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Species belonging to Vermes fauna of the Bosphorus

İstanbul Boğazı'nın Vermes faunasına ait türler

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Abstract

This research was carried out in order to determine species belonging to Vermes fauna present in the Bosphorus and some ecological properties of these species. As a result of this study, 31 species belonging to 19 families and 30 genera were determined and three species among them [*Schizoporella unicornis* (Johnston, 1847), *Marphysa sanguinea* (Montagu, 1815) and *Bonellia viridis* Rolando, 1821] were new records for the Bosphorus fauna, according to present literature. The distribution is given for the obtained 31 species according to stations, zones, depths, bottom structures and salinity.

Key words: Bosphorus, Vermes, Zoobenthos.

Introduction

The Bosphorus located between the co-ordinates 40°59'N - 41°15'N and 28°59'E - 29°10'E is separated from the Black Sea in north and the Sea of Marmara in south by means of thresholds.

Through the Bosphorus, the waters of the Black Sea having the approximate salinity 17.6 ‰ flow to the Sea of Marmara by means of a surface current, and the Mediterranean originated waters of the Sea of Marmara having the approximate salinity 38.5 ‰ flow to the Black Sea by means of a bottom current (Yüce and Türker, 1991).

Thus, the Bosphorus with waters in the character of both brackish water and typical sea water has a rich fauna. But, under the threat of heavy pollution, there is a danger of losing some species without even being recognised.

The number of studies previously carried out in the Bosphorus in relation with this subject is quite limited. Demir (1952), Tortonese (1959), Caspers (1968) and Topaloğlu and Kihara (1993) reported the Vermes species in their studies about macrobenthic fauna. Greca (1949) and Rullier (1963) carried out studies of Polychaeta only. Ünsal (1975a,1975b) and Ünsal and d'Hondt (1978-1979) investigated the Bryozoa in the Turkish territorial waters. Kocataş et al. (1993) contributed a part to this group in their review together with the others.

This work was carried out to aim at determining the species belonging to the Vermes group that forms an important part of the Bosphorus fauna and some ecological properties of these species.

Material and Methods

Material of this study was obtained from 28 stations of the Bosphorus at different depths in 1993 (Fig.1). The locations, co-ordinates, depths, substrates, water temperatures and salinities of 28 stations were given in Table 1.

The materials belonging to coastal fauna were obtained by scraping from rock bottom with a spatula at 10 stations from mediolittoral zone while the bottom materials belonging to remaining 18 stations at various depths from 15 to 70 m by using beam-trawl and dredge. The obtained species were fixed and preserved in the 5 % formalin prepared with sea water.

References used to identify the species were: Hincks, 1880; Marcus, 1926; Perrier, 1935; Eales, 1950; Demir, 1952; Grasse, 1959; Riedl, 1963; Ryland, 1965; Cuenot, 1969; Fauvel, 1969a, 1969b; Kluge, 1975; Ünsal, 1975b.

The distribution of the species is tabulated according to stations (Tab.2), salinities, zones and depths, and substrates (Tab.3).

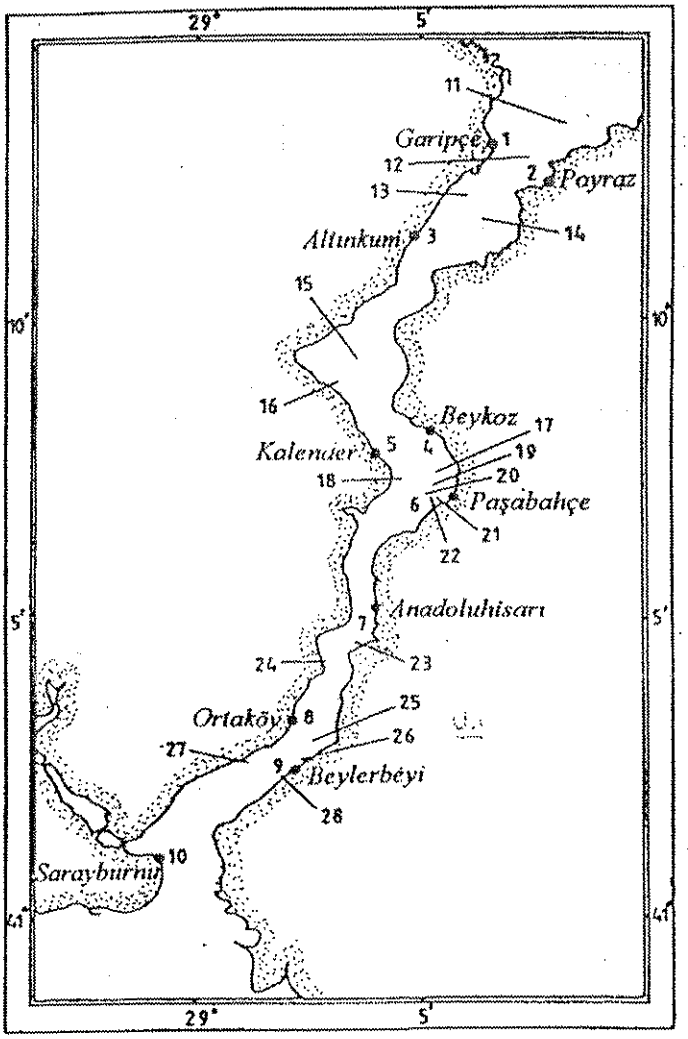

Figure 1. Sampling stations in the Bosphorus.

