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 thiriotae 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. thiriotae 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

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 subclassis Heterobranchia, due to some similarities between the species in this subclassis (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...
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 TUBITAK [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 thiriotae 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) 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;
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.

<table>
<thead>
<tr>
<th>St</th>
<th>Coordinates</th>
<th>Date</th>
<th>Depth</th>
<th>Biotope</th>
<th>Sampling</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>40°37'08&quot;N 26°38'17&quot;E</td>
<td>03.08.2000</td>
<td>32 m</td>
<td>Muddy sand</td>
<td>Dredge</td>
<td>Saros Bay</td>
</tr>
<tr>
<td>2</td>
<td>40°34'20&quot;N 26°48'26&quot;E</td>
<td>03.08.2000</td>
<td>20 m</td>
<td>Sandy mud</td>
<td>Dredge</td>
<td>Saros Bay</td>
</tr>
<tr>
<td>3</td>
<td>40°23'46&quot;N 26°21'46&quot;E</td>
<td>03.08.2000</td>
<td>105 m</td>
<td>Muddy sand</td>
<td>Dredge</td>
<td>Saros Bay</td>
</tr>
<tr>
<td>4</td>
<td>40°20'03&quot;N 26°13'12&quot;E</td>
<td>03.08.2000</td>
<td>94 m</td>
<td>Muddy sand</td>
<td>Dredge</td>
<td>Saros Bay</td>
</tr>
<tr>
<td>5</td>
<td>40°10'40&quot;N 25°40'50&quot;E</td>
<td>13.08.2000</td>
<td>104 m</td>
<td>Mud</td>
<td>Dredge</td>
<td>Gökçeada</td>
</tr>
<tr>
<td>6</td>
<td>40°07'22&quot;N 25°39'50&quot;E</td>
<td>13.08.2000</td>
<td>15 m</td>
<td>Sand</td>
<td>Dredge</td>
<td>Gökçeada</td>
</tr>
<tr>
<td>7</td>
<td>40°05'45&quot;N 25°50'45&quot;E</td>
<td>13.08.2000</td>
<td>27 m</td>
<td>Posidonia oceanica</td>
<td>Dredge</td>
<td>Gökçeada</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Coralligenous sand</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>40°11'17&quot;N 26°15'20&quot;E</td>
<td>02.08.2000</td>
<td>20 m</td>
<td>P. oceanica</td>
<td>Dredge</td>
<td>Gelibolu Peninsula</td>
</tr>
<tr>
<td>9</td>
<td>40°04'55&quot;N 26°10'50&quot;E</td>
<td>13.08.2000</td>
<td>29 m</td>
<td>Coarse sand</td>
<td>Dredge</td>
<td>Ent. Çanakkale St.</td>
</tr>
<tr>
<td>10</td>
<td>40°03'07&quot;N 26°12'41&quot;E</td>
<td>05.07.1995</td>
<td>0.5-1 m</td>
<td>Oystersia Adriatica</td>
<td>by hand</td>
<td>Çanakkale Near the monument</td>
</tr>
<tr>
<td>11</td>
<td>39°58'50&quot;N 26°03'25&quot;E</td>
<td>13.08.2000</td>
<td>30 m</td>
<td>Muddy sand</td>
<td>Dredge</td>
<td>Ent. Çanakkale St.</td>
</tr>
<tr>
<td>12</td>
<td>39°39'15&quot;N 26°02'00&quot;E</td>
<td>29.7.2000</td>
<td>70 m</td>
<td>Sandy mud</td>
<td>Dredge</td>
<td>South of Bozcaada</td>
