THE MACROZOOBENTHIC INVERTEBRATE FAUNA IN THE MARMARA SEA

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Abstract

Macrobenthic invertebrate were collected from 12 stations in the Marmara Sea. A total of 48 taxons were identifed. The highest species diversity was found in the southern Marmara with 19 taxons, whereas in the northern Marmara, only 2-9 taxons were identified. *Macropipus depurator* has the highest presence with 11, and *Parapenaeus longirostris* has highest dominance with 59.34 and highest abundance with 2853 specimens. A high diversity of species was found between 30-63 m in the stations around the Marmara islands. In the northern Marmara, 5-9 species were found between 66-174 m, and only two species at the 298 m station. As a result, the species diversity was found to be higher in the Southern Marmara Sea especially around the Kapıdağ Peninsula.

Keywords: Marmara Sea, Benthic Ecology, Diversity

Introduction

The Marmara sea is an important biological corridor/barrier between the two different marine ecosytems of the Black and Mediterranean seas (1, 3). Therefore, biological diversity research is important, for the development of conservation strategies within the Marmara Sea. The Marmara Sea has a two layer current system with different ecological conditions in the upper and deep layers, it has three depressions in the east-west direction down to 1000 meters (2). Few studies have been made on the ecology of the Marmara Sea (1, 4, 5). The present research studied the general composition of macrozoobenthic invertebrates, focusing on the difference between the northern and southern parts of the Marmara Sea.

Material and Method

This study was carried out between 1 and 19 August 2001. Twelve stations were sampled using a bottom trawl net with our research vessel R/V *Yunus*. The samples were collected at depths between 33 m and 298 m. Stations 6-8,10-12 were located in the northern Marmara and stations 1-5 and 9 were located in the southern Marmara. Each sample was described, measured, counted and weighed. An echosounder was used to measure depth.

Calculations of abundance, presence and dominance were made. Abundance (A) is the mean number of the individuals from the total number of samples, presence (P) the number of observations of a species from the total number of samples. A "P" value of 11 indicates 11 stations and dominance (D) is the propotion of the total number of one species to the total number of all organisms.

Results and Discussion

A total of 48 taxons were determined including two classes, two families and 15 genera. Abundance, presence and dominance were calculated after the description. *Macropipus depurator* has the highest presence (in 11 out of 12 stations), and *Parapenaeus longirostris* the most dominant with 59,34 and most abundant with 2853 specimens. The highest diversity of species was found between 30-63 meters (stations 3 and 5, 19 species; 16 species at station 4, 13 species at station 1; and 12 species at station 2, around the Marmara islands). In the northern Marmara between five and nine species were found in the 66-174 meter range and only two species in the 298 m. range (Table 1.).

The Marmara Sea has a two layer current system with different oceanographic conditions. The upper layer originated in the Black Sea and has low salinity waters. The lower layer is originally from the Mediterranean Sea and has a higher salinity and the southern part of the Marmara Sea is shallower than northern part. The Marmara Sea has three depressions down to 1000 m in an east-west direction. All these oceanographic and morphometric conditions affect the distribution of macrozoobenthic invertebrate fauna. As a result, the species diversity was found to be higher in the southern part of the Marmara Sea, especially around the Kapıdağ Peninsula.

Table 1. Species with number of individuals, values of abundance (A), presence (P) and dominance(D) in sampling stations.

