



Inventory of marine molluscs in Gulf of Oran (Western Algerian coastline)

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Abstract

This present paper made it possible to update the inventory of benthic malacofauna in the soft bottoms of gulf of Oran. Samples of macrobenthic fauna were collected and separated from the Molluscs from other zoological groups. 116 Molluscs inventoried and determined by the species, including 13 orders, 20 families, 24 genres and 29 species. Bivalvia is represented better than Gastropoda with respectively, 24 and 5 species. The analyzed taxa highlighted the dominant and main species on the bottom of the study sites, including *Nuculana commutata*, which appeared as the major species, followed by *Nucula sulcata* with respectively 23,46% and 12,34%. The present inventory indicates that the malacological fauna is less diversified than in the other zones studied of the Algerian coast.

Keywords: Malacofauna, Softbottom, Mollusc, Bivalvia, Gasteropoda, Gulf of Oran

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Introduction

In the west Algerian coast, few works were done on marine macrobenthic fauna. Most of the previous inventories of the benthic fauna of continental shelf in the west coast of Algeria were not updated (Dautzemberg, 1895; Pallary, 1900; Llabador, 1935; Amar, 1998, Kerfouf *et al.*, 2007; Bakalem *et al.*, 2008). The benthic fauna found in abundance in all marine ecosystems is a food source for a great diversity of animals, vertebrates, and invertebrates, some of which either fished or reared. The Molluscs are one of the biological keys to detecting any disturbance of the ecological system (Benzaoui *et al.*, 2015; Rouabhi, 2020). Molluscs are an essential indicator of estuaries and coastal ecosystem health, and the absence or presence of some species can give information about the water quality status (Dauvin *et al.*, 2010). The

objective of this research is an inventory and an update of the list of mollusc species of the soft bottom in the gulf of Oran.

Material and methods

Study area

Gulf of Oran is between Cap Aiguille and Cap Falcon on the Algerian West coast (Fig. 1). Two of the largest harbor in Algeria is in this area: Oran and Mers El Kébir. Waters coming from the Atlantic Ocean nourished the gulf of Oran. The circulation is very turbulent along the North African continent, which favors the dispersion of possible sources of pollution (Millot, 1989). This coastal water of the gulf of Oran exposed to different pollution whose origin is the urban concentration and socio-economic development (Remili and Kerfouf, 2013; Dilem *et al.*, 2014; Benali *et al.*, 2017).

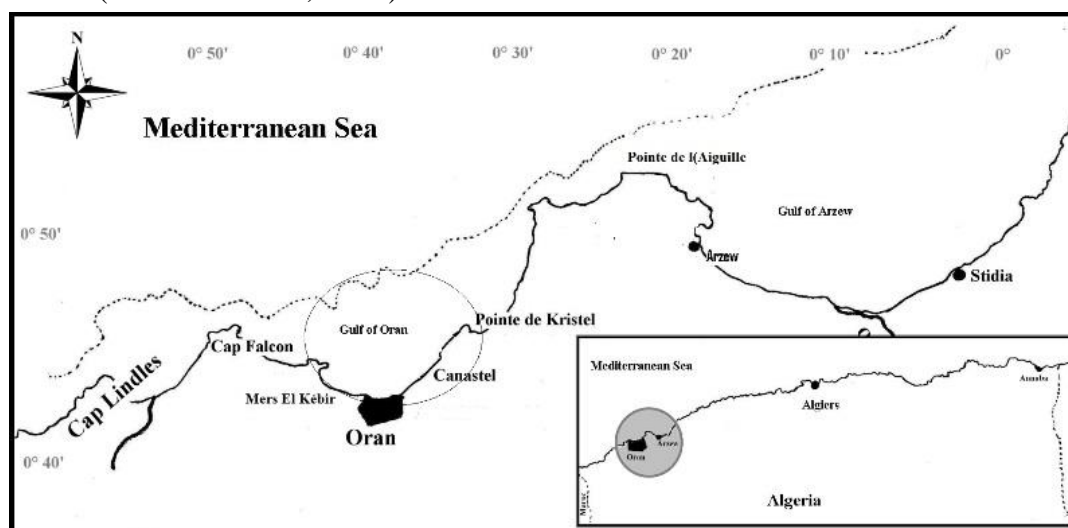


Figure 1: Study area.

