 8, 11, 12, 13, 14, 15, 19, 23, 24, 26, 27, 30, 31, 34, 35, 37, 38	[18, 20]
Cnidaria	Anthozoa	Actiniidae	*Actinia cari*		2, 45	[15, 26]
Cnidaria	Anthozoa	Actiniidae	*Actinia equina*		8, 40, 43, 44, 45, 47	[15]
Cnidaria	Anthozoa	Actiniidae	*Actinia striata*		2	[26]
Cnidaria	Anthozoa	Actiniidae	*Anemonia sulcata*		1, 5, 26, 27, 30, 35, 38	[18]
Cnidaria	Anthozoa	Actiniidae	*Anemonia viridis*		2, 4, 18, 19, 20, 22, 25, 31, 38	[9, 17, 18, 22, 26, 27]
Cnidaria	Anthozoa	Andresiidae	*Andresia partenopea*		1	[13]

Cnidaria	Anthozoa	Caryophylliidae	*Caryophyllia (Caryophyllia) inornata*		8, 11, 13	[20]
Cnidaria	Anthozoa	Caryophylliidae	*Caryophyllia (Caryophyllia) smithii*		8, 15, 16, 17	[11, 20, 29]
Cnidaria	Anthozoa	Caryophylliidae	*Caryophyllia sp.*		5, 15, 18, 25	[10, 18, 25]
Cnidaria	Anthozoa	Caryophylliidae	*Phyllangia americana mouchezii*		4, 8	[9, 20]
Cnidaria	Anthozoa	Caryophylliidae	*Hoplangia durotrix*		8, 13	[20]
Cnidaria	Anthozoa	Caryophylliidae	*Paracyathus pulchellus*		8	[20]
Cnidaria	Anthozoa	Caryophylliidae	*Polycyathus muellerae*		8, 9	[14, 15, 20]
Cnidaria	Anthozoa	Cerianthidae	*Cerianthus membranaceus*		4, 9, 10, 12, 13, 15, 18	[9, 11, 14, 17, 20]
Cnidaria	Anthozoa	Cerianthidae	*Cerianthus sp.*		15, 27, 34	[18]
Cnidaria	Anthozoa	Clavulariidae	*Clavularia sp.*		8, 13	[20]
Cnidaria	Anthozoa	Clavulariidae	*Sarcodictyon catenatum*		8	[20]
Cnidaria	Anthozoa	Dendrophylliidae	*Balanophyllia (Balanophyllia) europaea*		2, 3, 4, 5, 11, 13, 15, 19, 20, 21, 22	[9, 11, 13, 16, 20–22, 25–27]
Cnidaria	Anthozoa	Dendrophylliidae	*Balanophyllia sp.*		5, 13, 15, 19, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, 36, 37, 38	[18]
Cnidaria	Anthozoa	Dendrophylliidae	*Leptopsammia pruvoti*		6, 8, 9, 13, 15, 35, 39, 41	[11, 14, 15, 18, 20]
Cnidaria	Anthozoa	Epizoanthidae	*Epizoanthus arenaceus*	X		[28]
Cnidaria	Anthozoa	Funiculinidae	*Funiculina quadrangularis*	X		[28]
Cnidaria	Anthozoa	Gorgoniidae	*Leptogorgia sarmentosa*		4, 12, 30	[9, 18, 20]
Cnidaria	Anthozoa	Hormathiidae	*Calliactis parasitica*		5	[25]
Cnidaria	Anthozoa	N/A	*Scleractinia n.i.*		8	[20]

(continued)

Phylum	Class	Family	Species name	Not specified location	Location	Reference
Cnidaria	Anthozoa	Parazoanthidae	*Parazoanthus axinellae*		8, 12, 13, 15, 18, 19, 23, 24, 25, 36	[11, 15, 17, 18, 20]
Cnidaria	Anthozoa	Pennatulidae	*Pennatula rubra*	X		[28
Cnidaria	Anthozoa	Phymanthidae	*Phymanthus pulcher*		37	[18]
Cnidaria	Anthozoa	Plexauridae	*Bebryce mollis*		17	[29]
Cnidaria	Anthozoa	Pocilloporidae	*Madracis pharensis*		4, 6, 7, 8, 9, 13, 15, 39	[9, 11, 14, 15, 20]
Cnidaria	Anthozoa	Sagartiidae	*Cereus pedunculatus*		2	[26]
Cnidaria	Anthozoa	Scleractinia incertae sedis	***Cladocora caespitosa***		3, 4, 8, 11, 18, 20, 22, 24, 27, 29, 35, 36, 37	[5, 9, 13, 17, 18, 20, 22, 27]
Cnidaria	Anthozoa	Subselliflorae	*Pteroeides griseum*	X		[28]
Cnidaria	Anthozoa	Aiptasiidae	*Aiptasia mutabilis*		2, 12, 19, 20, 22	[20–22, 26, 27]
Cnidaria	Anthozoa	Alcyoniidae	*Alcyonium palmatum*	X		[28]
Cnidaria	Anthozoa	Aliciidae	*Alicia mirabilis*		3	[13]
Cnidaria	Hydrozoa	Aglaopheniidae	*Lytocarpia myriophyllum*	X		[28]
Cnidaria	Hydrozoa	Eudendriidae	*Eudendrium racemosum*		4, 15	[9, 11]
Cnidaria	Hydrozoa	Eudendriidae	*Eudendrium sp.*		8, 9, 10, 13	[14, 20]
Cnidaria	Hydrozoa	N/A	*Hydrozoa n.i.*		11, 12, 13	[20]
Cnidaria	Hydrozoa	Sertularellidae	*Sertularella sp.*		1, 5	[13, 25]
Cnidaria	Hydrozoa	Sertulariidae	*Sertularia perpusilla*		19	[21]
Cnidaria	Hydrozoa	Aglaopheniidae	*Aglaophenia harpago*		15	[11]
Cnidaria	Hydrozoa	Aglaopheniidae	*Aglaophenia pluma*		3	[13]
Cnidaria	Hydrozoa	Aglaopheniidae	*Aglaophenia sp.*		1, 5, 15, 23, 25, 27, 32, 35	[10, 18, 25]
Cnidaria	Hydrozoa	Campanulariidae	*Obelia geniculata*		1	[13]

