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The marine malacofauna of Bozcaada Island (NE Aegean Sea)

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Abstract
The Molluscs community of Bozcaada Island (NE Aegean Sea) was studied at 43 stations during 2000-2001. Depths of the stations ranged from 0.5 to 40 m. The samples were collected by means of dredging, drift netting, bottom trawling and scoop netting. A total of 127 molluscs belonging to 54 families were identified in the present study. The dominant species were Patella caerulea and Conus mediterraneus (Gastropoda). Multivariate analyses showed that the structure of the assemblages differed among depths with a clear gradient of distribution from shallow to deep stands. In comparison of the Bivalve fauna of Bozcaada Island and Imbros with Lesvos and Crete Island, they were found to be different.

Key words: Mollusc, Aegean Sea, Bozcaada Island

Introduction

The Aegean Sea is one of the four major basins of the Eastern Mediterranean. In the north it is connected to the Black Sea through the Strait of Dardanelles, the Sea of Marmara and the Strait of Bosphorus, and in the south to the Ionian Sea and the Levantine Sea, which are two of the other major basins of the Eastern Mediterranean.

Bozcaada Island which is located of the Aegean Sea (39˚ 47′ 30″-39˚ 50′ 90″N, and 25˚ 57′ 80″- 26˚ 05′ 00″ E) has an area of 42 km^2 and is situated nearly 5 km off the coast of the mainland, between the Strait of Dardanelles and Bababurnu (Figure 1).

In the check-list prepared by OZTURK AND CEVIK (2000), 376 mollusc species were reported from the Turkish coast of the Aegean Sea. Recently, Mollusc fauna from Turkish coast of the Aegean Sea was contributed by ALBAYRAK (2001, 2002), ALBAYRAK *et al.* (2001), ASLAN & BALKIS (2001), DEMIR (2003), MIFSUID & OVALIS (2003), OZTURK (2001), OZTURK & CEVIK (2001), OZTURK & ERGEN (2000), OZTURK & POUTIERS (2005), OZTURK *et al.* (2001, 2002), SALMAN & KATAGAN (2002).

Although OZTURK & CEVIK (2000) reported 457 gastropod species from the Turkish seas, this figure did not account for SWENNEN's (1961) study which reported eight Opisthobranchiata species (*Chelidonura fulvipunctata* Baba, 1938, *Lobiger serradifalci* (Calcara, 1840), *Elysia timida* (Risso, 1818), *Thuridilla hopei* (Vérany, 1853), *Cyerce cristallina* (Trinchese, 1881), *Taringa armata* Swennen, 1961, *Tritonia manicata* Deshayes, 1853, *Cuthona foliata* (Forbes & Goodsir, 1839) for Turkish seas.

Bozcaada is a very important area, because *Trivia levantina* Smriglio, Mariottini & Buzzurro, 1998 has

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as locus types**.** In addition, a few interesting records, which were *Ruditapes philippinarum* (Adams & Reeve, 1850) by ALBAYRAK *et al.* (2001) and *Trophonopsis breviatus* (Jeffreys, 1882), *Cylindriscala sp., Chrysallida dollfusi* (Kobelt, 1903)*, Lienardia mighelsi* Iredale & Tomlin, 1917*, Parvicardium vroomi* van Aartsen, Menkhorst & Gittenberger, 1984 by MIFSUID & OVALIS (2003) were reported also from Bozcaada Island.

This study was carried out to determine the malacofauna of Bozcaada Island and some of their ecological and zoogeographic features. Furthermore, the fauna of Bivalves of Bozcaada Island is compared with a few other islands (Imbros, Lesvos and Crete) located in the Aegean Sea.

Materials and Methods

The samples were obtained during 2000 and 2001 from 43 stations (Fig. 1) at the depths of 0.5-40 m by dredging, drift netting, bottom trawling and scoop netting.

