

Marine molluscs from Cape Milazzo (Sicily, Italy): a baseline

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ABSTRACT

An original data set of 556 benthic mollusc taxa, as a first account of Cape Milazzo local biodiversity, is provided. Qualitative differences between more or less anthropized areas have been put in evidence, and species distribution according to the main habitat typologies has been detailed. The highest biodiversity was found in the northern sites, corresponding to the Zone A of the established marine protected area. Most mollusc species under the European Economic Community (EEC) and National protection, and other ones listed as threatened, have been recorded, and are mainly associated to priority habitats as phanerogams meadows and vermetid reefs. In the meantime, the settlement of not indigenous species, mainly of tropical origin, and disease affecting threatened organisms under EEC protection, testified the vulnerability of the local ecosystem under the global change threat.

KEY WORDS

Mediterranean; molluscs; marine reserves; biodiversity; threatened species.

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INTRODUCTION

The naturalistic heritage of Cape Milazzo has long been recognized and in May 2018 it led to the establishment of a marine protected area. Scientific literature, however, is poor in information concerning the local marine biodiversity, especially on what concerns mollusc fauna, whose contribution is almost unknown. On the contrary, the fossil mollusc assemblages have been widely described (e.g., Ruggeri & Greco, 1965).

Current knowledge about the just declared marine protected area mainly regards coastal fishes assemblages, whose assessment in some priority habitats, as rocky algal reefs and *Posidonia oceanica* (L.) Delile meadows (UNEP-MAP-RAC/SPA, 2006), has been recently carried out in support of zoning proposal (La Mesa et al., 2017). Benthic fish assemblages are also known from

near-shore vermetid reefs (Consoli et al., 2008). A further priority habitat of builder molluscs, *Dendropoma cristatum* (Biondi, 1859), has been studied in their genetic/biogeographic features (Templado et al., 2016). Benthic fauna from marine caves has been recently investigated by Scotti et al. (2017), which reported 37 taxa belonging to poriferans, cnidarians, annelids, and bryozoans, although without mentioning molluscs. Overall, 55 species of molluscs have been reported in the past by Bombace (1969, 1970) from coralligenous seafloors, while 89 species have been recently reported by D'Alessandro et al. (2016) from a wide area of the Milazzo Gulf outside the proposed protected area. Dated sporadic records (Di Natale, 1982) have concerned some introduced taxa, namely the gastropod *Cerithium scabridum* Philippi, 1848 and the bivalve *Pinctada imbricata radiata* (Leach, 1814).

The aim of this paper is to provide original data on Cape Milazzo mollusc fauna and to constitute a baseline on which future dynamics of marine biodiversity both in protected and not protected areas can be evaluated.

MATERIAL AND METHODS

Study area

Cape Milazzo, located in the north-eastern coast of Sicily (Central Mediterranean), extends northward towards the Tyrrhenian Sea for about 6 km and stretches to a maximum width of 1.5 km (Fig. 1). The coastline is characterized by high rocky cliffs with cobble pocket beaches, due to high hydrodynamism and wave exposure, especially in the northern and western promontory's sides. Steep rocky bottoms prevail, but also sand-gravel inlets and patchy distributed *Posidonia oceanica* beds are widely diffused. South-eastern coasts are submitted to a lower water circulation, mainly flowing eastward, which generates an area of sediment accumulation (Sitran et al., 2009). Close to the promontory, anthropogenic pressure is high, mainly due to the presence of oil refineries and associated marine traffic. Impacts on marine environment have been investigated by Bergamasco et al. (2014), D'Alessandro et al. (2016), Di Bella et al. (2018), but only marginally they have been involved with the promontory coastal waters.

Meanwhile, issues related to the management of the Marine Protected Area have already been addressed, for example regarding the interference with small-scale fisheries (Battaglia et al., 2017).

The proposed zonation of the reserve includes: a zone A, in which no activity other than those authorized for the purpose of scientific research would be permitted; a zone B, with less restrictive regulation, except in the sub-sector Bs where the limitations would be greater; and a zone C, in which would be forbidden only underwater fishing and some recreational sporting activities such as water skiing or jet skiing.

The zone A, at the extreme north of the Cape, is mainly characterized by relevant coralligenous formations (Bombace 1969, 1970). The almost discontinuous zone B, in the north, includes the seabed surrounding "Punta Mazza", a stretch of the east

coast between Cirucco Point and Rugno Point, the Bay of S. Antonio to north-west, and a short stretch of coastline near the "Testa dell'Impiccato", southernmost. The sub-area Bs, to the north-west, includes a jagged stretch of coast with the so called West Shoal, Portella reef, and several small rocks and shoals.

Methods

A checklist of benthic mollusc species has been compiled according to WoRMS (<http://www.marinespecies.org/>), and updated at 2018-07-30, employing data collected in various contexts and research programs. The whole data set has been organized according to the proposal of reserve zonation, but including also some areas that should be considered of naturalistic value although not considered in the protection plan. Areas impacted by various anthropic activities have also been considered. Overall, five sites have been distinguished, as shown in figure 1:

Site 1. Area facing the industrial plants of Milazzo, the Mediterranean Refinery, and the thermo-electric power plant. Samples have been collected by diving within 10 m of depth.

Site 2. Industrial port of Milazzo. Samples have been collected by scraping iron pillars, from 3 m to 7 m depth, in September 2010. Other data have been collected by washing overall 70 dm³ of mud-sandy sediment sampled from June 2015 to June 2016.

Site 3. East coast, from the Marina of "Vacarella" up to Cala Oliva Point. Samples collected by diving within 10 m of depth, on sandy bottom with emerging rock slabs and patch-distributed *Posidonia oceanica* meadows.

Site 4. North-eastern coast, characterized by a short stretch of sandy beach alternating with small rocky cliffs from Riva Smeralda to Cirucco point. Samples have been collected by diving within 10 m of depth, on sandy bottoms with emerging rock slabs and patch-distributed *Posidonia oceanica* meadows. Further data have been collected by dredging between 50 m and 60 m depth.

Site 5. Northern coast, corresponding to the proposed zone A (integral reserve). Samples have been manually collected from reef pools in Mazza Point (a); from remainders on fishing nets operat-

ing on mud-detrital floors, 180–200 m depth, 2 NM NE from Mazza Point (b) and similarly 2 NM NW from Gamba di Donna Point (c); by SCUBA divers on hard bottom from “Scoglio della Portella”, 25–35 m depth (d) and from Cala S. Antonino, on patch distributed *Posidonia oceanica* meadows, 20 m depth.

Each record, moreover, has been contextualized in a simplified habitat typology, as follows:

PA - Photophilic Algae, on rocky cliff or cobbles, eventually trapping sand deposits.

PM - Phanerogam Meadows, mainly *Posidonia oceanica* on sandy or rocky bottoms, most rarely *Cymodocea nodosa* (Ucria) Asch. on sandy or sand-muddy bottoms.

RP - Reef Pools.

CD - Coastal Detritic and Biodetrinsic bottoms, including deep coralligenous formations.

SR - Supratidal Rocky reef.

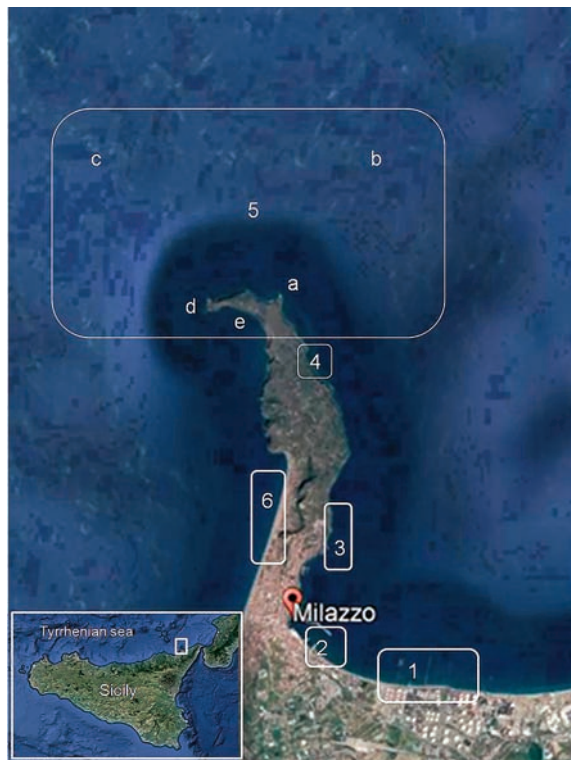


Figure 1. Cape Milazzo: the monitored sites (1–6) and the sub-areas of site 5 (a–e) are indicated.

Collections of stranded pelagic species have been moreover carried out in the five sites, but also in the western coast (site 6), due to particularly favorable wind exposure.

RESULTS AND DISCUSSION

The monitoring of Cape Milazzo seafloors overall provided 556 taxa, including 9 polyplacophorans, 392 gastropods, 152 bivalves, and 4 scaphopods, whose distribution per site and habitat type is arranged in Table 1. High numbers of species were found in the harbor area (Site 2), as well as in the Riva Smeralda (Site 4), which counted 243 and 217 taxa respectively. Site 3, close to the City of Milazzo, has provided 128 species, whilst just 57 species have been reported from the seafloors facing the industrial pole (Site 1).

