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BIOCOENOTIC ASSESSMENT OF THE LA STREA INLET (PORTO CESAREO, ITALY) AND ITS ASSOCIATED MALACOFAUNA

RIASSUNTO

L'insenatura de La Strea, situata lungo la costa sud–est del centro abitato di Porto Cesareo, rappresenta un ambiente di transizione ad elevata biodiversità, formatosi durante il Pleistocene in seguito all'allagamento di antiche paludi costiere. L'area si estende per circa 161 ettari, con una lunghezza di 2500 m, larghezza media di 700–800 m e profondità massima di 2,5 m. È separata dal mare aperto da una sottile lingua di terra denominata penisola de La Strea, ma comunica con esso tramite un'ampia apertura (circa 700 m) che impedisce l'instaurarsi delle tipiche condizioni lagunari. Questa connessione diretta conferisce all'area caratteristiche fisico-chimiche peculiari, rendendola un contesto ideale per studi di tipo biocenotico e per l'analisi dell'evoluzione delle comunità bentoniche nel tempo.

Nel presente lavoro è stata effettuata una caratterizzazione biocenotica della zona in esame adottando un metodo non sistematico, basandosi su osservazioni dirette partendo da una planimetria satellitare. Le biocenosi sono state identificate mediante il criterio fisionomico, fondato sulla diversità morfologica delle comunità, metodo utile per una descrizione preliminare e per pianificare indagini più dettagliate. Dopo una revisione della letteratura scientifica esistente e numerose osservazioni in situ, è stata elaborata una carta biocenotica con la dislocazione spaziale delle biocenosi riscontrate. È stato poi calcolato l'indice di similarità di Jaccard, al fine di valutare le variazioni nella composizione delle comunità di molluschi e il livello di biodiversità associato alle diverse biocenosi rilevate. Il risultato evidenzia una bassa similarità tra le sette biocenosi litorali riconosciute (valore massimo 0.17), a indicare che le comunità di molluschi sono fortemente differenziate, probabilmente per differenze ambientali locali. Ciò suggerisce che ciascuna biocenosi costituisce un'unità ecologica distinta.

Sono state inoltre elencate le specie di molluschi rinvenute nel corso di vari anni di monitoraggio, associate alle biocenosi di reperimento. La malacofauna dell'area, considerando anche le specie rinvenute da altri Autori, comprende 305 specie. Viene segnalata per la prima volta per il Salento *Tritia elongata* (Bucquoy, Dautzemberg and Dollfus, 1882).

SUMMARY

La Strea inlet, on the SE coast of Porto Cesareo, covers 161 ha, is 2500 m long, 700–800 m wide, and 2.5 m deep. Formed in the Pleistocene by flooding of coastal marshes, it is separated from the open sea by a peninsula yet connected via a 700 m breach, preventing true lagoonal conditions. Its shallow bathymetry allowed a non-systematic biocenotic survey based on direct observations and satellite planimetry. Biocenoses were delineated using physiognomic criteria to establish a preliminary framework. We produced an updated biocenotic map and compiled an inventory of 305 mollusc species, assigning each species to its respective biocenosis. *Tritia elongata* (Bucquoy, Dautzemberg and Dollfus, 1882) is reported for the first time from Salento.

The Jaccard similarity index was calculated to assess variations in benthic community composition and biodiversity across the identified biocenoses. Results show low similarity among the seven coastal biocenoses (maximum 0.17), indicating highly differentiated mollusk communities likely driven by local environmental factors, and suggesting that each biocenosis represents a distinct ecological unit.

INTRODUCTION

Biocenotic characterization allows assessing the state of the seabed at a given time and, more importantly, enables comparisons of benthic communities over time using data collected at different times. The analysis of benthic organisms is particularly valuable because, being substrate-bound, they constitute a sort of historical record of the study site.

Among benthic organisms, mollusc communities play a fundamental role in the dynamic of Mediterranean ecosystems, representing one of their most important and, at the same time, most easily studied components. For this reason, assessing their abundance is fundamental for describing the biodiversity of a given environment.

This aim of this study is to provide a biocenotic characterization of the La Strea inlet (Porto Cesareo, Lecce, Italy) and, secondarily, a checklist of the molluscs sampled in the study area, associating them, where possible, with the identified biocenoses. Mapping the benthic assemblages and the molluscs populations living in the area and, above all, having the possibility to make future comparisons, is particularly important in this case, as the study site is heavily impacted by human activities and hosts a residential area, with high seasonal tourist pressure in the summer, a fishing harbor, and three recreational boating facilities.

The logical adopted approach initially involved a review of the available literature concerning the biocenoses of the area under study, followed by numerous field surveys to verify and complement the preliminary information. After defining the biocenoses, a list of the mollusc species identified is presented, associating them, where possible, with their respective biocenoses.

Study area and geographical context

The La Strea inlet (coordinates at the inlet centre: 40°15'10.52" N - 17°54'5.11" E) is a transitional habitat particularly rich in biodiversity. Parenzan (1976) identified here a biotope that he described as unique in the Mediterranean (see below), Mercurio *et al.* (2001) highlighted its remarkable sponges richness, referring to the area as "Sponge Garden"; Corriero and Nonnis Marzano (2006) described a new sponge species, *Cliona spissaspira* (Porifera, Clionaidae). Other species described for the first time from materials collected in the inlet include *Paguristes streaensis* Pastore, 1984 (Arthropoda, Diogenidae), *Peltodoris sordii* Perrone, 1990 (Mollusca, Discodorididae) and the recently discovered *Bela salentina* Vitale, Trono & Prkìc, 2025 (Mollusca, Mangeliidae).

The bay originated during the Pleistocene as a result of the flooding of pre-existing coastal marshes (Cinelli *et al.*, 1988). It measures approximately 2,500 m in length and 700–800 m in width, with a maximum depth of 2.5 m (Passeri, 1974) and covered an area of about 161 ha. The bay occupies the southeastern coast area of Porto Cesareo and is separated from the open sea by a strip of land known as the La Strea Peninsula. Water exchange with the sea is ensured through a wide opening located between the extreme edge of the aforementioned peninsula and the small island called "della Testa," which lies opposite the town of Porto Cesareo. The presence of this broad connection to the open sea, approximately 700 m wide, prevents the area from acquiring the typical physico-chemical characteristics of a lagoon (Cinelli *et al.*, 1988). An exception is the innermost area, characterized by limited hydrodynamics, subject to intense evaporation phenomena due to its shallow depth and fed by numerous freshwater springs. During winter low tides, it remains completely exposed (Fig. 1). Although it exhibits features attributable to the *Biocenosis of supralittoral beaches subject to rapid desiccation*, this portion does not exhibit specific faunal adaptations. Given the transitory nature of the phenomenon, this area has not been considered among the recognized biocenoses.

Fig. 1 – The innermost section of the inlet exposed during winter low tide events (Ph. Daniele Trono).

The Peninsula, approximately 1.5 km long, contains medieval archaeological remains. Thanks to recently conducted topographic surveys, it was possible to identify structures that can likely be dated to the Swabian-Angevin period, between the 12th and 14th centuries (AA.VV., 2018). It is a site of significant faunal, floral, and vegetational importance and is dominated by low scrub and garrigue vegetation with myrtle, mastic, rockrose, phillyrea, and shrubby thyme, with large clearings featuring limestone outcrops (Fig. 2). The terminal stretch features stands of annual and perennial glasswort. Dominated by *Salicornia fruticosa* and other halophilous species, the glasswort is a priority habitat according to European directives (Directive 92/43/EEC). These environments are pioneers, capable of colonizing saline and muddy soils, and play a key role in water filtration and soil stabilization. In the temporary marshes, characterised by low salinity, there are dense populations of Baudot's buttercup, Calamaria and Purple Loosestrife with three bracts, very rare hydrophytes worthy of protection, included in the Regional Red List of Puglia.

Its limited accessibility and favorable location make it a stopover and wintering area for numerous bird species (Fig. 3). As for mammals, reptiles, and amphibians, very few are able to survive adverse conditions such as the lack of fresh water, high soil salinity, and strong, humid winds.

Fig. 2 – Vegetation of the La Strea Peninsula (Ph. Daniele Trono).

Fig. 3 – Migratory birdlife of the La Strea Peninsula (Ph. Daniele Trono).

Protective Measures

In 1997, by Ministerial Decree of December 12, 1997, the Porto Cesareo Marine Protected Area was established. The La Strea peninsula outer side, situated on the open sea, is one of the two Zone A areas (strict nature reserve) within the aforementioned MPA, while, approximately half of the inlet discussed in this study was initially classified as Zone C (general reserve) was later excluded from protection to allow for the heavy maritime traffic caused by the presence of three docks and the fishing port.

The access to the peninsula from land is difficult; nevertheless, human presence is significant, especially in the summer season. Since 2006, the La Strea peninsula has been part of the Oriented Nature Reserve "Palude del Conte e Duna Costiera – Porto Cesareo", established by Regional Law no. 5 of the Apulia Region on March 15, 2006. This law created a protected terrestrial area and one of its effects was the banning of car access to the peninsula, thereby indirectly contributing to the preservetion of the coastline.

MATERIALS AND METHODS

The biocenotic characterization of the study area, thanks to the shallow depth across its entire extent, was conducted through targeted field observations supported by satellite imagery.

Biocenoses were identified using the physiognomic criterion, which is based on differences in community appearance. This approach is generally adequate for a preliminary characterization and can provide a planning basis for more detailed investigations with more rigorous methods.

Mollusc sampling was carried out with the aim of covering all biocenoses present in the inlet. Samples were obtained by collecting sediments from the seabed at depths between 0.5 and 1.5 m, by visual collection during free diving, by washing algae, and by sampling in the *Cymodocea nodosa* (Ucria) (Asch. 1870) seagrass bed using a hand dredge.

Collected sediments were rinsed with freshwater and sieved through a 0.5 mm mesh to remove the finer particles. Samples were then dried and examined under a stereomicroscope.

All specimens listed in Table 2 are stored in the Author's private collection, as those illustrated in Figure 15, photographed with a 24-megapixel digital camera. The images were later optimized and assembled using photo-editing software. For practical reasons, the specimens shown in Figure 15 are not reproduced to scale.

Systematics follows the World Register of Marine Species (WoRMS).

Biocenoses are classified according to Pérès and Picard (1964). Although more recent classifications exist (e.g., EUNIS of the European Environment

Agency, Barcelona Convention, etc.), they are often either too general or still under development to fully replace the clarity and the specificity of PÉRÈS and PICARD (1964) in Mediterranean environments.

To assess the compositional affinity degree among the different biocenoses recorded in the inlet, the Jaccard similarity index was applied, based on the presence or absence of mollusc species found alive in at least three replicates for each biocenosis. Species identified exclusively as non-living were excluded in order to accurately represent the current structure of the communities. The Jaccard index was selected for its reliability in comparing biological communities using binary data, without considering relative abundances. For each pair of the biocenoses (n = 7), similarity was calculated using the formula:

$$\mathbf{J = c / (a + b - c)}$$

where ***c*** indicates the number of shared species, while ***a*** and ***b*** represent the total number of species present in each of the two biocenoses under comparison.