</tr>
<tr>
<td>13</td>
<td>39°27'10&quot;N 26°07'00&quot;E</td>
<td>29.7.2000</td>
<td>70-90 m</td>
<td>Sand</td>
<td>Dredge</td>
<td>Edremit Bay</td>
</tr>
<tr>
<td>14</td>
<td>39°31'28&quot;N 26°29'08&quot;E</td>
<td>17.08.2000</td>
<td>24 m</td>
<td>Mud</td>
<td>Dredge</td>
<td>Edremit Bay</td>
</tr>
<tr>
<td>15</td>
<td>39°21'30&quot;N 26°32'02&quot;E</td>
<td>06.07.1995</td>
<td>5 m</td>
<td>P. oceanica</td>
<td>by hand</td>
<td>Cunda Island Ayvalik</td>
</tr>
<tr>
<td>16</td>
<td>39°19'00&quot;N 26°32'05&quot;E</td>
<td>28.07.2000</td>
<td>53 m</td>
<td>Sandy mud</td>
<td>Dredge</td>
<td>Dikili</td>
</tr>
<tr>
<td>17</td>
<td>39°09'30&quot;N 26°40'20&quot;E</td>
<td>28.07.2000</td>
<td>30 m</td>
<td>P. oceanica+Caulerpa Racemosa</td>
<td>Dredge</td>
<td>Dikili</td>
</tr>
<tr>
<td>18</td>
<td>39°07'35&quot;N 26°50'05&quot;E</td>
<td>19.08.2000</td>
<td>8 m</td>
<td>P. oceanica</td>
<td>Dredge</td>
<td>Dikili</td>
</tr>
<tr>
<td>19</td>
<td>38°58'45&quot;N 26°47'40&quot;E</td>
<td>19.08.2000</td>
<td>31 m</td>
<td>Muddy sand</td>
<td>Dredge</td>
<td>Dikili</td>
</tr>
<tr>
<td>20</td>
<td>38°00'40&quot;N 26°47'28&quot;E</td>
<td>28.7.2000</td>
<td>50 m</td>
<td>Sand</td>
<td>Dredge</td>
<td>Çanarlı</td>
</tr>
<tr>
<td>21</td>
<td>38°57'11&quot;N 26°45'48&quot;E</td>
<td>28.7.2000</td>
<td>72 m</td>
<td>Muddy sand</td>
<td>Dredge</td>
<td>Çanarlı</td>
</tr>
<tr>
<td>22.1</td>
<td>38°55'36&quot;N 26°49'10&quot;E</td>
<td>07.03.2003</td>
<td>62 m</td>
<td>Coralligenous</td>
<td>Dredge</td>
<td>Çanarlı Bay</td>
</tr>
<tr>
<td>22.2</td>
<td>38°51'04&quot;N 26°54'56&quot;E</td>
<td>07.03.2003</td>
<td>50 m</td>
<td>Coralligenous</td>
<td>Dredge</td>
<td>Tavşan Island</td>
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<td></td>
<td></td>
<td>(Çanarlı Bay)</td>
</tr>
<tr>
<td>22.3</td>
<td>38°55'29&quot;N 26°49'30&quot;E</td>
<td>07.03.2003</td>
<td>46 m</td>
<td>Coralligenous sand</td>
<td>Dredge</td>
<td>Kızılkulesi (Çanarlı Bay)</td>
</tr>
<tr>
<td>22.4</td>
<td>38°55'05&quot;N 26°49'46&quot;E</td>
<td>03.07.2003</td>
<td>56 m</td>
<td>Coralligenous</td>
<td>Dredge</td>
<td>Kızılkulesi (Çanarlı Bay)</td>
</tr>
<tr>
<td>22.5</td>
<td>38°54'28&quot;N 26°49'57&quot;E</td>
<td>17.03.2005</td>
<td>20 m</td>
<td>Posidonia oceanica+Sand</td>
<td>Dredge</td>
<td>Kara Island (Çanarlı Bay)</td>
</tr>
<tr>
<td>22.6</td>
<td>38°54'17&quot;N 26°50'18&quot;E</td>
<td>17.03.2005</td>
<td>10 m</td>
<td>Posidonia oceanica</td>
<td>Dredge</td>
<td>Kara Island (Çanarlı Bay)</td>
</tr>
<tr>
<td>23</td>
<td>38°46'12&quot;N 26°55'27&quot;E</td>
<td>05.10.2001</td>
<td>25-35 m</td>
<td>Muddy sand</td>
<td>Grab-Dredge</td>
<td>Nemrut Bay</td>
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<tr>
<td>24</td>
<td>38°40'45&quot;N 26°44'26&quot;E</td>
