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Dacrydium hyalinum (Monterosato, 1875) and *Musculus discors* (Linnaeus, 1767): Two New Mytilidae (Bivalvia) Species for the Turkish Mollusc Fauna

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Abstract: The Bivalvia (Mollusca) fauna was studied from benthic samples collected from 101 stations from various biotopes in the Turkish Aegean Sea in 2000. Two species, namely *Dacrydium hyalinum* (Monterosato, 1875) and *Musculus discors* (Linnaeus, 1767), new to the Turkish Bivalvia fauna are reported. Notes on the morphological and ecological features of these species are provided.

Key Words: Mollusca, Bivalvia, Mytilidae, *Dacrydium hyalinum*, *Musculus discors*, Aegean Sea

Dacrydium hyalinum (Monterosato, 1875) ve *Musculus discors* (Linnaeus, 1767): Türkiye Mollusca Faunası İçin Yeni Kayıt İki Mytilidae (Bivalvia) Türü

Özet: Bu çalışmada, 2000 yılında Türkiye'nin Ege Denizi kıyılarının farklı derinlik ve biyotoplarından yapılan örneklemelerden, 101 istasyondan alınan materyalin incelenmesi sonucu tespit edilen ve Türkiye Bivalvia faunası için ilk defa rapor edilen *Dacrydium hyalinum* (Monterosato, 1875) ve *Musculus discors* (Linnaeus, 1767)' un morfolojik, ekolojik ve coğrafik dağılım özellikleri incelenmiştir.

Anahtar Sözcükler: Mollusca, Bivalvia, Mytilidae, *Dacrydium hyalinum*, *Musculus discors*, Ege Denizi

Introduction

Because of its location, geomorphological structure, and hydrographical and ecological characteristics, the Aegean Sea comprises an important part of the Mediterranean ecosystem. From the biological point of view, the Aegean Sea can be divided into 2 sub-regions (northern and southern) as the ecological features of these 2 basins show great variety (Kocataş and Bilecik, 1992).

Nearly 2000 marine Mollusca species are known in the Mediterranean; 422 of these belong to Bivalvia (Sabelli et al., 1990) while 296 of them have been recorded in the Aegean Sea to date (Öztürk and Çevik, 2000; Doğan, 2005; Zenetos et al., 2005). The family Mytilidae, represented by 33 species in the Mediterranean (Sabelli et al., 1990; Waren and Carrozza, 1990), includes species that are able to survive in a wide range of environmental conditions. Thirteen of these have been recorded in Turkish seas (Öztürk and Çevik, 2000; Albayrak and Çeviker, 2001) to date. During a detailed study of the bivalvia fauna along the Turkish Aegean coast (Doğan, 2005), 2 mytilid species [*Dacrydium hyalinum* (Monterosato, 1875) and *Musculus discors* (Linnaeus, 1767)] new for the Turkish mollusc fauna were found. Ecological and morphological features and zoogeographical distribution of these species are presented in this work.

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Materials and Methods

Benthic samples were collected with the R/V *Hippocampus* between 17.07.2000 and 05.10.2000 from different biotopes of infralittoral and circalittoral zones by means of dredge, beam-trawl and Van Veen grab. Samples were sieved through 0.5 mm mesh sized sieve. The specimens were deposited at the Museum of Faculty of Fisheries, Ege University (EFSM). Identification is based on Tebble (1966), Salas and Gofas (1997), and Giannuzzi-Savelli et al. (2001), and systematic classification is carried out according to CLEMAM (2006).

Results

As a result of the evaluation of 101 benthic samples, 2 mytilid species [*Dacrydium hyalinum* (Monterosato, 1875) and *Musculus discors* (Linnaeus, 1767)] new to the Turkish mollusc fauna are reported herein.

Musculus discors (Linnaeus, 1767) (Figure 1)

Material examined: B4 (1 specimen), B6 (1 specimen). Samples were encountered at 2 stations (Table 1) having *Posidonia oceanica* meadows at 5 and 20 m depths off the northern Aegean coast of Turkey (Figure 2).