The resulting values were organized into a 7×7 matrix and subsequently represented as a heatmap using conditional formatting in Microsoft Excel. The adopted color scale (from blue to red) highlighted the gradient of biological affinity, allowing for the visual identification of both ecologically homogeneous clusters and more isolated biocenoses.

Abbreviations used
H: Height;
W: Width;
NIS: Non-Indigenous Species.

RESULTS AND DISCUSSION

The La Strea Inlet represents a particularly noteworthy environment, characterized by high biodiversity. Owing to this, and to its easy accessibility from land, it has been the focus of numerous scientific investigations over the years. The first to recognize its ecological importance was Pietro PARENZAN, who published several works on the area (1976, 1981, 1983 and 1984).

In 1983, following a twenty-year study involving more than 2,000 dredgings along the Apulian coasts, PARENZAN published *Puglia Marittima*, a two-volume monograph including, for the first time, biocenotic maps of the seabeds along the entire Apulian coastline. Plate H concerns Porto Cesareo. Within the inlet, Parenzan essentially identified only three biocenoses:

- Biocenosis with *Anadyomene stellata* (Wulfen) C. Agardh, 1823 (Chlorophyta, Anadyomenaceae), *Geodia cydonium* (Jameson, 1811) (Porifera, Demospongiae), and *Holothuria impatiens* (Forsskål, 1775) (Echinodermata, Holothuriidae);
- Submerged reef or algal outcrops;
- *Cystoseira* spp.

Parenzan further devoted chapter 56 of his work to the first biocenosis, describing it as a subtropical-affinity environment, unique within the Mediterranean basin. According to Mercurio *et al*. (2007), the sponge *Geodia cydonium,* which formerly characterized large portions of the seabed, first reported by Parenzan in 1976 and subsequently the subject of several studies (Corriero *et al*., 1984; Mercurio et al., 2001; Corriero *et al*., 2004), is no longer present in the inlet. Its disappearance is attributed to increased sedimentation resulting from port infrastructures, as well as to rising seawater temperatures, which negatively affect the reproductive activity of this poriferan. Nevertheless, personal observations confirmed its persistence in the area, albeit with small-sized individuals.

The alga *Anadyomene stellata* is still present and, in certain sectors, dominates the benthic assemblages, forming characteristic rosette-like structures. These formations are transported by wave action across the inlet's seabed and, during extreme winter low tides, provide an important moist refuge for numerous species seeking shelter within them (Fig. 1).

Fig. 4 – The alga *Anadyomene stellata* with the echinoderm *Holothuria impatiens* (Ph. Daniele Trono).

Fig. 5 – Biocoenotic map (from Parenzan, 1983, modified).

In 1988, a study promoted by the Apulia Region and commissioned to the Universities of Lecce, Modena, and Pisa investigated various abiotic parameters (temperature, salinity, dissolved oxygen, etc.) as well as biotic components (plankton and benthos), demonstrating that the La Strea Inlet does not display the ecological characteristics typical of a lagoon (Cinelli *et al*., 1988). As part of this research, a cartographic representation was produced based on several field surveys (Fig. 6).

The following benthic communities were identified in the area:

- Photophilic and thermophilic community of the upper infralittoral rocky substrate in sheltered conditions;
- *Posidonia oceanica* seagrass meadow;
- Mixed seagrass meadow of *Caulerpa* and *Cymodocea*;
- Nitrophilous assemblages on hard substrate;
- Photophilic community of the upper infralittoral rocky substrate in sheltered conditions with *Cystoseira*;
- Assemblage of photophilic infralittoral communities on hard substrate.

The absence of nitrophilous assemblages, previously reported in correspondence with the urban area of Porto Cesareo, is noteworthy. This absence is consistent with the fact that, at the time of the study, untreated sewage outflows were present, which fortunately are no longer active. In most of the area, the authors described a mixed meadow of *Cymodocea* and *Caulerpa*, distributed along the entire northern margin of the inlet. At present, the latter is no longer found, having been replaced by a pure stand of the former species, located in the central sector of the terminal basin, with isolated patches scattered across the area (cfr. Fig. 13). These patches are also present in the southernmost part when submerged; however, they are subject to desiccation during periodic emersion events, although the rhizomes remain buried in the sediment, ready to sprout again during the following growing season (Fig. 7). The *Posidonia oceanica* meadow recorded by the authors at the mouth of the inlet is currently restricted to isolated patches located outside the study perimeter and will therefore not be considered in the present work.

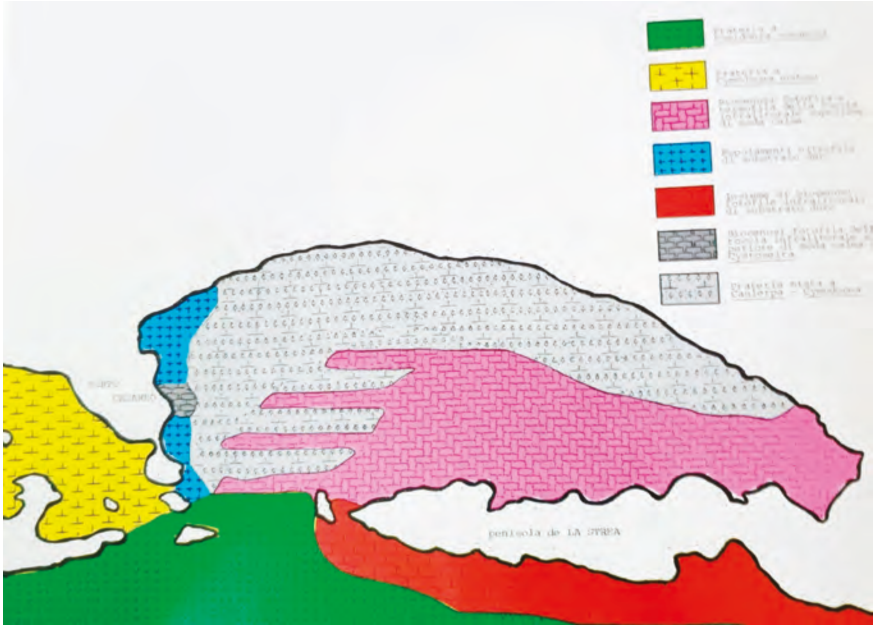

Fig. 6 – Vegetation mapping of the La Strea Inlet (from Cinelli et al., 1988).

Fig. 7 – *Cymodocea nodosa* at the terminal part of the inlet; in the background, the Salicornia-dominated saltmarsh (Ph. Daniele Trono).

The Marine Protected Area of Porto Cesareo has mapped the benthic communities present within its jurisdiction (Fig. 8), covering approximately half of the inlet, as the other half was excluded from the reserve due to intense recreational boating activity.

In the portion visible on the map, four benthic communities were identified:

- Community of shallow muddy sands in sheltered waters;
- Association with *Cymodocea nodosa* on shallow muddy sands in sheltered waters;
- Community of coarse sands and fine gravels mixed by wave action;
- Overexploited facies with encrusting algae and sea urchins.

The presence of the first two communities is confirmed, with a broadly accurate spatial configuration.

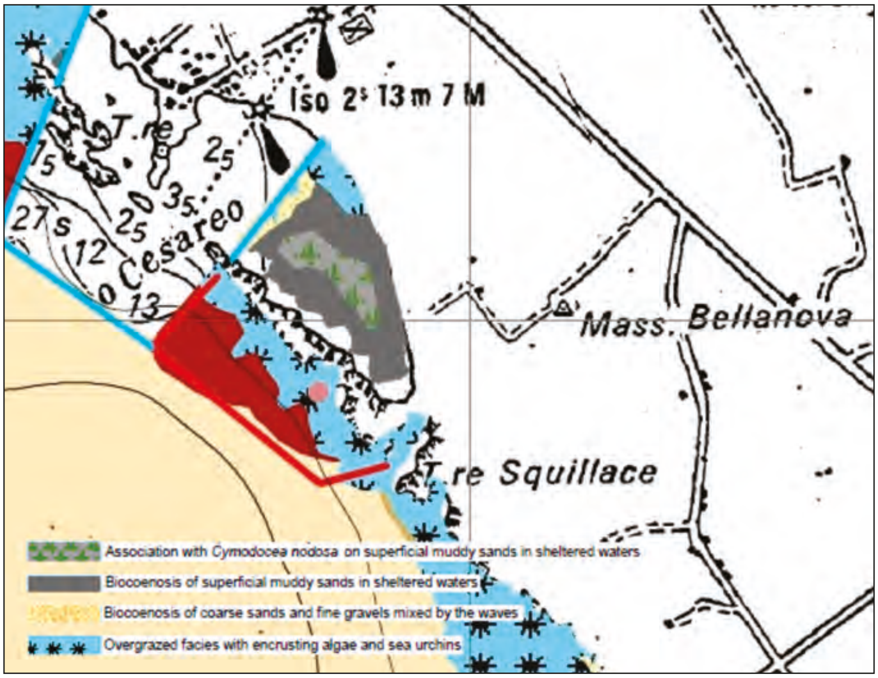

Fig. 8 – Habitat mapping of the Porto Cesareo Marine Protected Area (adapted from www.ampportocesareo.it).

The available studies generally present a low level of detail, insufficient to fully describe the structure and dynamics of coastal communities. The information retrievable from the literature is sometimes contradictory, and some findings are not consistent with the observations made in the field; moreover, not all data are codified according to the criteria of Pérès and Picard (1964). Nevertheless, the review of previous sources has allowed for a preliminary characterization of the benthic community types occurring in the study area, although without accurately defining their spatial configuration.

The modeling of coastal benthic communities represents a fundamental tool for advancing understanding and improving the management of coastal ecosystems. However, this approach must contend with the dynamic complexity of these systems: communities do not manifest as rigid or easily delimited entities. Along many coastal stretches, biological assemblages tend to overlap, interpenetrate, or gradually shift, blurring the boundaries between one association and another. Consequently, benthic community maps, while providing a useful overview, should be understood as simplified representations of a reality in constant transformation (See, for example, Fig. 9, which illustrates a coastal sector hosting *Mediolittoral Rock and Sand*, *Photophilous Algae* and *Muddy Sands in Sheltered Areas*).

With this premise, we can turn to the field situation, which has proven to be much more complex than what has thus far been reported in the literature.

Considering the main biocenoses, the situation observed is summarized in Table 1 and illustrated in Figure 13. In Table 1, each of the identified biocenoses is detailed in terms of its occurrence, along with a list of characteristic mollusc species whose frequency and abundance indicate a strong ecological affinity with the described biocenosis, althought without implying spatial exclusivity.

In the preparation of the study area biocenotic map, only the main biocenoses were represented, avoiding the facies subdivision as proposed by Pérès and Picard (1964). This decision was made not only to prevent excessive fragmentation of the map, which could have compromised its visual clarity, but also to facilitate comparison with other studies conducted in the Mediterranean and to enable integration with management and monitoring data, which are often structured on broader ecological units. Furthermore, as the study includes statistical analyses, the facies incorporation would have introduced variability that would be difficult to treat consistently and would have increased interpretative complexity. In a context like the one analyzed, where ecotonal transitions are often gradual and poorly defined, an overly fine distinction would risk emphasizing subjective elements. An exception to this criterion was made for the *Cymodocea nodosa* facies, which was considered separately due to its ecological relevance. This habitat is characterized by distinctive structural and functional features, hosts specific communities associated with well-defined environmental conditions, and plays a key role in primary production processes and coastal dynamics.