Sampling

We explored Forty-nine stations in this study. Samples were taken from a depth ranging from 30 to 106 m along the

shore region and from offshore (Table 1).

Table 1: Geographic position and depth of stations.

Stations	Position Latitude N	Position Longitude W	Depth (m)
1.7	35°45'45''	00°42'65''	70
1.8	35°46'95''	00°42'75''	80
1.9	35°47'23''	00°41'55''	90
1.9'	35°37'47''	00°41'60''	92
1.10	35°47'95''	00°41'55''	102
2.1	35°44'23''	00°41'08''	46
2.2	35°44'95''	00°40'05''	73
2.2'	35°44'95''	00°40'05''	73
2.3	35°45'80''	00°40'90''	81
2.4	35°46'70''	00°40'60''	82
2.5	35°47'60''	00°40'50''	87
2.6	35°48'50''	00°40'35''	98
3.1	35°44'38''	00°40'25''	61
3.2	35°45'05''	00°40'00''	73
3.3	35°45'85''	00°39'80''	81
3.4	35°46'90''	00°39'50''	82
3.5	35°47'90''	00°39'25''	91
3.6	35°48'50''	00°38'80''	91
4.1	35°42'00''	00°39'03''	42
4.2	35°43'05''	00°39'00''	66
4.3	35°44'05''	00°39'00''	74
4.4	35°44'09''	00°38'09''	77
4.5	35°46'05''	00°38'05''	77
4.6	35°47'03''	00°78'01''	82
4.7	35°48'02''	00°73'05''	84
4.8	35°49'50''	00°37'40''	110
5.5	35°43'05''	00°37'05''	56
5.6	35°43'08''	00°37'05''	60
5.7	35°45'00''	00°37'00''	70
5.8	35°47'08''	00°36'07''	82
5.9	35°48'06''	00°36'05''	94
5.10	35°48'04''	00°36'08''	106
6.4	35°44'68''	00°35'67''	39
6.5	35°45'42''	00°35'70''	55
6.6	35°46'35''	00°35'75''	61
6.6'	35°47'55''	00°35'85''	66
7.4	35°47'10''	00°34'60''	60
7.5	35°46'77''	00°34'45''	70
7.6	35°48'96''	00°34'50''	50
7.7	35°47'10''	00°34'60''	60
7.8	35°48'15''	00°35'20''	70
7.9	35°48'50''	00°35'50''	80
7.10	35°49'15''	00°35'55''	100
8.3	35°47'10''	00°33'30''	32
8.4	35°47'40''	00°33'50''	41
8.5	35°47'60''	00°33'65''	49
8.6	35°48'20''	00°34'00''	61
8.7	35°48'70''	00°34'75''	70
8.8	35°49'20''	00°34'55''	80
8.10	35°49'78''	00°34'95''	95

Sampling have been randomly selected in the coastal regions having both sandy and gravel substrates. The type of machine used for the sample was Aberdeen or “Smith Mc Intyre” grab. The residue was fixed with formalin (N/10) for laboratory study after sieving the samples. A first segregation was made, according to their belonging to one of the largest zoological groups. All molluscs were identified down to the species level, using Marsh (1964), Hinton (1972), Dance (1976), Springsteen and Leobrera (1986), Abbott (1991), Poppe (2008), Wong and Arshad (2011) and (<http://www.marinespecies.org/>) as references.

Data analysis

For each inventoried species, the frequency was noted to establish species abundance and dominance calculations.

Results

The 164 individuals of Molluscs were collected and inventoried in the Gulf of Oran. The determination of each specimen allowed us to identify 2 class, 13 orders, 20 families, 24 genus, and 29 species.

Two classes are highlighted: Bivalvia, and Gastropoda with 24 and 5 species.

Class: Bivalvia

We noted four (4) subclasses: Pteriomorpha, Heterodonta, Protobranchia, and Autobranchia.

Subclass: Pteriomorpha

Three (3) orders are identified:

Mytiloida, Pectinoida, and Limoida.

