

Ptenoglossa Species (Mollusca: Gastropoda) Distributed along the Turkish Coast of the Aegean Sea

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Abstract: This study was performed to determine Ptenoglossa species (Mollusca, Gastropoda) distributed along the Turkish coastline of the Aegean Sea. The examination of samples, taken between 1995 and 2005 from various biotopes and depths up to 300 m, yielded 249 specimens and 130 shells, belonging to 33 ptenoglossate species, of which *Monophorus thiriota* Bouchet 1984, *Similiphora similior* (Bouchet and Guillemot 1978), *Cerithiopsis diadema* Monterosato 1874, *Cerithiopsis jeffreysi* Watson 1885, *Krachia tiara* (Monterosato 1874), *Punctiscala cerigothana* (Sturani 1896), *Melanella boscii* (Payraudeau 1826), and *Nanobalcis nana* (Monterosato 1878) were unrecorded from the Turkish coasts. Furthermore, *M. thiriota* and *K. tiara* are new reports for the eastern Mediterranean Sea and the Aegean Sea fauna, respectively. This study also elucidates ecological characteristics of the species found and their distribution along the Turkish coasts. The photographs of newly reported species for the Turkish mollusc fauna are also given.

Key Words: Gastropoda, Ptenoglossa, Aegean Sea, ecology, distribution

Türkiye'nin Ege Denizi Kıyılarında Dağılım Gösteren Ptenoglossa (Mollusca: Gastropoda) Türleri

Özet: Bu çalışma, Türkiye'nin Ege Denizi Ptenoglossa (Mollusca, Gastropoda) türlerini saptamak amacıyla yapılmıştır. 1995-2005 yılları arasında, 300 m derinliğe kadar olan değişik bölgelerin farklı biyotoplarından alınan örneklerin değerlendirilmesi sonucu, bu sistematik kategori kapsamında, 33 tür ve bu türlere ait toplam 249 birey ve 130 kabuk tespit edilmiştir. Bu türler arasında *Monophorus thiriota* Bouchet 1984, *Similiphora similior* (Bouchet and Guillemot 1978), *Cerithiopsis diadema* Monterosato 1874, *Cerithiopsis jeffreysi* Watson 1885, *Krachia tiara* (Monterosato 1874), *Punctiscala cerigothana* (Sturani 1896), *Melanella boscii* (Payraudeau 1826) ve *Nanobalcis nana* (Monterosato 1878) daha önce kıyılarımızdan bildirilmemiştir. Ayrıca, *M. thiriota* Doğu Akdeniz ve *K. tiara* da Ege Denizi faunası için ilk defa rapor edilmektedir. Bu araştırmada, saptanan türlerin ekolojik özelliklerinin yanı sıra, bunların Türkiye denizlerine göre dağılımları da incelenmiştir. Bunlara ek olarak, Türkiye Mollusca faunası için yeni kayıt türlerin fotoğraflarına da yer verilmiştir.

Anahtar Sözcükler: Gastropoda, Ptenoglossa, Ege Denizi, ekoloji, dağılım

Introduction

The suborder Ptenoglossa (Gray, 1853) within the order Caenogastropoda, comprises 131 species belonging to 53 genera in the Mediterranean Sea, which are mainly characterised by having a comb-like radula (Giannuzzi-Savelli et al., 1999). However, according to Warén (1993), some taxa, such as Aclididae and Cimidae, retained in Ptenoglossa in Giannuzzi-Savelli et al., 1999, should be transferred to the subclass Heterobranchia, due to some similarities between the species in this subclass (in Giannuzzi-Savelli et al., 1999).

Many studies covering this suborder were conducted, especially in the second half of the last century, also including some revisions [e.g., Bouchet (1984, 1995), Aartsen et al., (1984), Hallgass (1985), Cachia et al., (1996), Fretter and Graham (1982), Bouchet and Warén (1986), Warén (1983, 1988)]. The Mediterranean ptenoglossate species have been well represented in a recently published atlas by Giannuzzi-Savelli et al., (1999), where 131 species belonging to 53 genera are illustrated. In spite of the relatively rich literature on the ptenoglossate molluscs, there is no detailed information

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on this group in the eastern Mediterranean, especially in the Levantine and Aegean Seas, although the checklists given by Buzzurro and Greppi (1996), Koutsoubas et al. (1997), and Öztürk et al., (2003) mentioned this suborder in the eastern Mediterranean Sea.

Ptenoglossate molluscs are heterogeneous regarding to their shell morphology, ecological characteristics, and zoogeographic distribution. For example, *Metaxia* (Delle Chiaje, 1828), a genus in the family Triphoridae, have a dextral shell, in contrast to the other genera of this family distributed in the Mediterranean, which have a sinistral shell. According to the relevant references indicated above (Warén, 1983 and Giannuzzi-Savelli et al., 1999), some of the ptenoglossate species are parasites on echinoderms (Eulimidae), whereas the others are predators-parasites of Anthozoa (Epitonidae) or inhabiting associated with sponges (Triphoridae).

The majority of the Mediterranean species of Ptenoglossa are of Atlanto-Mediterranean origin, but there are also species endemic to the Mediterranean Sea, and the others having boreal and cosmopolitan distributions. However, 3 species of this suborder distributed in the Mediterranean are alien: *Metaxia bacillum* (Issel, 1869), *Cerithiopsis pulvis* (Issel, 1869), and *Cerithiopsis tenthrenois* (Melvill, 1896).

According to Öztürk and Çevik (2000), only 35 species were reported from the Turkish coasts, of which 24 species were found in the Levantine Sea, 14 species in the Aegean Sea, and 19 species in the Sea of Marmara. Afterwards, Demir (2003), Albayrak (2003), and Gönlügür (2005) gave some information on the ptenoglossate species, which were newly reported from the Turkish coast.