The northernmost area, Site 5, was the most biodiverse, counting 155 species found in the sub-area 5c, 142 species in 5b, and 139 in 5d. Only 12 species have been recorded in Cala S. Antonino (5e) occasional samplings, while the low diversity (33 species) found in 5a supported with the reef pool (RP) extreme conditions. The Littorinidae *Melarhaphe neritoides* (Linnaeus, 1758) and *Echinolittorina punctata* (Gmelin, 1791) were the only mollusc species recorded in the extreme habitat of the supratidal rocky cliff (SR). The phanerogam meadow habitat (PM) showed, as expected, the highest biodiversity (302 species), followed by the photophilic algae (PA) and coastal detritic (CD) environments, which counted almost the same number of species (259 and 267, respectively). CD shared a notable number of species with the coralligenous formations investigated in the past by Bombace (1969, 1970), which listed 55 species of gastropods and 35 of bivalves, of which only three species were lacking in the present investigation, i.e., the gastropod *Babelomurex cariniferus* (Sowerby, 1834), reported as *Coralliophila babelis* (Requien, 1848), and the bivalves *Globivenus effossa* (Philippi, 1836) and *Coralliophaga lithophagella* (Lamarck, 1819).

The most interesting species recorded in the proposed zone A was a fresh empty shell of *Haliella tyrrhenica* Di Geronimo et La Perna, 1999, collected in spring 2011 (site 5c). This species (Fig. 2), initially suspected to be an holocene subfossil taxa since it has never been found alive, has been re-

cently reported from various localities of the Tuscan Archipelago and, according to Giusti & Micali (2018), might be actually living. The rather fresh specimen figured by Romani et al. (2016) and the present record are in agreement with such hypothesis.

Among the most widely distributed species, the Mediterranean endemic fan shell, *Pinna nobilis* Linnaeus, 1758, deserves particular attention, with a large population extending from Punta di Croce di Mare to Punta Cala Oliva, starting from 2 m depth. In the same stretch of seafloor, sporadic specimens of *P. rudis* Linnaeus, 1758, also occurred. Both fan shells, which play an important role as habitat builders, are protected species under the European Council Directive 92/43/EEC (European Economic Community, EEC, 1992), in the ANNEX II of Barcelona Convention and by local law in all the Mediterranean countries of the European Union. Their occurrence in the coastal waters of Milazzo is thus remarkable in the framework of establishing the marine protected area. Mass mortality events that recently affected wide areas in the western Mediterranean, including Cape Milazzo (Cabanellas-Reboredo et al., submitted) further suggest the need of accurate monitoring of their local populations. Other species under EEC and National protection were the date mussel *Lithophaga lithophaga* (Linnaeus, 1758), widely distributed along the rocky cliffs, the whelks *Charonia lampas* (Linnaeus, 1758) and *Ranella olearia* (Linnaeus, 1758), both recorded in the proposed “zone A” (site 5c), and the cowries *Naria spurca* (Linnaeus, 1758) and *Luria lurida* (Linnaeus, 1758), both apparently localized in Site 3 (Vaccarella-Puntaloro-Cala Oliva). The vermetid *Dendropoma cristatum* (Biondi, 1859) is reported in both the eastern and northern coasts (Sites 4, 4, and 5d), where it forms relevant bioconstructions. Species of high interest were also the whelks *Monoplex parthenopeus* (Salis Marschlins, 1793) (Fig. 3), which is included in the “Red List” of threatened species, and *Bursa scrobilator* (Linnaeus, 1758), not yet considered as endangered, although infrequent in the Mediterranean and actively sought for collection purposes.

Haliotis stomatiaeformis Reeve, 1846 (Fig. 4) is a poorly known species reported only from continental Sicily up to Malta (Geiger, 2000). According to Gaeta et al. (2003), habitat selection might

be the ecological factor allowing its coexistence with the common *H. tuberculata tuberculata* Linnaeus, 1758.

The record of *Mathilda bielerei* Smriglio et Mariottini, 2007 (Figs. 5–7), a species not yet dealt with in the scientific literature after its original description in Smriglio et al. (2007), is of relevant interest since it testifies that such species is not strictly tied to the type habitat, the deep-sea coral banks.

The settlement of a small population of the pearl oyster *Pinctata imbricata radiata* (Leach, 1814) (Fig. 8) is of different interest, as it testifies the progressive consolidation and spreading in the western basin of this species of Lessepsian origin, long time naturalized in the eastern basin up to the Ionian coasts of Sicily, with dated occasional reports from Milazzo (Di Natale, 1982) and sporadic records in the western Mediterranean (Lodola et al., 2013). Long time naturalized Lessepsian is also the mussel *Brachidontes pharaonis* (P. Fischer, 1870), whose spread in the central Mediterranean has been initially documented from western Sicily (Sarà et al., 2008). The occurrence of the warm Atlantic sea hare *Aplysia dactylomela* Rang, 1828, spreading in Tyrrhenian sea from Messina Strait since 2011 (Valdés et al., 2013) is a further evidence of ongoing tropicalization processes.

The record, at last, of single shells of *Buccinum undatum* (Linnaeus, 1758), *Nassarius turulosus* (Risso, 1826), and *Euspira catena* (da Costa, 1778), not included in the present list, suggested the occurrence of offshore Würmian age deposits.

On top of the benthic species, other 14 pelagic molluscs have been recorded in the coastal waters of Cape Milazzo. Most of them were shell remains of pteropoda found in bottom sediments of Site 5 (Tab. 2). More interesting, since specimens have been recorded living, were the violet snails stranded along both the eastern (Sites 2 and 3) and western coasts (site 6). Two species have been collected, the common *Janthina pallida* Thompson, 1840, of which massive stranding have been recorded, e.g., in October 1998, and the much less common *J. globosa* Swainson, 1822, which is suspected to be in further rarefaction. Stranding of the pseudothecosomata *Cymbulia peronii* Blainville, 1818, has been also documented along the western coast (Site 6).



Figure 2. *Haliella tyrrhenica*: ventral, dorsal, and lateral view. Figure 3. In situ living specimen of *Monoplex parthenopeus*. Figure 4. *Haliotis stomatiaeformis*. Figures 5–7. *Mathilda bielerei*. Fig. 6: apex and protoconcha. Fig. 7: detail of ornamentation. Figure 8. *Pinctata imbricata radiata*.

species	site	habitat
POLYPLACOPHORA		
<i>Leptochiton cimicoides</i> (Monterosato, 1879)	3	PM
<i>Leptochiton scabridus</i> (Jeffreys, 1880)	5d	PA
<i>Lepidochitona caprearum</i> (Scacchi, 1836)	5d	PA
<i>Ischnochiton rissoi</i> (Payaraudeau, 1826)	3 5d	PA, PM
<i>Callochiton septemvalvis</i> (Montagu, 1803)	5a	RP
<i>Rhysoplax corallinus</i> (Risso, 1826)	5d	PA
<i>Chiton olivaceus</i> Spengler, 1797	2 3	PA, PM
<i>Acanthochitona crinita</i> (Pennat, 1777)	2 3	PA, PM
<i>Acanthochitona fascicularis</i> (Linnaeus, 1767)	3 5a	RP, PM
GASTROPODA		
<i>Patella caerulea</i> Linnaeus, 1758	1 2 3 5a, d, e	PA, PM, RP
<i>Patella ulyssiponensis</i> Gmelin, 1791	4	PM
<i>Tectura virginea</i> (O.F. Müller, 1776)	4	PM
<i>Diodora gibberula</i> (Lamarck, 1822)	4	PM
<i>Diodora graeca</i> (Linnaeus, 1758)	2 4	PA, PM
<i>Diodora italica</i> (DeFrance, 1820)	2 4	PA, PM
<i>Emarginula adriatica</i> O.G. Costa, 1830	2 4 5c	PA, PM, CD
<i>Emarginula huzardii</i> Payaraudeau, 1826	2 4 5c, d	PA, PM, CD
<i>Emarginula octaviana</i> Coen, 1939	4 5c	PM, CD
<i>Emarginula punctulum</i> Piani, 1980	5c	PM
<i>Emarginula pustula</i> Thiele in Küster, 1913	5b	CD
<i>Emarginula rosea</i> Bell, 1824	5c	PM
<i>Emarginula tenera</i> Locard, 1891	5b, c	CD
<i>Fissurella nubecula</i> (Linnaeus, 1758)	2 3	PA, PM
<i>Anatoma aspera</i> (Philippi, 1844)	5c	PM
<i>Anatoma umbilicata</i> (Jeffreys, 1883)	5d	CD
<i>Scissurella costata</i> d'Orbigny, 1824	2 3 4 5d	PA, PM, CD
<i>Sinezona cingulata</i> (O.G. Costa, 1861)	5c	PM
<i>Haliotis stomatiaeformis</i> Reeve, 1846	3	PA
<i>Haliotis tuberculata tuberculata</i> Linnaeus, 1758	2 3 4	AP, PM
<i>Lepetella espinosae</i> Dantar & Luque, 1994	5b	CD
<i>Clelandella miliaris</i> (Brocchi, 1814)	5c	CD
<i>Gibbula ardens</i> (Salis Marschlins, 1793)	2 4	PA
<i>Gibbula fanulum</i> (Gmelin, 1791)	2 4 5c	PA, PM, CD
<i>Gibbula guttadauri</i> (Philippi, 1836)	4	PM
<i>Gibbula magus</i> (Linnaeus, 1758)	4 5c	PM, CD
<i>Gibbula philberti</i> (Récluz, 1843)	2 5d	PA
<i>Gibbula racketsi</i> (Payraudeau, 1826)	2 3	PA, PM
<i>Gibbula turbinoides</i> (Deshayes, 1835)	3 4	PM
<i>Steromphala adansonii</i> (Payraudeau, 1826)	2 4 5a	PA, PM, RP
<i>Steromphala divaricata</i> (Linnaeus, 1758)	2 3 4 5a	PA, PM, RP
<i>Steromphala rarilineata</i> (Michaud, 1829)	3 4	PM
<i>Steromphala umbilicaris</i> (Linnaeus, 1758)	2 4 5a	PA, RP
<i>Steromphala varia</i> (Linnaeus, 1758)	2 3 4	PA, PM
<i>Jujubinus curinii</i> Bogi et Campani, 2006	5b	CD