Fig. 9 – Coastal tract showing the spatial overlap of hard-substrate and soft-substrate biocoenoses, underscoring the blurred ecological boundaries between adjacent communities (Ph. Daniele Trono).

BIOCENOSIS	ACRONYM	OCCURRENCE	CHARACTERISTIC SPECIES
SUPRALITTORAL ZONE			
Hard-bottom communities			
Biocenosis of supralittoral rock	RS	On supralittoral rocky outcrops	*Melaraphe neritoides* (Linnaeus, 1758)
INTERTIDAL ZONE			
Hard-bottom communities			
Biocenosis of intertidal rock	RM	On mediolittoral rocky outcrops, even in the absence of macroscopic algal cover	*Phorcus articulatus* (Lamarck, 1822) *Thericium lividulum* (Risso, 1826) *Thericium repandum* (Monterosato, 1878)
Soft-bottom communities			
Biocenosis of intertidal sands	SM	Along all sandy coasts of the inlet, with a vertical extent between mean high and low tide levels	*Donacilla cornea* (Poli, 1791)
INFRALITTORAL ZONE			
Hard-bottom communities			
Infralittoral algae	AP	On rocky substrates, including the numerous pebbles on sandy bottoms. In fact, in some areas the seabed is scattered with boulders and pebbles formed by supralittoral and intertidal diagenesis of the sediment and by erosion of coastal limestones (Passeri, 1974)	*Jujubinus exasperatus* (Pennant, 1777) *Jujubinus striatus* (Linnaeus, 1758) *Steromphala racketti* (Payraudeau, 1826) *Alvania discors* (Allan, 1818) *Thericium lividulum* (Risso, 1826) *Thericium repandum* (Monterosato, 1878) *Gibberula philippi* (Monterosato, 1878)
Soft-bottom communities			
Shallow muddy sands in sheltered areas	SVMC	It is the most extensive biocenosis, encompassing infralittoral sandy bottoms from the tip of the peninsula to the innermost part of the inlet	*Tornus subcarinatus* (Montagu, 1803) *Pirenella conica* (de Blainville, 1829) *Hexaplex trunculus* (Linnaeus, 1758) *Conus ventricosus* Gmelin, 1791 *Tritia cuvierii* (Payraudeau, 1826) *Retusa leptoneilema* (Brusina, 1866) *Loripes orbiculatus* Poli, 1795 *Cerastoderma glaucum* (Linnaeus, 1758) *Polititapes aureus* (Gmelin, 1791) *Ruditapes decussatus* (Linnaeus, 1758) *Solecurtus strigilatus* (Linnaeus, 1767)
Facies with *Cymodocea nodosa*	Cym.	A large meadow in the terminal part, with scattered patches throughout the inlet	Rissoidae Cystiscidae *Eatonina cossurae* (Calcara, 1841) *Steromphala adansonii* (Payraudeau, 1826) *Tritia cuvierii* (Payraudeau, 1826) *Bela salentina* Vitale, Trono & Prkic, 2025 *Odostomia turriculata* Monterosato, 1869 *Retusa leptoneilema* (Brusina, 1866) *Retusa truncatula* (Philippi, 1836)
Well-sorted fine sands	SFBC	In the central part of the inlet, at the opening to the open sea	*Thericium vulgatum* (Bruguière, 1792) *Hexaplex trunculus* (Linnaeus, 1758) *Acanthocardia tuberculata* (Linnaeus, 1758)

Tab. 1 – Identified biocoenoses, occurrence and characterizing molluscan species in the La Strea Inlet.

Before analyzing the biocenoses specific composition and assessing the similarity index, it is necessary to introduce a methodological premise to ensure the ecological representativeness of the data. In complex littoral environments, characterized by spatial discontinuities, mixed substrates, and accumulations of floating organic debris, benthic communities display dynamics that make it difficult to unambiguously assign species to a single habitat.

Molluscs and other invertebrates, being both mobile and subject to passive transport, can occur outside their original biotope, with the risk of compromising the accuracy of biocenotic attribution. To minimize this risk, only species recorded alive in at least three replicates within the same biocenosis were considered. This dual criterion —live presence and repeated occurrence — ensures that only biologically active and stable components are retained, reducing both overestimation due to organic remains and misclassification caused by drift or dispersal. Within this framework, we referred to ecologically persistent and functionally characterized habitats, already recognized in the scientific literature as valid for biocenotic classification, in particular following the scheme proposed by Pérès and Picard (1964). The quantitative analysis of the coastal biocenoses in the study area is therefore based on this methodical selection of species. The results are shown in Fig. 10.

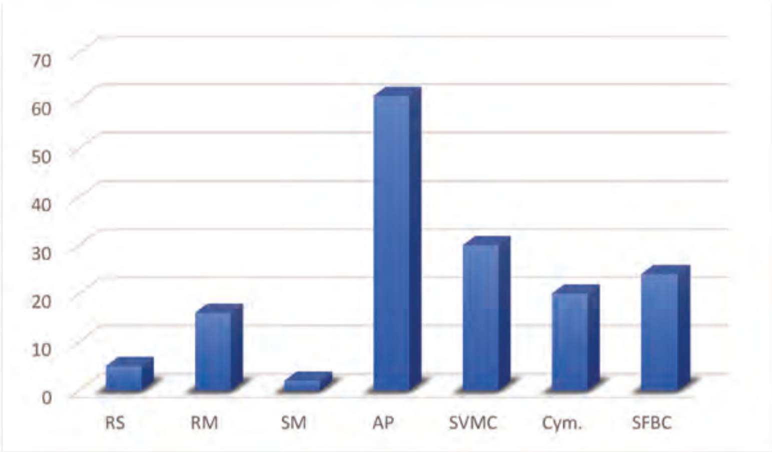

Fig. 10 – Species richness of the coastal biocoenoses analyzed.

The greatest species richness was observed in *Photophilous algal* communities, followed by *Muddy sands in sheltered areas*. This pattern reflects a combination of intrinsic ecological and structural factors.

Photophilous algal communities develop in littoral zones with high light irradiance and solid substrates, conditions that promote the settlement and growth of multicellular macroalgae. These formations generate complex three-dimensional habitats where intricate biotic interactions occur and ecological microniches multiply, supporting the accumulation of epiphytic, vagile, and sessile species. Functionally, such communities are characterized by high primary productivity that sustains dynamic food webs. Their structural stability, coupled with seasonal variability, enhances overall species diversity and allows these habitats to host a broad range of taxa.

The high species richness found in the biocenosis of *Muddy sand in sheltered areas* can be explained by both favorable environmental conditions and the trophic complexity of this habitat. In low-energy settings, fine sediments accumulate large amounts of organic matter, providing a stable food source for detritivorous invertebrates. These organisms create fragmented, niche-rich microhabitats that promote the coexistence of numerous taxa. Furthermore, the absence of strong currents limits the dispersal of organic matter and individuals, allowing the establishment of more stationary and specialized populations. The combined physical–chemical stability and substrate availability generate microenvironmental gradients that further enhance species diversity.

Cymodocea nodosa meadows even if they represent key ecosystems for the conservation of coastal environments, they exhibit a more selective community structure, dominated by species adapted to sedimentation, sandy substrate stability, and coexistence with a deep root system. Despite their apparently lower diversity, these meadows host a specialized fauna with well-defined functional roles, contributing to the overall ecological resilience of the habitat.

A comparative analysis among the different sites, based on the malacological component, was carried out using the Jaccard similarity index, calculated on the presence/absence of species across samples. This index, which is not weighted species by abundance, is suitable for assessing taxonomic overlap between ecological communities and is widely applied in coastal biodiversity studies to describe species distribution patterns and degrees of environmental heterogeneity.

The Jaccard index ranges from 0 to 1, where 0 indicates no similarity and 1 indicates complete identity. The matrix shows low values, between 0 and 0.17, indicating that the biocenoses share few common species and are therefore relatively distinct from each other (for the meaning of acronyms, see Table 1).

	RS	RM	SM	AP	SVMC	Cym.	SFBC
RS	0	0.17	0	0	0	0	0
RM	0.17	0	0	0.11	0	0	0
SM	0	0	0	0	0.03	0	0
AP	0	0.11	0	0	0.03	0.09	0.05
SVMC	0	0	0.03	0.03	0	0.08	0.12
Cym.	0	0	0	0.09	0.08	0	0.07
SFBC	0	0	0	0.05	0.12	0.07	0

Fig. 11 – Heatmap of the Jaccard similarity index among the seven analyzed biocoenoses. Warm tones indicate greater compositional affinity among mollusk communities.

This is best seen by constructing a dendrogram on this Jaccard matrix to highlight the clusters.

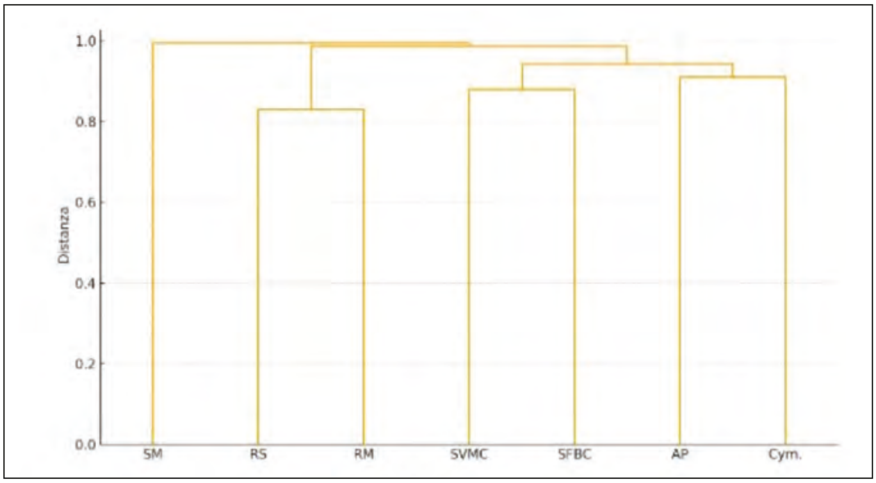

Fig. 12 – Dendrogram showing the relationships among the seven coastal biocenoses based on the Jaccard index (distance = 1 – J).

The dendrogram more clearly illustrates how the biocenoses cluster according to the similarity of molluscan species, with SM being the most distant and RS–RM forming the closest cluster.

- **RM and RS** cluster together, indicating that these two biocenoses share more species than the others; they are therefore ecologically related.
- **AP, SVMC, Cym., and SFBC** tend to form a separate group: although characterized by low similarity, they cluster in a way that reflects greater ecological proximity compared to other environments. Within this group, some pairs (e.g., SVMC–SFBC or AP–Cym.) show closer associations, consistent with shared environmental factors such as mobile or semi-stable substrates and the presence of marine vegetation.
- **SM** remains highly isolated: its distance from the others suggests a community with distinct ecological features.