Cnidaria	Hydrozoa	Sertulariidae	*Sertularia sp.*		4	[9]
Cnidaria	Scyphozoa	Nausithoidae	*Nausithoe punctata*		8	[20]
Cnidaria	Scyphozoa	Pelagiidae	*Pelagia noctiluca*	X		[28]
Annelida	Platyhelminthes	Eurytleptidae	*Prostheceraeus giesbrechtii*		18	[17]
Annelida	Polychaeta	Amphinomidae	*Hermodice carunculata*		1, 3, 4, 5, 8, 9, 10, 11, 13, 15, 18, 19, 20, 21, 26, 28, 35, 39, 40	[9–11, 13–18, 20, 22, 25]
Annelida	Polychaeta	Aphroditidae	*Aphrodita aculeata*		18	[17]
Annelida	Polychaeta	Arenicolidae	*Arenicola marina*		1	[13]
Annelida	Polychaeta	Bonelliidae	*Bonellia viridis*		4, 5, 11, 12, 15, 18, 25	[9, 10, 18, 20, 25]
Annelida	Polychaeta	Eunicidae	*Palola valida*		4	[12, 29]
Annelida	Polychaeta	N/A	*Polychaeta n.i.*		8	[20]
Annelida	Polychaeta	Nephtyidae	*Nephtys hombergii*		16	[29]
Annelida	Polychaeta	Phyllodocidae	*Phyllodoce mucosa*		17	[29]
Annelida	Polychaeta	Sabellidae	*Bispira mariae*		12, 39	[15, 20]
Annelida	Polychaeta	Sabellidae	*Bispira sp.*		5, 15, 24, 25	[18]
Annelida	Polychaeta	Sabellidae	*Myxicola infundibulum*		4, 12	[9, 20]
Annelida	Polychaeta	Sabellidae	*Sabella spallanzanii*		2, 3, 4, 5, 11, 15, 18, 19, 20, 24, 29, 33, 36	[9–11, 13, 17, 18, 21, 22, 25, 26]
Annelida	Polychaeta	Serpulidae	*Semivermilia sp.*		16, 17	[29]
Annelida	Polychaeta	Serpulidae	*Filograna*		8, 9, 10, 15, 41, 42	[11, 14, 15, 20]
Annelida	Polychaeta	Serpulidae	*Filograna implexa*		15, 16, 17, 18, 25	[17, 18, 29]
Annelida	Polychaeta	Serpulidae	*Hydroides dirampha*		4	[12, 29]
Annelida	Polychaeta	Serpulidae	*Hydroides norvegica*		16	[29]

(continued)

Phylum	Class	Family	Species name	Not specified location	Location	Reference
Annelida	Polychaeta	Serpulidae	*Metavermilia multicristata*		16, 17	[29]
Annelida	Polychaeta	Serpulidae	*Protula sp.*		1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 18, 19, 25, 26, 27, 30, 31, 33, 34, 35, 39, 40, 41, 42, 43, 44, 45, 46	[9–11, 13–15, 18–21, 23, 25, 26]
Annelida	Polychaeta	Serpulidae	*Serpula sp.*		3	[13]
Annelida	Polychaeta	Serpulidae	*Serpula vermicularis*		2, 5, 6, 7, 8, 9, 10, 12, 13, 15, 16, 17, 19, 23, 26, 29, 31, 32, 34, 39, 40, 41, 43, 45	[11, 14, 15, 18–21, 26, 29]
Annelida	Polychaeta	Serpulidae	*Spirobranchus polytrema*		1	[13]
Annelida	Polychaeta	Serpulidae	*Spirorbis (Spirorbis) spirorbis*		16, 17	[29]
Annelida	Polychaeta	Serpulidae	*Vermiliopsis infundibulum*		16, 17	[29]
Annelida	Polychaeta	Syllidae	*Syllis sp.*		17	[29]
Annelida	Polychaeta	Terebellidae	*Terebellidae*		4, 8, 11, 12, 13, 15, 18, 19, 26, 33, 34, 35	[9, 17, 18, 20]

Mollusca	Bivalvia	Arcidae	*Arca noae*	X	1, 3, 4, 5, 13, 15, 18, 19, 20, 21, 24, 25, 26, 27, 28, 29, 30, 31, 32, 34, 37	[9–11, 13, 16–18, 21–23, 25, 30]
Mollusca	Bivalvia	Arcidae	*Arca tetragona*		16, 17	[29]
Mollusca	Bivalvia	Astartidae	*Astarte sulcata*		16, 17, 18	[23, 29]
Mollusca	Bivalvia	Pectinidae	*Aequipecten opercularis*		16, 17	[29]
Mollusca	Bivalvia	Anomiidae	*Anomia ephippium*	X	16	[28, 29]
Mollusca	Bivalvia	Anomiidae	*Pododesmus patelliformis*		17	[29]
Mollusca	Bivalvia	Anomiidae	*Pododesmus squama*		16, 17	[29]
Mollusca	Bivalvia	Arcidae	*Barbatia barbata*	X	15	[11, 30]
Mollusca	Bivalvia	Arcidae	*Anadara corbuloides*		16, 17	[29]
Mollusca	Bivalvia	Arcidae	*Anadara gibbosa*		16, 17	[29]
Mollusca	Bivalvia	Cardiidae	*Cerastoderma glaucum*	X		[30]
Mollusca	Bivalvia	Cardiidae	*Acanthocardia aculeata*		16, 18	[23, 29]
Mollusca	Bivalvia	Cardiidae	*Acanthocardia deshayesii*	X		[30]
Mollusca	Bivalvia	Cardiidae	*Acanthocardia echinata*	X		[30]
Mollusca	Bivalvia	Cardiidae	*Acanthocardia paucicostata*		16, 17	[29]
Mollusca	Bivalvia	Cardiidae	*Acanthocardia tuberculata*	X	2, 4, 17, 18, 22	[9, 23, 26, 27, 29, 30]
Mollusca	Bivalvia	Cardiidae	*Laevicardium crassum*		4	[9]
Mollusca	Bivalvia	Cardiidae	*Laevicardium oblongum*		16	[29]
Mollusca	Bivalvia	Cardiidae	*Papillicardium minimum*		16, 17	[29]
Mollusca	Bivalvia	Cardiidae	*Papillicardium papillosum*		16	[29]
Mollusca	Bivalvia	Carditidae	*Centrocardita aculeata*		16, 17	[29]
Mollusca	Bivalvia	Chamidae	*Chama gryphoides*	X		[30]

(continued)