Table 1/1. List of the benthic molluscs recorded in Capo Milazzo coastal waters. Sites of collection (1–5) and prevalent habitat of each species are indicated: Photophilic Algae (PA); Phanerogam Meadows (PM); Reef Pools (RP); Coastal Detritic and Biodetritic bottoms (CD); Supratidal Rocky reef (SR).

species	site	habitat
<i>Jujubinus exasperatus</i> (Pennat, 1777)	2 4 5b	PA, PM, CD
<i>Jujubinus gravinae</i> (Dautzenberg, 1881)	5c	CD
<i>Jujubinus montagui</i> (Wood, 1828)	4 5b	PM, CD
<i>Jujubinus striatus</i> (Linnaeus, 1758)	2 4 5b, c	PA, PM, CD
<i>Jujubinus tumidulus</i> (Aradas, 1846)	4 5b	PM, CD
<i>Phorcus articulatus</i> (Lamarck, 1822)	3 4	PM
<i>Phorcus mutabilis</i> (Philippi, 1851)	3 4	PM
<i>Phorcus richardi</i> (Payraudeau, 1826)	3 4 5a	PM, RP
<i>Phorcus turbinatus</i> (Born, 1778)	3 4 5a	PM, RP
<i>Clanculus corallinus</i> (Gmelin, 1791)	3 4 5d	PM, PA
<i>Clanculus cruciatus</i> (Linnaeus, 1758)	2 3 4 5d	PA, PM
<i>Clanculus jussieui</i> (Payraudeau, 1826)	2 3 4 5a, d	PA; PM; RP
<i>Calliostoma conulus</i> (Linnaeus, 1758)	2 4 5b	PA, PM, CD
<i>Cirsonella romettensis</i> (Granata-Grillo, 1877)	5d	PA
<i>Dikoleps depressa</i> (Monterosato, 1880)	5d	PA
<i>Dikoleps marianae</i> Rubio, Dantart et Luque, 1998	5d	PA
<i>Skenea catenoides</i> (Monterosato, 1877)	5d	PA
<i>Skenea serpuloides</i> (Montagu, 1808)	5d	PA
<i>Lissomphalia bithynoides</i> (Monterosato, 1880)	5c	CD
<i>Skeneoides exilissima</i> (Philippi, 1844)	5d	PA
<i>Bolma rugosa</i> (Linnaeus, 1767)	2 3 4 5b	PA, PM, CD
<i>Danilia tinei</i> (Calcara, 1839)	5d	PA
<i>Moelleriopsis messanensis</i> (Seguenza, 1876)	5d	PA
<i>Akritogyra conspicua</i> (Monterosato, 1880)	5d	PA
<i>Homalopoma sanguineum</i> (Linnaeus, 1758)	5b	CD
<i>Tricolia</i> cfr. <i>entomocheila</i> Gofas, 1993	5b	CD
<i>Tricolia pullus pullus</i> (Linnaeus, 1758)	2 3 4	PA, PM
<i>Tricolia punctura</i> Gofas, 1993	2 5d	PA
<i>Tricolia speciosa</i> (Megerle von Mühlfeld, 1824)	2 3 4	PA, PM
<i>Tricolia tenuis</i> (Michaud, 1829)	2 3	PA, PM
<i>Tricolia landini</i> Bogi et Campani, 2007	2	PA
<i>Smaragdia viridis</i> (Linnaeus, 1758)	2 3 4	PA, PM
<i>Bittium lacteum</i> (Philippi, 1836)	2 3 4 5d	PA, PM
<i>Bittium latreillii</i> (Payraudeau, 1826)	1 5c, d	PA, CD
<i>Bittium reticulatum</i> (da Costa, 1778)	2 3 4 5a, c, d	PA, PM, RP, CD
<i>Cerithidium submammillatum</i> (De Rayneval et Ponzi, 1854)	2 5d	PA
<i>Cerithium alucastrum</i> (Brocchi, 1814)	2 3 4 5e	PA, PM
<i>Cerithium lividulum</i> Risso, 1826	2 3	AP, PM
<i>Cerithium protractum</i> Bivona Ant. in Bivona And., 1838	4 5d	PM
<i>Cerithium scabridum</i> Philippi, 1848	2 5b	PA
<i>Cerithium vulgatum</i> Bruguière, 1792	2 3 5a, e	PA, PM
<i>Fossarus ambiguus</i> (Linnaeus, 1758)	4 5d	PA, PM
<i>Tenagodus obtusus</i> (Schumacher, 1817)	5d	PA
<i>Turritella communis</i> Risso, 1826	5b	CD
<i>Turritella turbona</i> Monterosato, 1877	4	PM
<i>Metaxia metaxa</i> (Delle Chiaje, 1828)	5b, c	CD

Table 1/2. List of the benthic molluscs recorded in Capo Milazzo coastal waters. Sites of collection (1–5) and prevalent habitat of each species are indicated: Photophilic Algae (PA); Phanerogam Meadows (PM); Reef Pools (RP); Coastal Detritic and Biodetritic bottoms (CD); Supratidal Rocky reef (SR).

species	site	habitat
<i>Marshallora adversa</i> (Montagu, 1803)	2 5d	PA
<i>Monophorus erythrosoma</i> (Bouchet et Guillemot, 1978)	5e	PM
<i>Monophorus perversus</i> (Linnaeus, 1758)	4 5b, c	PM, CD
<i>Cheirodonta pallescens</i> (Jeffreys, 1867)	3 5d	PA, PM
<i>Krachia cylindrata</i> (Jeffreys, 1885)	5b, c	CD
<i>Krachia tiara</i> (Monterosato, 1874)	5b	CD
<i>Dizoniopsis concatenata</i> (Conti, 1864)	5b, e	PM, CD
<i>Dizoniopsis coppolae</i> (Aradas, 1870)	5d	PM
<i>Cerithiopsis barleei</i> Jeffreys, 1867	5b, d	PA, CD
<i>Cerithiopsis diadema</i> Monterosato, 1874	5d	AP
<i>Cerithiopsis fayalensis</i> R.B. Watson, 1886	4	HP
<i>Cerithiopsis jeffreysi</i> Watson, 1885	5d	AP
<i>Cerithiopsis minima</i> (Brusina, 1865)	2 4 5d	PA, PM
<i>Cerithiopsis scalaris</i> Locard, 1891	5d	PA
<i>Cerithiopsis tubercularis</i> (Montagu, 1803)	5d	PA
<i>Opalia coronata</i> (Philippi & Scacchi, 1840)	4 5c	PM, CD
<i>Cirsotrema pumiceum</i> (Brocchi, 1814)	2	PA
<i>Epitonium clathrus</i> (Linnaeus, 1758)	2 4 5d	PA, PM
<i>Epitonium hispidulum</i> (Monterosato, 1874)	5d	PA
<i>Epitonium muricatum</i> (Risso, 1826)	2 4	PA, PM
<i>Epitonium pulchellum</i> (Bivona, 1832)	5d	PA
<i>Epitonium tiberii</i> (de Boury, 1890)	4 5c	PM, CD
<i>Gyroskala lamellosa</i> (Lamarck, 1822)	3	PM
<i>Acirsa subdecussata</i> (Cantraine, 1835)	5c	CD
<i>Aclis ascaris</i> (W. Turton, 1819)	5d	PA
<i>Eulima bilineata</i> Alder, 1848	5b	CD
<i>Eulima glabra</i> (da Costa, 1778)	5b	CD
<i>Melanella polita</i> (Linnaeus, 1758)	4 5c	PM, CD
<i>Sabinella bonifaciae</i> (F. Nordsieck, 1974)	5b, c	CD
<i>Parvioris ibizenca</i> (Nordsiesck, 1968)	2 5c	PA, CD
<i>Sticteulima jeffreysiana</i> (Brusina, 1869)	5c	CD
<i>Vitreolina curva</i> (Monterosato, 1874)	5b, c	CD
<i>Vitreolina incurva</i> (Bucquoy, Dautzenberg et Dollfus, 1883)	5c	CD
<i>Vitreolina perminima</i> (Jeffreys, 1883)	2 5c	PA, CD
<i>Vitreolina philippi</i> (de Rayneval et Ponzi, 1854)	2 5c	PA, CD
<i>Nanobalcis nana</i> (Monterosato, 1878)	5c	CD
<i>Haliella tyrrhena</i> Di Geronimo et La Perna, 1999	5c	CD
<i>Echinolittorina punctata</i> (Gmelin, 1791)	1 2 5d	SR
<i>Melanhaphe neritoides</i> (Linnaeus, 1758)	5d	SR
<i>Skeneopsis planorbis</i> (O. Fabricius, 1780)	5c	CD
<i>Eatonina cossurae</i> (Calcara, 1841)	3 5d	PA, PM
<i>Eatonina fulgida</i> (J. Adams, 1797)	3 5d	PA, PM
<i>Eatonina ochroleuca</i> (Brusina, 1869)	5b	CD
<i>Eatonina pumila</i> (Monterosato, 1884)	5d	PA
<i>Rissoina bruguieri</i> (Payraudeau, 1826)	1 2 3	PA, PM
<i>Rissoa auriscalpium</i> (Linnaeus, 1758)	2 3	PA, PM