The highest similarity (0.17) occurs between *Supralittoral rock* and *Mesolittoral rock*, which host species similarly adapted to hard substrates and tidal action, making their close association ecologically consistent.

Although *Muddy sands in sheltered areas* and *Well–Sorted fine sands* are both composed of relatively stable or semi-stable substrates and host species adapted to fine sediments, the Jaccard index between the two communities is nevertheless low (0.12), indicating limited species overlap. This can be explained by the different conditions characterizing the two substrates, such as grain size, compaction, or depth of the oxygenated layer, which influence the ability of species to establish. In addition, the occurrence of muddy sands in more sheltered waters reduces the action of currents, leading to greater availability of organic detritus compared to well-sorted fine sands and thus favoring the development of different communities. Overall, these factors suggest that, despite broadly similar environmental conditions, the two sediment types host rather distinct molluscan communities.

The Jaccard index calculated between *Photophilous algae* communities and *Cymodocea* meadows is very low (0.09), indicating that the two biocenoses share very few species. This result is consistent with the ecological differences between the two environments: photophilous algae develop mainly on hard, well–lit substrates, whereas *Cymodocea* meadows grow on sandy or muddy sediments in more sheltered conditions, which support fewer molluscs capable of adapting to such a specialized habitat. In *Cymodocea* meadows, the malacofauna is in fact constrained by a combination of physical (sediment, oxygen, currents), chemical (salinity, nutrients), and biological (food, predation, competition) factors, and mainly consists of species feeding on the biofilm present on the leaves rather than on the leaves themselves. The low overlap thus reflects the strong specialization of species to different environmental conditions and highlights how each community hosts a characteristic fauna, contributing in a distinct way to coastal biodiversity.

The results obtained with the Jaccard index show low similarity among the seven littoral biocenoses analyzed, with maximum values of 0.17. This indicates that the living mollusc communities are strongly differentiated from each other, likely due to local environmental differences such as substrate type, exposure to wave action, and microhabitat characteristics. From an ecological perspective, these findings highlight how each biocenosis represents a fundamentally distinct unit.

In the southern sector of the study area, an anomalous benthic formation was identified (Fig. 14), consisting of an aggregate of photophilous macroalgae and other organisms usually sessile, including *Spongia officinalis* Linnaeus, 1759 (Demospongiae, Spongiidae) and the tunicate *Ecteinascidia turbinata* Herdman, 1880 (Ascidiacea, Perophoridae). These organisms were found lying on the seabed, at the base of the *Cymodocea nodosa* meadow, but without any stable anchorage to the substrate. The algal component was dominated by *Anadyomene stellata*, accompanied by other photophilous macroalgae. Despite the absence of anchorage, this formation was ecologically active and stable over time, acting as a temporary three-dimensional microhabitat. It is likely that the seagrass fronds functioned as a natural filter, retaining organisms detached from their original location by wave action.

Malacological analysis revealed, in correspondence with this formation, a marked increase in molluscan species richness and abundance compared both to the adjacent *C. nodosa* meadow and to unvegetated areas.

The species observed included taxa typical of mobile substrates as well as epiphytic and algivorous elements, suggesting an attraction and accumulation effect associated with the greater structural complexity of the aggregate. Although transitory, this faunal configuration highlights the possible role of such floating formations as local hotspots of benthic biodiversity, assuming a significant ecotonal value.

Although not formally classifiable as a distinct biocenosis according to the criteria of Pérès and Picard (1964), nor included in the quantitative analysis, the formation was nevertheless documented for its potential contribution to local diversity and to the understanding of malacological spatial dynamics. The species recorded were attributed to their respective reference biocenoses based on their known ecological preferences.

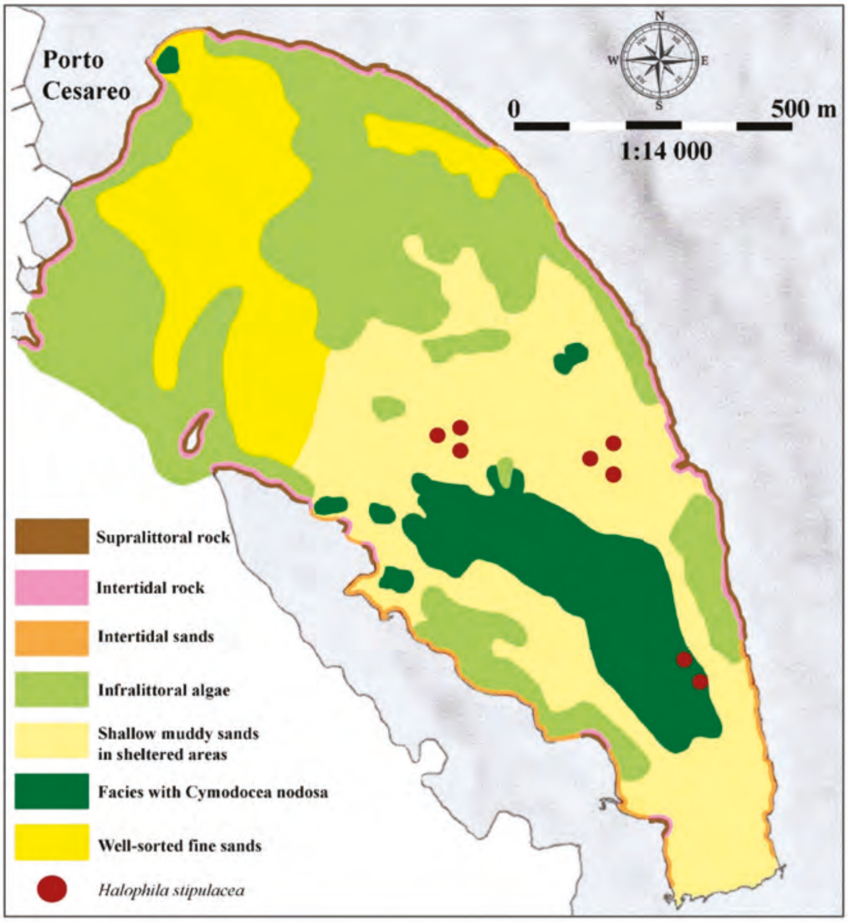

Fig. 13 – Biocenotic map of the La Strea inlet.

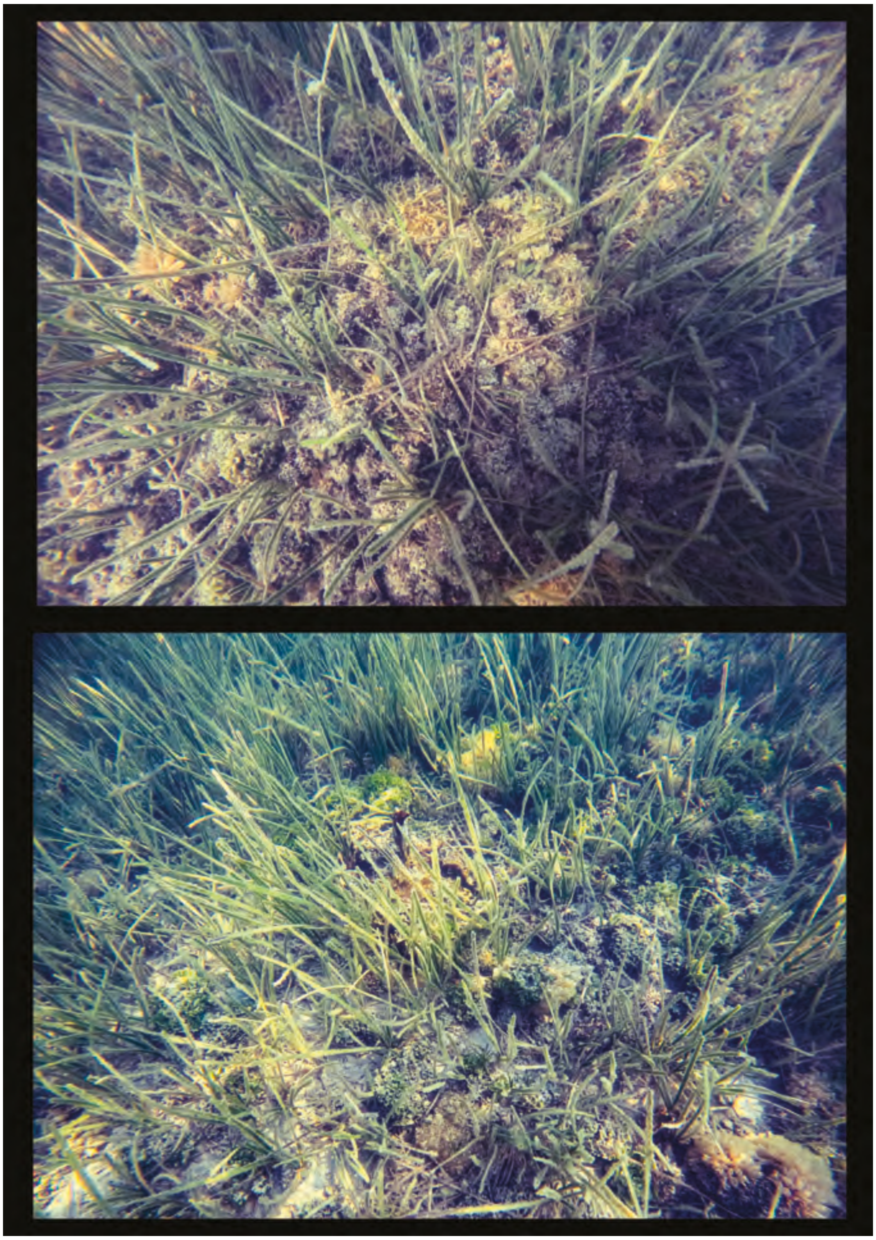

Fig. 14 – Atypical benthic formation in the southern sector of the study area (Ph. Fabio Vitale).

The biocenoses present in the study area may undergo major changes due to the very recent arrival of the seagrass *Halophila stipulacea* (Forsskål) Ascherson (Hydrocharitaceae). Toso and Musco (2023) reported this highly invasive species at various sites in the province of Lecce (Otranto, Santa Maria di Leuca, Gallipoli, Santa Caterina, Torre Uluzzo), but not at Porto Cesareo. Only one year after the above-mentioned article, however, it was recorded in the La Strea inlet, where it has so far colonized in scattered patches, encroaching upon the *Cymodocea nodosa* meadow; Figure 13 presents personal observations; nevertheless, it is highly plausible that this feature is also present at other sites. The species is already abundant in the coastal stretch between Porto Cesareo and Isola Grande, where it has replaced the native *C. nodosa* meadow in the immediate vicinity of the town, and in the bay of "Scinnute", a few hundred meters north of La Strea, where it forms a mixed meadow with the native seagrass.