Phylum	Class	Family	Species name	Not specified location	Location	Reference
Mollusca	Bivalvia	Clavagellidae	*Clavagella sp.*		39	[15]
Mollusca	Bivalvia	Corbulidae	*Corbula gibba*		16, 17	[29]
Mollusca	Bivalvia	Corbulidae	*Lentidium mediterraneum*		17	[29]
Mollusca	Bivalvia	Cuspidariidae	*Cardiomya costellata*		16, 17	[29]
Mollusca	Bivalvia	Cuspidariidae	*Cuspidaria cuspidata*		16	[29]
Mollusca	Bivalvia	Cuspidariidae	*Cuspidaria rostrata*		16	[29]
Mollusca	Bivalvia	Donacidae	*Donax sp.*		15	[11]
Mollusca	Bivalvia	Donacidae	*Donax trunculus*	X	4	[9, 30]
Mollusca	Bivalvia	Gastrochaenidae	*Rocellaria dubia*	X	2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 15, 18, 19, 20, 21, 22, 23, 24, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 40, 43, 44	[9–11, 13–17, 19–22, 25–27, 30]
Mollusca	Bivalvia	Glossidae	*Glossus humanus*	X	16	[28, 29]
Mollusca	Bivalvia	Glycymerididae	*Glycymeris bimaculata*	X		[30]
Mollusca	Bivalvia	Gryphaeidae	*Neopycnodonte cochlear*		8, 16, 17	[20, 29]
Mollusca	Bivalvia	Hiatellidae	*Hiatella arctica*	X	16	[28, 29]
Mollusca	Bivalvia	Hiatellidae	*Hiatella rugosa*		16	[29]
Mollusca	Bivalvia	Limidae	*Lima lima*		5	[25]
Mollusca	Bivalvia	Lucinidae	*Loripes orbiculatus*	X	15	[11, 30]
Mollusca	Bivalvia	Mactridae	*Lutraria lutraria*		15	[11]
Mollusca	Bivalvia	Mactridae	*Lutraria oblonga*		17	[29]
Mollusca	Bivalvia	Mactridae	*Spisula sp.*		17	[29]

Mollusca	Bivalvia	Mesodesmatidae	*Donacilla cornea*	X		[30]
Mollusca	Bivalvia	Mytilidae	*Modiolus barbatus*	X		[30]
Mollusca	Bivalvia	Mytilidae	*Musculus subpictus*	X		[28]
Mollusca	Bivalvia	Mytilidae	*Mytilus edulis*	X		[30]
Mollusca	Bivalvia	Mytilidae	*Mytilus galloprovincialis*	X	6, 7, 8, 19, 20, 21, 39, 41, 42, 45	[15, 16, 20–22, 30]
Mollusca	Bivalvia	Mytilidae	*Mytilus sp.*		24, 29, 30, 31, 32, 37, 38	[18]
Mollusca	Bivalvia	Mytilidae	*Arcuatula senhousia*	X	4	[12, 29, 30]
Mollusca	Bivalvia	Mytilidae	***Lithophaga lithophaga***	X	1, 3, 5, 6, 7, 8, 9, 10, 11, 13, 15, 18, 19, 20, 21, 22, 24, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 47	[5, 10, 11, 13–22, 25, 27, 30]
Mollusca	Bivalvia	Mytilidae	*Mytilaster minimus*	X		[30]
Mollusca	Bivalvia	Noetiidae	*Striarca lactea*	X	18	[23, 30]
Mollusca	Bivalvia	Nuculanidae	*Saccella commutata*		16, 17	[29]
Mollusca	Bivalvia	Nuculidae	*Nucula sulcata*		16, 17	[29]
Mollusca	Bivalvia	Ostreidae	*Ostrea edulis*	X		[30]
Mollusca	Bivalvia	Pectinidae	*Flexopecten flexuosus*		16	[29]
Mollusca	Bivalvia	Pectinidae	*Karnekampia sulcata*		17	[29]
Mollusca	Bivalvia	Pectinidae	*Palliolum incomparabile*		16, 17	[29]
Mollusca	Bivalvia	Pectinidae	*Palliolum striatum*		16	[29]
Mollusca	Bivalvia	Pectinidae	*Pecten jacobaeus*	X	1, 3, 18	[13, 23, 30]
Mollusca	Bivalvia	Pectinidae	*Talochlamys multistriata*		16, 17, 18	[23, 29]
Mollusca	Bivalvia	Pectinidae	*Manupecten pesfelis*		4, 15, 16, 17	[9, 11, 29]

(continued)

Phylum	Class	Family	Species name	Not specified location	Location	Reference
Mollusca	Bivalvia	Pectinidae	*Mimachlamys varia*		16, 17, 18	[23, 29]
Mollusca	Bivalvia	Pectinidae	*Pseudamussium clavatum*		16, 17	[29]
Mollusca	Bivalvia	Pharidae	*Ensis ensis*	X		[30]
Mollusca	Bivalvia	Pharidae	*Ensis siliqua*	X		[30]
Mollusca	Bivalvia	Pinnidae	***Pinna nobilis***	X	2, 5, 11, 13, 15, 18, 20, 21, 23, 27, 34, 35, 36, 37	[5, 10, 11, 16–18, 20, 22, 26, 30]
Mollusca	Bivalvia	Poromyidae	*Poromya rostrata*		17	[29]
Mollusca	Bivalvia	Psammobiidae	*Gari depressa*		15	[11]
Mollusca	Bivalvia	Psammobiidae	*Gari fervensis*		16	[29]
Mollusca	Bivalvia	Pteriidae	*Pteria hirundo*	X	17	[28–30]
Mollusca	Bivalvia	Semelidae	*Abra longicallus*		16, 17	[29]
Mollusca	Bivalvia	Semelidae	*Scrobicularia plana*		17	[29]
Mollusca	Bivalvia	Solecurtidae	*Azorinus chamasolen*		16, 17	[29]
Mollusca	Bivalvia	Tellinidae	*Clathrotellina carnicolor*		16	[29]
Mollusca	Bivalvia	Tellinidae	*Moerella donacina*	X		[30]
Mollusca	Bivalvia	Tellinidae	*Moerella pulchella*	X		[30]
Mollusca	Bivalvia	Teredinidae	*Teredo navalis*	X		[30]
Mollusca	Bivalvia	Thraciidae	*Thracia phaseolina*		3,	[13]
Mollusca	Bivalvia	Veneridae	*Callista chione*	X	18	[17, 30]
Mollusca	Bivalvia	Veneridae	*Chamelea gallina*	X		[30]
Mollusca	Bivalvia	Veneridae	*Ruditapes philippinarum*	X	4, 17	[12, 30]
Mollusca	Bivalvia	Veneridae	*Timoclea ovata*		16, 17	[29]
Mollusca	Bivalvia	Veneridae	*Dosinia exoleta*	X		[30]
Mollusca	Bivalvia	Veneridae	*Dosinia sp.*		15	[11]

