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RESEARCH PAPER

# An Annotated Checklist of the Marine Molluscs of the South Adriatic Sea (Montenegro) and a Comparison with Those of Neighbouring Areas

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**Abstract**

Published literature on the molluscs of Montenegro (South Adriatic Sea) is still very scarce. As a baseline for future studies that will enhance the knowledge of this fauna, we have compiled a checklist combining the existing published data with original data from a recent research. Examination of sampled material and a review of the relevant literature revealed the presence of 354 mollusc species. Twelve species have been recorded for the first time in Montenegrin waters, 7 species are of non-native origin while 14 taxa are recognized as endangered and threatened, according to the IUCN Red List and the Barcelona/Berne Conventions. A comparison of our results with those of the neighbouring seas indicates that mollusc fauna is insufficiently studied, but we should bear in mind that the number of recorded species in relation to the size of the researched area points to a rich malacofauna zone.

*Keywords*: Marine molluscs, checklist, alien species, Montenegro, Adriatic Sea.

## Introduction

Molluscs are important components of marine communities worldwide, comprising up to 15–25% of the benthic macrofauna (Sabelli, Giannuzzi-Savelli, & Bedulli,1990). These animals are mainly benthic, but some gastropods are holoplanktic, whereas cephalopods are mostly nectonic organisms (Sabelli & Taviani, 2014). They play important roles in the ecosystem structure and the maintenance of biodiversity (Zenetos, 1997). Furthermore, some molluscs have been widely used in monitoring studies of various contaminants worldwide, because of their economic and ecological importance (Štajn *et al*., 2002).

The earliest study on mollusc fauna in the Adriatic Sea was performed in the Venetian Lagoon (Olivi, 1792). Later, throughout the nineteenth and twentieth centuries, new data from the Gulf of Trieste as well as northern and central parts of the eastern cost (Dalmatia) were documented by many authors (Danilo & Sandri, 1855; Brusina, 1866; Coen, 1914; Vatova, 1949; Cossignani, Cossignani, Di Nisio, & Passamonti, 1992; Hrs-Brenko, 1997). Data on molluscs from the south-eastern Adriatic coast are scarce and most of the literature deals with benthic communities (Karaman & Gamulin-Brida, 1970; Stjepčević & Parenzan, 1980; Gamulin-Brida, 1983).

From a geomorphologic viewpoint, the Montenegrin coast can be divided into two main parts: the Bay of Boka Kotorska and the open sea. Given that Boka Kotorska Bay is a more suitable area for aquaculture, more intensive studies on the malacofauna have been performed there (i.e., Stjepčević, 1967, 1970; Stjepčević & Parenzan, 1982), while cephalopods have been studied in more detail in the open sea (Mandić, 1973a, 1984). In recent years, great interest has been focused on alien species (Katsanevakis, 2011; Mačić, 2013).

In writing this paper we attempted to collect all available data regarding malacofauna from the South Adriatic continental shelf (Montenegro) with the aim of deepening our knowledge about species diversity. Furthermore, the data are compared with the fauna of the adjacent seas with a view to obtaining a better understanding of species presence.

## Materials and Methods

To prepare the present checklist, we reviewed all the available scientific and grey literature records of molluscs published in the study area during the last 60 years, and for each listed species, the reference in which the species was reported, its habitats and an indication of its location on the Montenegrin coast were noted. The taxa were checked for the present

valid nomenclature and the classification was arranged according to the CLEMAM database.

Given that previous studies on molluscs have mostly been focused on the Bay of Boka Kotorska, new research was done at the open-sea sites to complete our knowledge of the present species. A survey was carried out from April to June 2015. Material was collected at 11 stations at depths of up to 30 m using a van Veen grab and scuba diving (Table 1, Figure 1). At each station, at least three replicates were performed. The material was fixed in a 10% seawater–formalin solution and then rinsed through a sieve with a 0.5mm mesh size in the laboratory and sorted into its component taxonomic groups under a stereomicroscope, and the molluscs were identified to species level.

## Results and Discussion

The compiled inventory of the molluscs and their distributions within two divisions of the Montenegrin continental shelf, namely the Bay of Boka Kotorska or the open sea, is presented in Table 2. According to the created checklist, a total of 354 species are known, divided into 122 families. Among the mollusc classes represented along the Montenegrin coast, the class Gastropoda dominates, with 198 species, followed by Bivalvia (131 species). The class Cephalopoda is represented by 17 species, the Scaphopoda by 5 species and the class Polyplacophora by 3 species.

References in Table 2R1. Stjepčević, 1967; R2. Karaman & Gamulin-Brida, 1970; R3. Stjepčević, 1970; R4. Stjepčević & Parenzan, 1980; R5. Stjepčević & Parenzan, 1982; R6. Mandić, 1984; R7. Mandić, 1973a; R8. Mandić & Stjepčević, 1983; R9. Hrs-Brenko, 1983; R10. Mandić, Stjepčević, & Dragović, 1982; R11. Stjepčević, 1974; R12. Mandić, 1973b; R13. Badalamenti, Garcia Charton, Cebrián, Mačić, & Kašćelan, 2008; R14. Fant *et al*., 2012; R15. Badalamenti, Garcia Charton, Treviño-Otón, Mačić, & Cebrian, 2012; R16. RAC-SPA, 2013; R17. Štajn *et al*., 2002; R18. Mačić, 2013; R19. EPA, 2011; R20. Zenetos *et al*., 2015; R21. Doneddu, Trainito, & Mačić 2013.

The checklist for the Montenegrin molluscs summarizes the knowledge of the diversity and distribution of known species from 1967 to the

**Table 1.** Locations, coordinates, sampling gears, depth and biotope characteristics of the sampling points

| Stations | Coordinates | | Sampling gear | Depth (m) | Biotopes |
|---|---|---|---|---|---|
| | Lat. | Long. | | | |
| Ada Bojana | 41°51'58.78" | 19°20'02.42" | Grab | 2.7 | Fine sand |
| Port Milena | 41°54'15.93" | 19°14'17.10" | Grab | 5.5 | Fine sand |
| Valdanos | 41°57'17.59" | 19°09'27.69" | Grab | 15 | Muddy sand |
| Veliki pijesak | 42°02'01.87" | 19°08'24.72" | Grab | 2.5 | Sand |
| Kraljičina plaža | 42°09'48.22" | 18°59'15.79" | Grab | 7 | Sand |
| Kalafat | 42°19'44.65" | 18°41'16.42" | Grab | 25 | Coarse sand |
| Trsteno | 42°16'47.84" | 18°47'15.25" | Grab | 5,5 | Muddy sand |
| Budva | 42°16'59.6" | 18°50'55.3" | SCUBA | 4.5 | Stone, sand |
| Platamuni | 42°15'58.63" | 18°47'38.29" | Grab | 30 | Muddy sand |
| Oblatno | 42°22'51.90" | 18°39'19.06" | Grab | 15 | Muddy sand |
| Dobreč | 42°24'41.61" | 18°33'27.72" | Grab | 19 | Sand |