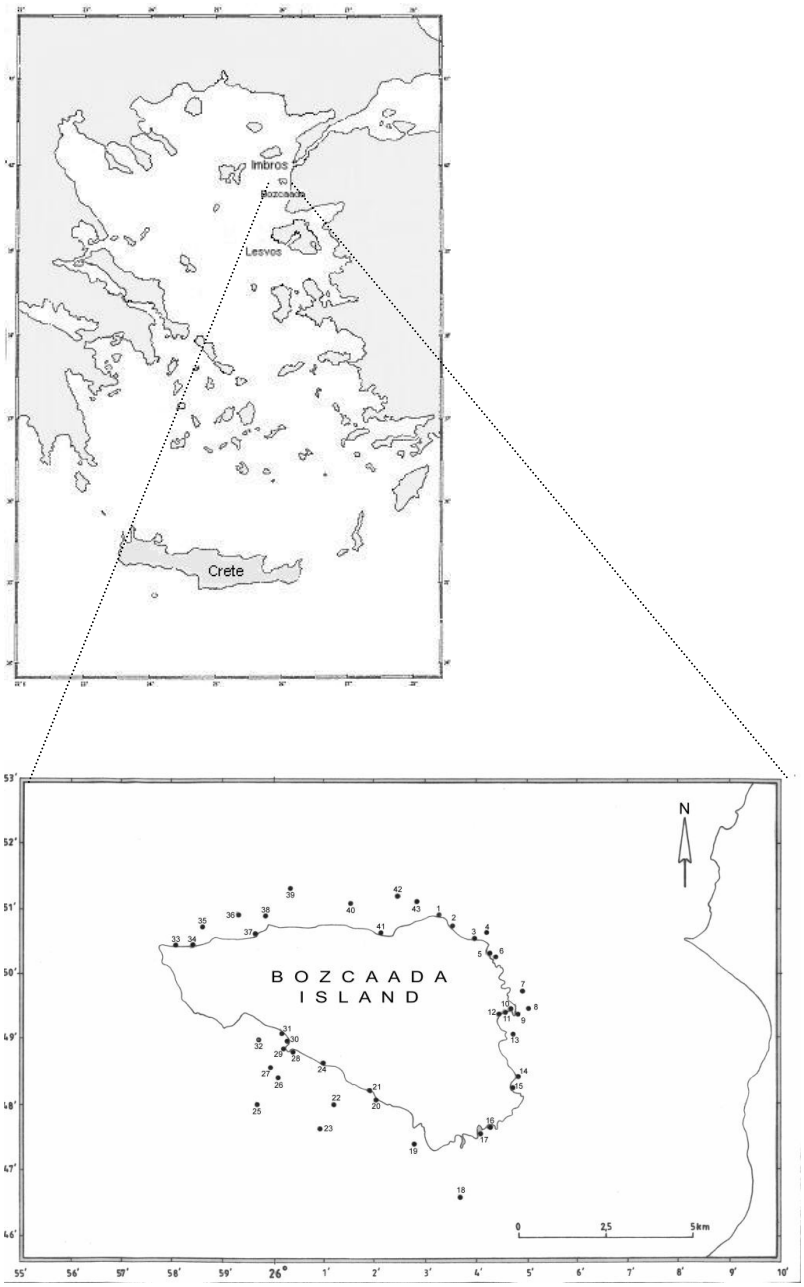


Fig.1. The maps of the Aegean Sea and Bozcaada Island.

Bottom depth, tool, temperature, salinity and dissolved oxygen of the stations are given in Table 1.

Table 1. Data about stations in Bozcaada Island

DN: Drift net; DR: Dredging; BTR: Bottom trawl; SN: Scoop net.

Station number	Date	Depth (m)	Tool	Temperature (°C)	Salinity psu	DO mg l^{-1}
1	27.08.2000	0.5	SN	24.0	33.2	6.9
2	25.11.2000	0.5	SN	17.3	36.6	10.3
3	17.02.2001	0.5	SN	13.9	36.9	7.8
4	24.05.2000	7	DR	15.3	36.2	11.8
5	19.02.2001	0.5	SN	13.9	37.5	7.5
6	18.02.2001	5	DN	13.7	37.7	7.2
7	26.05.2000	9	DR	16.3	35.3	9.4
8	26.05.2000	9	DR	16.3	35.4	9.4
9	27.05.2000	0.5	SN	19.5	32.0	5.4
10	30.08.2000	0.5	SN	25.1	33.7	7.9
11	19.02.2001	0.5	SN	13.8	37.4	7.5
12	22.11.2000	0.5	SN	16.7	30.4	10.6
13	18.02.2001	8	DR	13.4	37.3	7.8
14	22.11.2000	0.5	SN	17.8	32.5	11.4
15	27.05.2000	0.5	SN	20.2	33.8	5.9
16	30.08.2000	0.5	SN	23.0	33.7	5.4
17	27.05.2000	0.5	SN	20.0	33.5	6.0
18	23.05.2000	35	DN	14.7	38.2	7.7
19	26.05.2000	17	DR	15.3	35.5	10.7
20	27.05.2000	0.5	SN	18.0	34.0	8.6
21	30.08.2000	0.5	SN	22.5	34.0	7.6
22	24.11.2000	25	DN	16.8	37.5	8.2
23	18.02.2001	30	BTR	14.1	38.4	7.4
24	19.02.2001	0.5	SN	13.7	37.6	7.8
25	27.08.2000	40	BTR	14.2	38.6	8.2
26	26.05.2000	7	DR	17.8	35.5	6.6
27	18.02.2001	5	DR	13.6	37.6	7.3
28	22.11.2000	0.5	SN	18.7	34.9	11.2
29	18.02.2001	0.5	SN	13.7	37.6	7.8
30	25.05.2000	0.5	SN	20.0	33.5	8.8
31	19.02.2001	0.5	SN	13.7	37.5	7.7
32	24.11.2000	8	DR	16.8	36.7	8.8
33	31.08.2000	0.5	SN	22.4	32.1	7.5
34	25.11.2000	0.5	SN	16.3	36.5	9.5
35	24.11.2000	10	DR	16.9	36.6	8.5
36	24.11.2000	5	DR	17.2	37.0	8.6
37	25.11.2000	0.5	SN	15.7	36.3	10.6
38	24.05.2000	3	DR	16.5	35.7	11.0
39	24.05.2000	8	DR	16.0	35.7	10.0
40	24.11.2000	5	DR	17.1	36.9	8.7
41	25.05.2000	0.5	SN	21.0	32.2	11.0
42	24.11.2000	10	DR	17.3	37.1	9.1
43	24.05.2000	26	DR	14.8	36.8	11.6

Samples were collected with 0.5 mm mesh size. The residuals on the mesh were fixed in 4% formol solution. In the laboratory molluscs were then preserved in 70% alcohol and identified according to BARASH & DANIN (1992), COSSIGNANI *et al.* (1992), DELL'ANGELO & SMRIGLIO (1999), GAILLARD (1987), GARGIULLO & D'ANGELO (1987), GIANNUZZI-SAVELLI *et al.* (1994, 1996), GRAHAM (1971), PARENZAN (1970, 1976), POPPE & GOTO (1991, 1993), ŠIMUNOVIC (1995) and TEBBLE (1996). The taxonomy used is that of CLEMAM (2005). Zoogeographical distribution of identified species was also determined.