Mollusca	Bivalvia	Veneridae	*Mysia undata*	X		[30]
Mollusca	Bivalvia	Veneridae	*Pitar mediterraneus*		16	[29]
Mollusca	Bivalvia	Veneridae	*Pitar rudis*	X	17	[29, 30]
Mollusca	Bivalvia	Veneridae	*Venus casina*	X		[30]
Mollusca	Bivalvia	Veneridae	*Venus verrucosa*	X	1, 2, 3, 15, 18, 19	[11, 13, 21, 23, 26, 30]
Mollusca	Gastropoda	Aglajidae	*Philinopsis depicta*		18	[17]
Mollusca	Gastropoda	Alacuppidae	*Roxania utriculus*		17	[29]
Mollusca	Gastropoda	Anomiidae	*Heteranomia squamula*		17	[29]
Mollusca	Gastropoda	Aporrhaidae	*Aporrhais pespelecani*		3, 4, 15, 16, 17	[9, 11, 13, 29]
Mollusca	Gastropoda	Bullidae	*Bulla striata*	X		[30]
Mollusca	Gastropoda	Calliostomatidae	*Calliostoma conulus*		8, 16	[20, 29]
Mollusca	Gastropoda	Calliostomatidae	*Calliostoma virescens*		16	[29]
Mollusca	Gastropoda	Calycidorididae	*Diaphorodoris papillata*		8	[20]
Mollusca	Gastropoda	Calyptraeidae	*Calyptraea chinensis*		16, 17	[29]
Mollusca	Gastropoda	Capulidae	*Capulus ungaricus*		16	[29]
Mollusca	Gastropoda	Cassidae	*Semicassis undulata*		18	[17]
Mollusca	Gastropoda	Cerithiidae	*Bittium latreillii*	X	1, 15, 19, 23, 26, 27	[18, 30]
Mollusca	Gastropoda	Cerithiidae	*Bittium reticulatum*	X	16, 17, 18	[23, 29, 30]
Mollusca	Gastropoda	Cerithiidae	*Bittium sp.*		12, 13, 18	[17, 20]
Mollusca	Gastropoda	Cerithiidae	*Cerithium sp.*		5, 11, 25, 30	[18, 20]
Mollusca	Gastropoda	Cerithiidae	*Cerithium vulgatum*		2, 4, 5, 15, 18, 19, 20, 21, 22	[9–11, 16, 21–23, 25–27]
Mollusca	Gastropoda	Chromodorididae	*Felimare orsinii*		7, 8, 18	[15, 17, 20, 23]
Mollusca	Gastropoda	Chromodorididae	*Felimare picta*	X	5, 8, 18, 37	[10, 17, 18, 20, 25, 30]
Mollusca	Gastropoda	Chromodorididae	*Felimare sp.*		12, 13	[20]
Mollusca	Gastropoda	Chromodorididae	*Felimida krohni*	X	15, 19, 23, 25, 34	[18, 30]
Mollusca	Gastropoda	Chromodorididae	*Felimida luteorosea*	X		[30]
Mollusca	Gastropoda	Clathurellidae	*Comarmondia gracilis*		16	[29]

(continued)

Phylum	Class	Family	Species name	Not specified location	Location	Reference
Mollusca	Gastropoda	Colloniidae	*Homalopoma sanguineum*		5	[25]
Mollusca	Gastropoda	Columbellidae	*Mitrella minor*		17	[29]
Mollusca	Gastropoda	Conidae	*Conus ventricosus*		10, 18, 19, 21	[14, 16, 17, 21]
Mollusca	Gastropoda	Cylichnidae	*Cylichna cylindracea*		17	[29]
Mollusca	Gastropoda	Cymatiidae	*Cabestana cutacea*	X		[30]
Mollusca	Gastropoda	Cypraeidae	***Luria lurida***	X	5, 11, 18, 23, 34	[5, 10, 17, 18, 25, 30]
Mollusca	Gastropoda	Discodorididae	*Discodoris erubescens*	X		[30]
Mollusca	Gastropoda	Discodorididae	*Platydoris argo*		12	[20]
Mollusca	Gastropoda	Discodorididae	*Peltodoris atromaculata*	X	4, 8, 12, 15, 18, 23, 26, 27, 30, 32, 39	[9, 11, 15, 17, 18, 20, 30]
Mollusca	Gastropoda	Eulimidae	*Melanella alba*	X		[30]
Mollusca	Gastropoda	Facelinidae	*Cratena peregrina*	X	4, 12, 13, 15, 18	[9, 11, 17, 20, 30]
Mollusca	Gastropoda	Fasciolariidae	*Fusinus pulchellus*		16, 17, 18	[23, 29]
Mollusca	Gastropoda	Fasciolariidae	*Gracilipurpura rostrata*		16, 17	[29]
Mollusca	Gastropoda	Fasciolariidae	*Tarantinaea lignaria*	X	4, 5, 6, 15, 27	[9, 10, 18, 19, 25, 30, 31]
Mollusca	Gastropoda	Fissurellidae	*Diodora graeca*	X	16	[29, 30]
Mollusca	Gastropoda	Flabellinidae	*Calmella cavolini*		8	[20]
Mollusca	Gastropoda	Flabellinidae	*Flabellina affinis*	X	1, 4, 5, 13, 15, 18, 25, 31, 34, 35	[9, 11, 17, 18, 20, 30]
Mollusca	Gastropoda	Haliotidae	*Haliotis tuberculata*	X	2, 4, 5, 15, 19, 20	[9–11, 16, 21, 25, 26, 30]
Mollusca	Gastropoda	Hipponicidae	*Sabia conica*		16	[29]
Mollusca	Gastropoda	Mangeliidae	*Mangelia tenuicosta*		17	[29]
Mollusca	Gastropoda	Muricidae	*Hadriania craticulata*		16	[29]