Halophila stipulacea is generally considered a relatively fast-growing marine plant, and its success has been attributed to its high morphological, physiological, and biochemical plasticity, as well as its ability to spread and adapt to a wide range of environmental conditions (Gambi *et al.*, 2009; Willette and Ambrose, 2009). Furthermore, Wesselmann *et al.* (2020) provided evidence of a higher thermal tolerance of *H. stipulacea* compared to native Mediterranean seagrasses, suggesting that the ongoing increase in seawater temperature in the Mediterranean favors its expansion.

Conte *et al.* (2023), analyzing bacterial communities associated with the native seagrass *C. nodosa* and the alien *H. stipulacea* in the Aegean Sea, provided evidence of the competitive advantage of the latter. On the other hand, although *H. stipulacea* is listed among the worst invasive species (Boudouresque and Verlaque, 2002; Streftaris and Zenetos, 2006), there is still little evidence of its actual impact on native macrophytes in the Mediterranean Sea (Sghaier *et al.*, 2014; Tsirintanis *et al.*, 2022; Conte *et al.*, 2023).

Malacofauna

Once the biocenoses present in the inlet have been identified, the mollusc species recorded in each biocenosis can be assigned to the corresponding unit. A total of 235 species were recorded, comprising 5 Polyplacophora, 159 Gastropoda, 67 Bivalvia, 3 Cephalopoda, and 1 Scaphopoda, as listed in Table 2 and linked to the respective biocenoses in which they were found. The species count also includes beached specimens, as the geomorphological configuration of the study area and the location of sampling sites, situated in the innermost part of the bay, provide reasonable assurance that these individuals originated from nearby biocenoses.

Several studies have previously addressed the malacofauna of the inlet; for completeness, it is appropriate to reference these works and consider their contributions.

In 2012, a checklist of the malacofauna of the La Strea inlet was published (Trono, 2012), incorporating the Author's findings as well as those reported by Parenzan (1984) and Cinelli *et al*. (1988).

Poso *et al*. (2012) revised a substantial portion of Parenzan's collection; their work enabled the correction of several taxonomic misidentifications in Parenzan (1984) and added previously unpublished records from the collection.

Subsequent data on the study area were published by Furfaro *et al*. (2020), focusing on molluscs of the subclass Heterobranchia, Trono and Albano (2020) on the family Cerithiidae and Trono *et al*. (2023), as part of a broader checklist of Salento molluscs. These latter two studies data, along with Trono (2012), concerning species found by the Author, are included in Table 2, standardized and supplemented with new records.

Table 3 lists species reported by other Authors.

The total malacofauna of the inlet comprises 305 species (5 Polyplacophora, 209 Gastropoda, 87 Bivalvia, 3 Cephalopoda, 1 Scaphopoda), representing approximately 27% of the mollusc species recorded for Salento (Trono *et al*., 2023), and reflects the observed biocenotic complexity.

Of particular note is the *Tritia elongata* (Bucquoy, Dautzemberg & Dollfus, 1882) finding (Fig. 15, L and M). Aissaoui *et al*. (2017), in a genetic revision of Nassariidae from the Gulf of Gabès, rediscovered this species in Tunisia and extended its known range to other Mediterranean regions, including Andalusia, Sicily, and Corsica; russo (2021) reported it from the Venice Lagoon. Identification was based exclusively on morphological criteria as outlined by Aissaoui *et al*. (2017). Parenzan (1984) reported *Tritia corniculum* (Olivi, 1792) for La Strea. Since this species has never been personally recorded in the inlet, it is plausible that the specimens may have been *T. elongata*; verification would require examination of Parenzan's collection material. For the time being, *T. corniculum* remains listed in Table 3. With this observation, the species' distribution now includes the Salento area.

Class	Family	Species	Author	Recorded alive	Biocenosis
Polyplacophora	Leptochitonidae	*Lepidopleurus cajetanus*	(Poli, 1791)	X	AP, SVMC
Polyplacophora	Ischnochitonidae	*Ischnochiton rissoi*	(Payraudeau, 1826)	X	AP
Polyplacophora	Acanthochitonidae	*Acanthochitona fascicularis*	(Linnaeus, 1767)	X	AP
Polyplacophora	Tonicellidae	*Lepidochitona caprearum*	(Scacchi, 1836)	X	AP
Polyplacophora	Chitonidae	*Rhyssoplax olivacea*	(Spengler, 1797)	X	AP
Gastropoda	Patellidae	*Patella caerulea*	Linnaeus, 1758	X	RM, RS
Gastropoda	Patellidae	*Patella rustica*	Linnaeus, 1758	X	RM, RS
Gastropoda	Patellidae	*Patella ulyssiponensis*	Gmelin, 1791	X	RM, RS
Gastropoda	Fissurellidae	*Diodora gibberula*	(Lamarck, 1822)		SFBC, SVMC, SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Fissurellidae	*Diodora italica*	(Defrance, 1820)		SFBC
Gastropoda	Fissurellidae	*Emarginula huzardii*	Payraudeau, 1826		Beached material
Gastropoda	Fissurellidae	*Emarginula octaviana*	Coen, 1939		SVMC
Gastropoda	Fissurellidae	*Fissurella nubecula*	(Linnaeus, 1758)		Beached material
Gastropoda	Haliotidae	*Haliotis tuberculata*	Linnaeus, 1758	X	AP
Gastropoda	Trochidae	*Gibbula ardens*	(Salis Marschlins, 1793)	X	AP, SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Trochidae	*Gibbula fanulum*	(Gmelin, 1791)	X	AP
Gastropoda	Trochidae	*Gibbula philberti*	(Récluz, 1843)	X	AP
Gastropoda	Trochidae	*Gibbula racketti*	(Payraudeau, 1826)	X	AP
Gastropoda	Trochidae	*Gibbula turbinoides*	(Deshayes, 1835)	X	AP, SVMC
Gastropoda	Trochidae	*Steromphala adansonii*	(Payraudeau, 1826)	X	AP, SVMC
Gastropoda	Trochidae	*Steromphala adriatica*	(Philippi, 1844)		AP
Gastropoda	Trochidae	*Steromphala divaricata*	(Linnaeus, 1758)	X	RM
Gastropoda	Trochidae	*Steromphala nebulosa*	(Philippi, 1849)	X	AP, SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Trochidae	*Steromphala varia*	(Linnaeus, 1758)		AP
Gastropoda	Trochidae	*Jujubinus exasperatus*	(Pennant, 1777)	X	AP
Gastropoda	Trochidae	*Jujubinus striatus*	(Linnaeus, 1758)	X	AP
Gastropoda	Trochidae	*Phorcus articulatus*	(Lamarck, 1822)	X	RM

Class	Family	Species	Author	Recorded alive	Biocenosis
Gastropoda	Trochidae	*Phorcus richardi*	(Payraudeau, 1826)		RM
Gastropoda	Trochidae	*Phorcus turbinatus*	(von Born, 1778)	X	RM
Gastropoda	Trochidae	*Clanculus corallinus*	(Gmelin, 1791)		Beached material
Gastropoda	Trochidae	*Clanculus cruciatus*	(Linnaeus, 1758)	X	AP
Gastropoda	Trochidae	*Clanculus jussieui*	(Payraudeau, 1826)	X	AP, SVMC
Gastropoda	Trochidae	*Calliostoma conulus*	(Linnaeus, 1758)		SFBC
Gastropoda	Calliostomatidae	*Calliostoma laugieri*	(Payraudeau, 1826)		Beached material
Gastropoda	Collonidae	*Homalopoma sanguineum*	(Linnaeus, 1758)		Beached material
Gastropoda	Phasianellidae	*Tricolia pullus pullus*	(Linnaeus, 1758)		SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Neritidae	*Smaragdia viridis*	(Linnaeus, 1758)	X	AP, SFBC, SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Cerithiidae	*Bittium lacteum*	(Philippi, 1836)		Beached material
Gastropoda	Cerithiidae	*Bittium latreilli*	(Payraudeau, 1826)	X	AP, SFBC
Gastropoda	Cerithiidae	*Bittium reticulatum*	(da Costa, 1778)	X	SFBC, SVMC, SVMC (facies with *Cymodocea nodosa*)
Gastropoda	**Cerithiidae**	***Cerithium scabridum***	**Philippi, 1848**	**X**	**AP**
Gastropoda	Cerithiidae	*Thericium lividulum*	(Risso, 1826)	X	AP, RM, SVMC
Gastropoda	Cerithiidae	*Thericium renovatum*	(Monterosato, 1884)	X	AP
Gastropoda	Cerithiidae	*Thericium repandum*	(Monterosato, 1878)	X	AP, SVMC, RM
Gastropoda	Cerithiidae	*Thericium vulgatum*	(Bruguière, 1792)	X	SFBC, SVMC
Gastropoda	Planaxidae	*Fossarus ambiguus*	(Linnaeus, 1758)		SVMC
Gastropoda	Potamididae	*Pirenella conica*	(de Blainville, 1829)	X	SM, SVMC
Gastropoda	Triphoridae	*Marshallora adversa*	(Montagu, 1803)	X	AP
Gastropoda	Cerithiopsidae	*Dizioniopsis coppolae*	(Aradas, 1870)		SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Cerithiopsidae	*Cerithiopsis tubercularis* complex	(Montagu, 1803)		SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Epitoniidae	*Epitonium clathrus*	(Linnaeus, 1758)		Beached material
Gastropoda	Epitoniidae	*Epitonium spirilla*	(Monterosato, 1890)		Beached material
Gastropoda	Eulimidae	*Parvioris ibizenca*	(F. Nordsieck, 1968)		SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Eulimidae	*Vitreolina cfr. antiflexa*	(Monterosato, 1884)		SVMC

Class	Family	Species	Author	Recorded alive	Biocenosis
Gastropoda	Littorinidae	*Echinolittorina punctata*	(Gmelin, 1791)	X	RS
Gastropoda	Littorinidae	*Melaraphe neritoides*	(Linnaeus, 1758)	X	RS
Gastropoda	Cingulopsidae	*Eatonina cossurae*	(Calcara, 1841)	X	SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Cingulopsidae	*Eatonina pumila*	(Monterosato, 1884)	X	SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Skeneopsidae	*Skeneopsis planorbis*	(O. Fabricius, 1780)	X	SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Rissoidae	*Rissoa decorata*	Philippi, 1846		Beached material
Gastropoda	Rissoidae	*Rissoa lia*	(Monterosato, 1884)	X	SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Rissoidae	*Rissoa membranacea*	(J. Adams, 1800)	X	AP, SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Rissoidae	*Rissoa similis*	Scacchi, 1836	X	AP, SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Rissoidae	*Rissoa variabilis*	(Megerle von Mühlfeld, 1824)	X	SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Rissoidae	*Rissoa violacea*	Desmarest, 1814	X	SVMC, SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Rissoidae	*Alvania cancellata*	(da Costa, 1778)		Beached material
Gastropoda	Rissoidae	*Alvania discors*	(T. Allan, 1818)	X	AP, SFBC, SVMC, SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Rissoidae	*Alvania hirta*	(Monterosato, 1884)		Beached material
Gastropoda	Rissoidae	*Alvania lactea*	(Michaud, 1830)		SFBC, SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Rissoidae	*Alvania lanciae*	(Calcara, 1845)		SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Rissoidae	*Alvania litoralis*	(F. Nordsieck, 1972)	X	SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Rissoidae	*Alvania mamillata*	Risso, 1826	X	AP, SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Rissoidae	*Alvania pagodula*	(Bucquoy, Dautzenberg & Dollfus, 1884)	X	AP, SFBC, SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Rissoidae	*Alvania scabra*	(Philippi, 1844)		SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Rissoidae	*Alvania subcrenulata*	(Bucquoy, Dautzenberg & Dollfus, 1884)		SFBC, SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Rissoidae	*Crisilla semistriata*	(Montagu, 1808)		SVMC (facies with *Cymodocea nodosa*)