The objective of this study is to contribute to the knowledge of Ptenoglossa species in the Aegean Sea, with an emphasize on the species newly reported for the Turkish mollusc fauna.

Materials and Methods

The majority of the material investigated in this study was collected by the RV Hippocampus in 2000 during a cruise to the Turkish Aegean coastline, which was aimed to determine the biological diversity of the Turkish Aegean Sea coast. The remaining material was collected during various research projects, with different purposes,

performed on the area between 1995 and 2005 (Figure 1). Deep water benthic samples (8-300 m) were taken by sampling gears, such as Van Veen Grab, dredge and beam trawl, whereas the shallow water material (0-8 m) were collected by snorkelling. The sampled material was sieved with 0.5 mm mesh size and retained fauna was fixed in a 5% formalin solution. In the laboratory, ptenoglossate specimens were separated from the other taxa and examined within a project supported by TÜBİTAK [Project No: TBAG 2343 (103 T 154)]. The dates, coordinates, depths, and biotopes structures of the stations (and some substations), where the ptenoglossate specimens were collected, are indicated in Table 1. On the other hand, together with the distributional aspects of the determined species along the Turkish seas, the photographs of the newly reported species for the Turkish mollusc fauna are also given in Figure 2.

The systematics given follows Gianuzzi-Savelli et al., (1999) and CLEMAM (Check List of European Marine Mollusca).

The studied material is deposited in the Museum of the Faculty of Fisheries, Ege University (ESFM), İzmir, Turkey.

Results

The faunistic analysis of over 150 benthic samples revealed 249 specimens and 130 shells belonging to 33 species, 18 genera, and 6 families. Among the identified species, *Monophorus thiriota* Bouchet 1984, *Similiphora similior* (Bouchet and Guillemot 1978), *Cerithiopsis diadema* Monterosato 1874, *Cerithiopsis jeffreysi* Watson 1885, *Krachia tiara* (Monterosato 1874), *Punctiscalia cerigothana* (Sturani 1896), *Melanella boscii* (Payraudeau 1826), and *Nanobalcis nana* (Monterosato 1878) have never been recorded from the Turkish coasts. The established species during this study, and their distributional patterns on the Turkish coasts, are given below.

TRIPHORIDAE

Marshallora adversa (Montagu, 1803)

Murex adversus Montagu, 1803

Material: St. 7, 3 shells; st.17, 2 specimens; st. 21, 3 shells; st. 27.1, 1 specimen; st. 30, 2 shells; st. 31.1, 2 specimens and 1 shell; st. 34, 1 specimen; st. 40.1, 1 specimen and 3 shells; st. 41, 4 specimens and 2 shells;

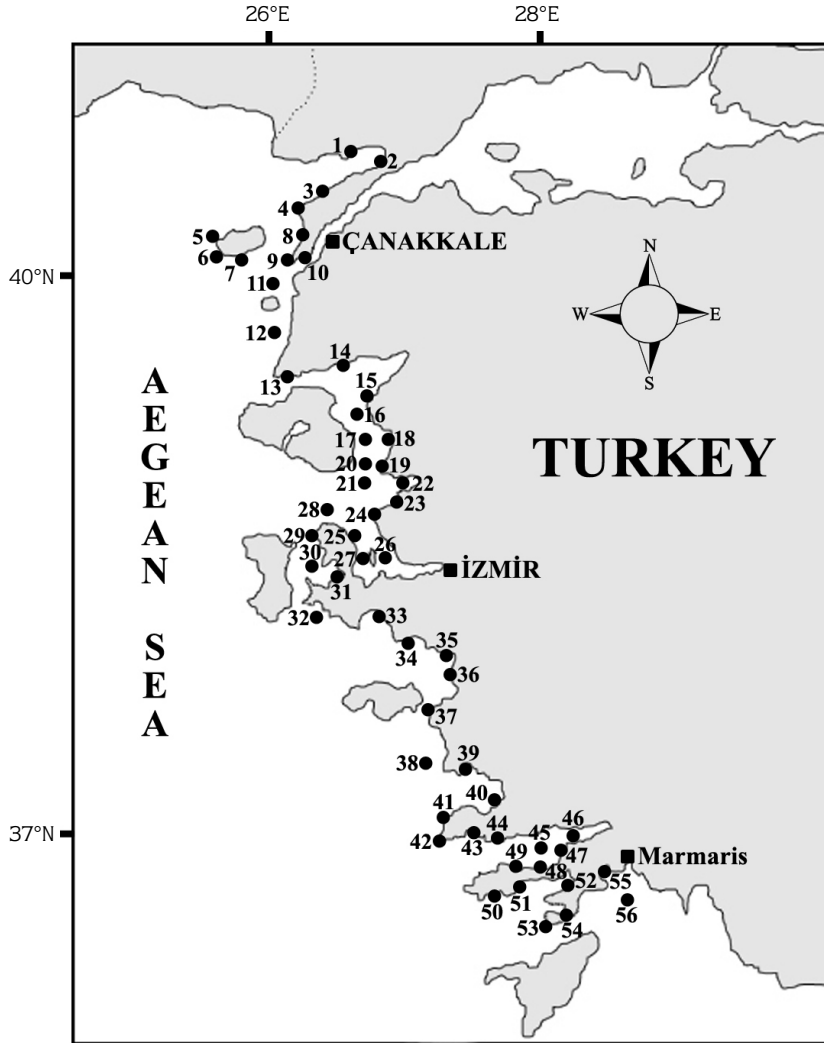


Figure 1. Map of the study area with location of the stations where ptenoglossate species were sampled.

st. 42, 1 specimen; st. 44, 3 specimens; st. 49, 1 specimen; st. 54.1, 1 specimen; st. 54.2, 1 shell.