Mollusca	Gastropoda	Muricidae	*Hexaplex trunculus*		1, 2, 5, 13, 15, 18, 19, 20, 23, 24, 26, 27, 29, 32	[10, 11, 17, 18, 21–23, 25, 26]
Mollusca	Gastropoda	Muricidae	*Stramonita haemastoma*	X	2, 19, 20, 21, 22, 24, 29, 32	[16, 18, 21, 22, 26, 27, 30]
Mollusca	Gastropoda	Muricidae	*Trophonopsis muricata*		16	[29]
Mollusca	Gastropoda	Nassariidae	*Tritia incrassata*	X		[30]
Mollusca	Gastropoda	Nassariidae	*Tritia lima*		16, 17	[29]
Mollusca	Gastropoda	Naticidae	*Naticarius hebraeus*	X	16	[29, 30]
Mollusca	Gastropoda	Naticidae	*Naticarius stercusmuscarum*		4, 15, 17, 18	[9, 11, 23, 29]
Mollusca	Gastropoda	Naticidae	*Neverita josephinia*	X	16, 18	[17, 29, 30]
Mollusca	Gastropoda	Neritidae	*Smaragdia viridis*	X		[30]
Mollusca	Gastropoda	Patellidae	*Patella caerulea*		2, 4, 5, 8, 15, 19, 20, 21, 22	[9–11, 16, 20–22, 25–27]
Mollusca	Gastropoda	Patellidae	*Patella rustica*		3, 6, 8, 45, 46	[13, 15, 19, 20]
Mollusca	Gastropoda	Patellidae	*Patella sp.*		5, 15, 24, 29	[18]
Mollusca	Gastropoda	Patellidae	*Patellidae*		8	[20]
Mollusca	Gastropoda	Phasianellidae	*Tricolia pullus*	X		[30]
Mollusca	Gastropoda	Phyllidiidae	*Phyllidia flava*	X	8, 12, 15, 19, 29	[11, 18, 20, 30]
Mollusca	Gastropoda	Plakobranchidae	*Thuridilla hopei*	X	18	[17, 30]
Mollusca	Gastropoda	Raphitomidae	*Raphitoma sp.*		12	[20]
Mollusca	Gastropoda	Rhizoridae	*Volvulella acuminata*	X		[30]
Mollusca	Gastropoda	Ringiculidae	*Ringicula auriculata*		16	[29]
Mollusca	Gastropoda	Samlidae	*Luisella babai*		4, 5, 15, 18	[9, 17, 18]
Mollusca	Gastropoda	Tethydidae	*Tethys fimbria*	X		[30]
Mollusca	Gastropoda	Tonnidae	***Tonna galea***	X	3, 4, 11, 12, 13, 14, 17, 18	[5, 9, 13, 20, 23, 29, 30]

(continued)

Phylum	Class	Family	Species name	Not specified location	Location	Reference
Mollusca	Gastropoda	Triphoridae	*Marshallora adversa*		16	[29]
Mollusca	Gastropoda	Trochidae	*Phorcus turbinatus*		2, 5, 15, 20, 21, 22	[11, 16, 22, 25–27]
Mollusca	Gastropoda	Turritellidae	*Turritella turbona*		16, 17	[29]
Mollusca	Gastropoda	Turritellidae	*Turritellinella tricarinata*	X	3, 4, 5, 15, 16, 17, 18	[9, 11, 13, 23, 25, 29, 30]
Mollusca	Gastropoda	Tylodinidae	*Tylodina perversa*	X		[30]
Mollusca	Gastropoda	Umbraculidae	*Umbraculum umbraculum*	X	18	[17, 30]
Mollusca	Gastropoda	Vermetidae	*Thylacodes arenarius*	X	8, 9, 10, 13, 24, 29, 30, 31	[14, 18, 20, 30]
Mollusca	Gastropoda	Vermetidae	*Vermetus granulatus*		8	[20]
Mollusca	Gastropoda	Vermetidae	*Vermetus sp.*		15	[11]
Mollusca	Gastropoda	Columbellidae	*Columbella rustica*		19, 21	[16, 21]
Mollusca	Gastropoda	Columbellidae	*Columbella sp.*		18	[17]
Mollusca	Gastropoda	Nassariidae	*Tritia mutabilis*		22	[27]
Mollusca	Gastropoda	Acteonidae	*Acteon tornatilis*	X		[30]
Mollusca	Gastropoda	Akeridae	*Akera bullata*	X		[30]
Mollusca	Gastropoda	Aplysiidae	*Aplysia depilans*		4, 18	[9, 17]
Mollusca	Gastropoda	Aplysiidae	*Aplysia fasciata*	X		[30]
Mollusca	Gastropoda	Borsoniidae	*Drilliola emendata*		16	[29]
Mollusca	Gastropoda	Borsoniidae	*Drilliola loprestiana*		16	[29]
Mollusca	Gastropoda	Epitoniidae	*Epitonium clathrus*	X		[30]
Mollusca	Gastropoda	Epitoniidae	*Epitonium turtonis*		16	[29]
Mollusca	Gastropoda	Eratoidae	*Erato voluta*		16	[29]
Mollusca	Gastropoda	Facelinidae	*Facelinidae*		12	[20]
Mollusca	Gastropoda	Fasciolariidae	*Fasciolaria sp*		18	[17]

Mollusca	Gastropoda	Fissurellidae	*Emarginula adriatica*		16	[29]
Mollusca	Gastropoda	Fissurellidae	*Emarginula fissura*		17	[29]
Mollusca	Gastropoda	Janolidae	*Janolus sp.*		31	[18]
Mollusca	Gastropoda	Muricidae	*Bolinus brandaris*		2, 3, 4, 18, 22	[9, 13, 17, 23, 26, 27]
Mollusca	Gastropoda	Naticidae	*Euspira catena*	X	5	[25, 30]
Mollusca	Gastropoda	Naticidae	*Euspira notabilis*		16, 17	[29]
Mollusca	Gastropoda	Plakobranchidae	*Elysia timida*	X		[30]
Mollusca	Gastropoda	Plakobranchidae	*Bosellia mimetica*		13	[20]
Mollusca	Gastropoda	Turbinidae	*Bolma rugosa*		3, 13, 19	[13, 20, 21]
Mollusca	Polyplacophora	Chitonidae	*Rhyssoplax olivacea*		5, 20, 22	[10, 22, 25, 27]
Mollusca	Scaphopoda	Dentaliidae	*Antalis dentalis*		3, 16, 17	[13, 29]
Mollusca	Scaphopoda	Dentaliidae	*Antalis inaequicostata*		16,	[29]
Mollusca	Scaphopoda	Dentaliidae	*Antalis vulgaris*	X		[30]
Mollusca	Scaphopoda	Fustiariidae	*Fustiaria rubescens*		16	[29]
Arthropoda	Malacostraca	Diogenidae	*Dardanus calidus*		5, 8, 13, 18	[17, 20, 25]
Arthropoda	Malacostraca	Dromioidea	*Dromia personata*		39	[15]
Arthropoda	Malacostraca	Dromioidea	*Dromia sp.*		30	[18]
Arthropoda	Malacostraca	Eriphiidae	*Eriphia verrucosa*		8, 42, 44	[15, 20]
Arthropoda	Malacostraca	Grapsidae	*Pachygrapsus marmoratus*		45	[15]
Arthropoda	Malacostraca	Nephropidae	***Homarus gammarus***		11, 18	[5, 23]
Arthropoda	Malacostraca	Paguridae	*Pagurus prideaux*		4, 8, 11, 12, 18, 32	[9, 17, 18, 20]
Arthropoda	Malacostraca	Palaemonidae	*Palaemon serratus*		32, 44, 45	[15, 18]
Arthropoda	Malacostraca	Palinuridae	***Palinurus elephas***		4, 9, 11, 15, 18, 19	[5, 9, 11, 14, 17, 18]
Arthropoda	Malacostraca	Scyllaridae	***Scyllarides latus***		1, 11, 18	[5, 13, 17]
Arthropoda	Malacostraca	Scyllaridae	***Scyllarus arctus***		11	[5]
Arthropoda	Malacostraca	Stenopodidae	*Stenopus spinosus*		6, 7, 8	[15, 19]
Arthropoda	Thecostraca	Balanidae	*Amphibalanus eburneus*		4	[29]