Order: Mytiloidea

Super family: Mytiloidea

Family: Mytilidae

Genus: *Lioberus*

Species: *Lioberus agglutinans*

(Cantraine, 1835) synonym *Amygdalum agglutinans* (Cantraine, 1835)

Genus: *Amygdalum*

Species: *Amygdalum*

phaseolinum (Philippi, 1844)

Order: Pectinoidea

Superfamily: Pectinoidea

Family: Pectinidae

Subfamily: Palliolinae

Genus: *Peplum*

Species: *Peplum clavatum* (Poli, 1795)

Order: Limoida

Superfamily: Limoidea

Family: Limidae

Genus: *Limatula*

Species: *Limatula subauriculata*

(Montagu, 1808)

Subclass: Heterodonta

Six (6) orders are identified: Carditoidea, Myoidea, Euheterodonta, Lucinoidea, Anomalodesmata and Veneroidea.

Order: Carditoidea

Superfamily: Carditoidea

Family: Carditidae

Genus: *Centrocardita*

Species : *Centrocardita aculeata* (Poli, 1795) synonym *Cardita aculeata* (Poli, 1795)

Genus: *Cardites*

Species: *Venericardia antiquata* (Linné, 1758) Synonym: *Cardites antiquatus* (Linnaeus, 1758)

Superfamily: Crassatelloidea

Family: Astartidae

Genus: *Gonilia*

Species: *Gonilia calliglypta* (Dall, 1903)

Order: Myoidea

Superfamily: Myoidea

Family: Corbulidae

Genus: *Corbula*

Species: *Corbula gibba* (Olivi, 1792)

Order: Euheterodonta

Superfamily: Hiatelloidea

Family: Hiatellidae

Genus: *Hiatella*

Species: *Saxicava arctica* (Linnaeus, 1767)

Order: Lucinoidea

Superfamily: Lucinoidea

Family: Lucinidae

Genus: *Loripes*

Species: *Loripes lacteus* (Poli, 1791) synonym *Loripes lucinalis* (Lamarck, 1818)

Order: Anomalodesmata

Superfamily: Pandoroidea

Family: Lyonsiidae

Genus: *Lyonsia*

Species: *Lyonsia norwegica* (Gmelin, 1791)

Order: Veneroidea

Superfamily: Cardioidea

Family: Cardiidae

Subfamily: Fraginae

Genus: *Papillicardium*

Species: *Papillicardium papillosum* (Poli, 1791)

Species: *Parvicardium scabrum* (Philippi, 1844)

Superfamily: Veneroidea

Family: Veneridae

Genus: *Pitar*

Species: *Pitar dione* (Linnaeus, 1758)

Species: *Pitar rudis* (Poli, 1795)

Genus: *Timoclea*

Species: *Venus ovata* (Pennant, 1777)
synonym *Timoclea ovata* (Pennant,
1777)

Superfamily: Tellinoidea

Family: Tellinidae

Genus: Moerella

Species: *Tellina donacina* (Linnaeus,
1758) synonym *Moerella donacina*
(Linnaeus, 1758)

Superfamily: Tellinoidea

Family: Tellinidae

Genus: Tellina

Species: *Tellina distorta* (Poli, 1791)

Superfamily: Tellinoidea

Family: Psammobiidae

Genus: Gari

Species: *Gari costulata* (Turton, 1822)

Subclass: Protobranchia

Three (3) are identified: Nuculanoida,
Nuculida, and *Cardiida*.

Order: Nuculanoida

Superfamily: Nuculanoidea

Family: Nuculanidae

Subfamily: Nuculaninae

Genus: Nuculana

Species: *Nuculana commutata*
(Philippi, 1844) synonym *Leda fragilis*
(Chemnitz, 1784)

Order: Nuculida

Superfamily: Nuculoidea

Family: Nuculidae

Genus: Nucula

Species: *Nucula turgida* (Gould, 1846)

Species: *Nucula sulcata* (Bronn, 1831)

Species: *Nucula nucleus* (Linnaeus,
1758)

Subclass: Autobranchia

Order: *Cardiida*

Family: Tellinidae

Genus: Gastrana

Species: *Gastrana fragilis* (Linnaeus,
1758) synonym *Uncidens arupinensis*
(Coen, 1933)

Class: Gastropoda

We noted one (1) subclass

Subclass: Caenogastropoda

Order: Neogastropoda

Superfamily: Buccinoidea

Family: Nassariidae

Genus: Nassarius

Species: *Nassa limata* (Philippi, 1836)
synonym *Nassarius lima*

(Dillwyn, 1817) **Species:** *Hinia*

reticulata (Linné, 1758) synonyme

Nassarius reticulatus (Linnaeus, 1758)

