



BENTHIC MACROFAUNA OF *POSIDONIA OCEANICA* MEADOWS IN THE ALBANIAN COAST.

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Key words:

Benthic macrofauna,
Posidonia oceanica,
Adriatic Sea,
Ionian Sea,
Albania

SYNOPSIS

Benthic macrofauna of *Posidonia oceanica* meadows in the Albanian coast, at the Adriatic Sea and Ionian Sea has been analyzed, mostly within the framework of the ecological and environmental assessments of *Posidonia* meadows during 2005 - 2007. In 10 surveyed sites, a total of 188 taxa of benthic macrofauna have been identified, including sponges, cnidarians, bryozoans, mollusks, annelids, crustaceans, echinoderms and ascidians. 56 taxa are reported for the first time for Albania, of which, 51 are mollusks from only one site, Saranda Bay. Relative comparisons of species richness and abundance have been made between studied areas, as well as abundance between the most common species of benthic macrofauna. Species richness and abundance of benthic macrofauna resulted to be linked to the environmental state and characteristics of the *Posidonia* meadow. These quantitative characteristics had higher values in the meadows with the highest bed cover, density and depth of the lower limit, such as in Stillo Cape, Kakomea Bay, Lukova and Rodoni Cape. In the highly degraded meadows, with small density and bed cover, it was recorded a low species richness and abundance, such as in Ceka (Durrës), Ksamili islands, eastern coast of Karaburun Peninsula and central part of Saranda Bay.

INTRODUCTION

Knowledge on meadows of *Posidonia oceanica* in Albania is relatively limited, due to the limited existing studies on marine benthic habitats and marine biodiversity

in general. However, in the recent years there is an increasing interest, as well as professional and technical capacities for the study of these very important habitats of marine ecosystem in Albania.

One of the multiple values of *Posidonia* meadows is related to their faunistic richness. Among the high diversity of these meadows, benthic macrofauna and mainly invertebrates represent a very important part of species richness and biomass (CINELLI ET AL., 1995).

The very few existing data on benthic macrofauna of *Posidonia* meadows in Albania have been gathered within the framework of a project related to inventory of coastal and *Posidonia* habitats in Albania, carried out in 2005. The preliminary results of this inventory have been published by BEQIRAJ & KASHTA 2007, listing 78 species in total, which have been defined as the most common species in *Posidonia* meadows in Albania.



Figure 1. Map of Albania with the sampling sites: 1-Rodoni Cape, 2-Porto Romano, 3-Ceka (Durrës), 4-Saint Vasil, 5-Raguze, 6-Lukova, 7-Kakomea, 8-Ksamili islands, 9-Stillo Cape, 10-Saranda Bay

The present paper is based on further elaborated results and gives important additional data, collected in 2007, which are reported for the first time on benthic macrofauna of Saranda Bay. From 140 species found in Saranda Bay, 113 are reported for the first time as species of *Posidonia* meadows in Albania.

Besides species composition, in this paper are also given assessments of species abundance of benthic macrofauna in *Posidonia* meadows. Species

composition and abundance are also commented in relation with the state and characteristics of the meadows themselves, in each study area, taking into account the bed cover, shoots density, upper depth limit and lowest depth limit of the meadow. Comparative assessments of species richness and abundance have been done between studied areas, as well as abundance between the most common species of benthic macrofauna of *Posidonia* meadows.

MATERIAL AND METHODS

Survey and inventory of the meadows of *Posidonia oceanica* have been carried out along the whole Albanian coast, from Velipoja in the north (close to Montenegro) to Stillo Cape in the south (close to Greece). Benthic macrofauna of *Posidonia* meadows has been sampled in 10 sites, which are pointed in the figure 1. For nine sites sampling was carried out during June - July 2005, while for one site, Saranda Bay, a particular and more detailed study has been done in February – March 2007. There were 23 sampling points within Saranda Bay, however, its benthic community is considered and analyzed as a single site in this paper.



Figure 2. Sampling with Ekman grab in Saranda

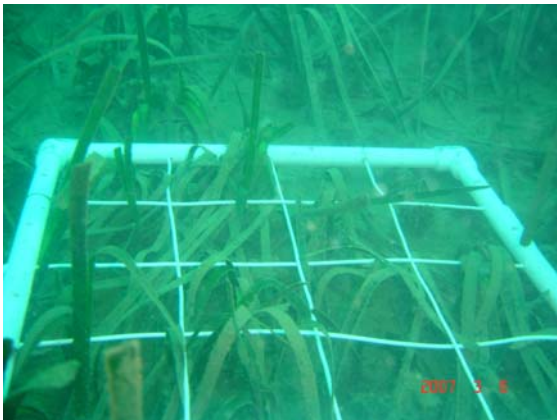


Figure 3. Sampling on *Posidonia* in Saranda. (photos: S. Beqiraj & L. Kashta)

The survey has been done on the board of a fishing boat. Besides preliminary aerial observations and visual examinations from the boat, a Ekman grab has been used to verify the presence of *Posidonia* meadows. When this presence has been verified, the sampling of *Posidonia* and its benthic macrofauna has been done by direct (scuba) diving. Study methods were based in the bibliographic references of BIANCHI *et al.*, 1991; CINELLI *et al.*, 1995; GIRAUD, 1977; MAZZELLA *et al.*, 1986 and MEINESZ & LAURENT, 1978.