The temperature was measured with the reversing thermometer of the Nansen bottle, the salinity by the Mohr-Knudsen method (IVANOFF, 1972); and the dissolved oxygen (DO) by the Winkler method (WINKLER, 1888).

Soyer's frequency index (F) was used to describe ecological importance of species. According to the SOYER (1970), species with F>50% are considered "constant", those with F between 25% and 50% are "common", while those with F values <25% are considered "rare".

McConnaughey Similarity and Analyses of Similarity (ANOSIM, CLARKE, 1993) were used to assess and compare patterns in the distribution of bivalve molluscs around Bozcaada, Imbros, Lesvos and Crete islands. The analysis SIMPER (CLARKE, 1993) was used to examine the contribution of individual species to the similarity measure used among the clusters as groups. Multivariate analyses were undertaken using the package PRIMER, ver. 3.1 (Plymouth Routines In Multivariate Ecological Research). The multivariate analyses were applied to presence/absence data of only Bozcaada Island.

Results

A total of 127 species belonging to 98 genera and 54 families were determined under 5 mollusc classes (Polyplacophora with five species, Gastropods 67, Bivalves 51, Scaphopods one and Cephalopods 3). These 127 species were given in Table 2 with their zoogeographic origin, minimum and maximum values of the depth and bottom structure the number of stations. A total of 14 species which were not taken into account of the statistical analyses could not be obtained as living samples among 127 species. Two of them belonged to Gastropods, whereas 12 species belonged to Bivalves.

The analysis of the frequency index revealed two common species (*Patella caerulea, Conus mediterraneus*), seven constant species (*Haliotis tuberculata lamellosa, Gibbula divaricata, Phorcus richardi, Osilinus turbinatus, Cerithium vulgatum, Haxaples trunculus, Columbella rustica*), and 118 rare species.

It has been identified as *Nassarius reticulatus* (Linnaeus, 1758) so far, it was identified as *Nassarius nitida* in this study according to the recent literature (Micu, 2004, Rolan &Luque, 1995, Sanjuan, *et al*. 1997)

Table 2: List of identified Molluscs species from Bozcaada Island
AM: Atlantic-Mediterranean B: Boreal C: Cosmopolitan E: Endemic IP: Indo-Pacific

SPECIES	ORIGIN	DEPTH (m)	BOTTOM	STATION N°
POLYPLACOPHORA				
LEPTOCHITONIDAE				
Lepidopleurus cajetanus (Poli, 1791)	AM	0.5	rock	10, 21, 41
ISCHNOCHITONIDAE				
Lepidochitona caprearum (Scacchi, 1836)	AM	0.5	rock	11
Lepidochitona cinerea (Linnaeus, 1767)	AM	0.5	rock	3, 10, 12
CHITONIDAE				
Chiton olivaceus Spengler, 1797	AM	0.5	rock	2, 3, 10, 16, 17, 21, 30, 41
ACANTHOCHITONIDAE				
Acanthochitona fascicularis (Linnaeus, 1767)	AM	0.5	rock	3, 10, 11, 17, 21
GASTROPODA				
PATELLIDAE				
Patella rustica Linnaeus,1758	AM	0.5	rock	34
Patella caerulea Linnaeus, 1758	E	0.5-5	rock	1, 2, 3, 5, 9, 10, 11, 12, 15, 16, 17, 20, 21, 24, 28, 29, 30, 31, 33, 34, 37, 40, 41
FISSURELLIDAE				
Diodora gibberula (Lamarck, 1822)	AM	0.5-40	rock	3, 10, 11, 20, 21, 25
Diodora graeca (Linnaeus, 1758)	AM	0.5	rock	21
HALIOTIDAE				
Haliotis tuberculata lamellosa Lamarck,1822	E	0.5	rock	5, 9, 10, 11, 12, 15, 16, 28, 30, 31, 41
TROCHIDAE				
Clanculus cruciatus (Linnaeus, 1758)	AM	0.5	rock	11
Clanculus corallinus (Gmelin, 1791)	E	0.5-8	rock	29, 30, 39
Jujubinus exasperatus (Pennant, 1777)	AM	5-30	*Posidonia*	4, 8, 22, 23, 27, 39, 42, 43
Jujubinus striatus striatus (Linnaeus, 1758)	AM	0.5-30	rock, sand	4, 23, 32, 33, 40, 42
Gibbula umbilicaris (Linnaeus, 1758)	E	0.5	rock	30
Gibbula turbinoides (Deshayes, 1835)	E	0.5-10	rock, sand	10, 42
Gibbula divaricata (Linnaeus, 1758)	AM	0.5	rock	2, 3, 5, 10, 11, 12, 14, 21, 24, 28, 29, 30, 31, 34
Gibbula ardens (Salis, 1793)	E	0.5-30	rock, sand	10, 19, 22, 23, 36, 39, 42
Gibbula adansonii adansonii (Payraudeau, 1826)	E	0.5	rock	1, 10, 29, 31
Phorcus richardi (Payraudeau, 1826)	E	0.5-5	rock, sand	2, 3, 6, 9, 10, 11, 12, 14, 15, 16, 20, 27, 28, 29, 30, 31, 34, 36, 37, 41