<td>07.07.1995</td>
<td>1-5 m</td>
<td>Rocks covered by algae+</td>
<td>by hand</td>
<td>Eski Foça</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Cladocora caespitosa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25.1</td>
<td>38°39'49&quot;N 26°29'22&quot;E</td>
<td>20.09.1995</td>
<td>4 m</td>
<td>Posidonia oceanica</td>
<td>Diving</td>
<td>Karaburun</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25.2</td>
<td>38°35'32&quot;N 26°35'01&quot;E</td>
<td>09.11.1997</td>
<td>48 m</td>
<td>Sand</td>
<td>Grab</td>
<td>İzmir Bay</td>
</tr>
<tr>
<td>25.3</td>
<td>38°40'45&quot;N 26°44'26&quot;E</td>
<td>01.09.1998</td>
<td>68 m</td>
<td>Sand</td>
<td>Grab</td>
<td>İzmir Bay</td>
</tr>
<tr>
<td>25.4</td>
<td>38°38'19&quot;N 26°42'43&quot;E</td>
<td>14.11.2000</td>
<td>58 m</td>
<td>Mud</td>
<td>Grab</td>
<td>İzmir Bay</td>
</tr>
<tr>
<td>26.1</td>
<td>38°37'58&quot;N 26°34'08&quot;E</td>
<td>01.09.1998</td>
<td>21 m</td>
<td>Mud</td>
<td>Grab</td>
<td>İzmir Bay</td>
</tr>
<tr>
<td>26.2</td>
<td>38°28'45&quot;N 26°46'30&quot;E</td>
<td>01.09.1998</td>
<td>54 m</td>
<td>Sandy mud</td>
<td>Grab</td>
<td>İzmir Bay</td>
</tr>
<tr>
<td>27.1</td>
<td>38°29'16&quot;N 26°39'26&quot;E</td>
<td>07.11.1997</td>
<td>13-20 m</td>
<td>Posidonia oceanica+Sandy mud</td>
<td>Grab</td>
<td>İzmir Bay</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>27.2</td>
<td>38°30'21&quot;N 26°38'36&quot;E</td>
<td>06.08.2002</td>
<td>8-20 m</td>
<td>Sandy mud+Shells</td>
<td>Grab</td>
<td>Mordoğan</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>fragments+P. oceanica</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>38°44'10&quot;N 26°22'00&quot;E</td>
<td>12.09.2000</td>
<td>183 m</td>
<td>Sandy mud</td>
<td>Dredge</td>
<td>Karaburun</td>
</tr>
<tr>
<td>St</td>
<td>Coordinates</td>
<td>Date</td>
<td>Depth</td>
<td>Biotope</td>
<td>Sampling</td>
<td>Location</td>
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<td>----</td>
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</tr>
<tr>
<td>29</td>
<td>38°36'55&quot;N 26°16'40&quot;E</td>
<td>12.09.2000</td>
<td>115 m</td>
<td>Muddy sand</td>
<td>Dredge</td>
<td>Karaburun</td>
</tr>
<tr>
<td>30</td>
<td>38°20'48&quot;N 26°14'15&quot;E</td>
<td>14.09.2000</td>
<td>53 m</td>
<td>Muddy sand+<em>Caulerpa racemosa</em></td>
<td>Dredge</td>
<td>Çeşme</td>
</tr>
<tr>
<td>31.1</td>
<td>38°24'14&quot;N 26°27'38&quot;E</td>
<td>22.02.2002</td>
<td>6 m</td>
<td><em>Posidonia oceanica</em>+Sand</td>
<td>Dredge</td>
<td>Ildır</td>
</tr>
<tr>
<td>31.2</td>
<td>38°24'03&quot;N 26°28'08&quot;E</td>
<td>31.10.1995</td>
<td>6 m</td>
<td><em>P. oceanica</em>+Sand</td>
<td>Grab</td>
<td>Ildır</td>
</tr>
<tr>
<td>31.3</td>
<td>38°23'27&quot;N 26°26'54&quot;E</td>
<td>01.05.2003</td>
<td>10, 18 m</td>