Table 1/3. List of the benthic molluscs recorded in Capo Milazzo coastal waters. Sites of collection (1–5) and prevalent habitat of each species are indicated: Photophilic Algae (PA); Phanerogam Meadows (PM); Reef Pools (RP); Coastal Detritic and Biodetritic bottoms (CD); Supratidal Rocky reef (SR).

species	site	habitat
<i>Rissoa decorata</i> Philippi, 1846	3	PM
<i>Rissoa guerinii</i> Récluz, 1843	2 3	PA, PM
<i>Rissoa italiensis</i> Verduin, 1985	5d	PA
<i>Rissoa lia</i> (Monterosato, 1884)	5a, d	PA, RP
<i>Rissoa membranacea</i> (J. Adams, 1800)	2 5d	PA
<i>Rissoa monodonta</i> Philippi, 1836	2 5d	PA
<i>Rissoa scurra</i> (Monterosato, 1917)	5d	PA
<i>Rissoa similis</i> Scacchi, 1836	2 5a, d	PA, RP
<i>Rissoa variabilis</i> (Megerle von Mühlfeld, 1824)	2 5a, c	PA, RP, CD
<i>Rissoa ventricosa</i> Desmarest, 1814	2 3	PA, PM
<i>Rissoa violacea</i> Desmarest, 1814	3 5d	PM, PA
<i>Alvania beanii</i> (Hanley in Thorpe, 1844)	4	PM
<i>Alvania cancellata</i> (da Costa, 1778)	4 5a, d	PM, RP, PA
<i>Alvania cimex</i> (Linnaeus, 1758)	2 4 5a, d	PA, PM, RP
<i>Alvania cimicoides</i> (Forbes, 1844)	5c	CD
<i>Alvania clathrella</i> L. Seguenza, 1903	5e	CD
<i>Alvania dictyophora</i> (Philippi, 1844)	5e	CD
<i>Alvania discors</i> (T. Allan, 1818)	2 3 4	PA, PM
<i>Alvania gaglinae</i> Amati, 1985	5c	CD
<i>Alvania geryonia</i> (Nardo, 1847)	4 5a	PM, RP
<i>Alvania hallgassi</i> Amati et Oliverio, 1985	5d	PA
<i>Alvania hirta</i> (Monterosato, 1884)	2 5b	PA, CD
<i>Alvania hispidula</i> (Monterosato, 1884)	5c	CD
<i>Alvania lanciae</i> (Calcara, 1845)	2 3 4 5a	PA, PM, RP
<i>Alvania lineata</i> Risso, 1826	2 3 4 5b	PA, PM, CD
<i>Alvania pagodula</i> (Bucquoy, Dautzenberg et Dollfus, 1884)	5b, c	CD
<i>Alvania punctura</i> (Montagu, 1803)	5b, c	CD
<i>Alvania rudis</i> (Philippi, 1844)	5b, c	CD
<i>Alvania scabra</i> (Philippi, 1844)	5a, b, c	RP, CD
<i>Alvania subcrenulata</i> (Bucquoy, Dautzenberg et Dollfus, 1884)	5b	CD
<i>Alvania testae</i> (Aradas et Maggiore, 1844)	5d	CD
<i>Alvania weinkauffi jacobusi</i> Oliverio, Amati et Nofroni, 1986	5d	CD
<i>Alvania zetlandica</i> (Montagu, 1815)	5c	CD
<i>Crisilla beniamina</i> (Monterosato, 1884)	5b	CD
<i>Crisilla semistriata</i> (Montagu, 1808)	5b	CD
<i>Manzonia crassa</i> (Kanmacher, 1798)	2 5c	RP, CD
<i>Obtusella intersecta</i> (S. Wood, 1857)	5c	CD
<i>Obtusella macilenta</i> (Monterosato, 1880)	5c	CD
<i>Botryphallus epidauricus</i> (Brusina, 1866)	5c	CD
<i>Peringiella elegans</i> (Locard, 1891)	1	CD
<i>Pusillina inconspicua</i> (Alder, 1844)	4 5c	PM, CD
<i>Pusillina lineolata</i> (Michaud, 1830)	2 5a 5b	AP, RP, CD
<i>Pusillina marginata</i> (Michaud, 1830)	2	PA
<i>Pusillina philippi</i> (Aradas et Maggiore, 1844)	3	PM
<i>Pusillina radiata</i> (Philippi, 1836)	4	PM
<i>Setia amabilis</i> (Locard, 1886)	5a	RP

Table 1/4. List of the benthic molluscs recorded in Capo Milazzo coastal waters. Sites of collection (1–5) and prevalent habitat of each species are indicated: Photophilic Algae (PA); Phanerogam Meadows (PM); Reef Pools (RP); Coastal Detritic and Biodetritic bottoms (CD); Supratidal Rocky reef (SR).

species	site	habitat
<i>Setia scillae</i> (Aradas et Benoit, 1876)	2	PA
<i>Pisinna glabrata</i> (Megerle von Mühlfeld, 1824)	3	PM
<i>Nodulus contortus</i> (Jeffreys, 1856)	5b	CD
<i>Paludinella globularis</i> (Hanley in Thorpe, 1844)	5a	RP
<i>Barleeia unifasciata</i> (Montagu, 1803)	2 3 5a	PA, PM, RP
<i>Caecum auriculatum</i> De Folin, 1868	2 5d	PA, PM
<i>Caecum clarkii</i> Carpenter, 1859	4	PM
<i>Caecum subannulatum</i> De Folin, 1870	2 5c	CD
<i>Caecum trachea</i> (Montagu, 1803)	1 4 5d	PA, PM
<i>Hyala vitrea</i> (Montagu, 1803)	2 3	PA, PM
<i>Tornus subcarinatus</i> (Montagu, 1803)	5d	PA
<i>Circulus striatus</i> (Philippi, 1836)	5b	CD
<i>Truncatella subcylindrica</i> (Linnaeus, 1767)	2 3 4	PA, PM
<i>Thylacodes arenarius</i> (Linnaeus, 1758)	3	PM
<i>Dendropoma cristatum</i> (Biondi, 1859)	2 3 5d	PA, PM,
<i>Petalocochnus glomeratus</i> (Linnaeus, 1758)	3	PM
<i>Thylaeodus rugulosus</i> (Monterosato, 1878)	2	PA
<i>Aporrhais pespelecani</i> (Linnaeus, 1758)	3 4 5c	PM, CD
<i>Crepidula unguiformis</i> Lamarck, 1822	2 3 4 5b	PA, PM, CD
<i>Calyptrea chinensis</i> (Linnaeus, 1758)	1 4 5b	PA, PM, CD
<i>Capulus ungaricus</i> (Linnaeus, 1758)	4 5c	PM, CD
<i>Lamellaria perspicua</i> (Linnaeus, 1758)	3 5d	PA, PM
<i>Erato voluta</i> (Montagu, 1803)	5d	PA
<i>Trivia arctica</i> (Pulteney, 1799)	1 2 4 5c	PA, PM, CD
<i>Trivia mediterranea</i> (Risso, 1826)	1 4	PM
<i>Trivia monacha</i> (da Costa, 1778)	4	PM
<i>Luria lurida</i> (Linnaeus, 1758)	2 3	AP, PM
<i>Naria spurca</i> (Linnaeus, 1758)	3	PM
<i>Simnia spelta</i> (Linnaeus, 1758)	5b	CD
<i>Pseudosimnia carnea</i> (Poiret, 1789)	5b	CD
<i>Naticarius stercusmuscarum</i> (Gmelin, 1791)	2 3 4 5c	PM, CD
<i>Naticarius hebraeus</i> (Martyn, 1786)	3 4 5c	PM, CD
<i>Notocochlis dillwynii</i> Payaraudeau, 1826	3	PM
<i>Tectonatica sagraiana</i> (d'Orbigny, 1842)	2 3	PM, CD
<i>Euspira fusca</i> (Blainville, 1825)	5b	CD
<i>Euspira intricata</i> (Donovan, 1804)	2 3 4	PM, CD
<i>Euspira macilenta</i> (Philippi, 1844)	4	PM
<i>Euspira nitida</i> (Donovan, 1804)	1 4	PM
<i>Galeodea echinophora</i> (Linnaeus, 1758)	2	CD
<i>Neverita josephina</i> Risso, 1826	2 3	PM
<i>Semicassis granulata</i> (Born, 1778)	3	PM
<i>Ranella olearium</i> (Linnaeus, 1758)	5c	CD
<i>Charonia lampas</i> (Linnaeus, 1758)	5c	CD
<i>Monoplex corrugatus</i> (Lamarck, 1816)	3	PM
<i>Monoplex parthenopeus</i> (Salis Marschlins, 1793)	5c	CD
<i>Cabestana cutacea</i> (Linnaeus, 1767)	4	PM