SPECIES	ORIGIN	DEPTH (m)	BOTTOM	STATION N°
Osilinus turbinatus (Born, 1778)	E	0.5	rock	1, 2, 9, 12, 15, 16, 17, 20, 24, 28, 29, 30, 31, 33, 34, 41
Osilinus articulatus (Lamarck, 1822)	E	0.5	rock	10, 11, 12, 16, 21, 28, 31
Calliostoma granulatum (Born, 1778)	AM	40	sand	25
Calliostoma laugieri laugieri (Payraudeau, 1826)	AM	25-30	sand	22, 23
Calliostoma conulus (Linnaeus, 1758)	AM	25	*Posidonia*	22
TURBINIDAE				
Bolma rugosa (Linnaeus, 1767)	AM	0.5-35	*Posidonia*	18, 19, 22, 23, 30, 42
Homalopoma sanguineum (Linnaeus,1758)	E	0.5-8	rock	9, 32, 39
TRICOLIIDAE				
Tricolia speciosa (Megerle von Mühlfeld, 1824)	E	30	*Posidonia*	23
Tricolia pullus pullus (Linnaeus, 1758)	E	8	rock	32
CERITHIIDAE				
Cerithium vulgatum Bruguière, 1792	AM	0.5-35	rock, sand	3, 6, 7, 9, 10, 12, 13, 17, 18, 19, 20, 21, 30, 31, 32, 42
Cerithium rupestre Risso, 1826	AM	0.5-8	rock, sand	9, 10, 11, 29, 32
Cerithium protractum Bivona Ant. in Bivona And.,1838	E	17-35	sand	18, 19, 43
Bittium reticulatum (da Costa, 1778)	AM	0.5-17	rock, sand	11, 16, 19, 20, 21, 28, 30, 32, 40, 41
Bittium scabrum (Olivi, 1792)	AM	0.5	rock	10
TURRITELLIDAE				
Turritella communis Risso, 1826	AM	0.5-25	rock, sand	11, 16, 19, 22, 39
EPITONIIDAE				
Epitonium commune (Lamarck, 1822)	AM	0.5	rock	10, 41
LITTORINIDAE				
Melarhaphe neritoides (Linnaeus, 1758)	AM	0.5	rock	2, 12, 28, 34
RISSOIDAE				
Rissoa splendida Eichwald, 1830	E	0.5	rock	10, 11, 16, 21, 33
VERMETIDAE				
Vermetus triquetrus Bivona Ant., 1832	AM	0.5	rock, sand	10, 11, 31
APORRHAIIDAE				
Aporrhais pespelecani (Linnaeus, 1758)	AM	25-40	sand	18, 22, 25
CALYPTRAEIDAE				
Crepidula unguiformis Lamarck, 1822	E	10-17	sand	19, 42
NATICIDAE				
Natica stercusmuscarum (Gmelin, 1791)	E	9	sand	7, 10-11-24-30 (empty shell)
Natica dillwynii Payraudeau, 1826	AM	-	-	11 (empty shell)
Neverita josephinia Risso, 1826	E	17	sand	19
Payraudeautia intricata (Donovan, 1804)	AM	3-40	sand	11-15 (empty shell), 25, 38
TONNIDAE				
Tonna galea (Linnaeus, 1758)	AM	17	sand	19
CASSIDAE				
Galeodea echinophora (Linnaeus, 1758)	E	40	sand	25
MURICIDAE				
Bolinus brandaris (Linnaeus, 1758)	E	5-35	sand	6, 18, 22, 42
Hexaplex trunculus (Linnaeus, 1758)	AM	0.5-40	rock, sand	6, 10, 12, 15, 16, 17, 19, 22, 23, 25, 28, 30, 38, 41, 42