In *Posidonia* meadows it has been assessed the bed cover (in percentage), shoots density (nr. shoots/m²), upper depth limit and lowest depth limit of the meadow. Biometric and lepidochronological analysis have been done, too, in order to assess leaves production and rhizomes growth rate.

Sampling of benthic macrofauna has been done by collecting the animals within a standard frame 40 cm x 40 cm on *Posidonia* leaves, rhizomes and their attached sediment. The collected samples have been preliminary sieved through a 0,5 mm mesh size sieve on board and preserved in 5% formalin and transported to the laboratory for the analysis (species identification and quantitative assessments). Video recordings and underwater photos have been also taken in many sites, in order to have additional data for the description of benthic habitats.

Benthic animals have been identified up to the lowest possible taxa. The main literature, which has been used for the identification and classification, consisted in publications (monographs, atlases, specific papers etc.) on macrozoobenthos of the Mediterranean Sea, as cited in the bibliography (BIANCHI *et al.* 1995; COSSIGNANI 1992; D'ANGELO & GARGIULLO 1991; GIANNUZZI-SAVELLI *et al.* 2003; LUTHER & FIEDLER 1988; MOJETA & GHISOTI 2000; RIEDL 1991).

Simple evaluation of the constancy (K) has been done for the assessment of species presence (after PEJA 1996) in Saranda Bay. Based on the value of constancy, a classification of species in 3 groups has been done: constant species (K > 50%), associating species (25% < K < 55%) and occasional species (K < 25%).

RESULTS AND DISCUSSIONS

A total of 188 taxa of macrobenthic animals has been found from the survey of *Posidonia oceanica* meadows in the Albanian coast (see Annex 1). The expected number of species should be much higher, taking into account that this is only the beginning of the study of *Posidonia* meadows and their benthic macrofauna in Albania, and the fact that the species number reported from different areas of Mediterranean is much higher, as it has been published in BOERO 1981; MEINESZ & LAURENT 1978; PEREIRA 1981; RUSSO & TERLIZZI 1998; TERLIZZI & RUSSO 1995; TERLIZZI & RUSSO 1996; VERLAQUE 1981.

In some cases, especially for polychaetes and few crustaceans, the identification remained at family level. If it would have been possible to make the identification up to species level in all cases, of course, the number of taxa should increase.



Figure 4. Foraminifer *Miniacina miniacea*, bivalve *Arcopagia balaustina* and cirriped *Scalpellum scalpellum* from Saranda Bay (photos: S. Beqiraj)

At the other side, it should be considered that Albanian coast has been under a very strong human impact during two last decades. Damages of natural habitats and high level of pollution in coastal and marine waters is a sharp environmental problem for Albania, as constantly stated from different reports and documents (TROENDLE 2002). This situation may be another potential reason for the low species number and abundance of benthic macrofauna in *Posidonia* meadows and for the unfavorable state of *Posidonia* itself in some coastal areas of Albania, as it is commented later in this paper.

From the 188 reported taxa, 1 is foraminifer, 13 sponges, 5 cnidarians, 1 polyplacophoran, 73 gastropods, 47 bivalves, 4 scaphopods, 12 polychaetes, 7 crustaceans, 9 bryozoans, 12 echinoderms, 4 ascidians (see the full list in Annex 1). From the preliminary data, published by Beqiraj & Kashta (2007), where 78 taxa have been listed, 73 of them are also listed in the Annex 1 (marked with +), excluding 4 fish species and the gastropod *Jujubinus depictus*, which is corrected by the authors themselves in this paper, as a synonym of *Jujubinus striatus* (after CLEMAM Taxonomic Database on European Marine Mollusca). The other 114 taxa, (in the Annex 1) are published here for the first time as macrofauna of *Posidonia* meadows in Albania, and almost all of them belong to Saranda Bay, from the sampling of 2007.

Mollusks are the dominant group in the aspect of species number, with 125 species, or 66% of the total number of taxa. Among them, gastropods have the highest species number, which is 58% of all reported mollusks and 38% of all reported taxa of macrobenthic animals in *Posidonia* meadows in Albanian coast.

The other groups have a relatively low species number, which was slightly higher for sponges, polychaetes and echinoderms. The foraminifer *Miniacina miniacea*, although a protozoan, is listed here with the macrofauna, since it is a colonial form, with a length up to 1 cm, which has a high presence and abundance in *Posidonia* meadows in the Albanian coast.