Distribution: Levantine Sea (Buzzurro and Greppi, 1996: 6). It is here reported from the Turkish coast of the Aegean Sea for the first time.

Monophorus erythrosoma (Bouchet and Guillemot, 1978)

Triphora erythrosoma Bouchet and Guillemot, 1978

Material: St. 6, 1 specimen; st. 18, 1 specimen; st. 25.1, 2 specimens and 1 shell.

Distribution: This species has recently been reported (Öztürk et al, 2007) from the Turkish coastline of the Aegean Sea.

Monophorus perversus (Linnaeus, 1758)

Trochus perversus Linnaeus, 1758

Material: St. 27.2, 1 specimen; st. 31.4, 1 specimen; st. 51.1, 1 shell.

Distribution: Levantine Sea (Demir, 2003: 110), Aegean Sea (Kocataş, 1978: 28-46; Doğan et al., 2005: 145), Sea of Marmara (Ostroumoff, 1896: 60-87;

Table 1. Coordinates, sampling dates, depths, and biotope characterizations of the stations.

St	Coordinates		Date	Depth	Biotope	Sampling	Location
	Lat.	Long.					
1	40°37'08"N	26°38'17"E	03.08.2000	32 m	Muddy sand	Dredge	Saros Bay
2	40°34'20"N	26°48'26"E	03.08.2000	20 m	Sandy mud	Dredge	Saros Bay
3	40°23'46"N	26°21'46"E	03.08.2000	105 m	Muddy sand	Dredge	Saros Bay
4	40°20'03"N	26°13'12"E	03.08.2000	94 m	Muddy sand	Dredge	Saros Bay
5	40°10'40"N	25°40'50"E	13.08.2000	104 m	Mud	Dredge	Gökçeada
6	40°07'22"N	25°39'50"E	13.08.2000	15 m	Sand	Dredge	Gökçeada
7	40°05'45"N	25°50'45"E	13.08.2000	27 m	<i>Posidonia oceanica</i> Coralligenous sand	Dredge	Gökçeada
8	40°11'17"N	26°15'20"E	02.08.2000	20 m	<i>P. oceanica</i>	Dredge	Gelibolu Peninsula
9	40°04'45"N	26°10'50"E	13.08.2000	29 m	Coarse sand	Dredge	Ent. Çanakkale St.
10	40°03'07"N	26°12'41"E	05.07.1995	0.5-1 m	<i>Cystoseria adriatica</i>	by hand	Çanakkale Near the monument
11	39°58'50"N	26°03'25"E	13.08.2000	30 m	Muddy sand	Dredge	Ent. Çanakkale St
12	39°39'15"N	26°02'00"E	29. 7. 2000	70 m	Sandy mud	Dredge	South of Bozcaada
13	39°27'10"N	26°07'00"E	29. 7. 2000	70-90 m	Sand	Dredge	Edremit Bay
14	39°31'28"N	26°29'08"E	17.08.2000	24 m	Mud	Dredge	Edremit Bay
15	39°21'30"N	26°38'02"E	06.07.1995	5 m	<i>P. oceanica</i>	by hand	Cunda Island Ayvalık
16	39°15'00"N	26°32'05"E	28.07.2000	53 m	Sandy mud	Dredge	Dikili
17	39°09'30"N	26°40'20"E	28.07.2000	30 m	<i>P. oceanica</i> + <i>Caulerpa racemosa</i>	Dredge	Dikili
18	39°07'35"N	26°50'05"E	19.08.2000	8 m	<i>P. oceanica</i>	Dredge	Dikili
19	38°58'45"N	26°47'40"E	19.08.2000	31 m	Muddy sand	Dredge	Dikili
20	39°00'10"N	26°44'28"E	28. 7. 2000	50 m	Sand	Dredge	Çandarlı
21	38°57'11"N	26°45'48"E	28. 7. 2000	72 m	Muddy sand	Dredge	Çandarlı
22.1	38°55'36"N	26°49'10"E	07.03.2003	62 m	Coralligenous	Dredge	Çandarlı Bay
22.2	38°51'04"N	26°54'56"E	07.03.2003	50 m	Coralligenous	Dredge	Tavşan Island (Çandarlı Bay)
22.3	38°55'29"N	26°49'30"E	07.03.2003	46 m	Coralligenous sand	Dredge	Kızkulesi (Çandarlı Bay)
22.4	38°55'05"N	26°49'46"E	03.07.2003	56 m	Coralligenous	Dredge	Kızkulesi (Çandarlı Bay)
22.5	38°54'28"N	26°49'57"E	17.03.2005	20 m	<i>Posidonia oceanica</i> +Sand	Dredge	Kara Island (Çandarlı Bay)
22.6	38°54'17"N	26°50'18"E	17.03.2005	10 m	<i>Posidonia oceanica</i>	Dredge	Kara Island (Çandarlı Bay)
23	38°46'12"N	26°55'27"E	05.10.2001 19.10.1999	25-35 m	Muddy sand	Grab-Dredge	Nemrut Bay
24	38°40'45"N	26°44'26"E	07.07.1995 14.06.1996	1-5 m	Rocks covered by algae+ <i>Cladocora caespitosa</i>	by hand	Eski Foça
25.1	38°39'49"N	26°29'22"E	20.09.1995 09.05.1996	4 m	<i>Posidonia oceanica</i>	Diving	Karaburun
25.2	38°35'32"N	26°35'01"E	09.11.1997	48 m	Sand	Grab	İzmir Bay
25.3	38°40'45"N	26°44'26"E	01.09.1998	68 m	Sand	Grab	İzmir Bay
25.4	38°38'19"N	26°42'43"E	14.11.2000	58 m	Mud	Grab	İzmir Bay
26.1	38°37'58"N	26°34'08"E	01.09.1998	21 m	Mud	Grab	İzmir Bay
26.2	38°28'45"N	26°46'30"E	01.09.1998	54 m	Sandy mud	Grab	İzmir Bay
27.1	38°29'16"N	26°39'26"E	07.11.1997 12.04.2000 20.12.2001 13.02.2002	13-20 m	<i>Posidonia oceanica</i> +Sandy mud	Grab	İzmir Bay
27.2	38°30'21"N	26°38'36"E	06.08.2002 03.06.2002	8-20 m	Sandy mud+Shells fragments+ <i>P. oceanica</i>	Grab	Mordoğan
28	38°44'10"N	26°22' 00"E	12.09.2000	183 m	Sandy mud	Dredge	Karaburun

