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# Turridae Swainson, 1840 Species (Gastropoda-Mollusca) of İzmir Bay (Aegean Sea)

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**Abstract:** This study aims to determine the species belonging to the family Turridae in İzmir Bay, based on specimens collected from 11 stations between 1995 and 1998. As a result of examinations, 15 species are determined in the region. Among these, *Mangelia paciniana* (Calcara, 1839), *Raphitoma echinata* (Brocchi, 1814) and *Philbertia horrida* Monterosato, 1884 are Mediterranean endemic species, and are new records for the Turkish coasts. Other species listed in this study are distributed both in the Mediterranean Sea and the Atlantic Ocean.

**Key Words:** Turridae, Neogastropoda, İzmir Bay, Aegean Sea, Turkey

## İzmir Körfezi'nin (Ege Denizi) Turridae Swainson, 1840 (Mollusca-Gastropoda) Türleri

**Özet:** İzmir Körfezinde Turridae familyası türlerini saptamak amacıyla yapılan bu çalışmada, 1995-1998 yılları arasında 11 istasyondan alınmış örnekler değerlendirilmiştir. Yapılan incelemeler sonucu bölgeden 15 tür saptanmıştır. Bunlardan *Mangelia paciniana* (Calcara, 1839), *Raphitoma echinata* (Brocchi, 1814) ve *Philbertia horrida* Monterosato, 1884 Türkiye kıyılarından ilk defa rapor edilmekte olup, Akdeniz endemiği türlerdir. Çalışmada verilen diğer türler ise Akdeniz'in yanı sıra Atlantik Okyanusunda da dağılım göstermektedir.

**Anahtar Sözcükler:** Turridae, Neogastropoda, İzmir Körfezi, Ege Denizi, Türkiye

## Introduction

Izmir Bay is located at the eastern coast of the Aegean Sea, forming an indentation towards western Anatolia. Due to the existence of deltas, lagoons and islets of various dimensions, it constitutes suitable ecological conditions especially for the benthic biota. However, the bay has been affected by pollutants from different sources in recent years. Hence, an increase in the number of studies concerning the impact of pollution on organisms was observed by the early 1960's, together with faunistical and floristical studies.

Pioneering information on the benthic organisms and the Gastropoda fauna (including the family Turridae) of İzmir Bay is based on studies carried out by Forbes (1) and Colombo (2). These studies were followed by Geldiay and Kocataş (3) and Kocataş (4), who included several Gastropoda species in their research. Although no Turridae species were listed in Kocataş's (4) study, some Gastropoda species inhabiting various algae facieses in İzmir Bay were noted.

The only data on the existence of Turridae in İzmir Bay is based on the study of Forbes (1), but there are some other studies on this subject carried out along the rest of the Turkish and the Mediterranean Sea coasts, i.e., Ostroumov (5), Nordsieck (6), Bogi et al., (7- 10), Aartsen et al. (11), Aartsen and Zenetos (12), Aartsen (13), Aartsen and Kinzelbach (14) and Buzzurro and Greppi (15).

Turridae species are predatory organisms that are distributed at various depths. Although some species belonging to the genus *Raphitoma* inhabit shallow depths, some *Mangelia* species are encountered at the bathyal zone (16).

## Materials and Methods

The samples were collected during various research projects carried out in İzmir Bay between 1995 and 1998. The sampling stations considered in this study include 3 coastal stations located in the outer bay and 8