**Figure 1.** Map of sampling points.

**Table 2.** The checklist of marine molluscs of Montenegro (the southeastern Adriatic Sea) with a reference in which the species was reported from the Montenegrin coast, locations (BKB = Boka Kotorska Bay; OS = Open sea); Habitat (Hs = hard substratum; Ss = soft substratum; P = pelagic; D = demersal; Pz = parazite); * = alien species; # = endangered or threatened species; PS = personal study and their presence in neighbouring seas (Cro-Croatian waters; Al-Albanian waters and SI-South Italy)

| Group/Species | References | BKB | OS | Habitat | Cro. | Al. | SI |
|---|---|---|---|---|---|---|---|
| POLYPLACOPHORA | | | | | | | |
| Chitonidae | | | | | | | |
| *Chiton corallinus* (Risso,1826) | R4;R5;R16 | x | | Hs;Ss | x | | x |
| *Chiton olivaceus* Spengler, 1797 | R1;R4;R5 | x | | Hs;Ss | x | x | x |
| Acanthochitonidae | | | | | | | |
| *Acanthochiton fascicularis* (Linnaeus, 1767) | R4;R5 | x | | Hs;Ss | x | x | x |
| GASTROPODA | | | | | | | |
| Patellidae | | | | | | | |
| *Patella caerulea* (Linnaeus, 1758 ) | R4;R5 | x | | Hs | x | x | x |
| *Patella rustica* (Linnaeus, 1758) | R4;R5 | x | | Hs | x | x | x |
| *Patella vulgata* (Linnaeus, 1758) | R1;R4;R5 | x | | Hs | x | | |
| Fissurellidae | | | | | | | |
| *Diodora gibberula* (Lamarck,1822) | R1;R4;R5 | x | | Hs;Ss | x | x | x |
| *Diodora graeca* (Linnaeus,1758) | R1;R4;R5;PS | x | x | Hs;Ss | x | x | x |
| *Diodora italica* (Defrance,1820) | R1;R4;R5 | x | | Hs;Ss | | x | x |
| *Emarginulla huzardii* Payraudeau,1826 | R4;R5 | x | | Hs;Ss | x | x | |
| *Emarginula fissura* (Linnaeus,1758) | R1;R4;R5 | x | | Hs;Ss | x | x | x |
| *Emarginula octaviana* Coen, 1939 | R4;R5 | x | | Hs;Ss | | x | x |
| *Puncturella noachina* (Linnaeus,1771) | R4;R5 | x | | Hs;Ss | | | x |
| Haliotidae | | | | | | | |
| *Haliotis tuberculata tuberculata* Linnaeus, 1758 | R1;R4;R5; | x | x | Hs;Ss | x | | x |
| Trochidae | | | | | | | |
| *Clanculus corallinus* (Gmelin,1791) | R1;R4;R5 | x | | Hs;Ss | x | x | x |
| *Clanculus cruciatus* (Linnaeus, 1758) | R4;R5 | x | | Hs;Ss | x | x | x |
| *Clelandella miliaris* (Brocchi, 1814) | R16;R16 | x | | Ss | | x | x |
| *Gibbula umbilicaris* (Linnaeus,1758) | R1 | x | | Hs;Ss | x | x | x |
| *Gibbula adriatica* (Philippi, 1844 ) | R1 | x | | Hs | | x | x |
| *Gibbula albida* (Gmelin,1791) | R4;R5; | x | | Hs;Ss | x | x | x |
| *Gibbula divaricata* (Linnaeus,1758) | R1;R4;R5 | x | | Hs;Ss | x | x | x |
| *Gibbula drepanensis* (Brugnone,1873) | R5 | x | | Hs;Ss | | | x |
| *Gibbula fanulum* (Gmelin,1791) | R4;R5 | x | | Hs;Ss | x | | x |
| *Gibbula guttadauri* (Philippi,1836) | R4;R5 | x | | Ss | | | x |
| *Gibbula magus* (Linnaeus,1758) | R1;R2;R4;R5 | x | | Hs;Ss | x | | x |
| *Gibbula philberti* (Récluz,1843) | R4;R5 | x | | Hs;Ss | | | x |
| *Gibbula rarilineata* (Michaud,1829) | R4;R5 | x | | Hs;Ss | x | x | x |
| *Gibbula varia* (Linnaeus,1758) | R4;R5 | x | | Hs;Ss | x | x | x |
| *Phorcus richardi* (Payraudeau, 1826) | R4;R5 | x | | Hs;Ss | | x | |
| *Jujubinus exasperatus* (Pennant,1777) | R4;R5 | x | | Hs;Ss | | x | x |
| *Jujubinus striatus* (Linnaeus,1758) | R1;R4;R5 | x | | Hs;Ss | x | x | x |
| *Phorcus articulatus* (Lamarck, 1822) | R4;R5 | x | | Hs | x | x | x |
| *Phorcus mutabilis* (Philippi, 1846) | R4;R5 | x | | Hs | x | x | x |
| *Phorcus turbinatus* (Born, 1778) | R1 | x | | Hs | x | x | x |
| Calliostomatidae | | | | | | | |
| *Calliostoma conulus* (Linnaeus, 1758) | R1;R4;R5 | x | | Hs;Ss | x | x | x |
| *Calliostoma laugieri* (Payraudeau, 1826) | R1 | x | | Hs;Ss | x | x | x |
| *Calliostoma zizyphinum* (Linnaeus,1758) | R1;R4;R5 | x | | Hs;Ss | x | x | x |
| Turbinidae | | | | | | | |
| *Bolma rugosa* (Linnaeus,1767) | R1;R4;R5 | x | | Hs;Ss | x | x | x |
| Phasianellidae | | | | | | | |
| *Tricolia pullus* (Linnaeus, 1758) | PS | | x | Hs;Ss | x | x | x |
| Colloniidae | | | | | | | |
| Homalopoma sanguineum (Linnaeus, 1758) | R1;R2;PS | x | | Hs;Ss | x | x | x |
| Neritidae | | | | | | | |