(continued)

Phylum	Class	Family	Species name	Not specified location	Location	Reference
Arthropoda	Thecostraca	Balanidae	*Balanidae*		13, 19, 23, 24, 26, 27, 28, 30, 34, 36, 38	[18]
Arthropoda	Thecostraca	Balanidae	*Perforatus perforatus*		2, 3, 4, 5, 15, 19, 20, 21, 22	[9–11, 13, 16, 21, 22, 25–27]
Arthropoda	Thecostraca	N/A	*Cirripedia sp.*		6, 7, 8, 11, 41, 42, 45	[15, 19, 20]
Bryozoa	Gymnolaemata	Beaniidae	*Beania magellanica*		8, 13	[20]
Bryozoa	Gymnolaemata	Adeonidae	*Adeonella calveti*		5, 8, 9, 10, 18	[10, 14, 17, 20, 25]
Bryozoa	Gymnolaemata	Adeonidae	*Adeonella pallasii*		16, 17	[29]
Bryozoa	Gymnolaemata	Antroporidae	*Rosseliana rosselii*		16	[29]
Bryozoa	Gymnolaemata	Bitectiporidae	*Pentapora fascialis*		4, 8, 16, 17, 18	[9, 14, 17, 29]
Bryozoa	Gymnolaemata	Bitectiporidae	*Schizomavella (Schizomavella) mamillata*		8, 9, 10, 11, 13, 16	[14, 20, 29]
Bryozoa	Gymnolaemata	Bitectiporidae	*Schizomavella linearis*		16	[29]
Bryozoa	Gymnolaemata	Bryocryptellidae	*Porella concinna*		17	[29]
Bryozoa	Gymnolaemata	Bryocryptellidae	*Porella sp.*		17	[29]
Bryozoa	Gymnolaemata	Bugulidae	*Crisularia plumosa*		4	[9]
Bryozoa	Gymnolaemata	Bugulidae	*Bugula neritina*		4, 5	[10, 12, 29]
Bryozoa	Gymnolaemata	Candidae	*Caberea boryi*		8, 11	[20]
Bryozoa	Gymnolaemata	Candidae	*Scrupocellaria scruposa*		17	[29]
Bryozoa	Gymnolaemata	Cellariidae	*Cellaria fistulosa*		16	[29]
Bryozoa	Gymnolaemata	Cellariidae	*Cellaria salicornioides*		4, 16	[9, 29]
Bryozoa	Gymnolaemata	Celleporidae	*Celleporina lucida*		16, 17	[29]
Bryozoa	Gymnolaemata	Celleporidae	*Turbicellepora camera*		16	[29]

Bryozoa	Gymnolaemata	Cribrilinidae	*Cribrilaria sp.*		16	[29]
Bryozoa	Gymnolaemata	Electridae	*Conopeum reticulum*		16, 17	[29]
Bryozoa	Gymnolaemata	Margarettidae	*Margaretta cereoides*		18	[17]
Bryozoa	Gymnolaemata	Membraniporidae	*Membranipora membranacea*		16	[29]
Bryozoa	Gymnolaemata	Microporellidae	*Diporula verrucosa*		16, 17	[29]
Bryozoa	Gymnolaemata	Microporidae	*Calpensia nobilis*		17	[29]
Bryozoa	Gymnolaemata	Myriaporidae	*Myriapora truncata*		1, 4, 5, 7, 8, 9, 10, 12, 13, 15, 18, 19, 20, 21, 25, 26, 28, 35, 36, 39, 41, 42	[9, 11, 14–22]
Bryozoa	Gymnolaemata	Phidoloporidae	*Reteporella beaniana*		16	[29]
Bryozoa	Gymnolaemata	Phidoloporidae	*Reteporella grimaldii*		1, 4, 5, 15, 16, 18	[9, 11, 13, 17, 25, 29]
Bryozoa	Gymnolaemata	Phidoloporidae	*Reteporella sp*		8, 13	[14, 15, 20]
Bryozoa	Gymnolaemata	Phidoloporidae	*Schizoretepora serratimargo*		16, 17	[29]
Bryozoa	Gymnolaemata	Schizoporellidae	*Schizobrachiella sanguinea*		1, 3, 4, 8, 9, 11, 13, 15, 16, 18, 40	[9, 11, 13–15, 20, 23, 29]
Bryozoa	Gymnolaemata	Schizoporellidae	*Schizoporella dunkeri*		15	[11]
Bryozoa	Gymnolaemata	Schizoporellidae	*Schizoporella errata*		9, 18, 20	[14, 17, 22]
Bryozoa	Gymnolaemata	Schizoporellidae	*Schizoporella unicornis*		17	[29]
Bryozoa	Gymnolaemata	Schizoporellidae	*Schizoporellidae*		1, 13, 15, 19, 23, 26, 27, 28, 34, 35, 36	[18]
Bryozoa	Gymnolaemata	Setosellidae	*Setosella vulnerata*		16, 17	[29]
Bryozoa	Gymnolaemata	Smittinidae	*Smittina cervicornis*		1, 3, 5, 6, 8, 11, 12, 13, 15, 17, 18, 25, 35, 39	[11, 13–15, 17–20, 25, 29]
Bryozoa	Gymnolaemata	Smittinidae	*Smittoidea marmorea*		17	[29]

(continued)