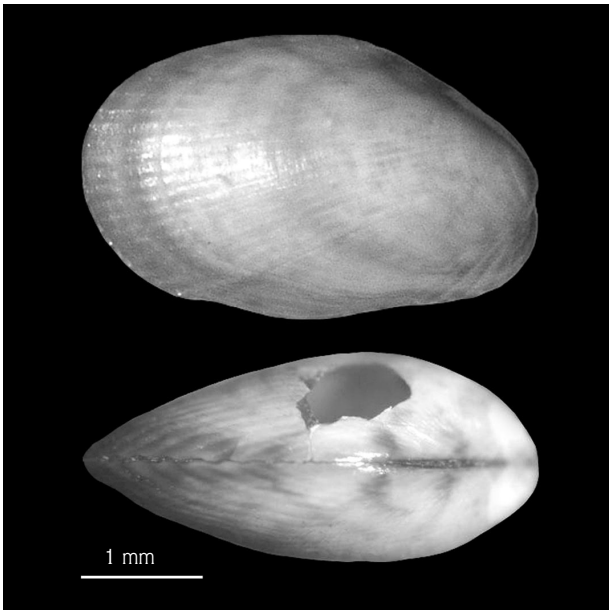

Figure 1. *Musculus discors.* View of the outside of the right valve (above) and dorsal view of the shell (below).

Description: Shell fragile, equivalve, inequilateral, beaks a short distance from the anterior end, rhomboidal in outline, yellow-brown, surface of the valves covered by a thin periostracum light green or brown, anterior part with 9-12 radiating ribs, and in the posterior, finer 30-45 or more ribs, very fine concentric lines also present, the middle part without ribs. Internal margin crenulated in correspondence with the radiating ribs, the rest smooth. Ligament external and deeply inset.

Dacrydium hyalinum (Monterosato, 1875) (Figure 3)

Material examined: B5 (3 specimens), E1 (1 specimen), F11 (shell only), F12 (shell only), G4 (1 specimen), H1 (shell only), H9 (1 specimen), H13 (shell only). Samples were encountered at 8 stations (Figure 2) at 27-183 m mostly represented by muddy and sandy bottoms with some including algae and *Posidonia oceanica* meadows (Table 2).

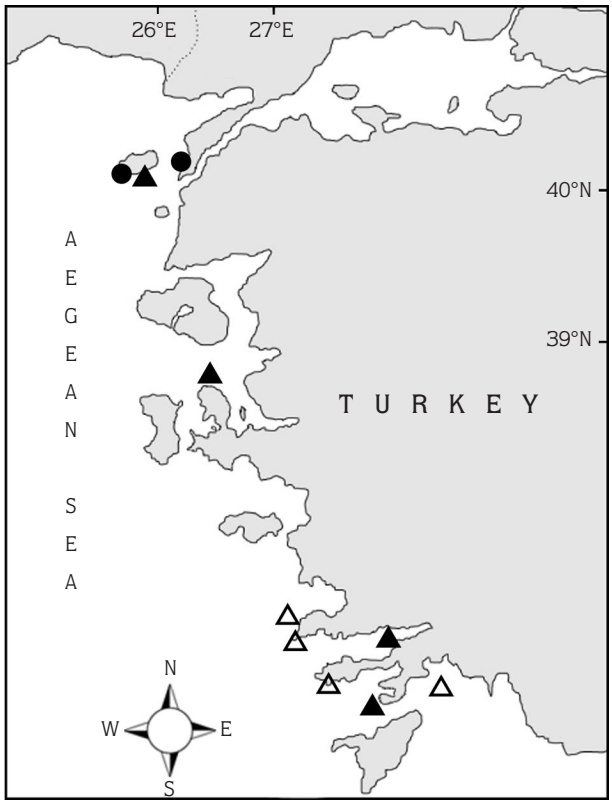

Figure 2. Locations of the stations where specimen(s) was sampled (circles denotes the presence of *M. discors,* triangles the presence of *D. hyalinum*, and empty triangles the shells only of *D. hyalinum*).