Family: Fasciolariidae

Subfamily: Fusininae

Genus: Fusinus

Species: *Fusinus rostratus* (Olivi,
1792)

Family: Buccinidae

Genus: Euthria

Species: *Euthria cornea* (Linnaeus,
1758)

Superfamily: Naticoidea

Family: Naticidae

Subfamily: Naticinae

Genus: Natica

Species: *Natica Dillwyni* (Payraudeau,
1826)

Discussion

The abundance of Molluscs varies from one site to another, depending on the substrate nature and the environmental quality. There is a high abundance in coastal stations of pollution indicator species, particularly those located at the level of wastewater discharges (Fig. 2).

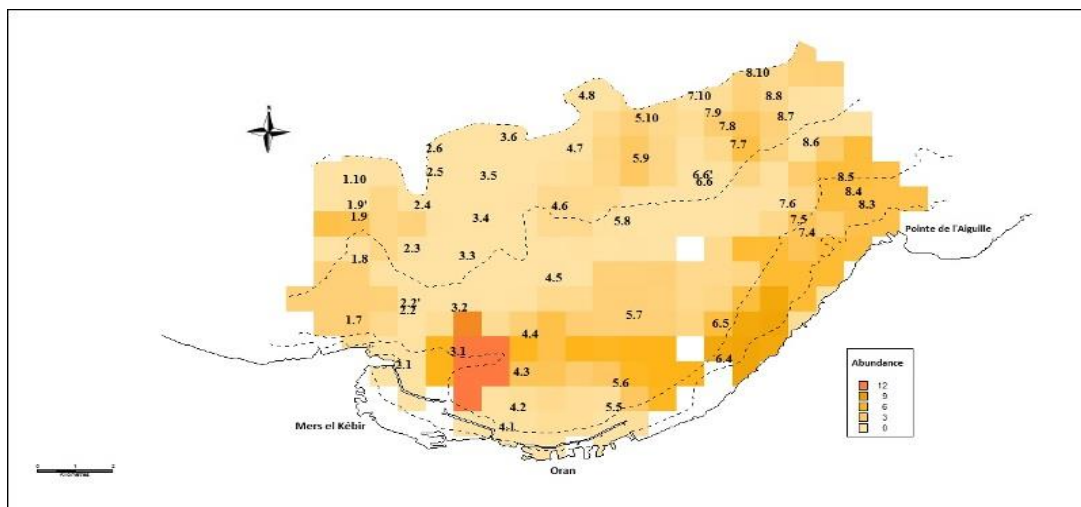


Figure 2: Abundance of Molluscs in the study area.

The specific richness is high in the coastal stations, particularly in the east of the gulf of Oran, that is in the Oran’s harbour, in a little disturbed area without any anthropic activities (Fig. 3).

The specific richness is high in the coastal stations, particularly in the east of the Gulf of Oran, which is at the port of Oran, in a less disturbed area without any anthropic activities.