Phylum	Class	Family	Species name	Not specified location	Location	Reference
Bryozoa	N/A	N/A	*Bryozoa n.i.*		8, 11, 12, 13	[20]
Bryozoa	Stenolaemata	Lichenoporidae	*Disporella hispida*		8	[20]
Bryozoa	Stenolaemata	Terviidae	*Tervia irregularis*		16	[29]
Bryozoa	Stenolaemata	Annectocymidae	*Annectocyma major*		17	[29]
Bryozoa	Stenolaemata	Annectocymidae	*Annectocyma tubulosa*		17	[29]
Bryozoa	Stenolaemata	Crisiidae	*Crisia elongata*		16,	[29]
Bryozoa	Stenolaemata	Crisiidae	*Crisia sp.*		8, 17	[14, 29]
Bryozoa	Stenolaemata	Frondiporidae	*Frondipora verrucosa*	X	8, 16, 17	[20, 28, 29]
Bryozoa	Stenolaemata	Horneridae	*Hornera frondiculata*		5, 16	[25, 29]
Bryozoa	Stenolaemata	Lichenoporidae	*Patinella radiata*		8, 11	[20]
Bryozoa	Stenolaemata	Plagioeciidae	*Entalophoroecia gracilis*		17	[29]
Bryozoa	Stenolaemata	Tubuliporidae	*Exidmonea atlantica*		16, 17	[29]
Bryozoa	Stenolaemata	Tubuliporidae	*Tubulipora notomala*		16	[29]
Echinodermata	Asteroidea	Asteriidae	*Coscinasterias tenuispina*	X	1, 4, 7, 13, 18, 20, 25, 26, 32, 34, 35, 38, 48	[9, 15, 17–19, 32–34]
Echinodermata	Asteroidea	Asterinidae	*Asterina gibbosa*		20	[22]
Echinodermata	Asteroidea	Astropectinidae	*Tethyaster subinermis*	X		[32, 33]
Echinodermata	Asteroidea	Chaetasteridae	*Chaetaster longipes*	X	1	[13, 28, 33]
Echinodermata	Asteroidea	Luidiidae	*Luidia ciliaris*	X		[13, 32, 33]
Echinodermata	Asteroidea	Luidiidae	*Luidia sarsi*	X		[32, 33]
Echinodermata	Asteroidea	Asteriidae	*Marthasterias glacialis*	X	1, 3, 5, 8, 11, 13, 15, 18, 19, 20, 21, 23, 25, 26, 27, 28, 29, 30, 34,	[11, 13, 15–18, 20–22, 32–34]

					35, 36, 37, 39, 48, 49	
Echinodermata	Asteroidea	Asterinidae	*Anseropoda placenta*	X		[28, 32, 33]
Echinodermata	Asteroidea	Astropectinidae	*Astropecten aranciacus*	X	4, 18	[9, 17, 28, 33]
Echinodermata	Asteroidea	Astropectinidae	*Astropecten bispinosus*	X		[32, 33]
Echinodermata	Asteroidea	Astropectinidae	*Astropecten irregularis pentacanthus*	X		[28, 32, 33]
Echinodermata	Asteroidea	Astropectinidae	*Astropecten jonstoni*	X	2, 22, 48	[26, 27, 32–34]
Echinodermata	Asteroidea	Astropectinidae	*Astropecten platyacanthus*	X	49	[32–34]
Echinodermata	Asteroidea	Astropectinidae	*Astropecten sp.*		3	[13]
Echinodermata	Asteroidea	Astropectinidae	*Astropecten spinulosus*	X	18	[17, 33]
Echinodermata	Asteroidea	Brisingidae	*Hymenodiscus coronata*	X		[33]
Echinodermata	Asteroidea	Echinasteridae	*Echinaster (Echinaster) sepositus*	X	1, 2, 3, 4, 5, 8, 11, 12, 13, 15, 18, 19, 20, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, 36, 49	[9–11, 13, 17, 18, 20–22, 25, 26, 32–34]
Echinodermata	Asteroidea	Goniasteridae	*Peltaster placenta*	X	18	[17, 32, 33]
Echinodermata	Asteroidea	Ophidiasteridae	*Hacelia attenuata*	X	1, 5, 7, 8, 9, 10, 11, 13, 18, 19, 20, 25, 31, 36, 39, 42	[10, 14, 15, 17, 18, 20, 21, 25, 32–34]
Echinodermata	Asteroidea	Ophidiasteridae	***Ophidiaster ophidianus***	X	1, 4, 5, 8, 9, 10, 11, 13, 15, 18, 19, 20, 25, 26, 27, 28, 34, 35, 36	[5, 9–11, 14, 17, 18, 20, 21, 25, 28, 32–34]
Echinodermata	Crinoidea	Antedonidae	*Antedon mediterranea*	X	4, 8, 11, 18	[9, 17, 20, 32, 33]
Echinodermata	Crinoidea	Antedonidae	*Antedon sp.*		25	[18]
Echinodermata	Echinoidea	Cidaridae	*Cidaris cidaris*	X		[28, 32, 33]

(continued)

Phylum	Class	Family	Species name	Not specified location	Location	Reference
Echinodermata	Echinoidea	Echinidae	*Echinus melo*	X		[28, 32, 33]
Echinodermata	Echinoidea	Echinidae	*Gracilechinus acutus*	X		[28, 32, 33]
Echinodermata	Echinoidea	Fibulariidae	*Echinocyamus pusillus*	X		[33]
Echinodermata	Echinoidea	Loveniidae	*Echinocardium cordatum*	X	20, 25, 48	[32–34]
Echinodermata	Echinoidea	Schizasteridae	*Ova canalifera*	X	3	[13, 32, 33]
Echinodermata	Echinoidea	Arbaciidae	*Arbacia lixula*	X	1, 3, 4, 5, 6, 7, 8, 11, 12, 13, 15, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 42, 43, 45, 46, 47	[9–11, 13, 15–22, 25, 27, 32, 33]
Echinodermata	Echinoidea	Brissidae	*Brissus unicolor*	X	6	[32–34]
Echinodermata	Echinoidea	Brissidae	*Brissopsis lyrifera*	X		[32, 33]
Echinodermata	Echinoidea	Cidaridae	*Stylocidaris affinis*	X	1, 18	[13, 17, 28]
Echinodermata	Echinoidea	Diadematidae	***Centrostephanus longispinus***	X	11	[5, 20, 28, 32, 33]
Echinodermata	Echinoidea	Parechinidae	***Paracentrotus lividus***	X	1, 2, 3, 4, 5, 8, 9, 10, 11, 13, 15, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38	[5, 9–11, 13, 14, 16–18, 20–22, 25–27, 32, 33]
Echinodermata	Echinoidea	Parechinidae	*Psammechinus microtuberculatus*	X		[32, 33]