<td>Sandy mud+<em>Sand</em>+<em>P. oceanica</em></td>
<td>Dredge</td>
<td>Ildır</td>
</tr>
<tr>
<td>31.4</td>
<td>38°24'07&quot;N 26°27'01&quot;E</td>
<td>19.02.2004</td>
<td>50-65 m</td>
<td>Muddy sand+Sandy mud+Mud</td>
<td>Dredge</td>
<td>Ildır</td>
</tr>
<tr>
<td>32</td>
<td>38°09'30&quot;N 26°17'40&quot;E</td>
<td>14.09.2000</td>
<td>113 m</td>
<td>Muddy sand</td>
<td>Dredge</td>
<td>Çeşme</td>
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<tr>
<td>33</td>
<td>38°11'51&quot;N 26°46'45&quot;E</td>
<td>22.06.1995</td>
<td>1-4 m</td>
<td>Hard substratum covered by algae+<em>P. oceanica</em></td>
<td>Dredge</td>
<td>Sığacık</td>
</tr>
<tr>
<td>34</td>
<td>38°03'10&quot;N 26°56'00&quot;E</td>
<td>30.09.2000</td>
<td>41 m</td>
<td>Sandy mud</td>
<td>Dredge</td>
<td>Sığacık</td>
</tr>
<tr>
<td>35</td>
<td>37°59'00&quot;N 27°11'15&quot;E</td>
<td>30.09.2000</td>
<td>32 m</td>
<td>Mud</td>
<td>Dredge</td>
<td>Kuşadası</td>
</tr>
<tr>
<td>35.1</td>
<td>37°51'34&quot;N 27°03'42&quot;E</td>
<td>23.07.1995</td>
<td>10-1 m</td>
<td><em>Halopteris filicinae</em>+ by hand</td>
<td>Dredge</td>
<td>Kuşadası</td>
</tr>
<tr>
<td>36.2</td>
<td>37°55'18&quot;N 27°07'41&quot;E</td>
<td>14.09.2000</td>
<td>78 m</td>
<td>Mud</td>
<td>Dredge</td>
<td>Kuşadası</td>
</tr>
<tr>
<td>36.3</td>
<td>37°48'00&quot;N 27°16'00&quot;E</td>
<td>29.09.2000</td>
<td>11-31 m</td>
<td>Mud</td>
<td>Dredge</td>
<td>Kuşadası</td>
</tr>
<tr>
<td>37</td>
<td>37°41'45&quot;N 27°02'45&quot;E</td>
<td>15.09.2000</td>
<td>71 m</td>
<td>Muddy sand+Coralligenous</td>
<td>Dredge</td>
<td>Kuşadası</td>
</tr>
<tr>
<td>38</td>
<td>37°23'55&quot;N 27°06'52&quot;E</td>
<td>15.09.2000</td>
<td>71 m</td>
<td>Sandy mud</td>
<td>Dredge</td>
<td>Didim</td>
</tr>
<tr>
<td>39</td>
<td>37°21'00&quot;N 27°21'50&quot;E</td>
<td>16.09.2000</td>
<td>14 m</td>
<td><em>Posidonia oceanica</em></td>
<td>Dredge</td>
<td>Gullük Bay</td>
</tr>
<tr>
<td>40.1</td>
<td>37°08'33&quot;N 27°30'12&quot;E</td>
<td>08.05.2002</td>
<td>15 m</td>
<td><em>P. oceanica</em>+Sand</td>
<td>Dredge</td>
<td>Salih Island</td>
</tr>
<tr>
<td>40.2</td>
<td>37°08'52&quot;N 27°31'57&quot;E</td>
<td>21.10.2001</td>
<td>13 m</td>
<td><em>P. oceanica</em>+Sandy mud</td>
<td>Dredge</td>
<td>Salih Island</td>
</tr>
<tr>
<td>40.3</td>
<td>37°08'26&quot;N 27°31'24&quot;E</td>
<td>21.10.2001</td>
<td>20 m</td>
<td><em>P. oceanica</em>+Muddy sand</td>
<td>Dredge</td>
<td>Salih Island</td>
</tr>
<tr>
<td>40.4</td>
<td>37°09'14&quot;N 27°30'22&quot;E</td>
<td>06.02.2002</td>
<td>9.5 m</td>
<td><em>P. oceanica</em>+Sand</td>
<td>Grab</td>
<td>Salih Island</td>
</tr>
<tr>
<td>40.5</td>
<td>37°09'00&quot;N 27°29'30&quot;E</td>
<td>17.09.2000</td>
<td>44 m</td>
<td>Sandy mud</td>
<td>Dredge</td>
<td>Bodrum</td>
</tr>
<tr>
<td>41.1</td>
<td>37°03'50&quot;N 27°13'30&quot;E</td>