In this paper 56 taxa are reported for the first time for Albania (see table 1). 51 of these taxa are mollusks, 3 polychaetes, 1 isopod and 1 bryozoan.

Among the 31 gastropod mollusks reported for the first time, the highest species number belong to rissoids (*Alvania*, *Rissoa*, *Pusillina*) with 7 species, conids (*Comarmondia*, *Mangelia*, *Raphitoma*) with 6 species, naticids (*Euspira*) with 3 species and pyramidellids (*Eulimella*, *Odostomia*, *Turbonilla*) with 3 species.

Among 17 bivalve species reported for the first time for Albania, venerids (*Timoclea*, *Pitar*) with 3 species have the highest number, while the other families are presented mostly with only one species and rarely 2 species.

Other mollusks are 3 scaphopods (*A. inaequicostata*, *A. panorma* and *F. rubescens*). From polychaetes, *Ch. variopedatus*, Fam. Pectinaridae and Sub. Fam. Eusyllinae are reported for the first time for Albania. The isopod crustacean *C. borealis* and the bryozoan *H. foliacea* are also reported for the first time.

There is an evident difference between the Adriatic coast and the Ionian coast in respect with the state of *Posidonia* meadows and its benthic macrofauna. After KASHTA et al., 2007, *Posidonia oceanica* beds in the Adriatic coast of Albania are rare and isolated mainly in Rodoni Cape, Porto Romano and Vlora Bay; while along the Ionian coast from south-west Karaburuni Peninsula to southern Albanian border (Stillo Cape) its state is considered as normal, referring to their density, leaves production and rhizome growth rate.

At the Adriatic coast, *Posidonia* meadows are in the best state in Rodoni Cape (site 1), with the bed cover 50%, density 1200 shoots/m² and lowest depth limit 20 m. Going toward south, in Durresi area, in the site 2 - Porto Romano, there is a degraded meadow with bed cover 40%, density 60 shoots/m² and lowest depth limit 15 m. In the next site, Durresi Ceka, almost only "matte morte" was present, with very rare shoots of *Posidonia* at 15 m depth. In two southern sites of the Adriatic coast, Saint Vasil and Raguza (sites 4 and 5) *Posidonia* meadows are very fragmented. Rare patches of *Posidonia* were presented in shallow water, up to 3 m depth, then there is "matte morte" up to 6 m depth, and the fragmented meadow has been found at 6 – 15 m depth, with a bed cover 50%, density 70 shoots/m² and lowest depth limit 15 - 18 m.

In these meadows of the Adriatic coast, macrobenthic fauna was relatively poor in species richness and abundance. The most common and abundant species were sponges *A. canabina*, *A. oroides*, *S. cunctatrix*, *S. officinalis*, *Cacospongia* sp., *P. ficiformis* and *D. avara*; hydrozoan *Aglaophenia* sp.; bryozoans *E. posidoniae*, *S. beaniana*, *M. truncata*, *S. cervicornis* and *Membranipora* sp.; polyplacophoran *Ch. olivaceus*; gastropods *C. cruciatus*, *C. corallinus*, *H. sanguineum*, *J. exasperatus*, *J. striatus*, *C. conulus*, *B. rugosa*, *T. tenuis*, *T. pullus*, *B. reticulatum*, *C. vulgatum*, *H. trunculus*, *M. scripta*, *C. rustica*, *N. incrassatus* and *H. tricolor*; bivalves *A. balaustina* *P. papillosum* and *V. verrucosa*; polychaete species of Nereidae and Eunicidae; holothurian *H. tubulosa* and ascidian *H. papillosa* (see Annex 1 for the full name of species).

Table 1. List of macrobenthic animals, reported for the first time for Albania.