Class	Family	Species	Author	Recorded alive	Biocenosis
Gastropoda	Rissoidae	*Manzonia crassa*	(Kanmacher, 1798)		SFBC, SVMC, SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Rissoidae	*Pusillina cfr. marginata*	(Michaud, 1830)	X	AP, SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Rissoidae	*Setia turriculata*	Monterosato, 1884		SFBC, SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Rissoinidae	*Rissoina bruguieri*	(Payraudeau, 1826)		SVMC
Gastropoda	Anabathridae	*Nodulus contortus*	(Jeffreys, 1856)		SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Anabathridae	*Nodulus spiralis*	van der Linden, 1986	X	SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Barleeiidae	*Barleeia unifasciata*	(Montagu, 1803)		SFBC, SVMC, SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Caecidae	*Caecum trachea*	(Montagu, 1803)	X	SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Hydrobiidae	*Hydrobia acuta*	(Draparnaud, 1805)	X	SVMC
Gastropoda	Tornidae	*Tornus subcarinatus*	(Montagu, 1803)	X	SFBC, SVMC, SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Truncatellidae	*Truncatella subcylindrica*	(Linnaeus, 1767)		SVMC, SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Vermetidae	*Thylaeodus semisurrectus*	(Bivona e Bernardi, 1832)		Beached material
Gastropoda	Triviidae	*Trivia mediterranea*	(Risso, 1826)		Beached material
Gastropoda	Cypraeidae	*Luria lurida*	(Linnaeus, 1758)	X	AP, RM
Gastropoda	Naticidae	*Naticarius hebraeus*	(Martyn, 1784)		SFBC
Gastropoda	Naticidae	*Naticarius stercusmuscarum*	(Gmelin, 1791)	X	SFBC
Gastropoda	Naticidae	*Neverita josephinia*	Risso, 1826		SFBC, SVMC
Gastropoda	Naticidae	*Euspira guillemini*	(Payraudeau, 1826)		Beached material
Gastropoda	Naticidae	*Euspira nitida*	(Donovan, 1803)	X	SVMC
Gastropoda	Muricidae	*Bolinus brandaris brandaris*	(Linnaeus, 1758)	X	SFBC
Gastropoda	Muricidae	*Hexaplex trunculus*	(Linnaeus, 1758)	X	AP, SFBC
Gastropoda	Muricidae	*Ocenebra erinaceus*	(Linnaeus, 1758)	X	AP
Gastropoda	Muricidae	*Ocenebra inglaria*	(Crosse, 1865)	X	AP, RM
Gastropoda	Muricidae	*Muricopsis cristata*	(Brocchi, 1814)	X	AP, RM

Class	Family	Species	Author	Recorded alive	Biocenosis
Gastropoda	Muricidae	*Coralliophila meyendorffii*	(Calcara, 1835)		Beached material
Gastropoda	Granulinidae	*Granulina boucheti*	Gofas, 1992		Beached material
Gastropoda	Granulinidae	*Granulina marginata*	(Bivona, 1832)		AP, SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Cystiscidae	*Gibberula miliaria*	(Linnaeus, 1758)	X	SFBC, SVMC, SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Cystiscidae	*Gibberula philippi*	(Monterosato, 1878)	X	AP, SFBC, SVMC, SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Mitridae	*Episcomitra cornicula*	(Linnaeus, 1758)	X	AP, SVMC
Gastropoda	Costellariidae	*Ebenomitra ebenus*	(Lamarck, 1811)	X	AP, RM
Gastropoda	Costellariidae	*Ebenomitra granum*	(Forbes, 1844)	X	SFBC, SVMC, SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Costellariidae	*Ebenomitra tricolor*	(Gmelin, 1791)		SVMC, SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Colubrariidae	*Cumia intertexta*	(Helbling, 1779)		SVMC
Gastropoda	Pisaniidae	*Pisania striata*	(Gmelin, 1791)	X	AP, RM
Gastropoda	Pisaniidae	*Enginella leucozona*	(Philippi, 1843)	X	SFBC, SVMC, SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Pisaniidae	*Aplus dorbignyi*	(Payraudeau, 1826)	X	AP, RM
Gastropoda	Tudiclidae	*Euthria cornea*	(Linnaeus, 1758)	X	AP
Gastropoda	Nassariidae	*Tritia cuvierii*	(Payraudeau, 1826)	X	AP, SFBC, SVMC, SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Nassariidae	*Tritia elongata*	(Bucquoy, Dautzenberg & Dollfus, 1882)	X	AP, SVMC, SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Nassariidae	*Tritia incrassata*	(Stroem, 1768)		SVMC, SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Nassariidae	*Tritia mutabilis*	(Linnaeus, 1758)		SFBC, SVMC
Gastropoda	Nassariidae	*Tritia neritea*	(Linnaeus, 1758)	X	SFBC, SVMC
Gastropoda	Nassariidae	*Tritia nitida*	(Jeffreys, 1867)		Beached material
Gastropoda	Columbellidae	*Columbella rustica*	(Linnaeus, 1758)	X	AP, SVMC
Gastropoda	Columbellidae	*Mitrella scripta*	(Linnaeus, 1758)	X	AP
Gastropoda	Fasciolariidae	*Aptyxis syracusana*	(Linnaeus, 1758)	X	AP, SFBC

Class	Family	Species	Author	Recorded alive	Biocenosis
Gastropoda	Conidae	*Conus ventricosus*	Gmelin, 1791	X	SFBC, SVMC
Gastropoda	Raphitomidae	*Cyrillia linearis*	(Montagu, 1803)		SVMC, SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Raphitomidae	*Raphitoma cfr. densa*	(Monterosato, 1884)		SFBC
Gastropoda	Raphitomidae	*Raphitoma cfr. horrida*	(Monterosato, 1884)		SFBC
Gastropoda	Raphitomidae	*Raphitoma laviae*	(Philippi, 1844)		Beached material
Gastropoda	Raphitomidae	*Raphitoma philberti*	(Recluz, 1843)		SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Raphitomidae	*Raphitoma cfr. spadiana*	Pusateri & Giannuzzi-Savelli, 2012		SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Mangeliidae	*Bela salentina*	Vitale, Trono e Prkic, 2025	X	SVMC, SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Mangeliidae	*Bela zenetouae*	(van Aartsen, 1988)		SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Mangeliidae	*Lyromangelia taeniata*	(Deshayes, 1835)		SVMC
Gastropoda	Mangeliidae	*Mangelia multilineolata*	(Deshayes, 1835)		SFBC, SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Mangeliidae	*Mangelia paciniana*	(Calcara, 1839)		Beached material
Gastropoda	Mangeliidae	*Mangelia striolata*	(Risso, 1826)		SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Mangeliidae	*Mangelia cfr. thapsiae*	(Oberling, 1970)		SVMC
Gastropoda	Mangeliidae	*Mangelia unifasciata*	(Deshayes, 1835)		SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Mangeliidae	*Pseudomangelia vauquelini*	(Payraudeau, 1826)		SVMC
Gastropoda	Mangeliidae	*Smithiella costulata*	(Risso, 1826)		Beached material
Gastropoda	Tofanellidae	*Graphis albida*	(Kanmacher, 1798)		SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Omalogyridae	*Ammonicera fischeriana*	(Monterosato, 1869)	X	AP
Gastropoda	Pyramidellidae	*Odostomia turriculata*	Monterosato, 1869		SVMC, SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Pyramidellidae	*Megastomia conoidea*	(Brocchi, 1814)	X	SVMC, SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Pyramidellidae	*Ividella excavata*	(Philippi, 1836)		SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Pyramidellidae	*Ondina warreni*	(Thompson, 1845)		Beached material
Gastropoda	Pyramidellidae	*Trabecula jeffreysiana*	(Monterosato, 1884)		SVMC (facies with *Cymodocea nodosa*)

Class	Family	Species	Author	Recorded alive	Biocenosis
Gastropoda	Pyramidellidae	*Turbonilla cfr. gradata*	Bucquoy, Dautzenberg & Dollfus, 1883		SVMC
Gastropoda	Pyramidellidae	*Turbonilla lactea*	(Linnaeus, 1758)		SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Pyramidellidae	*Turbonilla pumila*	Seguenza G., 1876		SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Pyramidellidae	*Turbonilla pusilla*	(R. A. Philippi, 1844)		SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Pyramidellidae	*Pyrgostylus striatulus*	(Linnaeus, 1758)		SFBC, SVMC
Gastropoda	Pyramidellidae	*Eulimella acicula*	(Philippi, 1836)		SVMC, SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Ringiculidae	*Ringicula auriculata*	(Menard De La Groye, 1811)		Beached material
Gastropoda	Bullidae	*Bulla striata*	Bruguière, 1792		SFBC
Gastropoda	Retusidae	*Retusa leptoeneilema*	(Brusina, 1866)		SVMC, SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Retusidae	*Retusa truncatula*	(Bruguière, 1792)		SVMC, SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Retusidae	*Retusa umbilicata*	(Montagu, 1803)		SFBC, SVMC (facies with *Cymodocea nodosa*)
Gastropoda	Aplysiidae	*Notarchus punctatus*	Philippi, 1836	X	SVMC
Gastropoda	Siphonariidae	*Williamia gussonii*	(O.G. Costa, 1829)		Beached material
Gastropoda	Trimusculidae	*Trimusculus mammillaris*	(Linnaeus, 1758)		Beached material
Gastropoda	Ellobiidae	*Leucophytia bidentata*	(Montagu, 1808)		SVMC
Gastropoda	Ellobiidae	*Ovatella firmini*	(Payraudeau, 1826)	X	SVMC
Gastropoda	Ellobiidae	*Myosotella myosotis*	(Draparnaud, 1801)	X	SVMC
Bivalvia	Nuculanidae	*Lembulus pellus*	(Linnaeus, 1758)		SVMC (facies with *Cymodocea nodosa*)
Bivalvia	Arcidae	*Arca noae*	(Linnaeus, 1758)	X	AP, SFBC, SVMC
Bivalvia	Arcidae	*Barbatia barbata*	(Linnaeus, 1758)	X	AP
Bivalvia	Noetidae	*Striarca lactea*	(Linnaeus, 1758)	X	AP
Bivalvia	Glycymerididae	*Glycymeris pilosa*	(Linnaeus, 1767)	X	SFBC
Bivalvia	Mytilidae	*Mytilaster minimus*	(Poli, 1795)	X	RM
Bivalvia	Mytilidae	*Mytilaster solidus*	Monterosato, 1883	X	RM
Bivalvia	Mytilidae	*Lithophaga lithophaga*	(Linnaeus, 1758)	X	AP