Table 1. (Continued)

St	Coordinates		Date	Depth	Biotope	Sampling	Location
	Lat.	Long.					
29	38°36'55"N	26°16'40"E	12.09.2000	115 m	Muddy sand	Dredge	Karaburun
30	38°20'48"N	26°14'15"E	14.09.2000	53 m	Muddy sand+ <i>Caulerpa racemosa</i>	Dredge	Çeşme
31.1	38°24'14"N	26°27'38"E	22.02.2002	6 m	<i>Posidonia oceanica</i> +Sand	Dredge	Ildır
31.2	38°24'03"N	26°28'08"E	31.10.1995	6 m	<i>P. oceanica</i> +Sand	Grab	Ildır
31.3	38°23'27"N	26°26'54"E	01.05.2003 01.12.2004	10, 18 m	Sandy mud+Sand+ <i>P. oceanica</i>	Dredge	Ildır
31.4	38°24'07"N	26°27'01"E	19.02.2004 23.08.2004	50-65m	Muddy sand+ Sandy mud+Mud	Dredge	Ildır
32	38°09'30"N	26°17'40"E	14.09.2000	113 m	Muddy sand	Dredge	Çeşme
33	38°11'51"N	26°46'45"E	22.06.1995	1-4 m	Hard substratum covered by algae+ <i>P. oceanica</i>	by hand	Siğacık Seferihisar
34	38°03'10"N	26°56'00"E	30.09.2000	41 m	Sandy mud	Dredge	Siğacık
35	37°59'00"N	27°11'15"E	30.09.2000	32 m	Mud	Dredge	Kuşadası
36.1	37°51'34"N	27°14'49"E	23.07.1995 14.06.1996	0-1 m	<i>Halopteris filicinae</i> + Rocks covered by algae	by hand	Kuşadası
36.2	37°55'18"N	27°07'41"E	14.09.2000	78 m	Mud	Dredge	Kuşadası
36.3	37°48'00"N	27°16'00"E	29.09.2000	11-31 m	Mud	Dredge	Kuşadası
37	37°41'45"N	27°02'45"E	15.09.2000	71 m	Muddy sand+Coralligenous	Dredge	Kuşadası
38	37°23'55"N	27°06'52"E	15.09.2000	71 m	Sandy mud	Dredge	Didim
39	37°21'00"N	27°21'50"E	16.09.2000	14 m	<i>Posidonia oceanica</i>	Dredge	Güllük Bay
40.1	37°08'33"N	27°30'12"E	08.05.2002	15 m	<i>P. oceanica</i> +Sand	Dredge	Salih Island
40.2	37°08'52"N	27°31'57"E	21.10.2001	13 m	<i>P. oceanica</i> +Sandy mud	Dredge	Salih Island
40.3	37°08'26"N	27°31'24"E	21.10.2001	20 m	<i>P. oceanica</i> +Muddy sand	Dredge	Salih Island
40.4	37°09'14"N	27°30'22"E	06.02.2002	9.5 m	<i>P. oceanica</i> +Sand	Grab	Salih Island
40.5	37°09'00"N	27°29'30"E	17.09.2000	44 m	Sandy mud	Dredge	Bodrum
41.1	37°03'50"N	27°13'30"E	17.09.2000	37 m	<i>Caulerpa racemosa</i> + <i>P. oceanica</i> +Sandy mud	Dredge	Bodrum
41.2	37°06'44"N	27°17'11"E	25.11.1999	31 m	Mud	Dredge	Yalıkavak Bodrum
42	36°56'45"N	27°16'32"E	17.09.2000	31 m	Sand+Algae	Dredge	Bodrum
43	37°01'16"N	27°26'29"E	22.07.1995	1-3 m	Rocks covered by algae+ <i>P. oceanica</i>	by hand	Bodrum
44	36°59'00"N	27°32'35"E	18.09.2000	47 m	Muddy sand+ <i>Caulerpa racemosa</i>	Dredge	Bodrum
45	36°56'22"N	27°51'17"E	09.07.1998	300 m	Mud+Detritus	Dredge	Gökova Bay
46	36°59'00"N	28°05'35"E	18.09.2000	82 m	Mud	Dredge	Gökova Bay
47	36°48'30"N	28°03'00"E	19.09.2000	17-25 m	<i>P. oceanica</i> +Sponge+Algae	Beam trawl	Gökova Bay
48	36°49'07"N	27°52'10"E	20.09.2000	54 m	Muddy sand	Dredge	Gökova Bay
49	36°47'58"N	27°41'25"E	20.09.2000	51 m	Algae+Sand	Dredge	Gökova Bay
50	36°39'50"N	27°32'30"E	20.09.2000	86 m	Coralligenous+Sand	Dredge	Datça
51.1	36°43'04"N	27°41'33"E	20.07.1995	0.3-2 m	Hard substratum covered by algae+ <i>Cyctoseira crinita</i>	by hand	Datça
51.2	36°45'08"N	27°47'00"E	21.09.2000	26 m	<i>P. oceanica</i> +Sand+Algae	Dredge	Datça
52.1	36°47'58"N	28°07'00"E	21.09.2000	10 m	Mud	Dredge	Marmaris
52.2	36°42'45"N	28°05'58"E	21.09.2000	45 m	Mud	Dredge	Marmaris
52.3	36°42'30"N	28°00'15"E	21.09.2000	57 m	Muddy sand	Dredge	Marmaris
53	36°32'56"N	27°58'30"E	22.09.2000	109 m	Coralligenous+Sand	Dredge	Marmaris
54.1	36°38'30"N	28°05'15"E	21.09.2000	13 m	<i>P. oceanica</i> +Sand	Dredge	Marmaris
54.2	36°40'31"N	28°09'51"E	22.09.2000	44 m	Sand+ <i>Caulerpa racemosa</i>	Dredge	Marmaris
55	36°46'09"N	28°15'25"E	22.07.1995	4 m	Rocks covered by algae	Diving	Marmaris
56.1	36°45'50"N	28°21'00"E	22.09.2000	86 m	Mud	Dredge	Marmaris
56.2	36°44'30"N	28°26'10"E	23.09.2000	110 m	Sandy mud	Dredge	Marmaris