MOLLUSCA, GASTROPODA	MOLLUSCA, BIVALVIA
<i>Emarginula octaviana</i> Coen, 1939	<i>Nucula sulcata</i> Bronn, 1831
<i>Smaragdia viridis</i> (Linnaeus, 1758)	<i>Nucula nucleus</i> (Linnaeus, 1758)
<i>Cerithiopsis</i> sp.	<i>Nuculana pella</i> (Linnaeus, 1758)
<i>Vitreolina antiflexa</i> Monterosato 1884	<i>Striarca lactea</i> (Linnaeus, 1758)
<i>Melanella polita</i> (Linnaeus, 1758)	<i>Musculus costulatus</i> (Risso, 1826)
<i>Alvania discors</i> (Allan, 1818)	<i>Lissopecten hyalinus</i> (Poli, 1795)
<i>Alvania hirta</i> (Monterosato 1884)	<i>Myrtea spinifera</i> (Montagu, 1803)
<i>Alvania hispidula</i> (Monterosato 1884)	<i>Diplodonta rotundata</i> (Montagu, 1803)
<i>Pusillina philippi</i> (Aradas & Maggiore, 1844)	<i>Glans trapezia</i> (Linnaeus, 1767)
<i>Rissoa monodonta</i> Philippi, 1836	<i>Lutraria lutraria</i> (Linnaeus, 1758)
<i>Rissoa violacea</i> Desmarest, 1814	<i>Arcopagia crassa</i> (Pennant, 1777)
<i>Rissoina bruguieri</i> (Payraudeau, 1826)	<i>Abra alba</i> (Wood W. 1802)
<i>Calyptrea chinensis</i> (Linnaeus, 1758)	<i>Timoclea ovata</i> (Pennant, 1777)
<i>Crepidula unguiformis</i> Lamarck, 1822	<i>Pitar mediterranea</i> (Dautzenberg, 1891)
<i>Trivia multilirata</i> (Sowerby G. B. II 1870)	<i>Pitar rudis</i> (Poli, 1795)
<i>Euspira catena</i> (da Costa, 1778)	<i>Mysia undata</i> (Pennant, 1777)
<i>Euspira guillemini</i> (Payraudeau, 1826)	<i>Hiatella rugosa</i> (Linnaeus, 1767)
<i>Euspira pulchella</i> (Risso, 1826)	MOLLUSCA, SCAPHOPODA
<i>Trophonopsis muricatus</i> (Montagu, 1803)	<i>Antalis inaequicostata</i> (Dautzenberg, 1891)
<i>Granulina marginata</i> (Bivona Ant. 1832)	<i>Antalis panorma</i> (Chenu, 1843)
<i>Volvarina mitrella</i> (Risso, 1826)	<i>Fustiaria rubescens</i> (Deshayes, 1825)
<i>Vexillum tricolor</i> (Gmelin, 1791)	ANNELIDA, POLYCHAETA
<i>Comarmondia gracilis</i> (Montagu, 1803)	<i>Chaetopterus variopedatus</i> (Renier, 1804)
<i>Mangelia attenuata</i> (Montagu, 1803)	Pectinaridae
<i>Mangelia nuperrima</i> (Tiberi, 1855)	Eusyllinae
<i>Mangelia paciniana</i> (Calcara, 1839)	CRUSTACEA, ISOPODA
<i>Mangelia vauquelini</i> (Payraudeau, 1826)	<i>Cirolana borealis</i> Lilljeborg, 1851
<i>Raphitoma</i> sp.	BRYOZOA, CHEILOSTOMATA
<i>Eulimella scillae</i> (Scacchi, 1835)	<i>Hippodiplosia foliacea</i> Solander, 1876
<i>Odostomia conoidea</i> (Brocchi, 1814)	
<i>Turbonilla rufa</i> (Philippi, 1836)	

A different situation has been recorded at the Ionian coast. For most of the surveyed sites (excluding Saranda Bay, which is commented separately later in this paper) Posidonia meadows had a good state, with the maximal bed cover 90% in Lukova (site 6), maximal density 1400 shoots/m² in Lukova (site 6) and Ksamil (site 8) and maximal lowest depth limit 28 m at Stillo Cape (station 9). Close to Ksamili islands, a degraded meadow has been recorded, with bed cover 20%, 70 shoots/m², at a depth 4 - 5 m.

In Posidonia meadows of the Ionian coast, the most common and abundant species of macrobenthic fauna were sponges *A. oroides*, *P. ficiformis*, *S. agaricina*, *S. officinalis*, *Cacospongia* sp., *S. cunctatrix*, *I. variabilis* Ch. *nucula* and *C. crambe*; hydrozoan *Aglaophenia* sp., anthozoans *A. palmatum*, *C. caespitosa* and *B. europaea*, bryozoans *M. truncata*, *P. fascialis*, *C. fistulosa*, *E. posidonia* and *Membranipora* sp., gastropods *J. striatus*, *B. rugosa*, *C. rustica*, *F. lignaria*, *C. vulgatum*, *H. trunculus*, *C. mediterraneus* and *D. atromaculata*; bivalves *B. barbata*, *P. hirundo*, *M. subpicta*; cirriped *S. scalpellum*, feather star *A. mediterranea*; sea urchins *S. granularis* and *A. lixula*; sea stars *E. sepositus* and *H. attenuata*; holothurian *H. tubulosa*; ascidians *A. virginea*, *H. papillosa*, *Ph. mamillata* and *B. schlosseri*.

Saranda Bay (site 10) has been studied separately, in more details, within the framework of a project related to Environmental Impact Assessment from construction activities in the harbor area.

The most developed meadows of Posidonia were found in the northern part of the bay, around the headland area. Relatively high bed cover, (from 40% to 90%) and density (550-600 shoots/m²) have been recorded in this part, from 6 – 11 m depth. The lowest depth limit was 20 m, while in shallow waters, near the coast, a large bed of dead rhizomes (matte morte) was observed. This presence of “matte morte” in very shallow water may be a consequence of fast sediment inputs from the intensive construction activities on the coast.