SPECIES	ORIGIN	DEPTH (m)	BOTTOM	STATION N°
Muricopsis cristata (Brocchi, 1814)	AM	0.5-5	rock	11, 17, 40
Ocinebrina edwardsii (Payraudeau, 1826)	AM	0.5	rock	2, 9, 10, 11, 15, 28
Ocinebrina aciculata (Lamarck, 1822)	AM	0.5-7	rock, sand	3, 4, 29
FASCIOLARIIDAE				
Fasciolaria lignaria (Linnaeus, 1758)	E	0.5	rock	17
Fusinus pulchellus (Philippi, 1844)	AM	40	sand	25
BUCCINIDAE				
Buccinulum corneum (Linnaeus, 1758)	AM	0.5-35	rock, sand	10, 18, 23, 29
Engina leucozona (Philippi, 1843)	E	0.5	rock	9, 10, 17, 20, 21, 30
Pisania striata (Gmelin, 1791)	AM	0.5	rock	2, 3, 10, 11, 14, 17, 28, 29, 30
Pollia scacchiana (Philippi, 1844)	E	0.5	rock	20
NASSARIIDAE				
Nassarius nitidus (Jeffreys, 1867)	AM	0.5-8	sand	10, 32
Nassarius mutabilis (Linnaeus, 1758)	E	3	sand	38
Nassarius pygmaeus (Lamarck, 1822)	AM	0.5-8	rock, sand	21, 32
Nassarius incrassatus (Ström, 1768)	AM	0.5-17	sand	3, 9, 10, 11, 12, 15, 16, 17, 19, 21, 26, 27, 28, 29, 30, 33, 38
Nassarius costulatus cuvierii (Payraudeau, 1826)	AM	0.5-8	sand	2, 10, 11, 39
Nassarius corniculum (Olivi, 1792)	AM	0.5	rock	10
Cyclope neritea (Linnaeus, 1758)	AM	0.5-7	rock, sand	24, 26, 28
COLUMBELLIDAE				
Columbella rustica (Linnaeus, 1758)	AM	0.5-5	rock	1, 3, 9, 10, 11, 12, 14, 15, 16, 17, 20, 21, 24, 27, 28, 29, 30, 31, 33, 36, 41
Mitrella gervillii (Payraudeau, 1826)	AM	0.5-7	rock, sand	21, 26
COSTELLARIIDAE				
Vexillum granum (Lamarck, 1811)	AM	0.5	sand	11
Vexillum littorale (Forbes, 1844)	E	0.5	rock	10, 21
CONIDAE				
Conus mediterraneus Hwass in Bruguière, 1792	E	0.5-8	rock, sand	1, 3, 9, 10, 11, 12, 14, 15, 16, 17, 20, 21, 24, 27, 28, 29, 30, 31, 32, 33, 39, 41
BULLIDAE				
Bulla striata Bruguière, 1792	AM	-	-	10, 11 (empty shell)
CYLICHNIDAE				
Scaphander lignarius (Linnaeus, 1758)	AM	40	sand	25
BIVALVIA				
ARCIDAE				
Arca tetragona Poli, 1795	AM	0.5	stone	10
Arca noae Linnaeus, 1758	AM	0.5	rock	11, 12 (empty shell), 15, 16, 21
Barbatia barbata (Linnaeus, 1758)	AM	0.5	rock	3 (empty shell), 15, 30
NOETIDAE				
Striarca lactea (Linnaeus, 1758)	AM	0.5-5	stone	10, 16, 27, 30, 40
GLYCYMERIDIDAE				
Glycymeris violacescens (Lamarck, 1819)	AM	3	sand	38

SPECIES	ORIGIN	DEPTH (m)	BOTTOM	STATION N°
MYTILIDAE				
Mytilus galloprovincialis Lamarck, 1819	AM	0.5-5	rock	3, 11, 36
Mytilaster lineatus (Gmelin, 1791)	E	0.5	rock	2, 12
Musculus costulatus (Risso, 1826)	AM	0.5	*Posidonia*	2, 14
Modiolus barbatus (Linneaus, 1758)	AM	0.5	rock	9, 10, 17
Modiolula phaseolina (Philippi, 1844)	AM	0.5	*Posidonia*	1, 3-8-10 (empty shell)
PINNIDAE				
Pinna nobilis Linneaus, 1758	E	5	sand	40
PECTINIDAE				
Pecten jacobeus (Linneaus, 1758)	AM	0.5	sand+mud	11
Lissopecten hyalinus (Poli, 1795)	AM	25-35	*Posidonia*	18, 22
Crassodoma multistriata (Poli,1795)	AM	0.5	gravel	10
Chlamys varia (Linneaus, 1758)	AM	0.5	rock	3, 31 (empty shell)
Chlamys glabra (Linnaeus, 1758)	AM	9-35	rock	8, 18, 40 (empty shell)
ANOMIIDAE				
Anomia ephippium Linnaeus, 1758	AM	0.5-5	*rock*	3, 5, 10, 11, 21, 31, 40, 41
OSTREIDAE				
Ostrea edulis Linnaeus, 1758	AM	-	-	11 (empty shell)
LUCINIDAE				
Loripes lacteus (Linnaeus, 1758)	AM	0.5-9	sand	8, 29
CHAMIDAE				
Chama gryphoides Linnaeus, 1758	AM	0.5	rock	3, 10, 17
Pseudochama gryphina (Lamarck, 1819)	AM	0.5	stone	10, 11
CARDITIDAE				
Cardita calyculata (Linnaeus, 1758)	AM	0.5	rock	3, 10, 11, 15, 16, 17, 21, 30, 31
Venericardia antiquata (Linneaus, 1758)	AM	0.5-3	rock, sand	8 (empty shell), 10, 11, 12, 14, 15, 38
CARDIIDAE				
Acanthocardia tuberculata (Linneaus, 1758)	AM	0.5	sand, mud	10, 12-33 (empty shell)
Parvicardium exiguum (Gmelin, 1791)	AM	-	-	40 (empty shell)
Papillicardium papillosum (Poli, 1791)	AM	3	sand	22 (empty shell), 38
Cerastoderma glaucum (Poiret, 1789)	AM	0.5	sand	11, 12
MACTRIDAE				
Mactra stultorum (Linneaus, 1758)	AM	-	-	8 (empty shell)
Spisula subtruncata (da Costa, 1778)	AM	-	-	8, 35, 36 (empty shell)
MESODESMATIDAE				
Donacilla cornea (Poli, 1791)	AM	0.5-3	mud, sand	11, 12, 16, 17, 37, 38, 41
TELLINIDAE				
Tellina nitida Poli, 1791	AM	-	-	8 (empty shell)
Tellina distorta Poli, 1791	AM	-	-	8 (empty shell)
Arcopagia balaustina (Linneaus, 1758)	AM	-	-	36 (empty shell)
DONACIDAE				
Capsella variegata (Gmelin, 1791)	AM	0.5	sand, mud, gravel	10, 11
PSAMMOBIIDAE				
Gari fervensis (Gmelin, 1791)	AM	-	-	8 (empty shell)
Gari depressa (Pennant, 1777)	AM	0.5	sand, mud, gravel	3, 11, 15