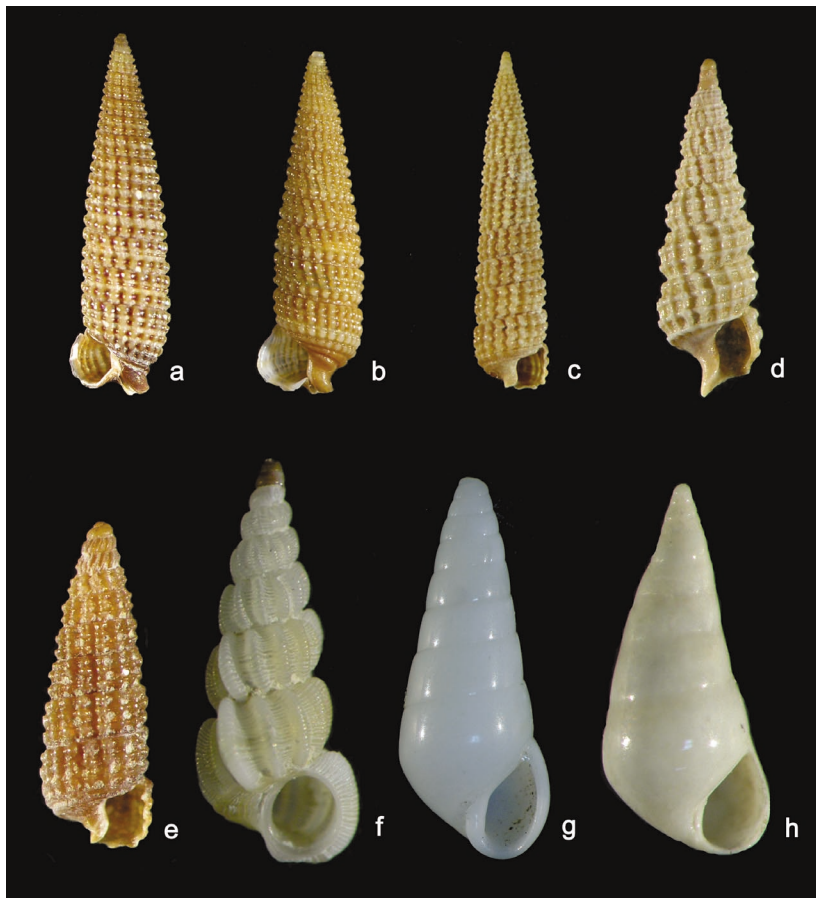


Figure 2. New record ptenoglossate gastropods for the Turkish mollusc fauna:
 a. *M. thiriota* (h=7.3 mm, st. 22.1), b. *S. similior* (h=8,3 mm, st. 31.3), c. *C. diadema* (h=6.0 mm, st. 22.1), d. *C. jeffreysi* (h=3.5 mm, st. 8), e. *K. tiara* (h=3.3 mm, st. 48), f. *P. cerigottana* (h=3.7 mm, st. 45), g. *M. boscii* (h=8.9 mm, st. 15) and h. *N. nana* (h=2.3 mm, st. 50).

Oberling, 1960-1962: 218), Black Sea (Demir, 2003: 110) and Dardanelle Strait (Pallary, 1917: 144).

Monophorus thiriota Bouchet, 1984

Figure 2a

Material: St. 53, 2 shells.

Distribution: It is reported for the first time from the Turkish coastline. According to the relevant literature, it is also a first record for the eastern Mediterranean.

Remarks: *M. thiriota* is similar to *S. similior* but differs from it in having 2 granulated and 1 smooth basal cords. The shell colour consists of light caramel brown background and granules with black-brown intergranular spaces. There is also difference in the colour of living

specimens. For further information see Bouchet (1984: 24-26).

Similiphora similior (Bouchet and Guillemot, 1978)

Figure 2b

Triphora similior Bouchet and Guillemot, 1978

Material: St. 27.1, 1 shell; st. 31.3, 3 specimens.

Distribution: This species is reported for the first time from the Turkish coastline.

Remarks: This species differs from *M. thiriota* in having 1 granulated and 2 smooth black-brown basal cords. The granules are light coloured. Living specimen is black or with black spots on white background. For further information see Bouchet (1984: 49-51).

Metaxia metaxae (Delle Chiaje, 1828)

Murex metaxa Delle Chiaje, 1828

Material: St. 24, 1 shell; st. 37, 1 shell; st. 39, 1 specimen; st. 42, 3 specimens; st. 55, 2 shells; st. 56.2, 1 shell.

Distribution: Levantine and Aegean Seas (Demir, 2003:110) and Sea of Marmara (Ostroumoff, 1896: 76).