Class	Family	Species	Author	Recorded alive	Biocenosis
Bivalvia	Mytilidae	*Musculus costulatus*	(Risso, 1826)	X	AP, SVMC, SVMC (facies with *Cymodocea nodosa*)
Bivalvia	Mytilidae	*Mytilus galloprovincialis*	Lamarck, 1819	X	AP
Bivalvia	Modiolidae	*Modiolus barbatus*	(Linnaeus, 1758)	X	AP
Bivalvia	Pinnidae	*Pinna nobilis*	(Linnaeus, 1758)	X	SFBC, SVMC (facies with *Cymodocea nodosa*)
Bivalvia	**Pteriidae**	***Pinctada imbricata radiata***	**(Leach, 1814)**	**X**	**AP**
Bivalvia	Pectinidae	*Flexopecten glaber*	(Linnaeus, 1758)	X	SFBC
Bivalvia	Pectinidae	*Mimachlamys varia*	(Linnaeus, 1758)	X	AP
Bivalvia	Anomiidae	*Anomia ephippium*	(Linnaeus, 1758)	X	AP
Bivalvia	Limidae	*Lima lima*	(Linnaeus, 1758)	X	AP
Bivalvia	Ostracidae	*Ostrea edulis*	Linnaeus, 1758	X	AP
Bivalvia	Ostracidae	*Ostrea stentina*	Payraudeau, 1826	X	AP
Bivalvia	Lucinidae	*Ctena decussata*	(O.G. Costa, 1829)	X	SVMC, SFBC
Bivalvia	Lucinidae	*Loripes orbiculatus*	Poli, 1791	X	SFBC, SVMC, SVMC (facies with *Cymodocea nodosa*)
Bivalvia	Chamidae	*Pseudochama gryphina*	(Lamarck, 1819)		AP
Bivalvia	Lasaeidae	*Lasaea adansoni*	(Gmelin, 1791)		AP
Bivalvia	Lasaeidae	*Bornia sebetia*	(O.G. Costa, 1829)		SVMC
Bivalvia	Carditidae	*Cardita calyculata*	(Linnaeus, 1758)		SVMC, SVMC (facies with *Cymodocea nodosa*)
Bivalvia	Carditidae	*Glans trapezia*	(Linnaeus, 1767)	X	SFBC, SVMC
Bivalvia	Carditidae	*Cardites antiquatus*	(Linnaeus, 1758)		SFBC
Bivalvia	Astartidae	*Goodallia cfr. micalii*	Giribet & Peñas, 1999		SVMC
Bivalvia	Cardiidae	*Acanthocardia paucicostata*	(Sowerby G.B. II, 1841)		Beached material
Bivalvia	Cardiidae	*Acanthocardia tuberculata*	(Linnaeus, 1758)	X	SFBC
Bivalvia	Cardiidae	*Parvicardium exiguum*	(Gmelin, 1791)		Beached material
Bivalvia	Cardiidae	*Parvicardium scriptum*	(Bucquoy, Dautzenberg & Dollfus, 1892)	X	SFBC, SVMC, SVMC (facies with *Cymodocea nodosa*)
Bivalvia	Cardiidae	*Papillicardium papillosum*	(Poli, 1791)		SFBC

Class	Family	Species	Author	Recorded alive	Biocenosis
Bivalvia	Cardiidae	*Laevicardium crassum*	(Gmelin, 1791)		SFBC
Bivalvia	**Cardiidae**	***Fulvia fragilis***	**(Forsskål, 1775)**		**SFBC**
Bivalvia	Cardiidae	*Cerastoderma glaucum*	(Linnaeus, 1758)	X	SVMC
Bivalvia	Mactridae	*Mactra stultorum*	(Linnaeus, 1758)	X	SFBC
Bivalvia	Mactridae	*Spisula subtruncata*	(da Costa, 1778)	X	SFBC, SVMC
Bivalvia	Mesodesmatidae	*Donacilla cornea*	(Poli, 1791)	X	SM, SFBC
Bivalvia	Tellinidae	*Bosemprella incarnata*	(Linnaeus, 1758)	X	SFBC
Bivalvia	Tellinidae	*Peronaea planata*	(Linnaeus, 1758)	X	SFBC
Bivalvia	Tellinidae	*Arcopella balaustina*	(Linnaeus, 1758)	X	SFBC
Bivalvia	Tellinidae	*Gastrana fragilis*	(Linnaeus, 1758)		SVMC (facies with *Cymodocea nodosa*)
Bivalvia	Donacidae	*Donax trunculus*	Linnaeus, 1758		Beached material
Bivalvia	Donacidae	*Donax variegatus*	(Gmelin 1791)		Beached material
Bivalvia	Donacidae	*Donax venustus*	Poli, 1795	X	SVMC
Bivalvia	Psammobiidae	*Gari depressa*	(Pennant, 1777)	X	SVMC
Bivalvia	Psammobiidae	*Gari fervensis*	(Gmelin, 1791)		Beached material
Bivalvia	Semelidae	*Abra alba*	(Wood W., 1802)		SVMC
Bivalvia	Semelidae	*Abra tenuis*	(Montagu, 1803)		SVMC
Bivalvia	Semelidae	*Scrobicularia lactea*	(Lamarck, 1818)	X	SVMC
Bivalvia	Solecurtidae	*Solecurtus strigilatus*	(Linnaeus, 1758)	X	SVMC
Bivalvia	Neoleptonidae	*Neolepton sulcatulum*	(Jeffreys, 1859)		SVMC (facies with *Cymodocea nodosa*)
Bivalvia	Veneridae	*Venus verrucosa*	Linnaeus, 1758	X	SFBC
Bivalvia	Veneridae	*Gouldia minima*	(Montagu, 1803)		SFBC
Bivalvia	Veneridae	*Chamelea gallina*	(Linnaeus, 1758)	X	SFBC, SVMC
Bivalvia	Veneridae	*Callista chione*	(Linnaeus, 1758)	X	SFBC, SVMC
Bivalvia	Veneridae	*Polititapes aureus*	(Gmelin, 1791)	X	SFBC, SVMC
Bivalvia	Veneridae	*Ruditapes decussatus*	(Linnaeus, 1758)	X	SFBC, SVMC
Bivalvia	Veneridae	*Irus irus*	(Linnaeus, 1758)		SFBC, SVMC
Bivalvia	Veneridae	*Dosinia exoleta*	(Linnaeus, 1758)	X	SFBC
Bivalvia	Veneridae	*Dosinia lupinus*	(Linnaeus, 1758)	X	SFBC

Class	Family	Species	Author	Recorded alive	Biocenosis
Bivalvia	Petricolidae	*Lajonkairia lajonkairii*	(Payraudeau, 1826)		Beached material
Bivalvia	Petricolidae	*Petricola lithophaga*	(Retzius, 1786)		Beached material
Bivalvia	Corbulidae	*Varicorbula gibba*	(Olivi, 1792)	X	SFBC, <u>SVMC</u>
Bivalvia	Hiatellidae	*Hiatella arctica*	(Linnaeus, 1767)	X	<u>AP</u>
Bivalvia	Thraciidae	*Thracia cfr. phaseolina*	(Lamarck, 1818)		SFBC
Scaphopoda	Dentaliidae	*Antalis vulgaris*	(da Costa, 1778)		SFBC
Cephalopoda	Sepiidae	*Sepia officinalis*	Linnaeus, 1758	X	Observed in situ
Cephalopoda	Loliginidae	*Loligo vulgaris*	Lamarck, 1798	X	Observed in situ
Cephalopoda	Octopodidae	*Octopus vulgaris*	Cuvier, 1798	X	Observed in situ

Tab. 2 – Species recorded in the La Strea Inlet and associated biocoenoses; the underlined character designates the biocenosis in which the specimens were recovered in a living state; NIS are highlighted in bold.

Class	Family	Species	Author	Reference
Gastropoda	Trochidae	*Gibbula guttadauri*	(R. A. Philippi, 1836)	1
Gastropoda	Turbinidae	*Bolma rugosa*	(Linnaeus, 1767)	1
Gastropoda	Phasianellidae	*Tricolia tenuis*	(Michaud, 1829)	2
Gastropoda	Triphoridae	*Monophorus perversus*	(Linnaeus, 1758)	1
Gastropoda	Cerithiopsidae	*Cerithiopsis minima*	(Brusina, 1865)	2
Gastropoda	Epitoniidae	*Gyroscala commutata*	(Monterosato, 1877)	1
Gastropoda	Rissoidae	*Rissoa guerini*	Récluz, 1843	1
Gastropoda	Rissoidae	*Rissoa ventricosa*	Desmarest, 1814	4
Gastropoda	Rissoidae	*Alvania cimex*	(Linnaeus, 1758)	1
Gastropoda	Caecidae	*Caecum auriculatum*	De Folin, 1868	2
Gastropoda	Vermetidae	*Thylacodes arenarius*	(Linnaeus, 1758)	1
Gastropoda	Vermetidae	*Petaloconchus glomeratus*	(Linnaeus, 1758)	1
Gastropoda	Vermetidae	*Vermetus granulatus*	(Gravenhorst, 1831)	1
Gastropoda	Naticidae	*Tectonatica rizzae*	(Philippi, 1844)	2
Gastropoda	Muricidae	*Dermomurex scalaroides*	(de Blainville, 1829)	1
Gastropoda	Muricidae	*Ocinebrina aciculata*	(Lamarck, 1822)	1
Gastropoda	Muricidae	*Orania fusulus*	(Brocchi, 1814)	1
Gastropoda	Marginellidae	*Volvarina mitrella*	(Risso, 1826)	1
Gastropoda	Nassariidae	*Tritia corniculum*	(Olivi, 1792)	1
Gastropoda	Nassariidae	*Tritia pellucida*	Risso, 1826	4
Gastropoda	Nassariidae	*Tritia unifasciata*	(Kiener, 1835)	1
Gastropoda	Fasciolariidae	*Tarantinaea lignaria*	(Linnaeus, 1758)	1
Gastropoda	Horaiclavidae	*Haedropleura septangularis*	(Montagu, 1803)	1
Gastropoda	Raphitomidae	*Leufroyia concinna*	(Scacchi, 1836)	2
Gastropoda	Raphitomidae	*Raphitoma echinata*	(Brocchi, 1814)	1
Gastropoda	Mangeliidae	*Bela menkhorsti*	van Aartsen, 1988	1,2
Gastropoda	Mangeliidae	*Bela zonata*	(Locard, 1891)	2
Gastropoda	Pyramidellidae	*Turbonilla acuta*	(Donovan, 1804)	1
Gastropoda	Pyramidellidae	*Turbonilla sinuosa*	(Jeffreys, 1884)	4
Gastropoda	Acteonidae	*Acteon tornatilis*	(Linnaeus, 1758)	1
Gastropoda	Ringiculidae	*Ringicula conformis*	Monterosato, 1877	1
Gastropoda	Retusidae	*Retusa mammillata*	(Philippi, 1836)	2
Gastropoda	Rhizoridae	*Volvulella acuminata*	(Bruguière, 1792)	2
Gastropoda	Goniodorididae	*Okenia problematica*	Pola M., Paz-Sedano S., Macali A., Minchin D., Marchini A. & Vitale F., 2019	3
Gastropoda	Discodorididae	*Peltodoris atromaculata*	Bergh, 1880	3
Gastropoda	Discodorididae	*Peltodoris sordii*	Perrone, 1990	6
Gastropoda	Coryphellidae	*Fjordia lineata*	(Lovén, 1846)	3
Gastropoda	**Tethydidae**	***Melibe viridis***	**(Kelaart, 1858)**	**5**
Gastropoda	Flabellinidae	*Edmundsella pedata*	(Montagu, 181)	3
Gastropoda	Flabellinidae	*Flabellina affinis*	(Gmelin, 1791)	3
Gastropoda	Facelinidae	*Cratena peregrina*	(Gmelin, 1791)	3