SPECIES	ORIGIN	DEPTH (m)	BOTTOM	STATION N°
VENERIDAE				
Venus verrucosa Linneaus, 1758	C	0.5-3	sand, mud, gravel	8 (empty shell), 9, 10, 11, 12, 16, 30, 31, 38
Chamelea gallina (Linnaeus, 1758)	AM	3-8	sand, mud	8-11 (empty shell), 36, 38, 39
Clausinella fasciata (da Costa, 1778)	AM	8	sand, gravel	39
Timoclea ovata (Pennant, 1777)	AM	-	-	8 (empty shell)
Dosinia exoleta (Linneaus, 1758)	AM	-	-	40 (empty shell)
Pitar rudis (Poli, 1795)	AM	0.5	mud, sand	3, 8 (empty shell)
Callista chione (Linneaus, 1758)	AM	3-17	sand	8, 19, 38, 40 (empty shell)
Tapes decussatus (Linnaeus, 1758)	C	0.5	gravel	3, 9-11 (empty shell), 10, 12, 14, 15, 16
Tapes philippinarum (Adams & Reeve, 1850)	IP	0.5	sand	9 (empty shell), 16
Irus irus (Linneaeus, 1758)	AM	0.5	rock	10, 14, 15, 28
Paphia rhomboides (Pennant, 1777)	AM	-	-	10-11-31- 39 (empty shell)
Venerupis senegalensis (Gmelin, 1791)	AM	0.5	rock	31
PETRICOLIDAE				
Petricola lithophaga (Philippson, 1788)	AM	0.5	rock	3, 12-13-38 (empty shell), 30
CORBULIDAE				
Corbula gibba (Olivi, 1792)	AM	3-17	sand, sand+mud, gravel	8, 19, 26, 38
PHOLADIDAE				
Pholas dactylus Linneaus, 1758	C	-	-	37 (empty shell)
SCAPHOPODA				
DENTALIIDAE				
Dentalium sp.	-	25	mud	22
CEPHALOPODA				
SEPIOLIDAE				
Sepiola rondeleti Leach,1817	E	7	rock	26
OCTOPODIDAE				
Octopus vulgaris Cuvier, 1797	C	30	rock	23
Eledone cirrhosa (Lamarck, 1798)	B	25	sand	22

According to the result of the cluster analysis Imbros Island was similar to Bozcaada Island in the bivalve community at about 70% and this was the same for Lesvos to Crete Islands (Fig. 2). Three were two groups seen in the cluster dendogram: Group I (Imbros and Bozcaada Islands) and Group II (Lesvos and Crete Islands). These two groups were linked at a similarly level of ~45% (Fig. 2). However, they were not found to be statistically different (p=33.3%, ANOSIM).

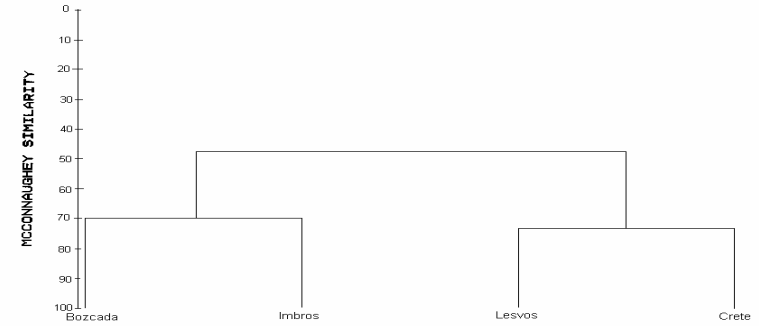


Fig. 2. McConnaughey Similarity dendogram showing bivalve species in Imbros, Bozcaada, Lesvos and Crete Islands

Fig. 3 displays clusters and relationship between the groups and the environmental data. There are two main groups, shallow stations (<5 m) and deeper stations (Fig. 3 c) when similarity level was truncated at 10%. The MDS configuration was in good agreement with only the bottom depth. However, the temperature, salinity and dissolved oxygen were not correlated with the groupings (Fig. 3 d-f). The groupings (Fig. 3 a) were not dependent on the sampling tools (Fig. 3 b).