Echinodermata	Echinoidea	Spatangidae	*Spatangus purpureus*	X	5, 11, 12, 15, 18, 20, 25, 48, 49	[11, 20, 25, 32–34]
Echinodermata	Echinoidea	Toxopneustidae	*Sphaerechinus granularis*	X	1, 3, 4, 5, 10, 11, 12, 13, 15, 18, 19, 20, 21, 24, 25, 26, 27, 28, 29, 32, 35, 36, 37, 41	[9–11, 13–18, 21, 22, 25, 32–34]
Echinodermata	Holothuroidea	Cucumariidae	*Leptopentacta elongata*	X		[32, 33]
Echinodermata	Holothuroidea	Holothuriidae	*Holothuria (Holothuria) mammata*	X	12, 20, 25, 49	[32–34]
Echinodermata	Holothuroidea	Holothuriidae	***Holothuria (Holothuria) tubulosa***	X	2, 3, 4, 5, 6, 7, 11, 13, 15, 19, 20, 21, 22, 23, 24, 25, 26, 27, 29, 30, 31, 32, 33, 37, 40, 43, 47	[5, 9, 11, 13, 15, 18, 19, 21, 22, 26, 27, 32–34]
Echinodermata	Holothuroidea	Holothuriidae	***Holothuria (Panningothuria) forskali***	X	5, 8, 11, 13, 18, 19, 25, 28, 30, 33	[5, 17, 18, 20, 32–34]
Echinodermata	Holothuroidea	Holothuriidae	***Holothuria (Platyperona) sanctori***	X	5, 6, 8, 15, 18, 19, 21, 25, 41	[10, 11, 14, 15, 21, 22, 25, 32–34]
Echinodermata	Holothuroidea	Holothuriidae	***Holothuria (Roweothuria) poli***	X	11, 12, 15, 18, 20, 49	[5, 11, 32–34]
Echinodermata	Holothuroidea	Holothuriidae	***Holothuria (Thymiosycia) impatiens***	X	18	[32–34]
Echinodermata	Holothuroidea	Phyllophoridae	*Thyone fusus mediterranea*	X		[33]
Echinodermata	Holothuroidea	Cucumariidae	*Hemiocnus syracusanus*	X		[32, 33]
Echinodermata	Holothuroidea	Cucumariidae	*Leptopentacta tergestina*	X		[32, 33]
Echinodermata	Holothuroidea	Cucumariidae	*Ocnus planci*	X		[32, 33]
Echinodermata	Holothuroidea	Mesothuriidae	*Mesothuria intestinalis*	X		[32, 33]

(continued)

Phylum	Class	Family	Species name	Not specified location	Location	Reference
Echinodermata	Holothuroidea	Stichopodidae	*Parastichopus regalis*	X		[28, 32, 33]
Echinodermata	Holothuroidea	Synaptidae	*Oestergrenia digitata*	X		[33]
Echinodermata	Loveniidae	Loveniidae	*Echinocardium fenauxi*	X		[32, 33]
Echinodermata	Ophiuroidea	Ophiodermatidae	*Ophioderma longicaudum*	X	18, 19, 48	[21, 32–34]
Echinodermata	Ophiuroidea	Ophiotrichidae	*Ophiothrix fragilis*	X	3, 4, 8, 9, 15	[9, 11, 13, 14, 20, 32, 33]
Echinodermata	Ophiuroidea	Ophiotrichidae	*Ophiothrix sp.*		1, 23, 25, 26, 27	[18]
Echinodermata	Ophiuroidea	Amphiuridae	*Amphipholis squamata*	X		[28, 33]
Echinodermata	Ophiuroidea	Amphiuridae	*Amphiura chiajei*	X		[33]
Echinodermata	Ophiuroidea	Amphiuridae	*Amphiura filiformis*	X		[33]
Echinodermata	Ophiuroidea	Amphiuridae	*Amphiura mediterranea*	X		[33]
Echinodermata	Ophiuroidea	Ophiodermatidae	*Ophioderma sp.*		15, 19, 27, 32	[18]
Echinodermata	Ophiuroidea	Ophiomyxidae	*Ophiomyxa pentagona*	X	18	[32–34]
Echinodermata	Ophiuroidea	Ophiuridae	*Ophiura albida*	X		[32, 33]
Echinodermata	Ophiuroidea	Ophiuridae	*Ophiura ophiura*	X		[28, 32, 33]
Chordata	Ascidiacea	Ascidiidae	*Ascidia mentula*	X		[28]
Chordata	Ascidiacea	Ascidiidae	*Ascidia virginea*	X		[28]
Chordata	Ascidiacea	Ascidiidae	*Ascidiella spp*	X		[28]
Chordata	Ascidiacea	Ascidiidae	*Botryllus schlosseri*	X		[28]
Chordata	Ascidiacea	Ascidiidae	*Phallusia mammillata*	X	4, 17	[9, 28, 29]
Chordata	Ascidiacea	Clavelinidae	*Clavelina dellavallei*		8	[20]
Chordata	Ascidiacea	Clavelinidae	*Pycnoclavella communis*		4, 8	[9, 20]
Chordata	Ascidiacea	Diazonidae	*Diazona violacea*	X		[28]
Chordata	Ascidiacea	Diazonidae	*Rhopalaea neapolitana*		3	[13]
Chordata	Ascidiacea	Didemnidae	*Didemnidae*		8, 11	[20]

Chordata	Ascidiacea	Didemnidae	*Didemnum commune*		4	[9]
Chordata	Ascidiacea	Didemnidae	*Didemnum fulgens*		15	[11]
Chordata	Ascidiacea	Didemnidae	*Didemnum maculosum*	X		[28]
Chordata	Ascidiacea	Didemnidae	*Didemnum spp.*	X	3, 18	[13, 17, 28]
Chordata	Ascidiacea	Didemnidae	*Diplosoma sp.*		8	[20]
Chordata	Ascidiacea	Didemnidae	*Diplosoma spongiforme*		4, 8, 11, 15	[9, 11, 14, 20]
Chordata	Ascidiacea	Didemnidae	*Lissoclinum weigelei*		2, 6, 15	[11, 19, 26]
Chordata	Ascidiacea	N/A	*Ascidacea sp.*		3	[13]
Chordata	Ascidiacea	Polycitoridae	*Polycitor sp.*		15	[11]
Chordata	Ascidiacea	Polyclinidae	*Aplidium conicum*		15, 18	[11, 17]
Chordata	Ascidiacea	Polyclinidae	*Aplidium tabarquensis*		18	[23, 35]
Chordata	Ascidiacea	Pyuridae	*Halocynthia papillosa*	X	1, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 15, 18, 19, 21, 22, 23, 24, 25, 26, 28, 29, 30, 31, 33, 34, 35, 36, 37, 40, 45	[7, 9, 11, 13–21, 23, 25, 27, 28]
Chordata	Ascidiacea	Pyuridae	*Microcosmus sp.*		6, 8, 11, 15, 20, 34, 36, 39, 41	[7, 15, 18–20, 22]
Chordata	Ascidiacea	Pyuridae	*Pyura dura*	X		[28]
Chordata	Ascidiacea	Pyuridae	*Pyura microcosmus*	X		[28]
Chordata	Ascidiacea	Pyuridae	*Pyura spp.*	X		[28]
Chordata	Ascidiacea	Styelidae	*Distomus variolosus*	X		[28]
Chordata	Ascidiacea	Styelidae	*Styela plicata*		18	[23]
Chordata	Ascidiacea		*Sydnium sp*		11, 34, 36	[7, 18]

Bold – protected specie

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