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ANOMURAN (CRUSTACEA : DECAPODA) SPECIES IN THE SEA OF MARMARA

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ABSTRACT

This study, identifying the Anomuran species of the Sea of Marmara and some of their ecological features, was carried out between the years of 1994 and 1997. In total, 13 Anomuran species were identified, five of which (*Pagurus anachoretus* Risso, 1827; *P. excavatus* (Herbst, 1791); *P. prideaux* Leach, 1815; *Anapagurus laevis* (Bell, 1845); *Pisidia bluteli* (Risso, 1816)) were designated as the first records for the fauna of the Sea of Marmara, and one (*P. excavatus*) is the first recording of the fauna for Turkish seas. Data about ecological properties of the species were given.

KEY WORDS : Sea of Marmara, Zoobenthos, Anomuran species

INTRODUCTION

The Sea of Marmara is a small basin (size ~ 70x250 km, surface area 11500 km^2 and maximum depth 1390 m) located between the continents of Europe and Asia (BEŞIKTEPE *et al.,* 1995). It has been subject to

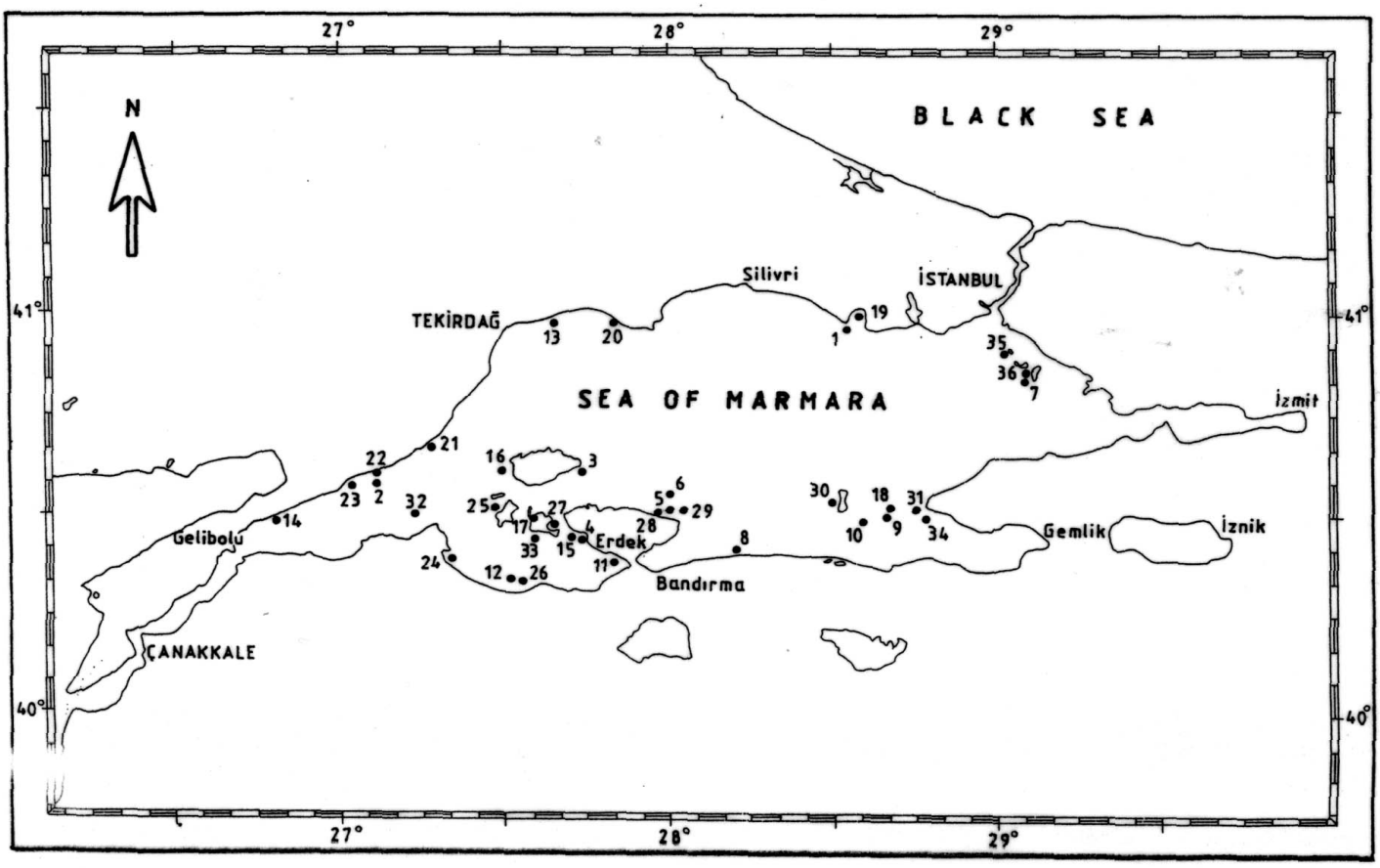

Fig.1 - Research stations in the Sea of Marmara

considerable human use and influence for many years and connects to the Black Sea through the Bosporus in the north-east and to the Aegean Sea via the Dardanelles in the south-west (□NL□ATA *et al.*, 1990).

Up to now, only a few studies on the Anomuran species in this region have been conducted (OSTROUMOFF, 1896; DEMIR, 1952; HOLTHUIS, 1961; KOCATA□, 1981; M□LLER, 1986). The aim of this study is to contribute to existing knowledge of the Anomuran fauna of the Sea of Marmara. In addition, some of their ecological properties are identified.