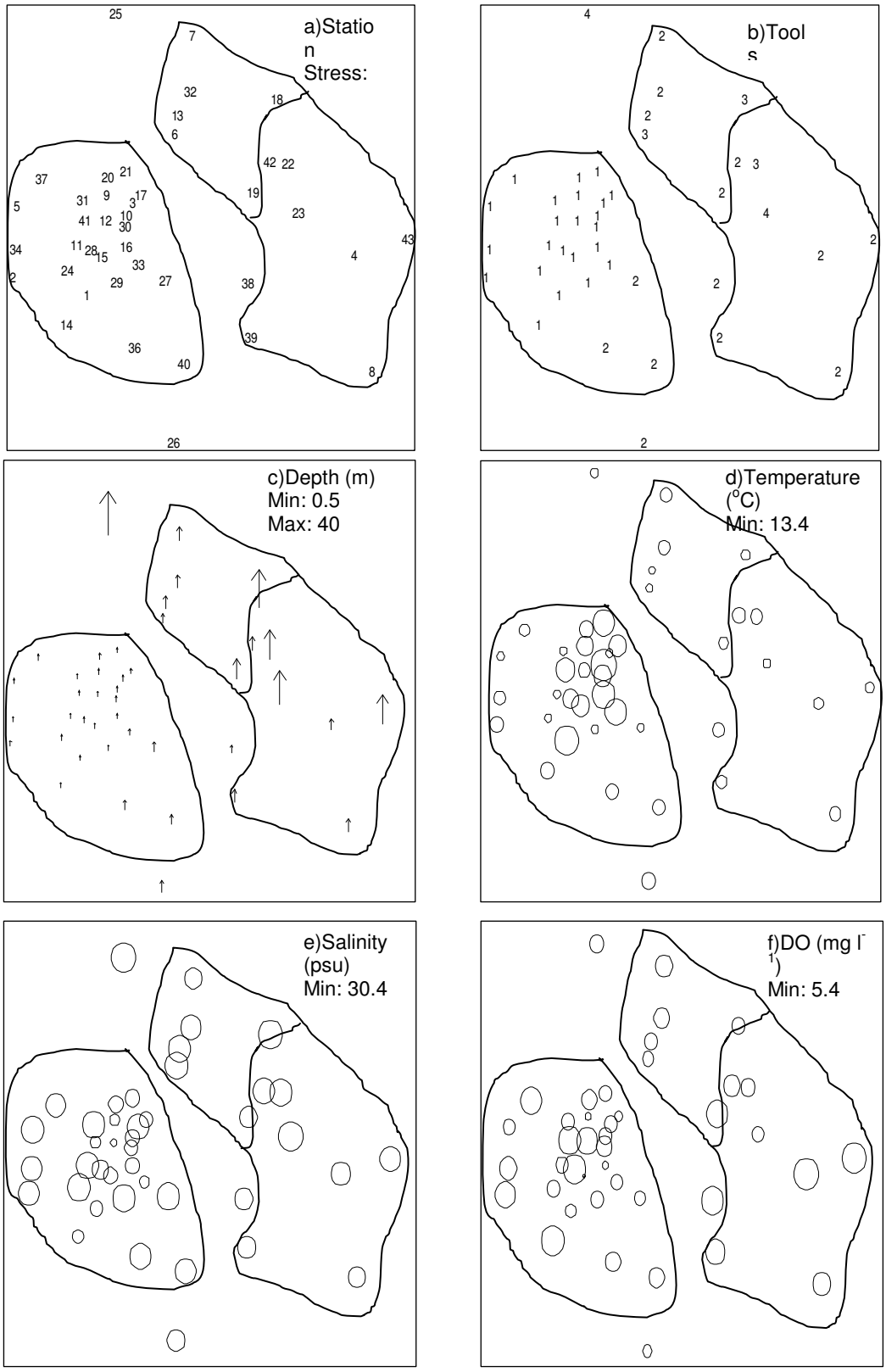


Fig. 3. Groups and subgroup configured on presence/absence species data of Bozcaada island and relationships between groups and ancillary data; stations (a), the tools; 1=scoop net, 2=dredge, 3=drift net and 4=bottom trawl (b), bottom depth (c), temperature (d), salinity (e) and dissolved oxygen, DO (f). Symbol size is proportional linearly to the measurements of environmental parameters.

Similarity percentages (SIMPER, CLARKE, 1993) was used to identify, the percentage contribution that each species made to the measure of similarity at depth. Deeper stations are composed of the group 1 and shallow stations are consist of group 2 as well it can be seen at the Table 3. ANOSIM tests showed that the aforementioned groups are significantly no different (global R superior to 12.075-at a significance level much than 5%).

Table 3. The stations number of groups.

Group	Stations	Size	Station Numbers (Fig.1)
1	Deeper	13	4,6-8,13,18,19,22,23,32,39,42,43
2	Shallower	26	1-3,5,9-12,14-17,20,21,24,27-31,33,34,36,37,40,41

The two main groups of the above-mentioned stations different species composition: *Cerithium vulgatum* and *Jujubinus exasperatus* (Table 4) were the most abundant species in deeper stations.

Table 4. Group 1 Average Similarity=18.16 S.D=15.356

Species	AV ABUN	SD	AVGE	SDEV	RATIO	Similarity Percent	CUM %
Cerithium vulgatum	0.54	0.52	5.2	10.99	0.48	28.79	28.79
Jujubinus exasperatus	0.54	0.52	4.3	7.90	0.54	23.47	52.26

AV ABUN: Average abundance ; **SD:** Abundance similarity ; **AVGE**: Average simmilarity
SDEV: Standard deviation of similarity ; **RATIO**: AVGE/ SDEV ; **CUM %**: Cumulative percent similarity

Patella caerulea, *Columbella rustica*, *Phorcus richardi* and *Conus mediterraneus* (Table 5) were the most abundant species in the shallow stations.