Table 1. Characteristics of the stations where *M. discors* was encountered.

Stations	Coordinates	Date	Depth (m)	Biotope	Sampling equipment
B4	40°07′22″ N 25°39′50″ E	13.08.2000	5	*Posidonia oceanica*	Beam-trawl
B6	40°11′17″ N 26°15′20″ E	02.08.2000	20	*Posidonia oceanica*	Dredge

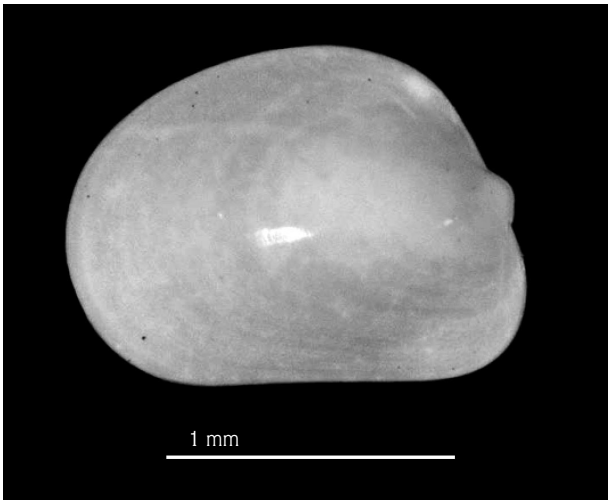

Figure 3. *Dacrydium hyalinum.* View of the outside of the right valve.

Description: Shell brittle, flattened, equivalve and slightly inequilateral, beaks lying close to the anterior margin. Irregularly oval, antero-ventral region broadly rounded, ventral margin straight. The shell is shiny vitreous white. Periostracum light yellow to beige. No sculpture present except for fine concentric striae. Margin smooth. Hinge line with numerous teeth on either side of the beaks, especially on the posterior side.

Discussion

Based on material collected from 101 stations along the Aegean coast of Turkey, 2 species belonging to the family Mytilidae are added to the Molluscan fauna of the Turkish seas. Thus, the number of the mytilid species occurring in Turkish seas has been increased to 15 (Table 3), as

Table 2. Characteristics of the stations where *D. hyalinum* was encountered (*Stations where only shells of the species were found).

Stations	Coordinates	Date	Depth (m)	Biotope	Sampling equipment
B5	40°05′45″ N 25°50′45″ E	02.08.2000	27	Posidonia oceanica	Dredge
E1	38°44′10″ N 26°22′00″ E	12.09.2000	183	Sandy mud	Dredge
F11*	37°03′50″ N 27°13′30″ E	17.09.2000	37	Sandy mud + Posidonia oceanica + algae	Dredge
F12*	36°56′45″ N 27°16′32″ E	17.09.2000	31	Sand +algae	Dredge
G4	36°58′30″ N 27°57′10″ E	18.09.2000	109	Muddy sand	Dredge
H1*	36°39′50″ N 27°32′30″ E	20.09.2000	86	Corall. + Sand	Dredge
H9	36°32′56″ N 27°58′30″ E	22.09.2000	109	Corall. + Sand	Dredge
H13*	36°44′30″ N 27°58′30″ E	23.09.2002	120	Sandy mud	Dredge

Table 3. Mytilid species distributed in Turkish seas.