Taxon	Sta.1	Sta.2	Sta.3	Sta4	Sta.5	Sta.6	Sta.7	Sta.8	Sta.9	Sta.10	Sta.11	Sta.12				
Depth (m)	61	33	63	37	38	70	298	83	47	174	66	82	TOTAL	A	P	D(%)
CNIDARIA																
F. quadrangularis	1	5	5										11	0.92	3	0.019
A. palmatum			7	4	4								15	1.25	3	0.025
P.phosphorea			26										26	2.2	1	0.044
Pennatula rubra	19												19	1.58	1	0.033
V. cynomorium		11			1								12	1	2	0.02
Veretillum sp.										1			1	0.08	1	0.002
ANNELIDA																
Hirudinea (sp.)	1												1	0.08	1	0.002
MOLLUSCA																
Cassidaria sp.	5		4										9	0.75	2	0.016
Arca sp.				2	2						27		31	2.58	3	0.053
Natica sp.											1		1	0.08	1	0.002
Bullomorpha sp.		175	10	442	892								1591	132.5	4	2.753
A. tuberculata				5	1								6	0.5	2	0.010
Pinna sp.				1									1	0.08	1	0.002
Pteria sp.						3							3	0.25	1	0.005
Eledone sp.					1								1	0.08	1	0.002
Illex coindetii		1											1	0.08	1	0.002
Loligo sp.	10	25	140	6	38	5			4				228	19	7	0.394
Sepia officinalis			5						69				74	6.16	2	0.128
Sepia orbignyana		21	5		3	4		2	21				59	4.91	6	0.102
Sepia rondeletti									1				1	0.08	1	0.002
Sepia sp.		102	21		115								238	19.8	3	0.412
Sepiola sp.			5										5	0.42	1	0.009
Sepiidae (sp.)	15												5	0.42	1	0.009
CRUSTACEA																
C. macendrea												1	1	0.08	1	0.002
P. typhlops										1			1	0.08	1	0.002
P.longirostris	4592		2046		5	5152	345	9731	4652	4300	370	3102	34295	2858	10	59.34
Plesionika sp.				1				6478		1573		3033	11084	923.6	4	19.18
M. depurator	111	2799	9	43	161	22		236	3304	14	13	61	6773	564.4	11	11.72
M. longirostris				7	2								9	0.75	2	0.016
Pilumnus hirtellus					1								1	0.08	1	0.002
Pilumnus sp.				2									2	0.16	1	0.002
G. rhomboides			3									1	4	0.33	2	0.009
Cancer sp.				2								7	9	0.75	2	0.015
Dorippe sp.			1										1	0.08	1	0.002
Paguride (sp.)					1								1	0.08	1	0.002
ECHINODERMATA																
A.aranciacus	2												2	0.16	1	0.002
A. spinulosus		25	93	344	210	78		7	7		176		940	78.3	8	1.626
A.irregularis	164												164	13.6	1	0.284
Asteroidea (sp.)									17	1			18	1.5	2	0.031
E. sepositus			1										1	0.08	1	0.002
Peltaster placenta	1												1	0.08	1	0.002
A. mediterranea			4	4									8	0.66	2	0.015
M. glacialis	20	21	4	4	3			2	3	1			58	4.83	8	0.100
Ophiura sp.				158	3+								161	13.42	2	0.279
Cidaris cidaris		6				5	1841			8		2	1856	154.6	4	3.212
S.purpureus																
Stichopus regalis	4	2	26		1			2		1		1	37	3.08	7	0.064
Cucumaria planci			5	8	4							1	18	1.5	4	0.031
TOTAL													57790			

References

1 - Öztürk B., 2002. The Marmara Sea, A Link Between The Mediterranean and The Black Sea. Pp. 337-340. *In:* E. Leppekoski et al (eds), Invasive Aquatic Species of Europe. Kluwer Academic Publ., Netherlands.

2 - Beşiktepe Ş.T., Özsoy E. and Latif M.A., 2000, Marmara Denizi'nin hidrografisi ve dolaşımı. Pp. 293-313. *In:* Öztürk B., Kadıoğlu M. and Öztürk H., (eds), Marmara Denizi 2000 Sempozyumu Bildiriler Kitabı. TÜDAV Publ. No: 5., İstanbul.

3 - Öztürk B. and Öztürk A.A., 1996. On the biology of the Turkish Strait system. Monaco No: special 17; CIESM Science Series.

4 - Balkıs H., 1995. Ecology of the Crabs Living in the Sea of Marmara. Pp. 1-23. İ.Ü Fen Fak. Biyoloji Dergisi. 58, İstanbul.

5 - Balkıs H., 1992. Marmara Adası littoralinin makrobentosu üzerine bir ön araştırma. Pp. 309-327. İ.Ü. Deniz Bilimleri ve Coğrafya Enstitüsü Bülteni. No: 9., İstanbul.