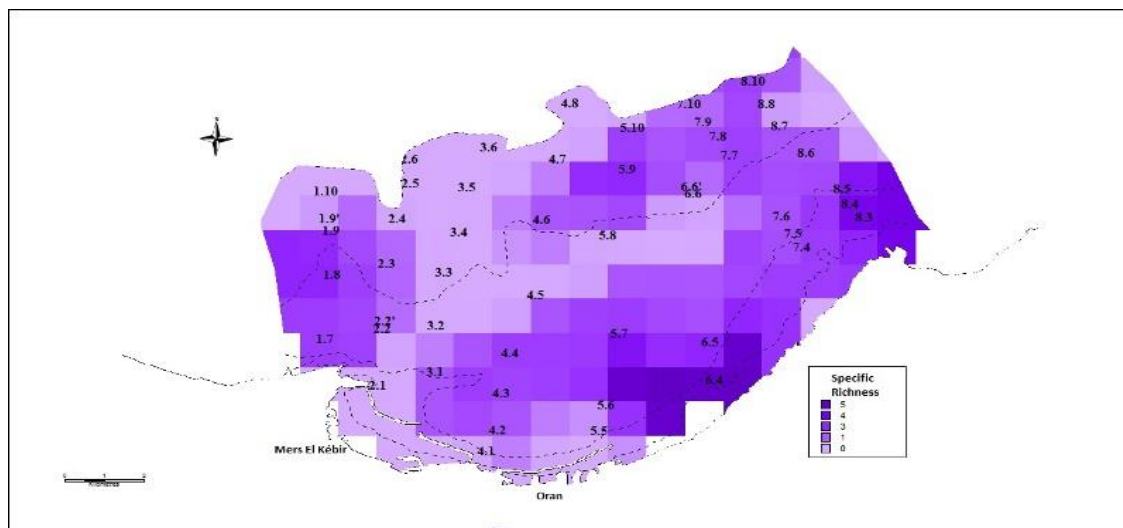


Figure 3: Specific richness of Molluscs in the study area.

Molluscs from the Gulf of Oran are all considered rare species (frequency <25%). Only five species have a frequency greater than 5%. Seven species have a frequency of 4.08% (*Corbula gibba*, *Hinia reticulata*, *Nassa limata*, *Nucula nucleus*, *Parvicardium scabrum*, *Tellina donacina*, *Venus*

ovata). The other species represent only 2.04%. *Nuculana commutata* shows the highest dominance (23.46%), followed by *Nucula sulcata* (12.34%) and *Nucula turgida* (9.87%). Most of the species sampled are represented by only one species per sample, except for the species *Lima subauriculata* (4.93%),

Papillicardium papillosum, and *Tellina donacina* with a dominance of (3.70%). Ecologically the mixticole (Mix) species dominate in the gulf of Oran, followed by the coastal detritus species (DC). This Gulf is distinguished from other open Algerian environments by the absence of large rivers draining terrigenous inputs to the coastal bottoms of the gulf as is the case in other bays and gulfs: Algiers, Annaba, Bejaia, and Arzew. This situation explains to a large extent the organization of the benthic fauna settlements in the Gulf of Oran. The distribution of Molluscs in the gulf of Oran depends on the nature of the substrate, its composition in organism matter, and the quality of the environment, as reported in the Mediterranean Sea (Bakalem *et al.*, 2020).

The comparison of the marine molluscs of the gulf of Oran with other areas in the Algerian coast (Gulf of Arzew, Bou Ismail bay, and Algiers bay) confirmed the superiority of species with wide ecological distribution. In this study about of the gulf of Arzew, a total of 66 species identified which is higher than what is observed in the gulf of Oran. The distribution of molluscs showed that their ecological preference to the substratum and higher species richness may be explained to the siltation of this gulf (Amar, 1998). This difference may be linked to a temporal evolution since the data for the Gulf of Arzew date back more than 20 years and or to a difference in the ecological state of the environment. As observed in the Gulf of Oran, molluscs have a clear

quantitative dominance in Bou-Ismaïl Bay (Hassam, 1991; Oulmi, 1991) and in Algiers bay (Bakalem *et al.*, 2020). In contrast to the dominance of bivalves in the gulf of Oran, the prospecting of rocky substrates of the Algerian west coast made it possible to identify 26 species of Gastropoda molluscs divided into 11 families (Meziane *et al.*, 2020). All research work carried out on marine mollusks in the western Algerian coast is related to one species within the framework of the Biomonitoring Programs (Bendoula *et al.*, 2017; Benali *et al.*, 2017; Meziane and Kerfouf, 2018).

Conclusion

The faunistic composition analysis of the sampled stations in the Gulf of Oran allowed us to count 116 individuals of Molluscs inventoried and determined by the species, including 13 orders, 20 families, 24 genres and 29 species. The large ecological stocks are mixticole species and coastal detritus species. The malacofauna of the gulf of Oran is scarce and less diversified (29 species) due to the nature of the soft bottoms (sand and gravel) and the absence of terrigenous inputs. The present study carried out on samples of macrofauna in the gulf of Oran made it possible to update the inventory of benthic macrofauna in the soft bottoms of these coasts. Spatio-temporal monitoring will provide more information on the dynamics of these macrobenthic communities. The present list of molluscs in Oran's gulf is the first step of an inventory which will be completed with a future article that will

provide information and argumentation on each species with their references.

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