Another developed bed with Posidonia was recorded in north-west of Saranada Bay, around Limioni area, from 5 to 18 m depth, with density 350 to 500 shoots/m². At the depth 3 – 5 m Posidonia beds were degraded and replaced by “matte morte”, covered by *Caulerpa racemosa*, patches of *Zostera noltii* and green alga *Flabellia petiolata*.

In central part of the bay, south of Saranda harbor, the sea bottom was highly degraded. This is mostly due to the high human impact from uncontrolled touristic activities in this part and other additional pollution from harbor activities. Only a narrow band of *Posidonia oceanica*, extended few meters wide, parallel to the shore, was recorded in central part of the bay, at 4 – 6 m depth. In the south-eastern part of the bay, a narrow but well developed bed of Psidonia was recorded in 10 – 13 m depth.

140 taxa of macrobenthic animals have been reported in Saranda Bay, of which 114 have not been reported before for the other areas of Posidonia meadows in Albanian coast (see Annex 1).

Although a relatively high species number in total (140), the majority of species had a low presence in the samples (low constancy value). Only 8 species were

present in more than half of the samples (constancy $K > 50\%$): gastropods *Bittium reticulatum* ($K = 91,3\%$), *Jujubinus exasperatus* ($K = 56,5\%$), *Smaragdia viridis* ($K = 52,2\%$); bivalves *Papillicardium papillosum* ($K = 78,2\%$), *Nucula sulcata* ($K = 65,2\%$), *Pitar rudis* ($K = 60,8\%$) *Abra alba* ($K = 52,2\%$); and polychaetes Nereidae ($K = 56,5\%$). These species are considered as constant species.

16 species are considered as associating species ($25\% < K < 50\%$). Among them, the highest value of constancy has been recorded for gastropods *Tricolia pullus* ($K = 47,8\%$), *Alvania cimex* ($K = 30,4\%$), *Pusillina lineolata* ($K = 34,7\%$), *Rissoa ventricosa* ($K = 43,4\%$), *Rissoina bruguieri* ($K = 34,7\%$), *Nassarius incrassatus* ($K = 39\%$); bivalves *Aequipecten opercularis* ($K = 30,4\%$), *Anomia ehippium* ($K = 30,4\%$), *Myrtea spinifera* ($K = 39,1\%$), *Glans trapezia* ($K = 39,1\%$), *Spisula subtruncata* ($K = 39,1\%$), *Arcopagia balaustina* ($K = 34,7\%$) and polychaetes Lumbrinereidae ($K = 30,4\%$).

The other 116 species, which are 82% of the all reported species for Saranda Bay are considered as occasional species ($K < 25\%$). Among them, the highest value of constancy resulted for the bivalves *Chlamys flexuosa*, *Lucinella divaricata*, *Tellina donacina*, *Tellina pulchella* and the sea urchin *Echinocyamus pusillus*.

As regards to the abundance (number of individuals in a sample), the highest abundance has been recorded for the gastropod *Bittium reticulatum* and the bivalve *Papillicardium papillosum*. The highest abundance values for *B. reticulatum* were 147 individuals and 89 individuals, which highly differ from the other samples, where its abundance varies from 24 individuals to 2 individuals per sample. For the bivalve *P. papillosum* the highest abundance value was 57 individuals, which differs from the other samples, where the abundance of this species varies from 16 individuals to 1 individuals per sample.

Other species with high abundance were also the gastropods *Jujubinus exasperatus*, *Smaragdia viridis*, the bivalves *Nucula sulcata* and *Abra alba*, as well as the polychaetes Nereidae. 43 species (or 30% of the total number of species) of Saranda Bay have been present with only one individual in the all samples, in total.

Low values of constancy and abundance of macrobenthic animals in the Posidonia meadows of Saranda Bay indicate an unfavorable situation for the benthic community in this area. The main factors for this situation may be related to the huge human impact in Saranda, through uncontrolled tourism activities, increasing pollution from sewage, urban wastes, maritime traffic and other activities in Saranda harbor. Quick increase of huge touristic constructions, quite close to the coast, has also increased the sediment inputs to the sea, because of uncontrolled discharges and wastes of inert materials at the coast. This increased sedimentation has strong negative consequences for Posidonia, since the sediment covers the Posidonia leaves and causes a quick degradation of the meadow, together with its benthic community.

From a relative comparison of species richness of benthic macrofauna between the studied areas, some areas are differentiated from the others. The highest species number has been recorded in Stillo Cape, Kakomea Bay and Lukova in the Ionian coast, and in Rodoni Cape in the Adriatic coast. In these sites, bed cover and density of Posidonia were higher and the lowest limit of the meadow was deeper. Referring to

CINELLI *et al.*, 1995; MAZZELLA *et al.*, 1986; PERGENT-MARTINI *et al.*, 1999, these characteristics of Posidonia meadows are indicators of its good state and good environmental quality of the respective marine area. Consequently, as it was expected, the species richness of benthic macrofauna in Posidonia meadows of these areas has resulted higher. A different situation has been encountered in other areas with low species richness of benthic macrofauna. In these areas, such as Ceka of Durresi, Ksamili islands, Saint Vasil, Raguza and central part of Saranda Bay, the Posidonia meadows are degraded, very fragmented, with small bed cover and density.