Table 1/5. List of the benthic molluscs recorded in Capo Milazzo coastal waters. Sites of collection (1–5) and prevalent habitat of each species are indicated: Photophilic Algae (PA); Phanerogam Meadows (PM); Reef Pools (RP); Coastal Detritic and Biodetritic bottoms (CD); Supratidal Rocky reef (SR).

species	site	habitat
<i>Bursa scrobilator</i> (Linnaeus, 1758)	5d	PA
<i>Hexaplex trunculus</i> (Linnaeus, 1758)	2 3 4 5c	PA, PM, CD
<i>Dermomurex scalaroides</i> (Blainville, 1829)	4 5a	PM, RP
<i>Ocenebra edwardsii</i> (Payraudeau, 1826)	3	PM
<i>Ocenebra erinaceus</i> (Linnaeus, 1758)	4	PM
<i>Ocenebrina aciculata</i> (Lamarck, 1822)	2 4 5b, c	PA, PM, CD
<i>Hadriana craticulata</i> Bucquoy et Dautzenberg, 1882	2 5c	CD
<i>Murexsul aradasii</i> (Monterosato in Poirier, 1883)	5b, c	CD
<i>Muricopsis cristata</i> (Brocchi, 1814)	2 5d	PA
<i>Typhinellus labiatus</i> (de Cristofori et Jan, 1832)	2 3	PA, PM
<i>Pagodula echinata</i> (Kiener, 1840)	5c	CD
<i>Trophonopsis barvicensis</i> (Johnston, 1825)	5c	CD
<i>Stramonita haemastoma</i> (Linnaeus, 1767)	1 2 3 4	PA, PM
<i>Coralliophila brevis</i> (Blainville, 1832)	5c, d	CD, PM
<i>Coralliophila meyendorffii</i> (Calcara, 1845)	3	PA
<i>Hirtomurex squamosus</i> (Bivona Ant. in Bivona And., 1838)	5d	PA
<i>Volvarina mitrella</i> (Risso, 1826)	4 5d	PM
<i>Granulina marginata</i> (Bivona, 1832)	2 5a, d	PA, PM, RP
<i>Granulina mediterranea</i> Landau, La Perna et Marquet, 2006	4	PM
<i>Granulina occulta</i> (Monterosato, 1896)	5b	CD
<i>Gibberula miliaria</i> (Linnaeus, 1758)	2 3 4 5d	PA, PM
<i>Gibberula philippi</i> (Monterosato, 1878)	2 4 5a, d	PN, PA, RP
<i>Gibberula recondita</i> Monterosato, 1884	2 5d	PA
<i>Isara cornea</i> (Lamarck, 1811)	3 5d	PA, PM
<i>Episcomitra cornicula</i> (Linnaeus, 1758)	2 4 5b	PA, PM, CD
<i>Pusia ebenus</i> (Lamarck, 1811)	2 4	PA, PM
<i>Pusia savignyi</i> (Payraudeau, 1826)	2 3 5d	PA, PM
<i>Pusia tricolor</i> (Gmelin, 1791)	2 4 5a, d	PA, PM, RP
<i>Euthria cornea</i> (Linnaeus, 1758)	2 4	PA, PM
<i>Pisania striata</i> (Gmelin, 1791)	2 4	PA, PM
<i>Chauvetia lefebvrii</i> (Maravigna, 1840)	5b, c	CD
<i>Chauvetia mamillata</i> (Risso, 1826)	4 5b, c	PM, CD
<i>Chauvetia procerula</i> (Monterosato, 1889)	5b, c	CD
<i>Chauvetia recondita</i> (Brugnone, 1873)	5d	PA
<i>Chauvetia turritellata</i> (Deshayes, 1835)	5b, c	CD
<i>Aplus dorbignyi</i> (Payraudeau, 1826)	2 3	PA, PM
<i>Cumia reticulata</i> (Blainville, 1829)	4 5b	PM, CD
<i>Tritia corniculum</i> (Olivi, 1792)	5d	PA
<i>Tritia cuvierii</i> (Payraudeau, 1826)	2 3 4	PA, PM
<i>Tritia lima</i> (Dillwyn, 1817)	4 5b, c	PM, CD
<i>Tritia mutabilis</i> (Linnaeus, 1758)	2	PA
<i>Tritia neritea</i> (Linnaeus, 1758)	2 3	PA, PM
<i>Tritia pygmaea</i> (Lamarck, 1822)	2 3	PA, PM
<i>Columbella rustica</i> (Linnaeus, 1758)	2 3 4 5a	PA, PM, RP
<i>Mitrella coccinea</i> (Philippi, 1836)	5d	PA
<i>Mitrella scripta</i> (Linnaeus, 1758)	2 5a, b, c	PA, RP, CD

Table 1/6. List of the benthic molluscs recorded in Capo Milazzo coastal waters. Sites of collection (1–5) and prevalent habitat of each species are indicated: Photophilic Algae (PA); Phanerogam Meadows (PM); Reef Pools (RP); Coastal Detritic and Biodetritic bottoms (CD); Supratidal Rocky reef (SR).

species	site	habitat
<i>Tarantinaea lignaria</i> (Linnaeus, 1758)	4	PM
<i>Aptyxis syracusana</i> (Linnaeus, 1758)	3	PM
<i>Fusinus dimassai</i> Buzzurro et Russo, 2007	5c	CD
<i>Fusinus parvulus</i> (Monterosato, 1884)	5b	CD
<i>Fusinus pulchellus</i> (Philippi, 1840)	4 5c	PM, CD
<i>Fusinus rostratus</i> (Olivi, 1792)	5c	CD
<i>Crassopleura maravignae</i> (Bivona Ant. in Bivona And., 1838)	5c	CD
<i>Haedropleura septangularis</i> (Montagu, 1803)	2 5b	PA, CD
<i>Drilliola emendata</i> (Monterosato, 1872)	5c	CD
<i>Drilliola loprestiana</i> (Calcara, 1841)	5c	CD
<i>Mitromorpha olivoidea</i> (Cantraine, 1835)	2 4 5d	PA, PM
<i>Clathromangelia granum</i> (Philippi, 1844)	4 5a, d	PM, RP, PA
<i>Comarmondia gracilis</i> (Montagu, 1803)	4 5c	PM, CD
<i>Conus ventricosus</i> Gmelin, 1791	2 3 4	PA, PM
<i>Raphitoma atropurpurea</i> (Locard et Caziot, 1900)	5c	CD
<i>Raphitoma concinna</i> (Scacchi, 1836)	2 4 5d	PA, PM
<i>Raphitoma echinata</i> (Brocchi, 1814)	2 5c	PA, CD
<i>Raphitoma laviae</i> (Philippi, 1844)	4 5c	PM, CD
<i>Raphitoma leufroyi</i> (Michaud, 1828)	5d	PA
<i>Raphitoma linearis</i> (Montagu, 1803)	2 4 5c	PA, PM, CD
<i>Raphitoma lineolata</i> (Bucquoy, Dautzenberg et Dollfus, 1883)	2 5c	AP, CD
<i>Teretia teres</i> (Reeve, 1844)	5b, c	CD
<i>Sorgenfreispira brachystoma</i> (Philippi, 1844)	2 4 5c	PA, PM, CD
<i>Bela decussata</i> (Locard, 1891)	5c	CD
<i>Bela menkhorsti</i> van Aarten, 1988	2 5c	PA, CD
<i>Bela nebula</i> (Montagu, 1803)	1 2 4	PA, PM
<i>Bela zenetouae</i> (van Aarten, 1988)	5c	CD
<i>Mangelia attenuata</i> (Montagu, 1803)	2 4 5b	PA, PM, CD
<i>Mangelia costata</i> (Pennant, 1777)	2 5b, c	PA, CD
<i>Mangelia costulata</i> Risso, 1826	2 4 5b	PA, PM, CD
<i>Mangelia multilineolata</i> (Deshayes, 1835)	4 5b, c	PM, CD
<i>Mangelia paciniana</i> (Calcara, 1839)	5b	CD
<i>Mangelia striolata</i> Risso, 1826	2 5b	PA, CD
<i>Mangelia taeniata</i> (Deshayes, 1835)	2 4 5b	PA, PM, CD
<i>Mangelia unifasciata</i> (Deshayes, 1835)	2 4 5d	PA, PM, CD
<i>Mangelia vauquelini</i> (Payraudeau, 1826)	5d	PA
<i>Basisulcata lepida</i> (Bayer, 1942)	5c	CD
<i>Philippia hybrida</i> (Linnaeus, 1758)	5c	CD
<i>Discotectonica discus</i> (Philippi, 1844)	5c	CD
<i>Solatisonax alleryi</i> (Seguenza G., 1876)	5c	CD
<i>Heliacus fallaciosus</i> (Tiberi, 1872)	5c	CD
<i>Pseudotorinia architae</i> (O.G. Costa, 1841)	5c	CD
<i>Mathilda bieleri</i> Smriglio et Mariottini, 2007	5c	CD
<i>Mathilda cochlaeformis</i> Brugnone, 1873	5c	CD
<i>Rissoella inflata</i> (Monterosato, 1880)	2 5c	PA, CD
<i>Rissoella opalina</i> (Jeffreys, 1848)	2 5c	PA, CD