Class	Family	Species	Author	Reference
Gastropoda	Aplysiidae	*Aplysia sp.*		1
Gastropoda	**Aplysiidae**	***Aplysia dactylomela***	**Rang, 1828**	**5**
Gastropoda	Aplysiidae	*Aplysia depilans*	Gmelin, 1791	3
Gastropoda	Aplysiidae	*Aplysia fasciata*	Poiret, 1789	3
Gastropoda	Aplysiidae	*Aplysia parvula*	Mörch, 1863	3
Gastropoda	Aplysiidae	*Aplysia punctata*	(Cuvier, 1803)	3
Gastropoda	**Aplysiidae**	***Bursatella leachii***	**Blainville, 1817**	**5**
Gastropoda	Plakobranchidae	*Elysia timida*	(Risso, 1818)	3
Gastropoda	Plakobranchidae	*Thuridilla hopei*	(Vérany, 1853)	3
Bivalvia	Nuculidae	*Nucula hanleyi*	Winckworth, 1931	4
Bivalvia	Nuculidae	*Nucula nucleus*	(Linnaeus, 1758)	1
Bivalvia	Mytilidae	*Musculus subpictus*	(Cantraine 1835)	4
Bivalvia	Limidae	*Limaria tuberculata*	(Olivi, 1792)	1
Bivalvia	Lucinidae	*Lucinella divaricata*	(Linnaeus, 1758)	1,2
Bivalvia	Lasaeidae	*Hemilepton nitidum*	(Turton, 1822)	2
Bivalvia	Lasaeidae	*Kellia suborbicularis*	(Montagu, 1803)	2
Bivalvia	Lasaeidae	*Kurtiella bidentata*	(Montagu, 1803)	2
Bivalvia	Lasaeidae	*Tellimya ferruginosa*	(Montagu, 1808)	2
Bivalvia	Astartidae	*Goodallia triangularis*	(Montagu, 1803)	2
Bivalvia	Cardiidae	*Parvicardium minimum*	(Philippi, 1836)	2
Bivalvia	Tellinidae	*Fabulina fabula*	(Gmelin, 1791)	1
Bivalvia	Tellinidae	*Macomangulus tenuis*	(da Costa, 1778)	1
Bivalvia	Tellinidae	*Moerella distorta*	(Poli, 1791)	2
Bivalvia	Tellinidae	*Moerella donacina*	(Linnaeus, 1758)	2
Bivalvia	Tellinidae	*Moerella pulchella*	(Lamarck, 1818)	4
Bivalvia	Donacidae	*Donax semistriatus*	Poli, 1795	1
Bivalvia	Veneridae	*Venerupis corrugata*	(Gmelin, 1791)	1
Bivalvia	Veneridae	*Pitar rudis*	(Poli, 1795)	4
Bivalvia	Petricolidae	*Mysia undata*	(Pennant, 1777)	1

Tab. 3 – Species recorded in the La Strea Inlet by other Authors. 1: Parenzan, 1984, 2: Cinelli *et al.*, 1988, 3: Furfaro *et al.*, 2020, 4: Parenzan Collection (Poso *et al.*, 2012); 5: Mancini and Langeneck (Pers. Com.); 6: Perrone, 1990. NIS are highlighted in bold.

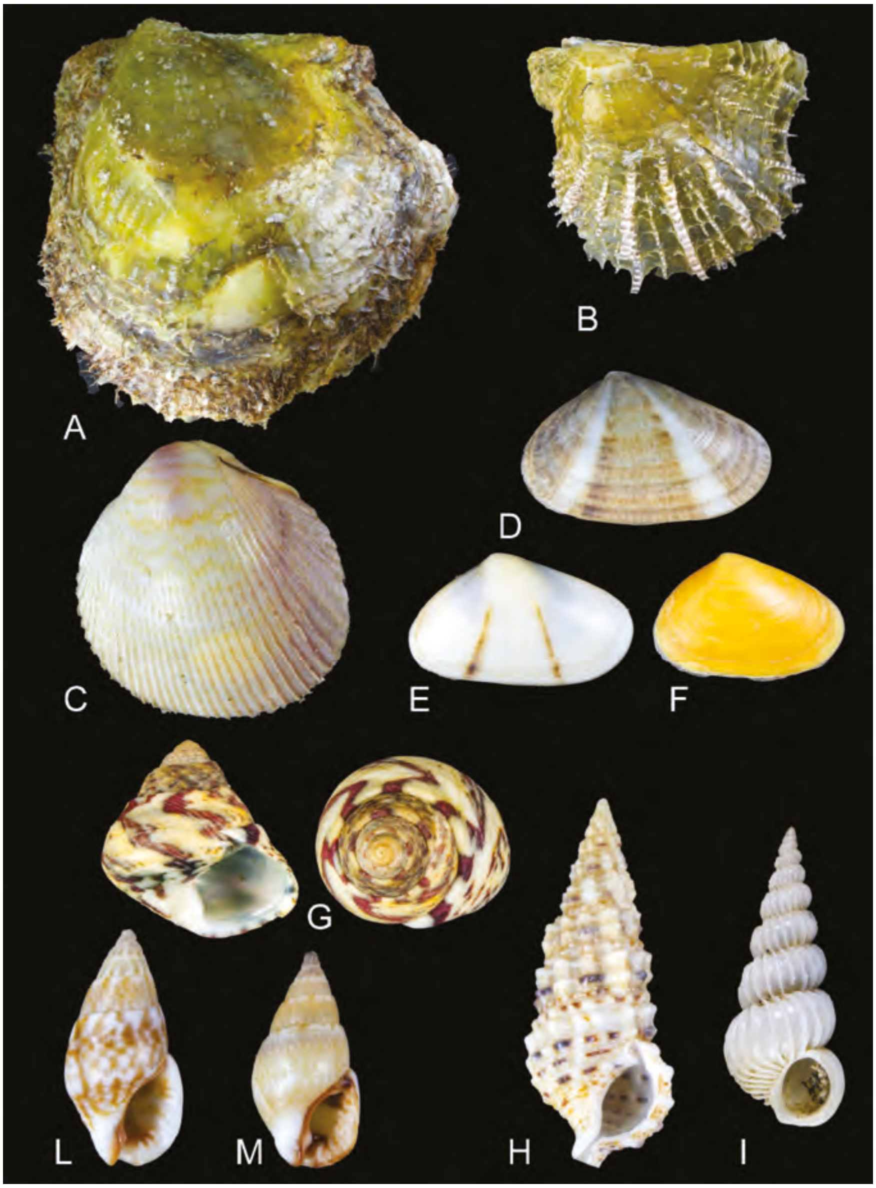

Fig. 15 – A. *Pinctada imbricata radiata*, H = 79 mm; B. *Pinctada imbricata radiata*, juvenile specimen, H = 36 mm; C. *Fulvia fragilis*, H = 33 mm; D. *Donacilla cornea*, L = 24 mm; E. *Donacilla cornea*, L = 23 mm; F. *Donacilla cornea*, L = 20 mm; G. *Phorcus articulatus*, H = 14 mm; H. *Cerithium scabridum*, H = 18 mm; I. *Epitonium spirilla*, H = 6 mm, L. *Tritia elongata*, H = 9 mm; M. *Tritia cfr. elongata*, H = 8 mm.

CONCLUSIONS

The literature review and fieldwork conducted allowed for the identification and mapping of the biocenoses present in the study area on a biocenotic chart. Six main biocenoses and one facies were recognized, a notably high number considering the limited spatial extent and the significant anthropogenic pressure characterizing the area. This latter factor currently prevents the implementation of more stringent conservation measures. Nonetheless, full compliance with existing regulations could still ensure effective protection of the inlet's biological communities.

Statistical analyses revealed low similarity among the investigated biocenoses, suggesting that mollusc communities are relatively distinct. This differentiation is likely driven by local environmental variables such as substrate type, wave exposure, and microhabitat conditions. From an ecological perspective, this implies that each biocenosis represents a substantially discrete unit.

Trono (2012) emphasized the need to establish a baseline for long-term monitoring of the effectiveness of conservation measures on the mollusc populations within the area. Thirteen years after that initial census, a preliminary assessment can now be attempted. No decline in biodiversity has been observed; on the contrary, further research during this period has expanded the list of recorded species and documented the arrival of three non-indigenous species (NIS) belonging to the phylum Mollusca: *Cerithium scabridum* Philippi, 1848, *Pinctada imbricata radiata* (Leach, 1814), and *Fulvia fragilis* (Forsskål in Niebuhr, 1775). Additional NIS have also been recorded, including the previously mentioned seagrass *Halophila stipulacea* and the decapod crustacean *Callinectes sapidus* Rathbun, 1896 (Malacostraca, Portunidae). Recent sampling campaigns conducted by the University of Salento have led to the detection of a significant number of non-indigenous and cryptogenic species, ten and six respectively, belonging to the phyla Mollusca, Crustacea, Arthropoda, and Bryozoa (Mancini and Langeneck, *pers. comm.*).

The high occurrence of NIS within a relatively confined area may be attributed to the protected nature of the site. Although not formally classified as a lagoonal environment, the area exhibits semi-isolated conditions that can facilitate the establishment of new species. The presence of marinas for recreational boating represents a potential vector for introduction, promoting the passive transport of propagules via hull fouling or bilge water discharge. These factors are compounded by the possible absence, or inefficacy, of natural predators in the new environment, a condition that reduces trophic pressure and may favor the proliferation of NIS (Torchin *et al.*, 2003).

Biological invasions represent a significant threat to native ecosystems, with consequences that may manifest at genetic, population, ecosystem, and economic levels (Ruiz *et al.*, 1997).

Biotic invasion is often followed by competition for resources, including direct interference between alien and native species. Native species may be partially or entirely displaced by their invasive counterparts.

In the present case, at least with regard to the non-native molluscs established in the inlet, none appear to have significantly interfered with native species. A different scenario may apply to *Halophila stipulacea*, which is rapidly colonizing new stretches of seabed. However, as previously noted, there is limited evidence of its negative impact on native macrophytes in the Mediterranean Sea (Sghaier *et al*., 2014; Tsirintanis *et al*., 2022; Conte *et al*., 2023). It would therefore be advisable to establish a long-term monitoring program to assess the potential impact of the ongoing spread of *H. stipulacea* on the local biota.

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