CONCLUSIONS

188 species of benthic macrofauna have been reported from the underwater meadows of the seagrass *Posidonia oceanica* of the Albanian coast, of which 56 are reported for the first time for Albania.

Gastropods, bivalves, sponges and bryozoans have higher species richness and abundance within the macrozoobenthic community of Posidonia meadows in the Albanian coast. Generally for the Albanian coast, but especially in the Adriatic, the situation of benthic macrofauna in Posidonia meadows should be considered as unfavorable. This situation is linked to the state of Posidonia meadows themselves. In the areas with degraded meadows, the species richness and abundance of benthic macrofauna was lower.

The expected number of species should be much higher, considering that the study of Posidonia meadows and their benthic macrofauna in Albania is in its beginning.

Further continuous, intensive and integrated studies are needed in order to increase the level of knowledge on benthic macrofauna and the whole Posidonia habitat, and to use them as environmental indicators for monitoring marine ecosystem in Albania.

Acknowledgements

These studies have been carried out within the framework of 2 projects: "Inventory of coastal and Posidonia habitats in Albania", supported by the Ministry of Environment, Forests and Water Administration of Albania and implemented by the Association for Protection of Aquatic Wildlife of Albania; and the project "Saranda Gateway Environment Impact Study and Environmental Impact Assessment", supported by the World Bank and implemented by the company Weissgerber & Partner.

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ANNEX

List of macrobenthic animals, reported for the meadows of *Posidonia oceanica* in the Albanian coast (with + are marked the species which has been published by Beqiraj & Kashta 2007).

FORAMINIFERA	+ <i>Homalopoma sanguineum</i> (Linnaeus, 1758)
+ <i>Miniacina miniacea</i> Pallas, 1766	+ <i>Calliostoma conulus</i> (Linnaeus, 1758)
PORIFERA (SPONGIA)	+ <i>Tricolia pullus</i> (Linnaeus, 1758)
+ <i>Chondrilla nucula</i> Schmidt, 1862	<i>Tricolia speciosa</i> (Megerle von Mühlfeld 1824)
+ <i>Spirastrella cunctatrix</i> (Schmidt, 1868)	+ <i>Tricolia tenuis</i> (Michaud, 1829)
+ <i>Axinella canabina</i> (Esper, 1794)	<i>Tricolia</i> sp.
+ <i>Axinella damicornis</i> (Esper, 1794)	<i>Smaragdia viridis</i> (Linnaeus, 1758)
+ <i>Crambe crambe</i> (Schmidt 1862)	+ <i>Cerithium vulgatum</i> Bruguière, 1792
+ <i>Agelas oroides</i> (Schmidt 1864)	+ <i>Bittium reticulatum</i> (da Costa, 1778)
+ <i>Petrosia ficiformis</i> (Poiret, 1789)	<i>Turritella turbona</i> Monterosato 1877
+ <i>Dysidea avara</i> (Schmidt, 1862)	<i>Cerithiopsis</i> sp.
+ <i>Spongia officinalis</i> Linnaeus, 1758	<i>Vitreolina antiflexa</i> Monterosato 1884
+ <i>Spongia agaricina</i> Pallas, 1766	<i>Melanella polita</i> (Linnaeus, 1758)
+ <i>Cacospongia</i> sp.	<i>Alvania beani</i> (Hanley in Thorpe 1844)
+ <i>Ircinia variabilis</i> Schmidt, 1862	<i>Alvania cimex</i> (Linnaeus, 1758)
+ <i>Aplysina aerophoba</i> (Schmidt, 1870)	<i>Alvania discors</i> (Allan, 1818)
CNIDARIA	<i>Alvania hirta</i> (Monterosato 1884)
+ <i>Aglaophenia</i> sp.	<i>Alvania hispidula</i> (Monterosato 1884)
+ <i>Cladocora caespitosa</i> (Linnaeus, 1758)	+ <i>Alvania lineata</i> Risso, 1826
+ <i>Caryophyllia inornata</i> (Duncan, 1878)	<i>Alvania</i> sp.
+ <i>Balaniophyllia europaea</i> (Risso, 1826)	<i>Pusillina lineolata</i> (Michaud, 1830)
+ <i>Alcyonium palmatum</i> (Pallas, 1766)	<i>Pusillina marginata</i> (Michaud, 1830)
POLYPLACOPHORA	<i>Pusillina philippi</i> (Aradas & Maggiore, 1844)
+ <i>Chiton olivaceus</i> Spengler, 1797	<i>Pusillina radiata</i> (Philippi, 1836)
GASTROPODA	<i>Rissoa monodonta</i> Philippi, 1836
<i>Haliotis tuberculata lamellosa</i> Lamarck, 1822	<i>Rissoa parva</i> (da Costa, 1778)
+ <i>Diodora gibberula</i> (Lamarck, 1822)	<i>Rissoa ventricosa</i> Desmarest, 1814
<i>Diodora graeca</i> (Linnaeus, 1758)	<i>Rissoa violacea</i> Desmarest, 1814
<i>Emarginula octaviana</i> Coen, 1939	<i>Rissoa</i> sp.
<i>Gibbula umbilicaris</i> (Linnaeus, 1758)	<i>Rissoina bruguieri</i> (Payraudeau, 1826)
<i>Gibbula</i> sp.	+ <i>Aporrhais pespelecani</i> (Linnaeus, 1758)
+ <i>Clanculus cruciatus</i> (Linnaeus, 1758)	<i>Calyptrea chinensis</i> (Linnaeus, 1758)
+ <i>Clanculus corallinus</i> (Gmelin, 1791)	<i>Crepidula unguiformis</i> Lamarck, 1822
+ <i>Jujubinus exasperatus</i> (Pennant, 1777)	<i>Trivia multilirata</i> (Sowerby G. B. II 1870)
+ <i>Jujubinus striatus</i> (Linnaeus, 1758)	<i>Euspira catena</i> (da Costa, 1778)
+ <i>Bolma rugosa</i> (Linnaeus, 1767)	<i>Euspira guillemini</i> (Payraudeau, 1826)