Table 5. Group 2 Average Similarity: 33.90 S.D=13.767

Species	AV. ABUN	SD	AVGE	SDEV	RATIO	Similarity Percent	CUM%
Patella caerulea	0.88	0.33	6.3	4.94	1.28	18.72	18.72
Columbella rustica	0.81	0.40	4.9	4.52	1.08	14.35	33.07
Phorcus richardi	0.73	0.45	4.1	4.89	0.85	12.24	45.31
Conus mediterraneus	0.77	0.43	4.1	4.13	1.00	12.22	57.53

AV ABUN: Average abundance; SD: Abundance similarity ; AVGE: Average simmilarity
SDEV: Standard deviation of similarity ; RATIO: AVGE/ SDEV ; CUM %: Cumulative percent similarity

Patella caerulea, *Columbella rustica*, *Phorcus richardi*, *Conus mediterraneus* and *Osilinus turbinata* (Table 6) were the most abundant discriminator species between these two groups.

Table 6. Average dissimilarity between groups 2 & 1=93.62 STD.DEV=7.917

	Group 2		Group 1						
Species	AV ABUN	S.D	AV ABUN	S.D	AV TERM	S.D	RATIO	Dissimilarity Percent	CUM%
Patella caerulea	0.88	0.33	0.00	0.00	5.18	3.69	1.40	5.54	5.54
Columbella rustica	0.81	0.40	0.00	0.00	4.45	3.39	1.31	4.75	10.29
Phorcus richardi	0.73	0.45	0.08	0.08	4.02	3.93	1.02	4.29	14.58
Conus mediterraneus	0.77	0.43	0.15	0.15	3.76	3.33	1.13	4.01	18.59
Osilinus turbinatus	0.62	0.50	0.00	0.00	3.53	3.36	1.05	3.77	22.36

AV ABUN: Average abundance ; SD: Abundance similarity ; AV TERM: Average dissimilarity between group 2 and 1.
AVGE: Average similarity ; SDEV: Standard deviation of similarity ; RATIO: AVGE/ SDEV; CUM %: Cumulative percent similarity

Discussion and Conclusions

Nassarius reticulatus (Linnaeus, 1758) was reported from the Aegean Sea in a few studies (KOUTSOUBAS *et al*., 1997; OZTURK & CEVIK 2000). Regarding to the literature, *Nassarius nitidus* was reported only by DEMIR (2003) as a variety of *Nassarius reticulatus*. However, according to the MICU (2004), recent morphological and biochemical studies (ROLAN & LUQUE, 1995; SANJUAN, *et al.* 1997) demonstrated that the name *Nassarius reticulatus* has been used until recently for two different valid species: *Nassarius reticulatus*, an Atlantic species which may be present in the Mediterranean only in parts of the Alboran Sea, and *Nassarius nitidus*, the most common and widespread nassariid through the Mediterranean. Obtained specimens were identified as *Nassarius nitidus* in this study.

Identified species around Bozcaada Island, 91 (72.2 %) are of Atlantic- Mediterranean origin, whereas 29 (23 %) are Mediterranean endemics, four (3.2 %) are cosmopolitan, one (0.8 %) is Boreal and one (0.8 %) is Indo-Pacific.

According to the obtained literature, the number of Bivalves and Gastropods species from Imbros, Bozcaada, Lesvos and Crete islands, which are situated from the North to the South of the Aegean Sea, is given in Table 7. McConnaughey Similarity and Analysis of Similarity ANOSIM took into account for presence/ absence of bivalve species in Bozcaada, Imbros, Crete and Lesvos islands.

All of these analyses were based only on the data regarding bivalves because the data on other groups of molluscs were insufficient. According to the these analyses showed that there are two groups Bozcaada, Imbros and Lesvos and Crete islands. The characteristics of the surface water of the Northern Aegean Sea that surrounds the islands in the group I as a classification Bozcaada and Imbros Islands are, under the influence of Black Sea waters and therefore surface salinity varies seasonally between 26-35 psu (YUCE, 1995). But at the result of ANOSIM, these four islands do not differ from each other.

According to the result of this study, *Cerithium vulgatum* and *Jujubinus exasperatus* were the most abundant species in deeper stations whereas, *Patella caerulea*, *Columbella rustica*, *Porcus richardi* and *Conus mediterraneus* were the most abundant species in the shallow stations. These results were supported by the common information, so that, *Cerithium vulgatum* is known that abundant at 10 m depth (CEBRIAN & BALLESTEROS, 2004), the another species which is *Jujubinus exasperatus* lives mainly on weeds from the low tide line down to 200 m (POPPE & GOTTO,1991). *Patella caerulea* lives to a few m in depth, *Columbella rustica* lives intertidal to 20 m and *Conus mediterraneus* lives in shallow water (POPPE & GOTTO, 1991). These two groups do not include the 25, 26 and 38 stations. Because obtained species from these stations are different from the most similarity species for two groups.

As a results of this study and others studies which were been done before at Bozcaada Island, the total number of determined mollusc species was increased to 132 in the littoral of Bozcaada Island. We think that the number of mollusc species known from Bozcaada will increase significantly if future research will extensively cover all kinds of habitats, including those deeper than 40 m.

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