MATERIALS AND METHODS

The samples were obtained between the years of 1994 and 1997 from 36 stations at the depths of 0.1 to 65 m by beam trawl, dredging, bottom trawl and scoop net (Fig. 1). These samples were rinsed in wire sieves. The Anomuran species were separated and then fixed and preserved in 5% sea water formalin. All Anomuran species have been conserved in the Hydrobiological Museum of the Department of Biology, Faculty of Science, the University of Istanbul.

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 by the Winkler method (WINKLER, 1888). The identification of the specimens was carried out according to BOUVIER (1940), ZARIQUIEY ALVAREZ (1968), DEMIR (1952) and INGLE (1993).

RESULTS

As a result of this study, a total of 13 species belonging to four families was identified. Five species (*Pagurus anachoretus* Risso, 1827; *P. excavatus* (Herbst, 1791); *P. prideaux* Leach, 1815; *Anapagurus laevis* (Bell, 1845); *Pisidia bluteli* (Risso, 1816)) are the first records for the fauna of the Sea of Marmara, one of them (*P. excavatus*) being the first for all Turkish seas. Data on minimum and maximum values of depth, temperature, salinity and dissolved oxygen, as well as bottom structure, number of examined specimen and the sampling stations on which the species was found, are provided (Table 1). Nomenclature of the species follows UDEKEM D'AKOZ (1999).