<td>17.09.2000</td>
<td>37 m</td>
<td><em>Caulerpa racemosa</em>+<em>P. oceanica</em>+Sandy mud</td>
<td>Dredge</td>
<td>Bodrum</td>
</tr>
<tr>
<td>41.2</td>
<td>37°06'44&quot;N 27°17'11&quot;E</td>
<td>25.11.1999</td>
<td>31 m</td>
<td>Mud</td>
<td>Dredge</td>
<td>Yalıkavak Bodrum</td>
</tr>
<tr>
<td>42</td>
<td>36°56'45&quot;N 27°16'32&quot;E</td>
<td>17.09.2000</td>
<td>31 m</td>
<td>Sand+Algae</td>
<td>Dredge</td>
<td>Bodrum</td>
</tr>
<tr>
<td>43</td>
<td>37°01'16&quot;N 27°26'29&quot;E</td>
<td>22.07.1995</td>
<td>1-3 m</td>
<td>Rocks covered by algae+<em>P. oceanica</em> by hand</td>
<td>Dredge</td>
<td>Bodrum</td>
</tr>
<tr>
<td>44</td>
<td>36°59'00&quot;N 27°32'35&quot;E</td>
<td>18.09.2000</td>
<td>47 m</td>
<td>Muddy sand+<em>Caulerpa racemosa</em></td>
<td>Dredge</td>
<td>Bodrum</td>
</tr>
<tr>
<td>45</td>
<td>36°56'22&quot;N 27°51'17&quot;E</td>
<td>09.07.1998</td>
<td>300 m</td>
<td><em>Mud</em>+Detritus</td>
<td>Dredge</td>
<td>Gökova Bay</td>
</tr>
<tr>
<td>46</td>
<td>36°59'00&quot;N 28°05'35&quot;E</td>
<td>18.09.2000</td>
<td>82 m</td>
<td><em>Mud</em></td>
<td>Dredge</td>
<td>Gökova Bay</td>
</tr>
<tr>
<td>47</td>
<td>36°48'30&quot;N 28°03'00&quot;E</td>
<td>19.09.2000</td>
<td>17-25 m</td>
<td><em>P. oceanica</em>+Sponge+Algae</td>
<td>Beam trawl</td>
<td>Gökova Bay</td>
</tr>
<tr>
<td>48</td>
<td>36°49'07&quot;N 27°52'10&quot;E</td>
<td>20.09.2000</td>
<td>54 m</td>
<td>Muddy sand</td>
<td>Dredge</td>
<td>Gökova Bay</td>
</tr>
<tr>
<td>49</td>
<td>36°47'58&quot;N 27°41'25&quot;E</td>
<td>20.09.2000</td>
<td>51 m</td>
<td><em>Algae</em>+Sand</td>
<td>Dredge</td>
<td>Gökova Bay</td>
</tr>
<tr>
<td>50</td>
<td>36°39'50&quot;N 27°32'30&quot;E</td>
<td>20.09.2000</td>
<td>86 m</td>
<td>Coralligenous+<em>Sand</em></td>
<td>Dredge</td>
<td>Datça</td>
</tr>
<tr>
<td>51.1</td>
<td>36°43'04&quot;N 27°41'33&quot;E</td>
<td>20.07.1995</td>
<td>0.3-2 m</td>
<td>Hard substratum covered by algae+<em>Cystoseira crinita</em></td>
<td>Dredge</td>
<td>Datça</td>
</tr>
<tr>
<td>51.2</td>
<td>36°45'08&quot;N 27°47'00&quot;E</td>
<td>21.09.2000</td>
<td>26 m</td>
<td><em>P. oceanica</em>+Sand+Algae</td>
<td>Dredge</td>
<td>Datça</td>
</tr>
<tr>
<td>52.1</td>
<td>36°47'58&quot;N 28°07'00&quot;E</td>
<td>21.09.2000</td>
<td>10 m</td>
<td><em>Mud</em></td>
<td>Dredge</td>
<td>Marmaris</td>
</tr>
<tr>
<td>52.2</td>
<td>36°42'45&quot;N 28°05'58&quot;E</td>
<td>21.09.2000</td>
<td>45 m</td>
<td><em>Mud</em></td>
<td>Dredge</td>
<td>Marmaris</td>
</tr>
<tr>
<td>52.3</td>
<td>36°42'30&quot;N 28°00'15&quot;E</td>
<td>21.09.2000</td>
<td>57 m</td>
<td>Muddy sand</td>
<td>Dredge</td>
<td>Marmaris</td>
</tr>
<tr>
<td>53</td>
<td>36°32'56&quot;N 27°58'30&quot;E</td>
<td>22.09.2000</td>
<td>109 m</td>
<td>Coralligenous+<em>Sand</em></td>