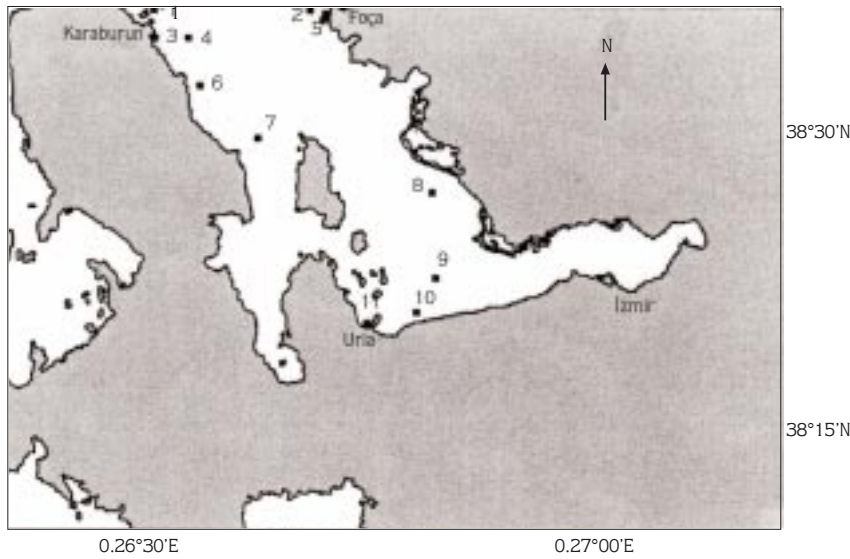


Figure 1. Species sampling stations

stations of different depths located at deeper sections of the bay (Figure 1).

The samplings at coastal stations were carried out by snorkel diving at depths not exceeding 6m, among different biotopes. Samples were collected from under stones, algae covered rocky biotopes, from brown algae facieces (such as *Padina pavonica* (L) Thivy, 1960, *Cystoseira* spp.) and from marine phanerogam meadows, such as *Posidonia oceanica* (L) Delile, 1813, *Zostera* spp. and *Cymodocea nodosa* (Ucria) Ascherson, 1869. Samplings in deeper waters were conducted on board R/V "K.Piri Reis" between 1996 and 1998, using grab, dredge and beam-trawl.

The collected material was fixed in 4% formalin and later identified in the laboratory. The taxonomical categories of the determined species were given in accord with Sabelli et al. (17).

### Results

Among 29 individuals examined, 15 Turridae species belonging to 9 genera were determined (Table).

As indicated in the Table, only *M. taeniata*, *R. laviæ* and *Ph. horrida* were encountered in the algae covered rocky biotope. Other species were collected from soft substrates, i.e., muddy-sand or sandy-mud, and from *P. oceanica* meadows.

### Discussion

In this study, 15 species belonging to the family Turridae were determined, based on material collected from 11 sampling stations. Among them, *Mangelia paciniana* (Calcara, 1839), *Raphitoma echinata* (Brocchi, 1814) and *Philbertia horrida* Monterosato, 1884 are new records for Turkish seas. *Mangelia attenuata* (Montagu, 1803) and *Comarmondia gracilis* (Montagu, 1803) are recorded for the first time at the Mediterranean and Aegean Sea coasts of Turkey; *Bela brachystoma* (Philippi, 1844), *Bela laevigata* (Philippi, 1836), *Crassopleura incrassata* (Dujardin, 1837), *Mitrolumna olivoidea* (Cantraine, 1835) and *Raphitoma laviæ* (Philippi, 1844) are new additions to the Gastropoda fauna of the Aegean Sea coast of Turkey (Table). Among the species determined, *F. taprurensis*, *R. laviæ* and *Ph. horrida* are endemic to the Mediterranean Sea, whereas, *B. nebula*, *M. attenuata*, *R. linearis* and *C. gracilis* are boreal species distributed especially in the northern parts of the Mediterranean Sea and the Atlantic Ocean.

The Turridae family is represented by 107 species belonging to 27 genera in the Mediterranean Sea (17) and by 58 species belonging to 18 genera in the Aegean Sea (18). However, the Turridae species known from Turkish seas are now increased to 34 with the present study. An examination of previous studies concerning Turridae revealed that the majority of species are reported from the coasts of Mediterranean Sea and the Sea of Marmara.