Table 1/7. List of the benthic molluscs recorded in Capo Milazzo coastal waters. Sites of collection (1–5) and prevalent habitat of each species are indicated: Photophilic Algae (PA); Phanerogam Meadows (PM); Reef Pools (RP); Coastal Detritic and Biodetritic bottoms (CD); Supratidal Rocky reef (SR).

species	site	habitat
<i>Ammonicera fischeriana</i> (Monterosato, 1869)	2 5c	PA, CD
<i>Ammonicera rota</i> (Forbes et Hanley, 1850)	2 5c	PA, CD
<i>Omalogyra atomus</i> (Philippi, 1841)	2 5c	PA, CD
<i>Omalogyra simplex</i> (Costa O.G., 1861)	2 5c	PA, CD
<i>Retrotortina fuscata</i> Chaster, 1896	5c	CD
<i>Tomura depressa</i> (Granata-Grillo, 1877)	2 5c	PA, CD
<i>Xenoskenea pellucida</i> (Monterosato, 1874)	2 5c	PA, CD
<i>Odostomia acuta</i> Jeffreys, 1848	2 5b	PA, CD
<i>Odostomia suboblonga</i> Jeffreys, 1884	5d	PA
<i>Odostomia turrita</i> Hanley, 1844	5d	PA
<i>Brachystomia scalaris</i> MacGillivray, 1843	2 5b	PA, CD
<i>Megastomia alungata</i> (Nordiesck, 1972)	2 5d	PA
<i>Megastomia conoidea</i> (Brocchi, 1814)	2 5a, d	PA, RP
<i>Euparthenia humboldti</i> (Risso, 1826)	4 5b, d	PM, CD
<i>Folinella excavata</i> (Philippi, 1836)	2 4 5b	PA, PM, CD
<i>Ondina crystallina</i> Locard, 1891	2	PA
<i>Ondina vitrea</i> (Brusina, 1866)	2 5d	PA
<i>Ondina warreni</i> (Thompson, 1845)	5d	PA
<i>Chrysallida stefanisi</i> (Jeffreys, 1869)	5b	CD
<i>Parthenina clathrata</i> (Jeffreys, 1848)	5b	CD
<i>Parthenina decussata</i> (Montagu, 1803)	5d	PA
<i>Parthenina emaciata</i> (Brusina, 1866)	2 5b, d	PA, CD
<i>Parthenina interstincta</i> (J. Adams, 1797)	2 5b	PA, CD
<i>Parthenina monozona</i> (Brusina, 1869)	2 4 5b	PA, PM, CD
<i>Tragula fenestrata</i> (Jeffreys, 1848)	2 5d	PA
<i>Odostomella bicincta</i> (Tiberi, 1868)	5d	PA
<i>Odostomella doliolum</i> (Philippi, 1844)	2 3 5b	PA, PM, CD
<i>Turbonilla acuta</i> (Donovan, 1804)	2 5b	PA, CD
<i>Turbonilla acutissima</i> Monterosato, 1884	2 5b	PA, CD
<i>Turbonilla edgari</i> (Melvill, 1896)	5b	CD
<i>Turbonilla gradata</i> Bucquoy, Dautzenberg et Dollfus, 1883	2 5b	PA, CD
<i>Turbonilla lactea</i> (Linnaeus, 1758)	2 4 5b, c	PA, PM, CD
<i>Turbonilla pusilla</i> (Philippi, 1844)	5b	CD
<i>Pyrgiscus jeffreysii</i> (Jeffreys, 1848)	2 4 5b	PA, PM, CD
<i>Pyrgiscus rufus</i> (Philippi, 1836)	2 4 5b	PA, PM, CD
<i>Pyrgostylus striatulus</i> (Linnaeus, 1758)	2 4 5b	PA, PM, CD
<i>Eulimella acicula</i> (Philippi, 1836)	2 5b, d	PA, CD
<i>Eulimella cerulli</i> (Cossmann, 1916)	2 5b, d	PA, CD
<i>Eulimella scillae</i> (Scacchi, 1835)	4 5b, d	PA, CD
<i>Eulimella ventricosa</i> (Forbes, 1844)	2 5b, d	PA, CD
<i>Clathrella clathrata</i> (Philippi, 1844)	5b	CD
<i>Ebala nitidissima</i> (Montagu, 1803)	5b	CD
<i>Ebala pointeli</i> (de Folin, 1868)	4 5b	PM, CD
<i>Cima minima</i> (Jeffreys, 1858)	2 5b	PA, CD
<i>Ringicula auriculata</i> (Ménard de la Groye, 1811)	2 5b, c	PA, CD
<i>Ringicula conformis</i> Monterosato, 1877	2 5b	PA, CD

Table 1/8. List of the benthic molluscs recorded in Capo Milazzo coastal waters. Sites of collection (1–5) and prevalent habitat of each species are indicated: Photophilic Algae (PA); Phanerogam Meadows (PM); Reef Pools (RP); Coastal Detritic and Biodebitric bottoms (CD); Supratidal Rocky reef (SR).

species	site	habitat
<i>Bulla striata</i> Bruguière, 1792	2 3	PA, PM
<i>Retusa crebrisculpta</i> (Monterosato, 1884)	2 5b	PA, CD
<i>Retusa leptoneilema</i> (Brusina, 1866)	1 2 5c	PA, CD
<i>Retusa mammillata</i> (Philippi, 1836)	1 5b	PA, CD
<i>Retusa minutissima</i> (Monterosato, 1878)	2 5b	PA, CD
<i>Retusa truncatula</i> (Bruguière, 1792)	2 4 5b	PA, PM, CD
<i>Retusa umbilicata</i> (Montagu, 1803)	2 5b	PA, CD
<i>Pyrunculus hoernesii</i> (Weinkauff, 1866)	5b, c	CD
<i>Volvulella acuminata</i> (Bruguière, 1792)	2 4 5b, c	PA, PM, CD
<i>Haminoea</i> sp.	2 4 5b	PA, PM, CD
<i>Atys jeffreysi</i> (Weinkauff, 1866)	4 5c	PM, CD
<i>Weinkauffia turgidula</i> (Forbes, 1844)	2 5c	PA, CD
<i>Hermania scabra</i> (O.F. Müller, 1784)	2 4 5c	PA, PM, CD
<i>Philine angulata</i> Jeffreys, 1867	5b	CD
<i>Philine catena</i> (Montagu, 1803)	4 5c	PM, CD
<i>Philine denticulata</i> (J. Adams, 1800)	5d	PA
<i>Philine intricata</i> Monterosato, 1884	5b, d	CD, PA
<i>Philine</i> sp.	5c	CD
<i>Philine punctata</i> (J. Adams, 1800)	5c	CD
<i>Philine quadripartita</i> Ascanius, 1772	1	PA
<i>Philine striatula</i> Monterosato, 1874	2 5c	PA, CD
<i>Scaphander lignarius</i> (Linnaeus, 1758)	4	PM
<i>Roxania utriculus</i> (Brocchi, 1814)	2 4 5c	PA, PM, CD
<i>Cylichna cylindracea</i> (Pennat, 1777)	5b, c	CD
<i>Umbraculum umbraculum</i> (Lightfoot, 1786)	5c	CD
<i>Tylodina perversa</i> (Gmelin, 1791)	5d	PA
<i>Berthella aurantiaca</i> (Risso, 1818)	5d	PA
<i>Berthella plumula</i> (Montagu, 1803)	5d	PA
<i>Berthella stellata</i> (Risso, 1826)	5d	PA
<i>Aplysia dactylomela</i> Rang, 1828	5e	PM
<i>Petalifera petalifera</i> (Rang, 1828)	2	PA
<i>Notarchus punctatus</i> Philippi, 1836	4 5b	PM, CD
<i>Williamia gussoni</i> (Costa O.G., 1829)	4 5b	PM, CD
BIVALVIA		
<i>Nucula nitidosa</i> Winckworth, 1930	1 2	PA
<i>Nucula nucleus</i> (Linnaeus, 1758)	4	PM
<i>Nucula sulcata</i> Bronn, 1831	2 4 5b, c, d	PA, PM, CD
<i>Lembulus pella</i> (Linnaeus, 1758)	1 2 3 4 5b	PA, PM, CD
<i>Saccella commutata</i> (Philippi, 1844)	4 5b	PM, CD
<i>Yoldiella philippiana</i> (Nyst, 1845)	5b 5c	CD
<i>Arca noae</i> Linnaeus, 1758	1 2 3 4 5a, b	PA, PM, RP, CD
<i>Arca tetragona</i> Poli, 1795	1 4 5b,c	PA, PM, CD
<i>Asperarca nodulosa</i> (O.F. Müller, 1776)	4 5b, c	PM, CD
<i>Asperarca secreta</i> La Perna, 1998	2 5b, c, d	PA, CD
<i>Barbatia barbata</i> (Linnaeus, 1758)	1 2 3 4	PA, PM
<i>Acar clathrata</i> (Defrance, 1816)	4 5c	PM, CD