Table 1. Data about stations.

Station no	Locations	Depth m	Substrate	Salinity ‰ S	Temperature T °C
1	GARIPÇE	-	Rock	18.1	24
2	POYRAZ	-	Rock	17.7	20.5
3	ALTINKUM	-	Rock	18	23.5
4	BEYKOZ	-	Rock	17.5	10.1
5	KALENDER	-	Rock	18.4	23.2
6	PAŞABAHÇE	-	Rock	15.7	16.5
7	ANADOLUHİSARI	-	Rock	16.7	9.9
8	ORTAKÖY	-	Rock	19.2	10
9	BEYLERBEYİ	-	Rock	18.3	10.2
10	SARAYBURNU	-	Rock	17.8	13.5
11	41°13′00′′N 29°08′20′′E	20	Sand	19.0	20.1
12	41°12′37′′N 29°07′38′′E	45	Sand	23.0	9.1
13	41°12′00′′N 29°05′54′′E	25	Mud	20.5	19.3
14	41°11′59′′N 29°06′33′′E	60	Mud+Shell	37.5	14.6
15	41°09′30′′N 29°03′60′′E	43	Mud	24.0	9.4
16	41°09′00′′N 29°03′00′′E	42	Mud	35.0	14.7
17	41°07′50′′N 29°05′30′′E	35	Stone	24.5	18.5
18	41°07′40′′N 29°04′47′′E	15	Shell	18.5	21.9
19	41°07′15′′N 29°05′15′′E	70	Mud	36.5	14.4
20	41°07′13′′N 29°05′12′′E	60	Mud+Shell	36.5	14.2
21	41°07′13′′N 29°05′22′′E	30	Mud+Shell	18.0	11.4
22	41°07′13′′N 29°05′18′′E	50	Mud+Shell	21.5	10.5
23	41°04′37′′N 29°03′58′′E	40	Mud+Stone	31.5	12.1
24	41°04′30′′N 29°02′51′′E	50	Shell	37.0	14.2
25	41°03′00′′N 29°02′54′′E	60	Shell	37.0	13.9
26	41°02′37′′N 29°02′26′′E	57	Mud+Stone	37.5	14.3
27	41°02′60′′N 29°01′15′′E	44	Stone	37.5	14.0
28	41°02′37′′N 29°01′55′′E	19	Shell	19.0	18.0

Table 2. Distribution of species in stations.

Species	Station Numbers																											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Cercyra hastata O.Schmidt							+	+	+																			
Leptoplana sp.	+		+	+																								
Lineus sp.															+		+		+			+						+
Scropocellaria scruposa (Linnaeus,1758)																												+
Schizomavella linearis (Hassal, 1841)											+				+			+										+
Schizoporella unicornis (Johnston,1847)					+														+									
Cryptosula pallasiana (Moll.,1803)	+	+	+	+	+	+		+		+	+	+		+	+	+	+	+		+	+	+	+	+	+			+
Harmothoe sp.	+														+													
Phyllodoce sp.	+																											
Eulalia sp.	+									+																		
Syllis amica Quatrefages,1865						+																						
Typosyllis armillaris (Müller,1771)	+	+	+		+		+	+	+																			
Neanthes diversicolor (O.F.M.,1776)																					+							
Neanthes succinea (Frey and Leuckart,1847)						+	+		+			+			+		+				+							
Perinereis cultrifera (Grube,1840)	+	+	+	+		+		+	+	+																		
Platynereis dumerilii (Audouin&M.Edwards,1833)	+	+	+							+																		
Eunice vittata (Delle Chiaje,1828)																			+						+			
Marphysa sanguinea (Montagu,1815)														+														
Lumbrinereis sp.																									+			
Polydora ciliata (Johnston, 1838)						+																						
Notomastus sp.																			+									
Capitella capitata (Fabricius,1780)				+		+				+										+								
Clymene sp.																										+		
Melinna palmata Grube,1870													+								+							
Terebellides stroemi Sars,1835																			+									
Chone filicaudata Southern, 1914																									+			
Serpula vermicularis Linnaeus,1767																												+
Hydroides norvegica Gunnerus, 1768														+			+		+								+	
Pomatoceros triqueter (Linnaeus,1767)								+	+		+			+	+		+	+				+		+	+			+
Spirorbis pagenstecheri (Quatrefages,1865)	+	+	+	+	+		+	+	+									+										+
Bonellia viridis Rolando,1821															+													

Table 3. Distribution of species according to salinity, zones and depths, substrate. Ml:Mediolittoral IL:Infralittoral SCL:Sircalittoral R:Rock Sh:Shell St:Stone M:Mud