**Table 2.** Continued

| Group/Species | References | BKB | OS | Habitat | Cro. | Al. | SI |
|---|---|---|---|---|---|---|---|
| Smaragdia viridis (Linnaeus,1758) | R4;R5;PS | x | x | Hs;Ss | x | x | x |
| Cerithiidae | | | | | | | |
| Bittium latreillii (Payraudeau, 1826) | R13;R15;R19;PS | x | x | Hs;Ss | x | x | x |
| Bittium reticulatum (da Costa, 1778) | R4;R5;R16;PS | x | x | Hs;Ss | x | x | x |
| Bittium submamillatum (de Rayneval & Ponzi, 1854) | R16 | x | | Ss | | | |
| #Cerithium vulgatum Bruguière, 1792 | R1;R2;R4;R5 | x | | Hs;Ss | x | x | x |
| Turritellidae | | | | | | | |
| Turritella communis (Risso,1826) | R2;R4;R5;PS | x | x | Hs;Ss | x | x | x |
| Turritella turbona (Monterosato, 1877 ) | R4;R5;R16 | x | | Hs;Ss | x | x | x |
| Triphoridae | | | | | | | |
| Monophorus perversus (Linnaeus, 1758) | R4;R5 | x | | Hs;Ss | | x | |
| Marshallora adversa (Montagu, 1803) | R4;R5;PS | x | | Hs;Ss | x | | x |
| Metaxia metaxa (Delle Chiaje 1828) | R4 | x | | Ss | x | | x |
| Strobiligera brychia (Bouchet & Guillemot, 1978) | R4;R5 | x | | Ss | | | |
| Cerithiopsidae | | | | | | | |
| Cerithiopsis jeffreysi (Watson, 1885) | R4;R5 | x | | Ss | | | x |
| Epitoniidae | | | | | | | |
| Epitonium clathrus (Linnaeus,1758) | R4;R5;PS | x | x | Hs;Ss | x | | |
| Epitonium muricatum (Risso, 1826) | R4;R5 | x | | Hs;Ss | | | |
| Epitonium turtonis (Turton, 1819) | R4;R5 | x | | Hs;Ss | | | x |
| Eulimidae | | | | | | | |
| Eulima glabra (da Costa,1778) | R1;R2;R4;R5;R16 | x | | Pz | x | x | x |
| Melanella alba (da Costa, 1778) | PS | | x | Ss | | | |
| Melanella compactilis (Locard, 1892) | R4 | x | | Ss | | | |
| Littorinidae | | | | | | | |
| Melarhaphe neritoides (Linnaeus, 1758) | R1;R5 | x | | Hs | x | x | x |
| Rissoidae | | | | | | | |
| Alvania cancellata (da Costa, 1778) | R4;R5 | x | | Hs;Ss | | | x |
| Alvania lineata (Risso, 1826) | R16 | x | | Hs;Ss | x | x | x |
| Alvania cimex (Linnaeus,1758) | R4;R5 | x | | Hs;Ss | x | x | x |
| Alvania cimicoides (Forbes, 1844) | R4;R5 | x | | Hs;Ss | x | x | |
| Alvania hispidula (Monterosato, 1884) | R4;R5 | x | | Ss | x | x | x |
| Peringiella elegans (Locard, 1892) | R4;R5 | x | | Hs;Ss | | | |
| Pusillina marginata (Michaud, 1830) | R4;R5 | x | | Hs;Ss | | x | x |
| Rissoa guerinii (Récluz,1843) | R4;R5 | x | | Hs;Ss | x | | x |
| Rissoa membranacea (Adams J., 1800) | R4;R5 | x | | Hs;Ss | | | |
| Rissoa monodonta (Philippi,1836) | R4;R5 | x | | Ss | x | x | x |
| Rissoa parva (da Costa, 1778) | R4;R5 | x | | Hs;Ss | x | | |
| Rissoa splendida (Eichwald,1830) | R5;R16 | x | | Hs;Ss | x | | |
| Setia ambigua (Brugnone, 1873) | R4;R5 | x | | Hs;Ss | | | |
| Caecidae | | | | | | | |
| Caecum trachea (Montagu, 1803) | R4;R5 | x | | Hs;Ss | x | | x |
| Parastrophia asturiana de Folin, 1870 | R4;R5 | x | | Ss | | | |
| Hydrobiidae | | | | | | | |
| Peringia ulvae (Pennant, 1777) | R4;R5 | x | | Ss | | x | |
| Iravadiidae | | | | | | | |
| Hyala vitrea (Montagu, 1803) | R4;R5 | x | | Ss | | | x |
| Tornidae | | | | | | | |
| Circulus striatus (Philippi, 1836) | R4;R5 | x | | Ss | x | | x |
| Vermetidae | | | | | | | |
| Thylacodes arenarius (Linnaeus, 1758) | R1;R13;R15;R16; R19 | x | x | Hs | x | | |
| Petaloconchus glomeratus (Linnaeus, 1758) | R4;R5 | x | | Hs | x | x | x |
| Aporrhaiidae | | | | | | | |
| Aporrhais pespelecani (Linnaeus, 1758) | R1;R2;R4;R5;R16 | x | | Ss | x | x | x |
| Calyptraeidae | | | | | | | |
| Calyptraea chinensis (Linnaeus, 1758) | R1;R2;R4;R5;R16 | x | | Ss | x | x | x |
| Crepidula moulinsii (Michaud, 1829) | R1;R2;R4;R5 | x | | Hs;Ss | x | | |

**Table 2.** Continued

| Group/Species | References | BKB | OS | Habitat | Cro. | Al. | SI |
|---|---|---|---|---|---|---|---|
| Capulidae | | | | | | | |
| Capulus ungaricus (Linnaeus, 1758) | R1 | x | | Hs;Ss | | x | x |
| Triviidae | | | | | | | |
| Trivia multilirata (Sowerby,G: B. II, 1870) | R1;R2 | x | | Ss | | x | |
| Cypraeidae | | | | | | | |
| #Luria lurida (Linnaeus, 1758) | R1;R19 | x | x | Hs | x | x | x |
| #Zonaria pyrum (Gmelin, 1791) | R1 | x | | Hs | x | x | x |
| #Erosaria spurca (Linnaeus, 1758) | R1 | x | | Hs;Ss | x | | x |
| Ovulidae | | | | | | | |
| Pseudosimnia adriatica (Sowerby,G: B. II, 1870) | R1;R2 | x | | Hs | x | | |
| Naticidae | | | | | | | |
| Euspira macilenta (Philippi, 1844) | R16;R16 | x | | Hs;Ss | | x | x |
| Euspira nitida (Donovan, 1804) | R1;R2;R4;R5 | x | | Ss | | | |
| Natica hebraea (Martyn,1786) | R1;R2;R4;R5;PS | x | x | Hs;Ss | x | x | |
| Euspira catena (da Costa, 1778) | PS | | x | Hs;Ss | x | x | x |
| Euspira intricata (Donovan, 1804) | R4 | x | | Hs;Ss | x | | |
| Notocochlis dillwynii (Payraudeau, 1826) | R4;R5 | x | | Hs;Ss | x | x | x |
| Neverita josephinia (Risso, 1826) | R1;PS | x | x | Ss | x | x | x |
| Natica stercusmuscarum (Gmelin, 1791) | R1;R2;R4;R5 | x | | Ss | | x | x |
| Tonnidae | | | | | | | |
| #Tonna galea (Linnaeus, 1758) | R1;R2;PS | x | x | Ss | x | x | x |
| Ranellidae | | | | | | | x |
| Cabestana cutacea (Linnaeus, 1767) | R21 | | x | Ss | | | |
| Cassidae | | | | | | | |
| Galeodea echinophora (Linnaeus,1758) | R1;R2;R5 | x | | Ss | x | x | x |
| Muricidae | | | | | | | |
| Bolinus brandaris (Linnaeus, 1758) | R1;R2;R4;R5;R16 | x | | Hs;Ss | x | x | x |
| Coralliophila squamosa (Bivona Ant. in Bivona And., 1838) | R4;R5 | x | | Hs;Ss | | | x |
| Hexaplex trunculus (Linnaeus, 1758) | R1;R2;R4;R5;R13 ;R15;R16;R19 | x | | Hs;Ss | x | x | x |
| Muricopsis cristata (Brocchi,1814) | R4;R5 | x | | Hs | x | x | x |
| Ocenebra erinaceus (Linnaeus, 1758) | R1 | x | | Hs;Ss | x | x | |
| Stramonita haemastoma (Linnaeus, 1767) | R15;PS | | x | Hs | x | | x |
| Marginellidae | | | | | | | |
| Granulina marginata (Bivona Ant., 1832) | R1;R4;R5 | x | | Hs;Ss | | x | x |
| Costellariidae | | | | | | | |
| Vexillum tricolor (Gmelin,1791) | R1;R4;R5 | x | | Hs;Ss | x | x | x |
| Vexillum luculentum (Reeve, 1845) | R4 | x | | Hs;Ss | | | |
| Vexillum acuminatum (Gmelin, 1791) | R4 | x | | Hs;Ss | x | | |
| Buccinidae | | | | | | | |
| Euthria cornea (Linnaeus, 1758) | R1;R4;R5 | x | | Hs;Ss | x | | |
| Pollia dorbignyi (Payraudeau, 1826) | R4;R5 | x | | Hs;Ss | | x | x |
| Pisania striata (Gmelin, 1791) | R1;R4;R5 | x | | Hs;Ss | | x | x |
| Nassariidae | | | | | | | |
| Cyclope neritea (Linnaeus,1758) | R1;R4;R5 | x | | Hs;Ss | | x | x |
| Nassarius corniculum (Olivi, 1792) | R4;R5 | x | | Ss | x | | x |
| Nassarius cuvierii (Payraudeau, 1826) | R4;R5 | x | | Hs;Ss | x | | x |
| Nassarius mutabilis (Linnaeus,1758) | R1 | x | | Ss | x | x | x |
| Nassarius pygmaeus (Lamarck, 1822) | R1;R2;R4;R5;R16 | x | | Hs;Ss | | x | x |
| Nassarius reticulatus (Linnaeus, 1758) | R1 | x | | Hs;Ss | x | x | x |
| Nassarius incrassatus (Strøm, 1768) | R4;R5;PS | x | x | Hs;Ss | x | x | x |
| Columbellidae | | | | | | | |
| Columbella rustica (Linnaeus, 1758) | R1;R4;R5 | x | | Hs;Ss | x | x | x |
| Mitrella scripta (Linnaeus,1758) | R4;R5 | x | | Hs;Ss | | | x |
| Fasciolariidae | | | | | | | |
| Fusinus pulchellus (Philippi,1840) | R1;R4;R5 | x | | Ss | | | x |
| Fusinus rostratus (Olivi,1792) | R1;R2;R4;R5 | x | | Hs;Ss | x | | |