<i>Euspira pulchella</i> (Risso, 1826)	<i>Crassostrea gigas</i> (Thunberg, 1793)
<i>Euspira</i> sp.	<i>Lucinella divaricata</i> (Linnaeus, 1758)
<i>Hadriana craticuloides</i> (Vokes, 1964)	+ <i>Pseudochama gryphina</i> (Lamarck, 1819)
+ <i>Hexaplex trunculus</i> (Linnaeus, 1758)	<i>Myrtea spinifera</i> (Montagu, 1803)
<i>Muricopsis cristata</i> (Brocchi, 1814)	<i>Diplodonta rotundata</i> (Montagu, 1803)
<i>Trophonopsis muricatus</i> (Montagu, 1803)	+ <i>Cardita sulcata</i> Bruguiere, 1792
<i>Granulina marginata</i> (Bivona Ant. 1832)	<i>Glans trapezia</i> (Linnaeus, 1767)
<i>Volvarina mitrella</i> (Risso, 1826)	<i>Acanthocardia paucicostata</i> (Sowerby G.B.II 1841)
<i>Vexillum tricolor</i> (Gmelin, 1791)	+ <i>Acanthocardia tuberculata</i> (Linnaeus, 1758)
+ <i>Fasciolaria lignaria</i> (Linnaeus, 1758)	+ <i>Papillicardium papillosum</i> (Poli, 1791)
+ <i>Nassarius incrasatus</i> (Ström, 1768)	<i>Spisula subtruncata</i> (da Costa, 1778)
<i>Nassarius reticulatus</i> (Linnaeus, 1758)	<i>Lutraria lutraria</i> (Linnaeus, 1758)
+ <i>Columbella rustica</i> (Linnaeus, 1758)	<i>Tellina donacina</i> Linnaeus, 1758
+ <i>Mitrella scripta</i> (Linnaeus, 1758)	<i>Tellina pulchella</i> Lamarck, 1818
<i>Comarmondia gracilis</i> (Montagu, 1803)	<i>Tellina serrata</i> Brocchi, 1814
<i>Mangelia attenuata</i> (Montagu, 1803)	+ <i>Arcopagia balaustina</i> (Linnaeus, 1758)
<i>Mangelia nuperrima</i> (Tiberi, 1855)	<i>Arcopagia crassa</i> (Pennant, 1777)
<i>Mangelia paciniana</i> (Calcara, 1839)	<i>Abra alba</i> (Wood W. 1802)
<i>Mangelia vauquelini</i> (Payraudeau, 1826)	<i>Venus casina</i> Linnaeus, 1758
<i>Raphitoma</i> sp.	+ <i>Venus verrucosa</i> Linnaeus, 1758
<i>Eulimella scillae</i> (Scacchi, 1835)	<i>Timoclea ovata</i> (Pennant, 1777)
<i>Odostomia conoidea</i> (Brocchi, 1814)	<i>Dosinia exoleta</i> (Linnaeus, 1758)
<i>Turbonilla rufa</i> (Philippi, 1836)	<i>Pitar mediterranea</i> (Dautzenberg, 1891)
<i>Bulla striata</i> Bruguiere, 1792	<i>Pitar rudis</i> (Poli, 1795)
+ <i>Hypselodoris tricolor</i> (Cantraine, 1835)	<i>Venerupis aurea</i> (Gmelin, 1791)
+ <i>Discodoris atromaculata</i> (Bergh, 1880)	<i>Mysia undata</i> (Pennant, 1777)
BIVALVIA	<i>Hiatella rugosa</i> (Linnaeus, 1767)
<i>Nucula sulcata</i> Bronn, 1831	+ <i>Modiolarca subpicta</i> (Cantraine, 1835)
<i>Nucula nucleus</i> (Linnaeus, 1758)	<i>Musculus costulatus</i> (Risso, 1826)
<i>Nuculana pella</i> (Linnaeus, 1758)	<i>Pecten jacobaeus</i> (Linnaeus, 1758)
<i>Arca noae</i> Linnaeus, 1758	<i>Aequipecten opercularis</i> (Linnaeus, 1758)
<i>Arca tetragona</i> Poli, 1795	<i>Lissopecten hyalinus</i> (Poli, 1795)
<i>Striarca lactea</i> (Linnaeus, 1758)	<i>Chlamys flexuosa</i> (Poli, 1795)
+ <i>Barbatia barbata</i> (Linnaeus, 1758)	<i>Chlamys varia</i> (Linnaeus, 1758)
+ <i>Pteria hirundo</i> (Linnaeus, 1758)	<i>Anomia ephippium</i> Linnaeus, 1758
+ <i>Mytilus galloprovincialis</i> Lamarck, 1819	SCAPHOPODA
<i>Modiolus barbatus</i> (Linnaeus, 1758)	+ <i>Antalis (Dentalium) vulgaris</i> (da Costa 1778)
<i>Limaria hians</i> (Gmelin, 1791)	<i>Antalis inaequicostata</i> (Dautzenberg, 1891)
<i>Ostrea edulis</i> Linnaeus, 1758	<i>Antalis panorma</i> (Chenu, 1843)