CERITHIOPSIDAE

Cerithiopsis diadema Monterosato, 1874

Figure 2c

Material: St. 13, 1 specimen; st. 22.1, 2 specimens; st. 36.2, 1 shell.

Distribution: It is here being reported for the first time from the Turkish coastline.

Remarks: *C. diadema* differs from the other cerithiopsid species distributed in the Turkish Seas in having a specific protoconch structure; it consists of 1-1.5 smooth and 3 axially ribbed whorls, which are angulated by a carina at their base. On the body whorl there are 2 peripheral chords close to each other. For further information see Cachia et al. (1996: 130)

Cerithiopsis fayalensis Watson, 1886

Material: St. 56.1, 1 shell; st. 56.2, 2 shells.

Distribution: Sea of Marmara (Demir, 2003:110). It is reported for the first time from the Turkish coastline of the Aegean Sea.

Cerithiopsis jeffreysi Watson, 1885

Figure 2d

Material: St. 8, 1 shell

Distribution: This species is reported here for the first time from the Turkish coast.

Remarks: This species differs from the other resembling cerithiopsid species in having a square cancellated shell and a cylindrical protoconch with 4 smooth whorls. For further information see Aartsen et al. (1984: 29) and Cachia et al. (1996: 131)

Cerithiopsis minima (Brusina, 1865)

Cerithium minimum Brusina, 1865

Material: St. 8, 2 shells; st. 17, 1 specimen; st. 18, 1 specimen; st. 30, 3 specimens; st. 36.3, 1 specimen; st.

38, 1 specimen; st. 39, 1 specimen; st. 40.2, 1 specimen; st. 47, 1 shell; st. 49, 1 shell.

Distribution: Levantine Sea (Buzzurro and Greppi, 1996: 6) and Sea of Marmara (Ostroumoff, 1896: 60-68; Oberling, 1969-1971: 189). It is reported here for the first time from the Turkish coast of the Aegean Sea.

Cerithiopsis tubercularis (Montagu, 1803)

Murex tubercularis Montagu, 1803

Material: St. 9, 1 specimen; st. 17, 1 specimen; st. 22.2, 1 specimen; st. 22.5, 1 specimen; st. 31.3, 1 specimen and 3 shells; st. 31.4, 1 specimen; st. 39, 1 specimen; st. 41.1, 1 shell; st. 42, 1 specimen; st. 44, 3 specimens; st. 54.1, 1 specimen; st. 54.2, 1 shell.

Distribution: Levantine Sea (Buzzurro and Greppi, 1996: 6), Aegean Sea (Çınar et al., 2006: 235), Sea of Marmara (Ostroumoff, 1896: 60-80 and Oberling, 1969-1971: 189) and Black Sea (Demir, 2003: 110)

Dizoniopsis coppolae (Aradas, 1870)

Cerithium coppolae Aradas, 1870

Material: St. 31.4, 1 specimen; st. 40.2, 6 shells; st. 40.4, 2 specimens.

Distribution: Levantine Sea (Buzzurro and Greppi, 1996: 6), Aegean Sea (Demir, 2003:110 and Öztürk, 2007: 566) and Sea of Marmara (Ostroumoff, 1896: 76 and Demir, 2003:110).

Krachia tiara (Monterosato, 1874)

Figure 2e

Cerithiopsis tiara Monterosato, 1874

Material: St. 48, 1 specimen.

Distribution: It is reported for the first time from the Turkish coastline. According to the literature, it is also a new record for the Aegean Sea fauna.

Remarks: This species characterized by having a protoconch of 1.5 smooth and 2 roughly axial ribbed whorls. On the body whorl there is 1 basal chord. For further information see Hallgass (1985: 9-14)

ACLIDIDAE

Aclis attenuans Jeffreys, 1883

Material: St. 3, 7 shells; st. 4, 7 shells.

Distribution: It has been reported recently (Öztürk et al., 2007:566) from the Turkish coast of the Aegean Sea.

Acis minor (Brown, 1827)

Turritella minor Brown, 1827

Material: St. 2, 1 specimen and 3 shells; st. 23, 1 specimen; st. 38, 1 shell.

Distribution: According to Demir (2003: 111), it has also distribution in the Levantine Sea and Sea of Marmara.

CIMIDAE

Graphis albida (Kanmacher, 1798)

Material: St. 3, 1 shell.

Distribution: Levantine Sea (Buzzurro and Greppi, 1996:6) and Aegean Sea (Öztürk et al., 2007:566).

EPITONIIDAE

Epitonium algerianum (Weinkauff, 1866)

Scalaria algeriana Weinkauff, 1866

Material: St. 1, 1 shell; st. 3, 1 specimen and 1 shell; st. 13, 1 specimen; st. 29, 1 specimen.

Distribution: Aegean Sea (Aartsen and Kinzelbach, 1990: 105) and Sea of Marmara (Ostroumoff, 1896: 64).

Epitonium cantrainei (Weinkauff, 1866)

Scalaria cantrainei Weinkauff, 1866

Material: St. 5, 2 specimens; st. 7, 1 specimen; st. 9, 1 specimen; st. 16, 1 shell; st. 17, 5 specimens; st. 20, 1 shell; st. 30, 5 specimens; st. 34, 1 specimen; st. 35, 2 specimens; st. 44, 3 shells; st. 46, 1 specimen; st. 52.1, 1 specimen; st. 52.2, 2 specimens; st. 54.1, 1 specimen.

Distribution: According to Demir (2003:111), it is also distributed in the Sea of Marmara.

Epitonium turtonis (Turton, 1819)

Turbo turtonis Turton, 1819

Material: St. 23, 1 specimen; st. 40.5, 1 specimen; st. 41.2, 1 specimen.