Table 1/9. List of the benthic molluscs recorded in Capo Milazzo coastal waters. Sites of collection (1–5) and prevalent habitat of each species are indicated: Photophilic Algae (PA); Phanerogam Meadows (PM); Reef Pools (RP); Coastal Detritic and Biodetritic bottoms (CD); Supratidal Rocky reef (SR).

species	site	habitat
<i>Anadara gibbosa</i> (Reeve, 1844)	4	PM
<i>Batharca pectunculoides</i> (Scacchi, 1835)	5b	CD
<i>Striarca lactea</i> (Linnaeus, 1758)	1 5b	PA, CD
<i>Limopsis tenuis</i> Seguenza, 1876	2 3 4 5c	CD
<i>Glycymeris bimaculata</i> (Poli, 1795)	2 3 4	PM
<i>Glycymeris glycymeris</i> (Linnaeus, 1758)	2 3 4	PM
<i>Mytilus edulis</i> Linnaeus, 1758	3	AP
<i>Mytilus galloprovincialis</i> Lamarck, 1819	1 2 3	AP
<i>Brachidontes pharaonis</i> (P. Fischer, 1870)	1 2 3	AP
<i>Mytilaster solidus</i> Monterosato, 1883	1 2	AP
<i>Crenella arenaria</i> Monterosato, 1875 ex H. Martin, ms.	5c	CD
<i>Gregariella petagnae</i> (Scacchi, 1832)	5c	CD
<i>Gregariella semigranata</i> (Reeve, 1858)	1 2 4 5c, d	PA, PM, CD
<i>Musculus costulatus</i> (Risso, 1826)	1 2 3 4 5b	PA, PM, CD
<i>Musculus discors</i> (Linnaeus, 1767)	5d	PA
<i>Musculus subpictus</i> (Cantraine, 1835)	4 5b	PM, CD
<i>Rhomboidella prideauxi</i> (Learch, 1815)	4 5c	PM, CD
<i>Lithophaga lithophaga</i> (Linnaeus, 1758)	1 2 5d	PA
<i>Modiolus barbatus</i> (Linnaeus, 1758)	1 2 3 4	PA, PM
<i>Gibbomodiola adriatica</i> (Lamarck, 1819)	2 5c	PA, CD
<i>Dacrydium hyalinum</i> (Monterosato, 1875)	3 5b, c	PM, CD
<i>Modiolula phaseolina</i> (Philippi, 1844)	4 5c, d	PM, PA, CD
<i>Pinna nobilis</i> Linnaeus, 1758	2 3 4 5d, e	PA, PM
<i>Pinna rudis</i> Linnaeus, 1758	3	PM
<i>Pinctada imbricata radiata</i> (Leack, 1814)	3	PM
<i>Similipecten similis</i> (Laskey, 1811)	4	PM
<i>Pecten jacobaeus</i> (Linnaeus, 1758)	2 4 5c	PM, CD
<i>Flexopecten flexuosus</i> (Poli, 1795)	2 4 5b, c, d	PA, PM, CD
<i>Flexopecten glaber</i> (Linnaeus, 1758)	2 4 5d	PA, PM
<i>Flexopecten hyalinus</i> (Poli, 1795)	2 4 5b	PA, PM, CD
<i>Aequipecten commutatus</i> (Monterosato, 1875)	4 5b	PM, CD
<i>Aequipecten opercularis</i> (Linnaeus, 1758)	4	PM
<i>Mimachlamys varia</i> (Linnaeus, 1758)	2 4 5b	PA, PM, CD
<i>Palliolum incomparabile</i> (Risso, 1826)	4 5b 5e	PM, CD
<i>Pseudamussium clavatum</i> (Poli, 1795)	4 5b	PM, CD
<i>Delectopecten vitreus</i> (Gmelin, 1791)	5c	CD
<i>Manupecten pesfelis</i> (Linnaeus, 1758)	4	PM
<i>Talochlamys multistriata</i> (Poli, 1795)	2 4 5e	PA, PM
<i>Spondylus gaederopus</i> Linnaeus, 1758	1 2 3 4 5d	PA, PM
<i>Anomia ephippium</i> Linnaeus, 1758	1 2 3 4 5d, e	PA, PM
<i>Heteranomia squamula</i> (Linnaeus, 1758)	5e	PM
<i>Pododesmus patelliformis</i> (Linnaeus, 1761)	3 5d	PA, PM
<i>Lima lima</i> (Linnaeus, 1758)	2 3	PA, PM
<i>Limaria hians</i> (Gmelin, 1791)	2 4 5d, e	PA, PM
<i>Limaria tuberculata</i> (Olivi, 1792)	5b	CD
<i>Limatula gwyni</i> (Sykes, 1903)	4 5b	PM, CD

Table 1/10. List of the benthic molluscs recorded in Capo Milazzo coastal waters. Sites of collection (1–5) and prevalent habitat of each species are indicated: Photophilic Algae (PA); Phanerogam Meadows (PM); Reef Pools (RP); Coastal Detritic and Biodetritic bottoms (CD); Supratidal Rocky reef (SR).

species	site	habitat
<i>Limatula subauriculata</i> (Montagu, 1808)	5b	CD
<i>Ostrea edulis</i> Linnaeus, 1758	1 2 3 5c, d	PA, PM, CD
<i>Crassostrea gigas</i> (Thunberg, 1793)	1 2 4	PA, PM
<i>Neopycnodonte cochlear</i> (Poli, 1795)	4 5b, c	PM, CD
<i>Ctena decussata</i> (O. G. Costa, 1829)	1 2 3 4 5d	PA, PM
<i>Loripinus fragilis</i> (Philippi, 1836)	2 3 4	PM
<i>Loripes orbiculatus</i> Poli, 1791	2 3	PM
<i>Myrtea spinifera</i> (Montagu, 1803)	4 5b	PM, CD
<i>Lucinoma borealis</i> (Linnaeus, 1767)	4	PM
<i>Lucinella divaricata</i> (Linnaeus, 1758)	1 3 4 5d	PM, CD
<i>Axinulus alleni</i> Carrozza, 1981	1	PM
<i>Thyasira biplicata</i> (Philippi, 1836)	1	PM
<i>Diplodonta intermedia</i> Biondi-Giunti, 1859	1	PM
<i>Diplodonta rotundata</i> (Montagu, 1803)	4	PM
<i>Diplodonta trigona</i> (Scacchi, 1835)	5b	CD
<i>Chama gryphoides</i> Linnaeus, 1758	1 2 3 4	PA, PM
<i>Pseudochama gryphina</i> (Lamarck, 1819)	2 3 4	PA, PM
<i>Kellia suborbicularis</i> (Montagu, 1803)	5c	CD
<i>Hemilepton nitidum</i> (W. Turton, 1822)	2 5c	PA, CD
<i>Kurtiella bidentata</i> (Montagu, 1803)	5d	PA
<i>Epilepton clarkiae</i> (W. Clark, 1852)	1	PA
<i>Neolepton sulcatulum</i> (Jeffreys, 1859)	2 5b 5c	PA, CD
<i>Cardita calyculata</i> (Linnaeus, 1758)	3	PM
<i>Centrocardita aculeata</i> (Poli, 1795)	3 4 5b 5c	PM, CD
<i>Glans trapezia</i> (Linnaeus, 1767)	2 3 4	PA, PM
<i>Coripia corbis</i> (Philippi, 1836)	5c	CD
<i>Cardites antiquatus</i> (Linnaeus, 1758)	2 3 4	PA, PM
<i>Astarte fusca</i> (Poli, 1791)	4 5c	PM, CD
<i>Astarte sulcata</i> (da Costa, 1778)	4 5c	PM, CD
<i>Digitaria digitaria</i> (Linnaeus, 1758)	4 5d	PA, PM
<i>Goodallia micalii</i> Giribet & Peñas, 1999	5c	CD
<i>Goodallia pusilla</i> (Forbes, 1844)	5c 5d	PA, CD
<i>Goodallia triangularis</i> (Montagu, 1803)	4 5c 5d	PM, CD
<i>Gonilia calliglypta</i> (Dall, 1903)	5c 5d	CD
<i>Acanthocardia paucicostata</i> (G.B. Sowerby II, 1834)	1 2 3	PM
<i>Acanthocardia tuberculata</i> (Linnaeus, 1758)	3	PM
<i>Parvicardium exiguum</i> (Gmelin, 1791)	2 4	PA, PM
<i>Parvicardium minimum</i> (Philippi, 1836)	1 2 3 4 5d	PM
<i>Papillicardium papillosum</i> (Poli, 1791)	1 2 4 5b	PM
<i>Laevicardium crassum</i> (Gmelin, 1791)	4	PM
<i>Laevicardium oblongum</i> (Gmelin, 1791)	4 5c	PM, CD
<i>Cerastoderma edule</i> (Linnaeus, 1758)	2 3	PM
<i>Maetra stultorum</i> (Linnaeus, 1758)	2	PM
<i>Spisula subtruncata</i> (da Costa, 1778)	1 4	PM
<i>Moerella distorta</i> (Poli, 1791)	1 2 4	PM
<i>Bosemprella incarnata</i> (Linnaeus, 1758)	2	PM