**Table 2.** Continued

| Group/Species | References | BKB | OS | Habitat | Cro. | Al. | SI |
|---|---|---|---|---|---|---|---|
| Fusinus parvulus (Monterosato, 1884) | R4;R5 | x | | Ss | | | |
| Fusinus syracusanus (Linnaeus,1758) | R1;R2;R4;R5 | x | | Hs;Ss | x | | x |
| Tarantinaea lignaria (Linnaeus, 1758) | R13;R15;R19 | | x | Hs | | | x |
| Conidae | | | | | | | |
| Conus ventricosus (Gmelin, 1791) | R1;R4;R5 | x | | Hs;Ss | x | | |
| Horaiclavidae | | | | | | | |
| Haedropleura septangularis (Montagu, 1803) | R4;R5 | x | | Ss | | | x |
| Mangeliidae | | | | | | | |
| Bela brachystoma (Philippi, 1844) | R4;R5 | x | | Ss | x | | x |
| Bela taprurensis (Pallary, 1904) | R4;R5 | x | | Ss | | | x |
| Mangelia attenuata (Montagu, 1803) | R4;R5;R16 | x | | Ss | x | x | x |
| Mangelia costulata Risso, 1826 | R4;R5 | x | | Ss | | | x |
| Mangelia striolata Risso, 1826 | R4;R5 | x | | Ss | | | x |
| Mangelia scabrida Monterosato, 1890 | R4;R5 | x | | Ss | x | | x |
| Mangelia stosiciana Brusina, 1869 | R4;R5 | x | | Ss | | | x |
| Mangelia unifasciata (Deshayes, 1835) | R4;R5;R16 | x | | Hs;Ss | x | | x |
| Raphitomidae | | | | | | | |
| Raphitoma aequalis (Jeffreys, 1867) | R16 | x | | Ss | | | |
| Raphitoma philberti (Michaud,1829) | R4;R5 | x | | Ss | | | |
| Raphitoma purpurea (Montagu, 1803) | R4;R5 | x | | Hs;Ss | x | | |
| Raphitoma echinata (Brocchi, 1814) | R4;R5 | x | | Hs;Ss | | x | x |
| Raphitoma cordieri (Payraudeau, 1826) | R4;R5 | x | | Ss | | | x |
| Mathildidae | | | | | | | |
| Mathilda quadricarinata (Brocchi,1814) | R4;R5 | x | | Hs;Ss | | | |
| Pyramidellidae | | | | | | | |
| Eulimella acicula (Philippi, 1836) | R4 | x | | Pz | x | | |
| Eulimella scillae (Scacchi,1835) | R4;R5 | x | | Pz | x | x | x |
| Megastomia conoidea (Brocchi, 1814) | R4;R5 | x | | Pz | | x | x |
| Turbonilla delicata (Monterosato, 1874) | R4;R5 | x | | Pz | x | | |
| Turbonilla gradata (Bucquoy, Dautzenberg & Dollfus, 1883) | R4;R5 | x | | Pz | x | | x |
| Turbonilla lactea (Linnaeus,1758) | R4;R5 | x | | Pz | | x | x |
| Turbonilla pusilla (Philippi,1844) | R4;R5 | x | | Pz | | | x |
| Acteonidae | | | | | | | |
| Acteon tornatilis (Linnaeus, 1758) | R4;R5;R16;R20 | x | | Hs;Ss | x | x | |
| Ringiculidae | | | | | | | |
| Ringicula auriculata (Ménard de la Groye,1811) | R4;R5;R16;R20 | x | | Ss | | | x |
| Ringicula conformis (Monterosato,1877) | R4;R5;R20 | x | | Hs;Ss | x | | x |
| Ringicula gianninii Nordsieck, 1974 | R4;R5;R20 | x | | Ss | | x | |
| Bullidae | | | | | | | |
| Bulla striata (Bruguière, 1792) | PS | | x | Ss | x | x | x |
| Haminoeidae | | | | | | | |
| Haminoea hydatis (Linnaeus,1758) | R4;R5;R20 | x | | Hs;Ss | x | x | x |
| Haminoea navicula (da Costa,1778) | R4;R5;R20 | x | | Ss | x | x | x |
| Weinkauffia turgidula (Forbes, 1844) | R4;R20 | x | | Ss | x | | x |
| Philinidae | | | | | | | |
| Philine quadripartita Ascanius, 1772 | R1;R2;R4;R5;R20 | x | | Hs;Ss | x | | |
| Philine scabra (O. F. Müller, 1784) | R4;R5;R20 | x | | Ss | x | | |
| Cylichnidae | | | | | | | |
| Cylichna cylindracea (Pennant,1777) | R4;R5;R20 | x | | Ss | x | x | x |
| Retusidae | | | | | | | |
| Volvulella acuminata (Bruguière, 1792) | R20 | | x | Ss | x | | x |
| Plakobranchidae | | | | | | | |
| Elysia timida (Risso, 1818) | R20 | | x | Hs | x | | x |
| Thuridilla hopei (Vérany, 1853) | R16;R20 | x | x | Hs;Ss | x | | |
| Umbraculidae | | | | | | | |
| Umbraculum umbraculum (Lightfoot, 1786) | R20 | | x | Hs | x | x | x |
| Tylodinidae | | | | | | | |
| Tylodina perversa (Gmelin, 1791) | R20 | | x | Hs | x | | x |
| Akeridae | | | | | | | |