Distribution: Levantine Sea (Buzzurro and Greppi, 1996: 6), Aegean Sea (Aartsen and Kinzelbach, 1990: 105), and Sea of Marmara (Ostroumoff, 1896: 61, 72; Oberling, 1969-1971: 189)

Epitonium clathrus (Linnaeus, 1758)

Turbo clathrus Linnaeus, 1758

Material: St. 8, 2 shells; st. 17, 1 specimen; st. 22.3, 1 shell; st. 25.2, 2 specimens; st. 25.3, 1 shell; st. 31.4, 1 specimen; st. 40.3, 1 specimen.

Distribution: Levantine Sea (Buzzurro and Greppi, 1996: 6), Aegean Sea (Kocataş, 1978: 46; Aartsen and Kinzelbach, 1990: 105), Sea of Marmara (Ostroumoff, 1896: 63-70), and Black Sea (Albayrak, 2003: 72, 73; Çulha, 2004: 72)

Punctiscalia cerigottana (Sturani, 1896)

Figure 2f

Scala cerigottana Sturany, 1896

Material: St. 45, 1 specimen.

Distribution: It is reported here from the Turkish coasts for the first time.

Opalia hellenica (Forbes, 1844)

Scalaria helenica Forbes, 1844

Material: St. 1, 1 shell; st. 22.2, 1 shell.

Distribution: It has been reported previously from the Aegean Sea as *Opalia coronata* (Aartsen and Kinzelbach, 1990:105).

EULIMIDAE

Eulima bilineata Alder, 1848

Material: St. 1, 2 shells; st. 2, 2 shells; st. 14, 1 specimen; st.16, 2 specimens; st. 20, 2 shells; st. 37, 1 specimen.

Distribution: Levantine Sea (Buzzurro and Greppi, 1996: 6) and Sea of Marmara (Ostroumoff, 1896: 64-87). It is being newly reported from the Turkish coast of the Aegean Sea.

Eulima glabra (da Costa, 1778)

Strombiformis glaber da Costa, 1778

Material: St. 7, 1 specimen; st. 11, 1 specimen; st. 17, 1 specimen; st.19, 6 specimens; st. 22.6, 2 specimens; st. 25.4, 2 shells; st. 26.1, 3 specimens, st. 26.2, 1 shell; st. 27.1, 1 specimen; st. 28, 1 specimen; st. 30, 2 specimens; st. 31.2, 2 specimens; st. 31.3, 1 specimen; st. 38, 1 specimen; st. 40.5, 3 specimens; st. 41.1, 1 specimen.

Distribution: Levantine Sea (Buzzurro and Greppi, 1996: 6), Aegean Sea (Çınar et al., 2006: 235), and Sea of Marmara (Ostroumoff, 1896: 77).

Melanella boscii (Payraudeau, 1826)

Figure 2g

Rissoa boscii Payraudeau, 1826

Material: St. 15, 1 specimen and 1 shell.

Distribution: In this study it is reported for the first time from the Turkish coasts.

Remarks: Among the eulimid species distributed along the Turkish coasts, it is close to *M. polita*, but differs from it in having broadly conical shell and the columella, which is folded over itself to form a thickened lip. For further information see Warén (1988: 23).

Melanella polita (Linnaeus, 1758)

Turbo politus Linnaeus, 1758

Material: St. 9, 3 specimens; st. 12, 1 specimen; st. 22.4, 1 specimen; st. 28, 1 specimen; st. 32, 1 shell; st. 38, 1 specimen; st. 40.1, 2 specimens.

Distribution: Levantine Sea (Buzzurro and Greppi, 1996: 6), Sea of Marmara (Ostroumoff, 1896: 77), and Bosphorus strait (Marion, 1898: 181). It is newly reported from the Turkish coast of the Aegean Sea.

Melanella stalioides (Brusina, 1869)

Eulima stalioides Brusina, 1869

Material: St. 33, 1 shell; st. 42, 1 specimen; st. 47, 1 specimen.

Distribution: Levantine Sea (Giannuzzi-Savelli et al., 1999: 104). It is a new record for the Turkish Aegean Sea fauna.

Nanobalcis nana (Monterosato, 1878)

Figure 2h

Eulima nana Monterosato, 1878

Material: St. 50, 12 shells; st. 53, 6 specimens; st. 56.1, 2 specimens; st. 56.2, 1 shell.

Distribution: It is here reported for the first time from the Turkish coastline.

Remarks: The specimens of this species have a shell of relatively broad type. Body whorl rather rounded and its height is less than half height of the shell. The outer lip forms a regular and pronounced bulge without a sinus. For further information see Cachia et al., (1996: 160)

Parvioris ibizenca (Nordsieck, 1968)

Eulima microstoma ibizenca, Nordsieck, 1968

Material: St. 17, 2 specimens; st. 18, 1 shell; st. 27.1, 3 specimens; st. 27.2, 1 specimen; st. 31.3, 4 specimens; st. 36.1, 2 specimens; st. 39, 6 specimens; st. 40.4, 1 shell; st. 43, 1 specimen; st. 51.1, 1 specimen; st. 54.2, 3 specimens.

Distribution: This species has been recently reported by Öztürk et al., (2007:566) from the Aegean coastline.

Sticteulima jeffreysiana (Brusina, 1869)

Leiostraca jeffreysiana Brusina, 1869

Material: St. 7, 2 specimens; st. 8, 1 shell; st. 13, 8 specimens; st. 22.3, 2 specimens; st. 30, 3 shells; st. 44, 2 shells; st. 54.2, 2 specimens and 2 shells; st. 56.1, 1 specimen.

Distribution: Levantine Sea (Tringali, 1994: 57; Buzzurro and Greppi, 1996:6). This is a new record for the Turkish coastline of the Aegean Sea.

Vitreolina curva (Monterosato, 1874)

Eulima curva Monterosato, 1874

Material: St. 16, 1 specimen; st. 24, 1 shell; st. 30, 1 specimen.; st. 32, 1 specimen; st. 38, 1 specimen; st. 51.2, 1 specimen.