<p><i>Fustiaria rubescens</i> (Deshayes, 1825)</p> <p>ANNELIDA</p> <p><i>Chaetopterus variopedatus</i> (Renier, 1804)</p> <p><i>Nephtys</i> sp.</p> <p>+Nereidae</p> <p>+Eunicidae</p> <p>Serpulidae</p> <p>Phyllodocidae</p> <p>Pectinoridae</p> <p>Glyceridae</p> <p>Cirratulidae</p> <p>Lumbrinereidae</p> <p>Syllidae</p> <p><i>Eusyllinae</i></p> <p>CRUSTACEA</p> <p>+<i>Scalpellum scalpellum</i> (Linnaeus, 1767)</p> <p><i>Crangon crangon</i> (Linnaeus, 1758)</p> <p><i>Macropipus depurator</i> (Linnaeus, 1758)</p> <p>Palemonidae</p> <p>+Paguridae</p> <p><i>Cirolana borealis</i> Lilljeborg, 1851</p> <p><i>Gammarus</i> sp.</p>	<p>BRYOZOA</p> <p><i>Hippodiplosia foliacea</i> Solander, 1876</p> <p><i>Retepora</i> sp.</p> <p><i>Membranipora</i> sp.,</p> <p><i>Electra posidoniae</i> Gautier, 1954</p> <p><i>Cellaria fistulosa</i> (Linnaeus, 1758)</p> <p><i>Sertella beaniana</i> (King, 1846)</p> <p><i>Myriapora truncata</i> (Pallas, 1766)</p> <p><i>Smittina cervicornis</i> (Pallas, 1766)</p> <p><i>Pentapora fascialis</i> (Pallas, 1766)</p> <p>ECHINODERMATA</p> <p>+<i>Antedon mediterranea</i> (Lamarck, 1816)</p> <p><i>Spatangus purpureus</i> Müller, 1776</p> <p><i>Echinocyamus pusillus</i> (O. F. Müller, 1776)</p> <p><i>Paracentrotus lividus</i> (Lamarck, 1816)</p> <p>+<i>Sphaerechinus granularis</i> (Lamarck, 1816)</p> <p>+<i>Arbacia lixula</i> (Linnaeus, 1758)</p> <p><i>Astropecten</i> sp.</p> <p>+<i>Echinaster sepositus</i> (Retzius, 1805)</p> <p>+<i>Hacelia attenuata</i> (Gray, 1840)</p> <p><i>Ophiura albida</i> Forbes, 1839</p> <p><i>Ophiura texturata</i> Lamarck, 1816</p> <p>+<i>Holothuria tubulosa</i> Gmelin, 1788</p> <p>ASCIDIACEAE</p> <p><i>Ascidia virginea</i> O. F. Müller, 1776.</p> <p><i>Phallusia mamillata</i> (Cuvier, 1815)</p> <p><i>Botryllus schlosseri</i> (Pallas, 1766)</p> <p><i>Halocynthia papillosa</i> (Linnaeus, 1767)</p>
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