**Table 2.** Continued

| Group/Species | References | BKB | OS | Habitat | Cro. | Al. | SI |
|---|---|---|---|---|---|---|---|
| Akera bullata O. F. Müller, 1776 | R4;R5;R20 | x | x | Ss | x | | x |
| Aplysiidae | | | | | | | |
| Aplysia depilans (Gmelin, 1791) | R20 | x | | Hs;Ss | x | x | x |
| *Aplysia dactylomela (Rang, 1828) | R20 | x | | Hs | x | | |
| Aplysia fasciata poiret, 1789 | R20 | | x | Hs | x | | x |
| *Bursatella leachi de Blainville, 1817 | R16;R18;R20 | x | | Ss | x | | |
| Doridídae | | | | | | | |
| Doris bertheloti (d'Orbigny, 1839) | R20 | x | | Ss | x | | |
| Discodorididae | | | | | | | |
| Atagema rugosa Pruvot-Fol, 1951 | R20 | x | | Hs | x | | |
| Baptodoris cinnabarina Bergh, 1884 | R20 | x | | Hs | x | | |
| Geitodoris portmanni (Schmekel 1972) | R16 | x | | Hs | | | |
| Discodoris erubescens Bergh 1884 | R20 | | x | Hs | | | |
| Platydoris argo (Linnaeus, 1767) | R16 | x | | Hs | x | | |
| Peltodoris atromaculata (Bergh, 1880) | R13;R15;R19;R20 | | x | Hs;Ss | x | x | |
| Chromodorididae | | | | | | | |
| Felimare orsinii (Vérany, 1864) | | | | | x | | |
| Felimare picta (Schultz in Philippi, 1836) | R15;R16;R20 | x | x | Hs | x | x | |
| Felimare tricolor (cantraine, 1835) | R20 | x | | Hs | x | x | |
| Felimida krohni (Vérany, 1846) | R13;R15;R19;R20 | | x | Hs | x | | |
| Felimida luteorosea (Rapp, 1827) | R20 | | x | Hs | x | | |
| Phyllidiidae | | | | | | | |
| Phyllidia flava (Aradas, 1847) | R15 | | x | Hs | x | | |
| Dendrodorididae | | | | | | | |
| Doriopsilla areolata Bergh, 1880 | R20 | x | | Hs | | x | |
| Calycidorididae | | | | | | | |
| Diaphorodoris papillata Portmann & Sandmeier, 1960 | R20 | x | | Hs | x | | |
| Tritoniidae | | | | | | | |
| Tritonia nilsodhneri (Marcus Ev., 1983 ) | R16 | x | | Hs | | | |
| Tethydidae | | | | | | | |
| *Melibe viridis Kelaart 1858 | R20 | x | | Hs | x | | |
| Tethys fimbria Linnaeus, 1767 | R20 | | x | Hs | x | | |
| Proctonotidae | | | | | | | |
| Janolus cristatus (delle Chiaje 1841) | R20 | x | | Hs | x | | |
| Facelinidae | | | | | | | |
| Cratena peregrina (Gmelin, 1791) | R16;R20;PS | | x | Hs | x | | |
| Dicata odhneri (Schmekel, 1967) | R16;R20 | x | | Hs | | | |
| Dondice banyulensis Portmann & Sandmeier, 1960 | R20 | x | | Hs | x | | |
| Facelina fusca Schmekel, 1966 | R20 | x | | hs | x | | |
| Flabellinidae | | | | | | | |
| Flabellina affinis (Gmelin, 1791) | R13;R15;R16;R19 ;R20;PS | x | x | Hs;Ss | x | | |
| Flabellina babai Schmekel, 1972 | R15;R20 | | x | Hs | x | | |
| Flabellina ischitana (Hirano & Thompson, 1990) | R16 | x | | Hs | x | | |
| Flabellina iodinea (J. G. Cooper, 1863) | PS | | x | Hs | | | |
| Flabellina pedata (Montagu 1816) | R20 | x | | Hs | x | | |
| Rissoellidae | | | | | | | |
| Rissoella diaphana (Alder, 1848) | R4;R5 | x | | Hs | | | |
| Rissoinidae | | | | | | | |
| Rissoina bruguieri (Payraudeau,1826) | R4;R5 | x | | Hs | | | x |
| BIVALVIA | | | | | | | |
| Nuculidae | | | | | | | |
| Nucula nitidosa (Winckworth, 1930) | R17 | x | | Ss | | x | x |
| Nucula nucleus (Linnaeus,1758) | R1;R2;R4;R5;R16 | x | | Ss | | x | x |
| Nucula sulcata (Bronn,1831) | R4;R5;R16 | x | | Ss | | x | x |
| Nuculanidae | | | | | | | |
| Nuculana pella (Linnaeus, 1767) | R1;R2;R4;R5;R16 | x | | Ss | x | x | x |
| Saccella commutata (Philippi, 1844) | R1;R2;R4;R5 | x | | Ss | | x | x |
| Arcidae | | | | | | | |

**Table 2.** Continued

| Group/Species | References | BKB | OS | Habitat | Cro. | Al. | SI |
|---|---|---|---|---|---|---|---|
| Acar gradata (Broderip & Sowerby, G. B. I 1829) | R4;R5 | x | | Ss | | | |
| Anadara polii (Mayer, 1868) | R1;R2;R5 | x | | Ss | | | x |
| *Anadara transversa (Say, 1822) | R16 | x | | Ss | | | |
| Arca noae (Linnaeus, 1758 ) | R1;R4;R5;R13;R15;R16;PS | x | x | Hs | x | x | x |
| Arca tetragona (Poli, 1795) | R1;R2,R4;R5 | x | | Ss | | x | x |
| Barbatia barbata (Linnaeus,1758) | R1;R4;R5;R16;PS | | x | Ss | x | x | x |
| Noetiidae | | | | | | | |
| Striarca lactea (Linnaeus, 1758) | R1;R4;R5;PS | x | x | Hs;Ss | x | | x |
| Glycymerididae | | | | | | | |
| Glycymeris glycymeris (Linnaeus,1758) | R1;R2;R4;R5 | x | | Ss | x | x | x |
| Glycymeris bimaculata (Poli 1795) | PS | | x | Ss | x | x | x |
| Glycymeris nummaria (Linnaeus, 1758) | R1; | x | | Ss | | | |
| Mytilidae | | | | | | | |
| Dacrydium vitreum (Møller, 1842) | R4;R5 | x | | Hs;Ss | | | |
| Modiolus barbatus (Linnaeus,1758) | R1;R4;R5;PS | x | x | Hs;Ss | x | x | x |
| #Lithophaga lithophaga (Linneaus,1758) | R1;R4;R5;R13;R14;R15;R16;R19;PS | x | x | Hs | | x | x |
| Musculus discors (Linnaeus, 1767) | R4;R5 | x | | Ss | | | |
| Mytilaster lineatus (Gmelin,1791) | R4;R5 | x | | Ss | | | x |
| Mytilaster minimus (Poli,1795) | R1;R4;R5;PS | x | x | Hs | x | x | x |
| Mytilus galloprovincialis (Lamarck, 1819) | R1;R2;R4;R5;R9;R11;R17;PS | x | x | Hs;Ss | x | x | x |
| Mytilus edulis (Linnaeus, 1758) | R16;PS | x | x | Hs;Ss | | | x |
| *Arcuatula senhousia (Benson in Cantor, 1842) | PS | | x | Ss | | | |
| Gibbomodiola adriatica (Lamarck, 1819) | R4;R5;R16 | x | | Ss | | | |
| Pinnidae | | | | | | | |
| #Pinna nobilis (Linnaeus,1758) | R1;R2;R4;R5;R13;R14;R15;R16;R19;PS | x | x | Ss | x | x | x |
| Atrina fragilis (Pennant 1777) | R1;R2;R4;R5 | x | | Ss | | | x |
| Pteriidae | | | | | | | |
| Pteria hirundo (Linnaeus, 1758) | R1;R2;R4;R5;R15 | x | x | Hs;Ss | | x | x |
| Pectinidae | | | | | | | |
| Aequipecten opercularis ( Linnaeus, 1758) | R1;R2;R4;R5 | x | | Ss | | x | x |
| Manupecten pesfelis (Linnaeus, 1758) | R4;R5 | x | | Hs;Ss | | | |
| Flexopecten glaber (Linnaeus, 1758) | R1;R4;R5;R16 | x | | Ss | | | |
| Pecten jacobeus ( Linnaeus, 1758) | R1;R2;R4;R5;R16;PS | x | x | Ss | x | x | x |
| Pecten maximus (Linnaeus, 1758) | R4;R5 | x | | Ss | | | |
| Pseudamussium sulcatum (Müller O.F., 1776) | R4;R5 | x | | Ss | | | |
| Talochlamys multistriata (Poli, 1795) | R4;R5 | x | | Ss | | x | x |
| Mimachlamys varia (Linnaeus, 1758) | R1;R2;R4;R5;R16 | x | | Ss | x | x | x |
| Spondylidae | | | | | | | |
| Spondylus gaederopus (Linnaeus,1758) | R1;R4;R5 | x | | Hs | x | x | x |
| Anomiidae | | | | | | | |
| Anomia ephippium (Linnaeus, 1758) | R1;R2;R4;R5 | x | | Ss | | x | x |
| Heteranomia squamula (Linnaeus, 1758) | R4;R5 | x | | Ss | | | |
| Monia patelliformis (Linnaeus, 1761) | R4;R5 | x | | Ss | | x | |
| Limidae | | | | | | | |
| Lima lima (Linnaeus,1758) | R1; | x | | Hs | | x | x |
| Limaria hians (Gmelin,1791) | R1;R4;R5 | x | | Ss | | | x |
| Ostreidae | | | | | | | |
| Ostrea edulis Linnaeus, 1758 | R1;R2;R4;R5;R11;PS | x | x | Hs | x | x | x |
| Ostrea stentina (Payraudeau, 1826) | R4;R5 | x | | Hs | | x | |
| Lucinidae | | | | | | | |