Table. Turridae species determined in Izmir Bay and their ecological characteristics (**Lx**: consecutive number of the literature as given in the reference list; **FR**: First record for the area)

SPECIES	Sampling date	Station	Number of individuals	Depth (m)	Habitat	Mediterr. Sea	Turkish Aegean Sea	Coasts Sea of Marmara	Black Sea
<i>Bela brachystoma</i> (Philippi, 1844)	8/11/97	8	4	20					
	14/10/98	2	1	62	Mud	L15	FR	L5	-
	13/10/98	7	1	37					
<i>Bela laevigata</i> (Philippi, 1836)	14/10/98	10	1	47	Mud	L15	FR	L20	-
<i>Bela nebula</i> (Montagu, 1803)	7/7/95	5	1	4	<i>P. oceanica</i>	L15	L1	L5	-
	14/10/98	2	1	62	Sandy-mud				
	7/11/97	6	1	48	Sandy-mud				
<i>Fehria taprurensis</i> (Pallary, 1904)	8/11/97	8	1	20	Sandy-mud	L15	L14	-	-
<i>Mangelia attenuata</i> (Montagu, 1803)	14/6/95	11	1	4	<i>P. oceanica</i>	-	FR	L5	-
	8/11/97	8	1	20	<i>P. oceanica</i>				
<i>Mangelia paciniana</i> (Calcara, 1839)	14/10/98	9	1	50	Sandy-mud	-	FR	-	-
<i>Mangelia unifasciata</i> (Deshayes, 1835)	20/9/95	3	1	4	<i>P. oceanica</i>	L15	L14	L5	-
	21/1/98	7	1	10	Sandy-mud				
<i>Mangiliella taeniata</i> (Deshayes, 1835)	20/9/95	3	1	0-2	Algae-rocky	-	L14	-	-
<i>Crassopleura incrassata</i> (Dujardin, 1837)	7/11/97	4	1	70	Sandy-mud	L15	FR	-	-
	7/11/97	1	1	77	Muddy-sand				
<i>Mitrolumna olivoidea</i> (Cantraine, 1835)	13/10/98	6	1	49	Mud	L15	FR	-	-
<i>Raphitoma echinata</i> (Brocchi, 1814)	13/10/98	6	2	49	Muddy-sand	-	FR	-	-
	14/6/95	11	1	4	<i>P. oceanica</i>				
<i>Raphitoma laviæ</i> (Philippi, 1844)	20/9/95	3	1	0-2	Algae-rocky	L15	FR	19	-
<i>Raphitoma linearis</i> (Montagu, 1803)	7/11/97	6	1	49	Muddy-sand	L15	L14	-	-
	8/11/97	8	1	20	Muddy-sand				
	13/10/98	6	1	48	Muddy-sand				
<i>Comarmondia gracilis</i> (Montagu, 1803)	9/11/97	6	1	48	Muddy-sand	-	FR	L18	-
<i>Philbertia horrida</i> Monterosato, 1884	14/6/95	11	1	0-2	Algae-rocky	-	FR	-	-

A total of 17 species were reported from Taşucu (Mediterranean Sea) by Buzzuro and Greppi (15) and 17 from the Sea of Marmara by Ostroumov (5). Moreover, both Forbes (1) and Aartsen and Kinzelbach (14) reported 9 species from the Aegean Sea coast of Turkey. With the addition of new records for the Turkish Aegean Sea presented in this study, the number of species now known from our coasts has increased to 19. Although some species such as *B. laevigata* and *M. unifasciata* are known to exist in the Black Sea (18, 20), no Turridae species was hitherto recorded from the Turkish Black Sea coast (21, 22).

Although some Turridae species inhabit algae-covered rocky habitats and *P. oceanica* meadows, the majority of them are distributed in soft substrates of various depths. For example, there are some species existing in shallow waters, i.e., *M. taeniata*, *R. laviæ* and *Ph. horrida* that were also determined in this study, and some others extending as far as to the bathyal zone. *Mangelia nuperrima* (Tiberi 1855), reported from a depth of 2 m in the Sea of Marmara (as *Ginnania nuperrima*) by Ostroumov (5), is known to be distributed at depths of up to 1911 m at the Atlantic Ocean (16).

Consequently, the number of Turridae species in Turkish seas is distinctively lower than those reported from the Mediterranean and Aegean seas. It is clear that further detailed studies covering broader ranges and deep waters will improve our knowledge of the Turridae of Turkish coasts.

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