	Black Sea	Sea of Marmara	Aegean Sea	Mediterranean
Mytilus galloprovincialis Lamarck, 1819	+	+	+	+
Brachidontes pharaonis (Fischer P., 1870)	-	-	+	+
Septifer forskali Dunker, 1855	-	-	-	+
Mytilaster lineatus (Gmelin, 1791)	+	+	+	-
Mytilaster minimus (Poli, 1795)	-	+	+	+
Gregariella petagnae (Scacchi, 1832)	-	-	+	+
Modiolarca subpictus (Cantraine, 1835)	-	+	+	+
Musculus costulatus (Risso, 1826)	-	+	+	+
Musculus discors (Linnaeus, 1767)	-	-	+	-
Lithophaga lithophaga (Linnaeus, 1758)	-	+	+	+
Modiolus barbatus (Linnaeus, 1758)	+	+	+	+
Modiolus adriaticus (Lamarck, 1819)	+	+	+	+
Amygdalum agglutinans (Cantraine, 1835)	-	-	-	+
Dacrydium hyalinum (Monterosato, 1875)	-	-	+	-
Modiolula phaseolina (Philippi, 1844)	+	+	+	+

opposed to the 33 species of the family Mytilidae present in the Mediterranean. Thirteen mytilid species were reported from the Aegean coast of Turkey to date, followed by the Mediterranean coast with 12 species. Within these species, *Brachidontes pharaonis* (Fisher P., 1870) (reported from Aegean and Mediterranean coasts of Turkey) and *Septifer forskali* Dunker, 1855 (found along the Mediterranean coast of Turkey) are lessepsian mytilid species. The Marmara Sea is represented by 9 mytilid species, while the lowest number (5) of species is reported from the Black Sea coast of Turkey, which may be attributed to the extreme environmental conditions (hydrogen sulphide occurring in certain depths, lower salinity values, and biotope diversity).

Musculus discors lives attached by byssus threads to algae, in particular to *Corallina officinalis*, and to the rocks of the littoral zone (Barsotti, 1972), from the intertidal zone to deep water (Poppe and Goto, 1993) up to 3264 m (Jeffreys, 1879). It has also been reported from sandy bottoms between 5 and 45 m (Borja and Muxika, 2001) on the mantle of *Ascidia mentula* (Parenzan, 1974) and on the roots of *Posidonia oceanica* (Zenetos, 1986). *M. discors* has a very wide distribution in the northern hemisphere, occurring in the Atlantic Ocean, south from the Arctic to Madeira, extending into the Mediterranean, and to New York; in the Pacific it, or a variant, ranges south to Puget Sound and Japan (Tebble, 1966). The species has been recorded in the Greek Aegean and Ionian seas by Zenetos (1996) (and references therein) and Zenetos et al. (2005).

Dacrydium hyalinum has been recorded by Salas (1996) between 76 and 118 m on hard bottoms (gravel and rocks with coralline algae) and by Cosenza and Fasulo (1997) from nets at 30 m. It has also been reported by Cachia et al. (2004) between 45 and 160 m. The exact distribution range of *D. hyalinum* is uncertain due to confusion with other species (Cachia et al., 2004). Mattson and Waren (1977) noted that the species was only known from off Palermo. However, later records from both the western (Salas, 1996) and eastern basin (Zenetos, 1996; Cosenza and Fasulo, 1997; Cachia et al., 2004) revealed the presence of this rare species throughout the Mediterranean Sea. Doubts on the distribution range of *Dacrydium hyalinum* due to confusion with other species, especially *D. vitreum* (Moller, 1842), were also mentioned by Salas and Gofas (1997). As a matter of fact, *D. hyalinum* seems not to be recorded from the Aegean Sea to date, while Zenetos (1996) reports these 2 species as synonyms. Nevertheless, some distinctive characteristics of these 2 species have been given in later literature by Salas and Gofas (1997), allowing for the accurate identification of the Turkish material.

A review of the Mytilidae family in Turkish seas has revealed a lower diversity than that reported from the Mediterranean and adjacent seas. More detailed and widespread (geographic plus bathymetric coverage) studies should be undertaken to contribute to the knowledge of distributional and ecological features of Molluscan fauna of Turkish seas.

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