**Table 2.** Continued

| Group/Species | References | BKB | OS | Habitat | Cro. | Al. | SI |
|---|---|---|---|---|---|---|---|
| Anodontia fragilis (Philippi, 1836) | R4;R5 | x | | Ss | x | x | x |
| Ctena decussata (Costa O.G.,1829) | R4;R5 | x | | Ss | x | x | x |
| Myrtea spinifera (Montagu, 1803) | R4;R5;R16 | x | | Ss | | x | x |
| Loripes lucinalis (Lamarck, 1818) | R1;R2;R4;R5;PS | x | x | Ss | | | |
| Lucinella divaricata (Linnaeus, 1758) | R1;R4;R5 | x | | Ss | x | x | x |
| Lucinoma borealis (Linnaeus, 1767) | R16 | x | | Ss | | | x |
| Thyasiridae | | | | | | | |
| Thyasira flexuosa (Montagu, 1803) | R5 | x | | Ss | | | x |
| Ungulinidae | | | | | | | |
| Diplodonta brocchii (Deshayes 1850) | R4;R5 | x | | Ss | | x | |
| Diplodonta rotundata (Montagu, 1803) | R4;R5;R16 | x | | Ss | x | x | x |
| Chamidae | | | | | | | |
| Chama circinata (di Monterosato, 1878) | R4;R5 | x | | Hs;Ss | | | |
| Chama gryphoides (Linnaeus, 1758) | R1;R4;R5;R16;PS | x | x | Hs;Ss | x | x | x |
| Lasaeidae | | | | | | | |
| Lepton squamosum (Montagu, 1803) | R4;R5 | x | | Ss | | | |
| Montacutidae | | | | | | | |
| Kurtiella bidentata (Montagu, 1803) | R4;R5;R16 | x | | Ss | | x | x |
| Sportellidae | | | | | | | |
| Sportella recondita (Fischer P. in de Folin, 1872) | R16;R16 | x | | Ss | | | |
| Cardiidae | | | | | | | |
| Acanthocardia echinata (Linnaeus, 1758) | R1;R2;R4;R5;PS | x | x | Ss | | x | x |
| Acanthocardia deshayesii (Payraudeau, 1826) | PS | | x | Ss | | | |
| Acanthocardia paucicostata (Sowerby G. B. II, 1834) | R1;R2;R4;R5;R16 | x | | Ss | x | x | x |
| Acanthocardia tuberculata (Linneaus,1758) | R1;R4;R5;PS | x | x | Ss | x | x | x |
| Cerastoderma glaucum (Bruguière, 1789) | R4;R5 | x | | Ss | x | x | x |
| Laevicardium oblongum (Gmelin,1791) | R1;R4;R5 | x | | Ss | x | x | x |
| Papillicardium papillosum (Poli, 1791) | R4;R5;R16 | x | | Ss | | | x |
| Parvicardium exiguum (Gmelin,1791) | R1;R2;R4;R5 | x | | Ss | x | x | x |
| Parvicardium minimum (Philippi,1836) | R4;R5;R16 | x | | Ss | | x | |
| Parvicardium scabrum (Philippi, 1844) | R4;R5 | x | | Ss | | x | |
| Mactridae | | | | | | | |
| Mactra glauca (Born, 1778 ) | PS | x | | Ss | | x | |
| Mactra stultorum (Linnaeus,1758) | R1;R4;R5 | x | | Ss | x | | x |
| Spisula subtruncata (da Costa, 1778) | R4;R5 | x | | Ss | x | x | x |
| Mesodesmatidae | | | | | | | |
| Donacilla cornea (Poli,1791) | R1;R2;R4;R5;PS | x | x | Ss | | | x |
| Tellinidae | | | | | | | |
| Arcopagia balaustina (Linnaeus, 1758) | R4;R5 | x | | Ss | | | x |
| Arcopagia crassa (Pennant, 1777) | R16 | x | | Ss | | x | |
| Gastrana fragilis (Linnaeus,1767) | R4;R5 | x | | Ss | x | x | x |
| Tellina distorta Poli,1791 | R1;R16 | x | | Ss | | x | x |
| Tellina donacina Linnaeus, 1758 | R4;R5;PS | x | x | Ss | x | x | x |
| Tellina pulchella (Lamarck,1818) | R1;R4;R5 | x | x | Ss | | x | x |
| Tellina serrata (Brocchi, 1814) | R4;R5 | x | | Ss | x | | x |
| Tellina tenuis (da Costa, 1778) | R16 | x | | Ss | x | | x |
| Donacidae | | | | | | | |
| Donax semistriatus Poli, 1791 | R4;R5 | x | | Ss | | x | x |
| Donax trunculus Linnaeus, 1758 | R21;PS | | x | Ss | x | x | x |
| Psammobiidae | | | | | | | |
| Gari fervensis (Gmelin, 1791) | R4;R5 | x | | Ss | x | x | x |
| Gari depressa (Pennant, 1777) | R1;R2;R4;R5 | x | | Ss | x | x | x |
| Gari tellinella (Lamarck, 1818) | R4;R5 | x | | Ss | | x | x |
| Semelidae | | | | | | | |
| Abra alba (Wood. W., 1802) | R4;R5 | x | | Ss | | x | x |
| Abra nitida (Müller O.F., 1776) | R4;R5 | x | | Ss | | | x |
| Abra prismatica (Montagu, 1808) | R4;R5 | x | | Ss | | x | |
| Abra segmentum (Récluz, 1843) | R4;R5 | x | | Ss | | x | x |