Table 1

List of species and ecological properties in the sampling stations

Family	Species	Material examined	Stations	Ecological properties				
				Depth m	t^0C	p.s.u.	$mg.l^{-1}$	Bottom structure
GALATHEIDAE	*Galathea squamifera* Leach, 1814	1 F[1]	10	18	10.7	35.0	7.2	Rock
PORCELLANIDAE	*Pisidia bluteli* (Risso, 1816)	1 M [1], 2 F	10-17	13-18	10.7-17.5	20.9-35.0	7.2-8.8	Rock+ Stone
	Pisidia longimana (Risso, 1816)	4 M, 9 F	10-11-17-21-23-26-28	12-18	10.4-17.5	20.9-35.0	4.1-9.8	Stone+ Rock
	Porcellana platycheles (Pennant, 1777)	3 F	35-36	0.1	22.7-22.9	20.0-20.3	10.0-10.3	Rock
DIOGENIDAE	*Clibanarius erythropus* (Latreille, 1818)	5 M, 1 F	35-36	0.1	22.7-22.9	20.0-20.3	10.0-10.3	Rock
	Diogenes pugilator (P.Roux, 1829)	9 M, 2 F	19-22-24-30	13-18	15.4-17.2	24.2-34.1	3.4-7.0	Sand
	Paguristes eremita (Linnaeus,1767)	18 M, 5 F	3-5-6-9-13-18-25-29-31-32-34	18-65	14.8-15.8	35.3-38.0	1.2-4.3	Mud
PAGURIDAE	*Anapagurus bicorniger* A.Milne Edwards & Bouvier, 1892	1 M	4	30	14.9	36.1	6.3	Mud
	Anapagurus laevis (Bell, 1845)	2 M	14	13	17.5	20.9	8.8	Sand
	Pagurus anachoretus Risso, 1827	2 M, 1 F	10	18	10.7	35.0	7.2	Rock
	Pagurus cuanensis Bell, 1845	7 M, 1 F	4-15-16-20-27-31	17-63	14.8-15.6	33.7-36.9	2.0-6.3	Mud
	Pagurus excavatus (Herbst, 1791)	7 M, 5F	1-2-7-8-12-18-31-33	33-53	14.4-15.0	33.2-37.2	1.2-3.8	Mud
	Pagurus prideaux Leach, 1815	4 M, 3 F	6-9-18	42-43	14.9-15.3	36.7-37.1	1.6-4.1	Mud

[1] F - females; M - males

DISCUSSION

The oldest study on Anomura in the Sea of Marmara was performed by OSTROUMOFF (1896). He reported nine species and two genera from this region. Then, DEMIR (1952) reported eight species belonging to Anomuran fauna. He recorded *Porcellana digitalis* Heller and he was not sure of the accuracy of his identification. MULLER (1986) identified this species as *Pisidia longicornis* (Linnaeus, 1767), whereas GELDIAY and KOCATAS (1970) interpreted its identity as *P. longimana*. The description and figure of *P. digitalis* in DEMIR (1952) most closely resemble to *P. longimana*. Therefore, GELDIAY and KOCATAS (1970) interpretation of this taxon has been accepted. Moreover, two species were reported by HOLTHUIS (1961), four species by KOCATAS (1981) and two species by MULLER (1986).

A total of 16 Anomuran species had been identified in studies carried out in the Sea of Marmara prior to the present study. With the addition of newly recorded species in this study, the number of Anomuran species known to exist in the Sea of Marmara has now reached 21. The distribution of the species present in the Sea of Marmara throughout the Turkish seas is given in table 2.

Table 2

Anomuran recorded from the Turkish seas

Species	**Black Sea**	**Bosporus**	**Sea of Marmara**	**Dardanelles**	**Aegean Sea**	**Mediter-ranean Sea**
GALATHEIDAE						
Galathea intermedia			3		5,6,8	4,6
G. nexa		2	2	1	8	
G. squamifera			3, 9		5,6,8	6
G. strigosa			3			
Munida perarmata			2		7	
M. rugosa			2			
PORCELLANIDAE						
Pisidia bluteli			9		5,6,8	4,6
P. longimana	4	3,4	3,4,6,9		5,6,8	4,6
Porcellana platycheles			2,3,6,9		5,6,8	4,6
DIOGENIDAE						
Clibanarius erythropus	4,6	2,3	2,3,6,9		5,6,8	4,6
Diogenes pugilator	4,6	3	2,3,4,6,9	1	5,6,8	6
Paguristes eremita		2	2,9		5,6,8	6

PAGURIDAE						
Anapagurus bicorniger			7,9		5,6,8	
A. breviaculeatus			3		6	
A. laevis			9		6,8	
Cestopagurus timidus			7		5,6,8	4
Pagurus anachoretus			9	1	5,8	4
P. cuanensis		2	2,9	1	5,6,8	6
P. excavatus			9			
P. forbesii			2			
P. prideaux			9		5,8	

1 - COLOMBO (1885); 2 - OSTROUMOFF (1896); 3 - DEMIR (1952); 4 - HOLTHUIS (1961); 5 - GELDIAY & KOCATA (1970); 6 - KOCATA (1981); 7 - M LLER (1986); 8 - CENGIZ *et al*. (2001); 9 - Present study.

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