Table 1/11. List of the benthic molluscs recorded in Capo Milazzo coastal waters. Sites of collection (1–5) and prevalent habitat of each species are indicated: Photophilic Algae (PA); Phanerogam Meadows (PM); Reef Pools (RP); Coastal Detritic and Biodetritic bottoms (CD); Supratidal Rocky reef (SR).

species	site	habitat
<i>Peronidia albicans</i> (Gmelin, 1791)	2	PM
<i>Peronaea planata</i> (Linnaeus, 1758)	2	PM
<i>Moerella pulchella</i> (Lamarck, 1818)	2	PM
<i>Serratina serrata</i> (Brocchi, 1814)	2 4	PM, CD
<i>Moerella donacina</i> (Linnaeus, 1758)	2 4 5d	PM
<i>Asbjornsenia pygmaea</i> (Lovén, 1846)	4	PM
<i>Arcopella balaustina</i> (Linnaeus, 1758)	4 5e	PM
<i>Gastrana fragilis</i> (Linnaeus, 1758)	2	PM
<i>Donax semistriatus</i> Poli, 1759	2 5d	PM
<i>Donax variegatus</i> (Gmelin, 1791)	2 4 5d	PM
<i>Gari costulata</i> (W. Turton, 1822)	4	PM
<i>Gari depressa</i> (Pennant, 1777)	3	PM
<i>Gari fervensis</i> (Gmelin, 1791)	1 4	PM
<i>Gari tellinella</i> (Lamarck, 1818)	5b	CD
<i>Abra alba</i> (W. Wood, 1802)	1 4 5d	PM
<i>Abra longicallus</i> (Scacchi, 1835)	2 4	PM
<i>Abra nitida</i> (O.F. Müller, 1776)	1 2	PM
<i>Abra prismatica</i> (Montagu, 1808)	1 4	PM
<i>Abra tenuis</i> (Montagu, 1803)	2	PM
<i>Scrobicularia cottardii</i> (Payraudeau, 1826)	1 3	PM
<i>Scrobicularia plana</i> (da Costa, 1778)	2	PM
<i>Azorinus chamasolen</i> (da Costa, 1778)	2	PM
<i>Solecurtus scopula</i> (W. Turton, 1822)	4	PM
<i>Solecurtus strigilatus</i> (Linnaeus, 1758)	3	PM
<i>Venus casina</i> Linnaeus, 1758	4 5b	PM, CD
<i>Venus verrucosa</i> Linnaeus, 1758	2 3 4	PM
<i>Gouldia minima</i> (Montagu, 1803)	1 3 4 5b	PM, CD
<i>Chamelea gallina</i> (Linnaeus, 1758)	2 3	PM
<i>Clausinella fasciata</i> (da Costa, 1778)	4	PM
<i>Timoclea ovata</i> (Pennat, 1777)	1 2 3 4 5b	PM, CD
<i>Pitar rudis</i> (Poli, 1795)	2 4 5e	PM
<i>Callista chione</i> (Linnaeus, 1758)	1 2 3 4	PM
<i>Polititapes aureus</i> (Gmeli, 1791)	2	PM
<i>Polititapes rhomboides</i> (Pennat, 1777)	2	PM
<i>Ruditapes decussatus</i> (Linnaeus, 1758)	2	PM
<i>Irus irus</i> (Linnaeus, 1758)	2 4 5d	PA, PM
<i>Dosinia lupinus</i> (Linnaeus, 1758)	1 3	PM
<i>Lajonkairia lajonkairii</i> (Payraudeau, 1826)	2 4 5a, d	PA, PM, RP
<i>Lajonkairia substriata</i> Montagu, 1808	5c	CD
<i>Corbula gibba</i> (Olivi, 1792)	1 2 4 5d	PM
<i>Rocellaria dubia</i> (Pennat, 1777)	1 2 4 5b, d	PA, PM, CD
<i>Hiatella arctica</i> (Linnaeus, 1767)	2 5c	PA, CD
<i>Hiatella rugosa</i> (Linnaeus, 1767)	1 2 3 4 5c	PA, PM, CD
<i>Xylophaga dorsalis</i> (W. Turton, 1819)	2 5c	PA, CD
<i>Bryopa aperta</i> (G.B. Sowerby I, 1823)	5b	CD
<i>Bryopa melitensis</i> (Broderip, 1834)	5b	CD

Table 1/12. List of the benthic molluscs recorded in Capo Milazzo coastal waters. Sites of collection (1–5) and prevalent habitat of each species are indicated: Photophilic Algae (PA); Phanerogam Meadows (PM); Reef Pools (RP); Coastal Detritic and Biotritic bottoms (CD); Supratidal Rocky reef (SR).

species	site	habitat
<i>Cuspidaria cuspidata</i> (Olivi, 1792)	4	PM
<i>Cardiomya costellata</i> (Deshayes, 1835)	1 4 5b	PM, CD
SCAPHOPODA		
<i>Antalis agilis</i> (M. Sars in G.O. Sars, 1872)	2 5d	CD
<i>Antalis inaequicostata</i> (Dautzenberg, 1891)	2 4	PM
<i>Antalis vulgaris</i> (da Costa, 1778)	4 5d	PM
<i>Fustiaria rubescens</i> (Deshayes, 1825)	2 4	PM

Table 1/13. List of the benthic molluscs recorded in Capo Milazzo coastal waters. Sites of collection (1–5) and prevalent habitat of each species are indicated: Photophilic Algae (PA); Phanerogam Meadows (PM); Reef Pools (RP); Coastal Detritic and Biodetritic bottoms (CD); Supratidal Rocky reef (SR).

Species	Site
<i>Janthina globosa</i> Wainson, 1822	2, 3, 6
<i>Janthina pallida</i> W. Thompson, 1840	2, 3, 6
<i>Atlanta peronii</i> Lesueur, 1817	5c
<i>Cavolinia inflexa</i> (Lesueur, 1813)	5b, c
<i>Diacria trispinosa</i> (Lesueur, 1821)	5d
<i>Clio pyramidata</i> Linnaeus, 1767	2, 5c
<i>Creseis clava</i> (Rang, 1828)	5b, c
<i>Styliola subula</i> (Quoy et Gaimard, 1827)	5b, c
<i>Limacina bulimoides</i> (d'Orbigny, 1835)	5c
<i>Limacina retroversa</i> (J. Fleming, 1823)	5c
<i>Limacina trochiformis</i> (d'Orbigny, 1835)	5c
<i>Heliconoides inflatus</i> (d'Orbigny, 1835)	5c
<i>Cymbulia peronii</i> Blainville, 1818	2, 3, 6
<i>Peracle reticulata</i> (d'Orbigny, 1835)	5c

Table 2. List of the pelagic molluscs recorded in Capo Milazzo coastal waters. Sites of collection of each species (2, 3, 6) are indicated.

CONCLUSIONS

The check-list of 556 benthic taxa here provided, although not exhaustive of the overall biodiversity of the Milazzo Peninsula, may be considered at least representative of the local mollusc fauna and respective habitats, some of which of relevant conservative values, i.e., phanerogam meadows and the more localized vermetid reefs. Most mollusc species under EEC and National protection, and other ones listed as threatened, occur in the coastal seafloors of the Milazzo peninsula, even in areas submitted to relevant anthropogenic pressure.

In the meantime, the settlement of not indigenous species, mainly of tropical origin, together

with disease affecting threatened organisms under EEC protection, testified vulnerability of the local ecosystem toward the global change menaces.

The recent establishment of a marine protected area is an important initiative to protect the most sensitive and most valuable natural habitats, and offers new opportunities to improve their knowledge and conservation. Few data are available today on the local biodiversity of these ecosystems, which should be rapidly investigated in order to evaluate the effect of the protection measures as well as any change in valuable habitats not subject to special protection measures. It must be emphasized, in fact, that the local interdiction to human activities cannot protect the marine reserve against the effects of anthropic pressure on the vast territory, which in the Milazzo area are mainly linked to the presence of oil rigs and related oil tanker traffic.

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