**Table 2.** Continued

| Group/Species | References | BKB | OS | Habitat | Cro. | Al. | SI |
|---|---|---|---|---|---|---|---|
| Scrobicularia cottardii (Payraudeau,1826) | R4;R5 | x | | Ss | | x | x |
| Scrobicularia plana (da Costa,1778) | R1;R4;R5 | x | | Ss | x | x | x |
| Solecurtidae | | | | | | | |
| Azorinus chamasolen (da Costa,1778) | R4;R5;R16 | x | | Ss | x | x | x |
| Solecurtus candidus (Brocchi, 1814) | R4;R5 | x | | Ss | | | |
| Trapeziidae | | | | | | | |
| Coralliophaga lithophagella (Lamarck, 1819) | R4;R5 | x | | Ss | | | x |
| Glossidae | | | | | | | |
| Glossus humanus (Linnaeus,1758) | R1;R2;R4;R5 | x | | Ss | | x | x |
| Veneridae | | | | | | | |
| Callista chione (Linnaeus, 1758) | PS | | x | Ss | x | x | x |
| Chamelea gallina (Linnaeus,1758) | R4;R5;PS | x | x | Ss | x | x | x |
| Clausinella fasciata (da Costa, 1778) | R1;R4;R5;R16 | x | | Ss | x | x | x |
| Dosinia lupinus ( Linnaeus, 1758) | R1;R2;R4;R5 | x | | Ss | x | x | x |
| Dosinia exoleta (Linnaeus,1758) | R1;R4;R5;PS | x | x | Ss | x | x | x |
| Gouldia minima (Montagu,1803) | R4;R5 | x | | Ss | x | x | x |
| Irus irus (Linnaeus,1758) | R1;R4;R5 | x | | Hs;Ss | x | x | x |
| Mysia undata (Pennant,1777) | R4;R5 | x | | Ss | x | | x |
| Petricola lithophaga (Retzius,1788) | R4;R5 | x | | Hs;Ss | | | x |
| Pitar rudis (Poli,1795) | R1;R2;R4;R5;R16 ;PS | x | x | Ss | x | x | x |
| Polititapes aureus (Gmelin, 1791) | R1;R2;R4;R5; | x | | Ss | | | |
| *Ruditapes philippinarum (Adams & Reeve, 1850) | PS | | x | Ss | | x | x |
| Ruditapes decussatus (Linnaeus, 1758) | R1;R4;R5 | x | | Ss | x | x | x |
| Timoclea ovata (Pennant, 1777) | R16 | x | | Ss | x | x | x |
| Venus verrucosa Linnaeus, 1758 | R1;R4;R5;PS | x | x | Ss | x | x | x |
| Venus casina Linnaeus, 1758 | R4;R5;PS | x | x | Ss | x | x | x |
| Corbulidae | | | | | | | |
| Corbula gibba (Olivi,1792) | R1;R2;R4;R5;R16 | x | | Ss | x | x | x |
| Teredinidae | | | | | | | |
| *Teredo navalis (Linnaeus,1758) | R1;R4;R5;PS | x | x | Hs | | | x |
| Gastrochaenidae | | | | | | | |
| Gastrochaena dubia (Pennant, 1777) | R4;R5;R13;R15;R 16;R19;PS | x | x | Hs | x | | x |
| Solenidae | | | | | | | |
| Solen marginatus (Pulteney,1799) | R1;R4;R5 | x | | Hs | x | x | x |
| Pharidae | | | | | | | |
| Ensis siliqua (Linnaeus, 1758) | R21 | | x | Ss | x | | |
| Ensis ensis ( Linnaeus, 1758) | PS | | x | Ss | x | x | x |
| Ensis minor (Chenu,1843) | R4;R5 | x | | Ss | | x | x |
| Pharus legumen (Linnaeus,1767) | R1;R2;R4;R5 | x | | Ss | | x | |
| Phaxas pellucidus (Pennant, 1777) | R4;R5 | x | | Ss | | | |
| Hiatellidae | | | | | | | |
| Hiatella arctica (Linnaeus,1767) | R1;R2;R4;R5 | x | | Hs | x | x | x |
| Hiatella rugosa (Linnaeus,1767) | R1;R4;R5 | x | | Hs | | x | x |
| Saxicavella jeffreysi (Winckworth,1930) | R4;R5 | x | | Hs | | | |
| Thraciidae | | | | | | | |
| Thracia corbuloidea de Blainville, 1827 | R4 | x | | Ss | | | x |
| Thracia gracilis Jeffreys, 1865 | R4;R5 | x | | Ss | | | |
| Thracia phaseolina (Lamarck, 1818) | R4;R5 | x | | Ss | | | |
| Thracia pubescens (Pulteney,1799) | R4;R5 | x | | Ss | x | x | x |
| Pandoridae | | | | | | | |
| Pandora pinna (Montagu,1803) | R4;R5 | x | | Ss | | x | |
| Poromyidae | | | | | | | |
| Poromya granulata (Nyst & Westendorp,1839) | R4;R5 | x | | Ss | | x | x |
| Cuspidariidae | | | | | | | |
| Cuspidaria cuspidata (Olivi,1792) | R1;R2;R4;R5;R16 | x | | Ss | | x | x |
| Cuspidaria rostrata (Spengler, 1793) | R4;R5 | x | | Ss | | x | |

**Table 2.** Continued

| Group/Species | References | BKB | OS | Habitat | Cro. | Al. | SI |
|---|---|---|---|---|---|---|---|
| SCAPHOPODA | | | | | | | |
| Dentaliidae | | | | | | | |
| Antalis dentalis (Linnaeus,1758) | R1;R2;R4 | x | | Ss | x | x | x |
| Antalis vulgaris (da Costa,1778 ) | R4;R5;PS | x | x | Ss | x | | x |
| Antalis inaequicostata (Dautzenberg,1891) | R1;R4;R5;R16 | x | | Hs;Ss | x | x | x |
| Fustiariidae | | | | | | | |
| Fustiaria rubescens (Deshayes 1825) | R5 | x | | Ss | x | | x |
| Gadilidae | | | | | | | |
| Dischides politus (S. Wood, 1842) | R16 | x | | Ss | | | x |
| CEPHALOPODA | | | | | | | |
| Sepiidae | | | | | | | |
| #Sepia elegans Blainville,1827 | R1;R2;R3;R6;R7;R8;R12 | x | x | D | x | x | x |
| #Sepia officinalis ( Linnaeus,1758) | R1;R2;R3;R6;R7;R8;R10;R12 | x | x | D | x | x | x |
| #Sepia orbignyana (Férussac, 1826) | R6;R7;R8;R12 | | x | D | x | x | x |
| Sepiolidae | | | | | | | |
| #Rossia macrosoma (Delle Chiaje, 1830) | R6;R7;R8;R12 | | x | D | x | x | |
| #Sepietta oweniana (d'Orbigny, 1841) | R1;R3;R6;R7;R8;R12 | x | | D | x | x | |
| #Sepiola rondeletii Leach, 1817 | R1;R2;R3;R6;R7;R8;R12 | x | x | D | x | x | x |
| Loliginidae | | | | | | | |
| Alloteuthis media (Linnaeus, 1758) | R6;R7;R8;R12 | | x | D | | x | |
| Loligo vulgaris (Lamarck,1798) | R1;R2;R3;R6;R7;R8;R10;R12 | x | x | D | x | x | x |
| Ommastrephidae | | | | | | | |
| Illex coindetii (Vérany, 1839) | R6;R7;R8;R12 | | x | D | x | x | |
| Todarodes sagittatus (Lamarck, 1798) | R6;R8 | | x | P | x | x | |
| Octopodidae | | | | | | | |
| #Eledone cirrhosa (Lamarck, 1798) | R6;R7;R8;R12 | | x | D | x | x | |
| Eledone moschata (Lamarck, 1798) | R1;R2;R3;R6;R7;R8;R10;R12 | x | x | D | x | x | |
| Octopus salutii (Vérany, 1836) | R6;R7;R8;R12 | | x | D | x | x | |
| Octopus vulgaris (Cuvier,1797) | R1;R3;R6;R7;R8;R12;R15;R21 | x | x | D | x | x | |
| Pteroctopus tetracirrhus (Delle Chiaje, 1830) | R6;R8;R12 | | x | D | x | x | |
| Scaeurgus unicirrhus (Delle Chiaje [in de Férussac & d'Orbigny], 1841) | R6;R7;R8;R12 | | x | D | x | x | |
| Argonautidae | | | | | | | |
| Argonauta argo (Linnaeus, 1758) | R6;R8 | | x | P | x | x | x |