Distribution: Levantine Sea (Buzzurro and Greppi, 1996:6), Aegean Sea (Aartsen and Kinzelbach, 1990: 105 as *Balcis curva*), and Sea of Marmara (Ostroumoff, 1896: 63-90).

Vitreolina incurva (Bucquoy, Dautzenberg and Dollfus, 1883)

Eulima incurva B. D. D., 1883

Material: St. 10, 1 specimen; st. 33, 2 specimens; st. 39, 1 shell; st. 40.5, 2 specimens; st. 43, 1 specimen; st. 56.1, 2 specimens.

Distribution: Levantine Sea (Buzzurro and Greppi, 1996:6) and Sea of Marmara (Ostroumoff, 1896: 61-84). This species is here reported for the first time from Turkish Aegean coast.

Vitreolina philippi (Rayneval and Ponzi, 1854)

Eulima philippi Rayneval and Ponzi, 1854

Material: St. 7, 2 specimens; st. 8, 10 specimens; st. 9, 12 specimens; st. 11, 6 shells; st. 14, 1 specimen; st. 17, 5 specimens; st. 20, 3 shells; st. 30, 10 specimens; st. 36.1, 1 specimen and 1 shell; st. 41.1, 2 specimens; st. 44, 5 shells; st. 52.2, 1 specimen; st. 52.3, 5 specimens; st. 53, 2 specimens; st. 54.2, 1 specimen; st. 56.1, 2 specimens.

Distribution: Levantine Sea (Buzzurro and Greppi, 1996: 6) and Aegean Sea (Aartsen and Kinzelbach, 1990: 105 as *Balcis philippii*).

Discussion

In this study, 33 species of 131 ptenoglossate representatives in the Mediterranean Sea were determined. Among these, *M. thiriota* was previously unrecorded from the eastern Mediterranean. Its eastern distributional limit in the Mediterranean is known to be the coastline of Maltese Islands (Cachia et al., 1996: 125) and southern Adriatic Sea (near Otranto, Italy) (Terlizzi et al., 2003: 166). The specimens of *M. thiriota* investigated in this study was sampled from a depth of 109 m, whereas the depth range of this species previously reported were 0-37 m (Bouchet, 1984 and Terlizzi et al., 2003). Furthermore, *K. tiara*, found in muddy sand habitat at 54 m depth, has never been reported from the Aegean Sea. In the eastern Mediterranean, it was previously reported from the Cypriot coast (Levantine Sea) (Öztürk et al., 2003: 57). In addition, a shell of a freshly dead specimen of *C. jeffreysi* in *P. oceanica* meadows at 20 m depth was found in St. 8. This species is one of the rarest cerithiopsid species in the eastern Mediterranean. According to Koutsoubas et al., (1997: 29), it was previously reported only from southern Aegean Sea and is reported here for the first time from the northern Aegean Sea. On the other hand, Öztürk et al (2007) has recently stated that *Dizoniopsis coppolae* (Aradas, 1870) was known only from the Sea of Marmara, although this species was previously reported from the Levantine (Buzzurro and Greppi, 1996: 6) and the Aegean Seas (Demir, 2003: 110). This contradiction is a result of an error in the software for species distribution used by B. Öztürk and a similar error is also valid for *Alvania fractospira* Oberling (1970), *Graphis albida* Kanmacher (1798), and *Mathilda gemmulata* Semper (1865), which were previously reported from the Turkish coast of the Levantine Sea by Buzzurro and Greppi (1996).

Ptenoglossate molluscs have a wide depth range and occur in different habitats (Table 1). Some species, such as *M. erythrosoma*, *S. similior*, and *M. boscii*, were distributed only in shallow waters up to 20 m, while the others such as *M. metaxae*, *E. glabra*, *M. polita*, and *V. curva* had a relatively wide depth range of distribution, from the upper littoral up to over 100 m depth. Among the investigated species, *P. cerigottana* attracted

attention as the deepest species, which was found in a material consisting of mud with detritus at 300 m depth. Regarding to their habitat distribution (Table 1), the ptenoglossate species are also fairly heterogeneous. Of the species sampled more than one time or in more than one station, only 2 species (*M. erythrosoma* and *E. turtonis*) were found in the same type habitat.

Among the ptenoglossate families represented in the Mediterranean, Eulimidae includes the highest number of species, most of which are well known as ectoparasites or endoparasites of holothurians, ophiuroids, crinoids, asteroids, and echinoids (Warén, 1983). In the study area, *E. glabra* and *V. philippi* were the dominant eulimids, whereas *M. boscii* was very rare (2 individuals).

In the Mediterranean, most of the ptenoglossate representatives are known from the western Mediterranean. In the eastern Mediterranean, the number of the reported ptenoglossate species is fairly limited, since it is characterized by a low biological diversity due to its oligotrophic nature. For example, in a recently conducted study (Öztürk et al., 2003) along the Cypriot coast (Levantine Sea), 46 ptenoglossate species were reported. However, Koutsoubas et al. (1997) reported 54 species having distribution in the Aegean Sea. In line with the fact that less number of species known from the eastern Mediterranean, the number of the ptenoglossate species reported from the Turkish coasts are also restricted. To date, a total of 35 species were reported from the Turkish coast, most of which were found in the Levantine Sea (Öztürk and Çevik, 2000; Demir, 2003; Çulha, 2004; Gönülğür-Demirci, 2005). Aegean Sea is an important basin in the Mediterranean system with considerable biological diversity due to its geomorphologic structure and hydrographic characteristics. Despite this, compared especially with those reported from the western Mediterranean, a low number of ptenoglossate species are known from the area, probably due to low numbers of studies performed in the Aegean Sea.

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