Species	Salinity ‰o S		Zones and Depths									Substrate			
			ML	IL				SCL							
	15.7-24.7	24.8-37.5	-	15	20	25	30	40	50	60	70	R	Sh	St	M
TURBELLARIA															
Cercyra hastata	+		+									+			
Leptoplana sp.	+		+									+			
NEMERTINI															
Lineus sp.	+	+			+			+	+		+		+	+	+
STELMATOPODA															
Scropocellaria scruposa	+				+								+		
Schizomavella linearis	+			+	+				+				+		
Schizoporella unicornis	+	+	+								+	+			
Cryptosula pallasiana	+	+	+	+	+		+	+	+	+		+	+	+	
POLYCHAETA															
Harmothoe sp.	+		+						+			+			+
Phyllodoce sp.	+		+									+			
Eulalia sp.	+		+									+			
Syllis amica	+		+									+			
Typosyllis armillaris	+		+									+			
Neanthes diversicolor	+						+								+
Neanthes succinea	+		+				+	+	+			+		+	+
Perinereis cultrifera	+		+									+			
Platynereis dumerilii	+		+									+			
Eunice vittata		+								+	+		+		+
Marphysa sanguinea		+								+					+
Lumbrinereis sp.		+								+			+		
Polydora ciliata	+		+									+			
Notomastus sp.		+									+				+
Capitella capitata	+	+	+							+		+			
Clymene sp.		+								+					+
Melinna palmata	+					+	+								+
Terebellides stroemi		+									+				+
Chone filicaudata		+								+			+		
Serpula vermicularis	+				+								+		
Hydroides norvegica	+	+						+	+	+	+			+	
Pomatoceros triqueter	+	+	+	+	+			+	+	+		+	+	+	
Spirorbis pagenstecheri	+		+	+	+							+	+		
ECHIUROIDEA															
Bonellia viridis	+								+						+

Results

As a result of this research, totally 31 species were obtained belonging to 19 families and 30 genera. Of these species, *Schizoporella unicornis* (Johnston, 1847), *Marphysa sanguinea* (Montagu, 1815) and *Bonellia viridis* Rolando, 1821 were noted to be new records for the Bosphorus fauna.

To determine the distribution of species according to salinity, 24.7 ‰ salinity was assumed as the value separating brackish water from typical sea water (Tait, 1981).

In Table 3, it is seen that 18 species were living merely in brackish water, 7 species in typical sea water and 6 species in both water. Distribution according to zones showed that 9 species were living only in mediolittoral, 4 in infralittoral and 9 in sircalittoral, 1 in both mediolittoral and infralittoral, 2 in both infralittoral and sircalittoral, 3 in both mediolittoral and sircalittoral and 3 in all three zones. Regarding the distribution according to substrate, it is seen that 11 species were living solely on rock bottom, 5 on shell bottom, 1 on stone bottom and 7 on mud bottom. As regards the number of species according to edaphic factors, the rock bottom is at first place with 16 species.

Discussion

The species were determined by this investigation, belonging to Vermes fauna present from shore to 70 m depths of the Bosphorus and their ecological properties.

As a result of systematical identification of the obtained species, it was determined that Turbellaria was being represented by 2 species, Nemertini by 1, Stelmatopoda by 4, Polychaeta by 23 and Echiuroidea by 1. Three species among these were determined to be new records for the Bosphorus fauna.

In previously conducted studies, totally 189 Vermes species had been determined, 10 belonging to Turbellaria, 8 to Nemertini, 2 to Spinculoidea, 1 to Archiannelida, 155 to Polychaeta, 1 to Olygochaeta

and 12 to Stelmatopoda. Many of these species could not be obtained in this study. The relevant reasons for that can be as follows:

All materials belonging to coastal fauna were taken from rock bottom. No material was taken from soft bottom. Material from bottom fauna could not be taken at 1-15 m depths of infralittoral zone due to sunken vessels and underwater cables, heavy Bosphorus traffic and prohibition of approach to coast in some areas. Infauna could not be examined sufficiently in studies conducted in areas deeper than 15 m since only beam-trawl and dredge were used.

However, the number of species belonging to Vermes fauna of the Bosphorus increased from 189 to 192 with the addition of three new recorded species. Moreover, the places were determined where these species exactly existed and their distribution according to salinity, substrate and zone.

These data will guide the studies to be carried out for the purpose of protecting these species which are under pollution threat in the Bosphorus.

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Özet

Bu araştırma İstanbul Boğazı'nda bulunan Vermes faunasına ait olan türleri ve bu türlerin bazı ekolojik özelliklerini saptamak amacıyla yapılmıştır. Bu çalışma sonucunda, 19 familya ve 30 cinse ait 31 tür saptanmış ve eldeki literatüre göre bu türlerden 3 tanesinin [*Schizoporella unicornis* (Johnston, 1847), *Marphysa sanguinea* (Montagu, 1815), *Bonellia viridis* Rolando, 1821] İstanbul Boğazı faunası için yeni kayıt oldukları belirlenmiştir. Elde edilen 31 türün istasyonlara, zonlara, derinliklere, dip yapısına ve tuzluluğa göre dağılımları verilmiştir.

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