<td>Dredge</td>
<td>Marmaris</td>
</tr>
<tr>
<td>54.1</td>
<td>36°48'30&quot;N 28°05'15&quot;E</td>
<td>21.09.2000</td>
<td>13 m</td>
<td><em>P. oceanica</em>+Sand</td>
<td>Dredge</td>
<td>Marmaris</td>
</tr>
<tr>
<td>54.2</td>
<td>36°40'31&quot;N 28°09'51&quot;E</td>
<td>22.09.2000</td>
<td>44 m</td>
<td>Sand+<em>Caulerpa racemosa</em></td>
<td>Dredge</td>
<td>Marmaris</td>
</tr>
<tr>
<td>55</td>
<td>36°46'09&quot;N 28°15'25&quot;E</td>
<td>22.07.1995</td>
<td>4 m</td>
<td>Rocks covered by algae</td>
<td>Diving</td>
<td>Marmaris</td>
</tr>
<tr>
<td>56.1</td>
<td>36°45'50&quot;N 28°21'00&quot;E</td>
<td>22.09.2000</td>
<td>86 m</td>
<td><em>Mud</em></td>
<td>Dredge</td>
<td>Marmaris</td>
</tr>
<tr>
<td>56.2</td>
<td>36°44'30&quot;N 28°26'10&quot;E</td>
<td>23.09.2000</td>
<td>110 m</td>
<td>Sandy mud</td>
<td>Dredge</td>
<td>Marmaris</td>
</tr>
</tbody>
</table>

**Monophorus thiriotae** Bouchet, 1984

**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. thiriotae* 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)

**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. thiriotae* 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

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

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 cancelled 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)

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 tuberculata (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.


Dizoniopsis coppolae (Aradas, 1870)

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


Krachia 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

Acis 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.
Aclis 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.


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.


Punctisca cerigottana (Sturany, 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 helenica (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), Sea of Marmara (Ostroumoff, 1896: 64-87). It is being newly reported from the Turkish coast of the Aegean Sea.

Melanella boscii (Payraudeau, 1826)

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 stalioi* (Brusina, 1869)

*Eulima stalioi* 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.

*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 (Buzzurro and Greppi, 1996: 6; 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. 52.1, 1 specimen; st. 52.2, 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. thiriotae* 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. thiriotae* 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 found 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; Gönülügür-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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References