present day. The available data (Figure 2) show that these animals are much better studied in Boka Kotorska Bay than in the open sea (Stjepčević, 1967; Karaman & Gamulin-Brida, 1970; Stjepčević, 1974; Stjepčević & Parenzan, 1982). If we take the cephalopods into consideration, which are pelagic or demersal living molluscs, it is clear that species diversity along the open sea of the Montenegrin coast has been studied much more than that of other mollusc groups (Mandić, 1973a, 1984).

From the species listed in Table 2. *Tricolia pullus* (Linnaeus, 1758), *Melanella alba* (da Costa, 1778), *Euspira catena* (da Costa, 1778), *Bulla striata* Bruguière, 1792, *Flabellina iodinea* (J. G. Cooper, 1863), *Glycymeris bimaculata* (Poli, 1795), *Arcuatula senhousia* (Benson, 1842), *Acanthocardia deshayesii* (Payraudeau, 1826 ), *Mactra glauca* (Born, 1778), *Callista chione* (Linnaeus, 1758), *Ruditapes philippinarum* (Adams and Reeve, 1850) and *Ensis ensis* (Linnaeus, *1758*) are new records for the Montenegrin mollusc fauna. Species already known from the rest of the Mediterranean seas have, for the first time, been collected from the area because this part of the Adriatic Sea was, until the present study, very poorly investigated.

Among the recorded mollusc species, 7 (*Teredo navalis* (Linnaeus, 1758), *Arcuatula senhousia* (Benson, 1842), *Anadara transversa* (Say, 1822), *Ruditapes philippinarium* (Adams & Reeve, 1850), *Melibe viridis* Kelaart, 1858, *Bursatella leachi* de

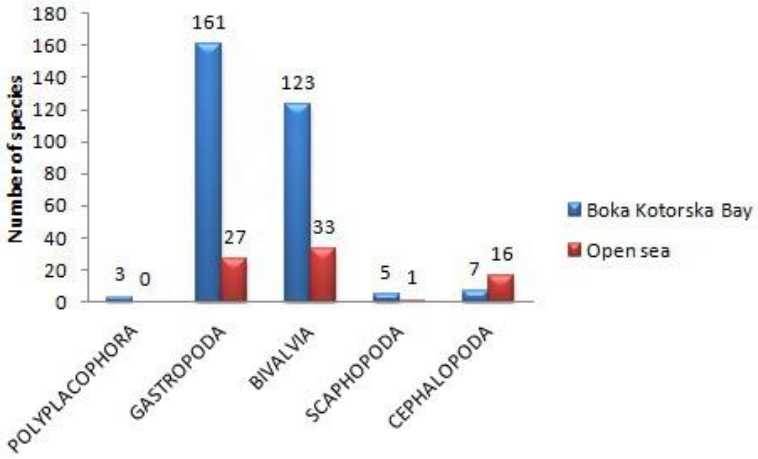


**Figure 2.** Total number of the mollusc species according to distribution classes in the Boka Kotorska Bay and Open Sea.

Blainville, 1817 and *Aplysia dactylomela* (Rang, 1828) are alien species that originated outside the Mediterranean Sea. The problem of non-native species is probably not as great anywhere in the world as in the Mediterranean Sea where 215 mollusc species have been recorded (Zenetos *et al*., 2012). The highest number of ascertained alien molluscs in the Mediterranean came from the Red Sea via the Suez Canal (Gofas & Zenetos, 2003). Studying non-native molluscs in Croatian waters, Pećarević, Mikuš, Bratoš Cetinić, Dulčić and Čalić (2013) recorded 10 species. Along all of the Italian shores, 35 alien mollusc species were documented by Crocetta *et al*. (2013), while from the southern Italian coast (Tyrrhenian and Ionian Sea) five introduced species were reported (Crocetta, Renda, & Colamonaco, 2009). The number of introduced mollusc species is much higher in the eastern Mediterranean, and a review of the literature revealed a total of 168 valid alien species from the seas surrounding Turkey (Öztürk, Doğan, Bitlis-Bakir, & Salman, 2014).

Analysis of collected data recognized 14 species (*Cerithium vulgatum* Bruguière, 1792, *Luria lurida* (Linnaeus, 1758), *Zonaria pyrum* (Gmelin, 1791), *Erosaria spurca* (Linnaeus, 1758), *Tonna galea* (Linnaeus, 1758), *Lithophaga lithophaga* (Linneaus,1758), *Pinna nobilis* (Linnaeus,1758), *Sepia elegans* Blainville,1827, *Sepia officinalis* (Linnaeus,1758), *Sepia orbignyana* (Férussac, 1826), *Rossia macrosoma* (Delle Chiaje, 1830), *Sepietta oweniana* (d'Orbigny, 1841), *Sepiola rondeleti* Leach, 1817 and *Eledone cirrhosa* (Lamarck, 1798) as being endangered and threatened according to the IUCN Red List and the Barcelona/Berne Conventions. The high economic importance of some mollusc species makes them an object for overfishing (Sala & Knowlton, 2006). Among other causes often considered as serious threats to marine species we can list global warming, ocean acidification, habitat loss and pollution (Sabelli & Taviani, 2014).

As the Montenegrin coast covers a small part of the eastern Adriatic Sea and at the same time has great ecological importance between the Ionian and Adriatic Sea in terms of understanding species diversity, we have compared 354 noted species with adjacent areas (Table 2):

-Albanian coast (Dhora, 2012; Zenetos *et al*., 2015);

-Croatian coast– East Adriatic (Zavodnik, 1999; Turk, 2000; Krstulović-Šifner *et al*., 2005; Šiletić, 2006; Milišić, 2007; Lipej, Dobrajc, Mavrič, Šamu, & Alajbegovič, 2008; Peharda, Ezgeta-Balić, Vrgoč, Isajlović, & Bogner, 2010; Zenetos *et al*., 2015);

-South Italy–Ionian Sea (Schiaparelli, 2008; Trono & Marci, 2013).

This comparison enabled the following main points to be underlined:

The diversity of Montenegrin mollusc fauna is similar to the Albanian fauna as expected in terms of similar ecological conditions (Dhora, 2012). Furthermore, the number of gastropods and bivalves recorded from Montenegrin waters is considerably less than in adjacent seas (Croatia and South Italy) (Zavodnik, 1999; Trono & Marci, 2013). Our opinion is that the main reason is the lack of research projects focused on molluscs. Although cephalopod fauna was well studied in the last century (Mandić, 1973a, 1984), species diversity occurring in Croatian waters is richer (Krstulović Šifner *et al*., 2005).

A comparison of our results with those for the adjacent seas indicates that the mollusc fauna is insufficiently studied, but we should bear in mind that the number of recorded species proportional to the size of the researched area indicates a species-rich region and suggests that more intensive studies in future could result in many new records, especially alien.

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