



Heterostropha Species of the Turkish Coasts: Odostomiinae Pelseneer, 1928 (Gastropoda, Heterobranchia, Pyramidellidae)

Bilal Öztürk^{1*}, Banu Bitlis Bakır¹, Pasquale Micali²

¹ Ege University, Faculty of Fisheries, Dept. Hydrobiology, Bornova, Izmir, Turkey.

² Via Papiria 17, I-61032 Fano (PU), Italy.

* Corresponding Author: Tel.: +90.232 3115215; Fax: +90.232 3883685;
E-mail: bilal.ozturk@ege.edu.tr

Received 30 July 2012
Accepted 4 January 2013

Abstract

The present paper deals with Odostomiinae species distributed along the Turkish coasts. The examination of a material sampled from different depths (0-875 m) and biotopes between 1996 and 2011 resulted in identification of 20 *Odostomia* (*O. acuta*, *O. angusta*, *O. barashi*, *O. carrozzai*, *O. conoidea*, *O. conspicua*, *O. erjaveciana*, *O. eulimoides*, *O. megerlei*, *O. kromi*, *O. improbabilis*, *O. lorioli*, *O. lukisii*, *O. plicata*, *O. scalaris*, *O. sicula*, *O. silesui*, *O. turriculata*, *O. turrita* and *O. unidentata*), 2 *Liostomia* (*L. afzelii* and *L. clavula*) 1 *Noemiamea* (*N. dolioliformis*) and 5 *Ondina* (*O. anceps*, *O. crystallina*, *O. diaphana*, *O. vitrea* and *O. warreni*) species. Among the identified species, *Odostomia silesui* and *Ondina anceps* are new records for the eastern Mediterranean, *Liostomia afzelii* is new for the Levantine and Aegean Seas, *Odostomia megerlei* is new for the Levantine Sea, *Odostomia angusta*, *O. barashi* and *O. lorioli* are new for the Aegean Sea molluscan fauna, *Odostomia carrozzai* is new for the Turkish mollusc fauna, *Odostomia unidentata* is new for the Turkish Levantine and Aegean Seas, *Liostomia clavula* is new for the Turkish Levantine coast and 6 species (*Odostomia conspicua*, *O. kromi*, *O. improbabilis*, *O. lukisii*, *O. turrita* and *Ondina diaphana*) are new ones for the Turkish Aegean Sea fauna. Of the identified species, *Odostomia conoidea* is the most abundant and widely distributed species along the Turkish coasts, whereas *Odostomia angusta*, *O. barashi*, *O. megerlei*, *Ondina anceps* and *O. crystallina* are species with restricted distribution. *Odostomia silesui* is the deepest living Odostomiinae species among the dealt with herein. In the present study, some ecological and distributional features and taxonomic remarks, with colour photographs of the identified species, are given.

Keywords: *Odostomia*, *Liostomia*, *Noemiamea*, *Ondina*, Mollusca, Turkish Seas, Eastern Mediterranean, ecology, taxonomy, distribution.

Türkiye Kıyılarının Heterostropha Türleri: Odostomiinae Pelseneer, 1928 (Gastropoda, Heterobranchia, Pyramidellidae)

Özet

Bu çalışmada Türkiye kıyılarında dağılım gösteren Odostomiinae türleri incelenmiştir. 1996-2011 yılları arasında farklı derinliklerden (0-875) ve yaşam ortamlarından alınan materyalin incelenmesi sonucu, 20 *Odostomia* (*O. acuta*, *O. angusta*, *O. barashi*, *O. carrozzai*, *O. conoidea*, *O. conspicua*, *O. erjaveciana*, *O. eulimoides*, *O. megerlei*, *O. kromi*, *O. improbabilis*, *O. lorioli*, *O. lukisii*, *O. plicata*, *O. scalaris*, *O. sicula*, *O. silesui*, *O. turriculata*, *O. turrita* ve *O. unidentata*), 2 *Liostomia* (*L. afzelii* ve *L. clavula*), 1 *Noemiamea* (*N. dolioliformis*) ve 5 *Ondina* (*O. anceps*, *O. crystallina*, *O. diaphana*, *O. vitrea* ve *O. warreni*) türü tespit edilmiştir. Bu türlerden *Odostomia silesui* ve *Ondina anceps* Doğu Akdeniz, *Liostomia afzelii* Levantine Denizi ve Ege Denizi, *Odostomia megerlei* Levantine Denizi, *Odostomia angusta*, *O. barashi* ve *O. lorioli* Ege Denizi Mollusca faunası, *Odostomia carrozzai* Türkiye Mollusca faunası, *Odostomia unidentata* Türkiye'nin Levantine ve Ege Denizi kıyıları, *Liostomia clavula* Türkiye'nin Levantine Denizi kıyıları ve 6 tür (*Odostomia conspicua*, *O. kromi*, *O. improbabilis*, *O. lukisii*, *O. turrita* ve *Ondina diaphana*) Türkiye'nin Ege Denizi kıyıları için ilk defa rapor edilmektedir. Saptanan türlerden, *O. conoidea* kıyılarımızın en yaygın, *Odostomia angusta*, *O. barashi*, *O. megerlei*, *Ondina anceps* ve *O. crystallina* ise sınırlı dağılıma sahip Odostomiinae türleridir. Tespit edilen türler arasında *O. silesui* en derin dağılımlı tür olarak dikkat çekmektedir. Bu çalışmada, incelenen türlerin renkli fotoğraflarının yanı sıra, bu türlerin bazı taksonomik, ekolojik ve dağılım özelliklerine yer verilmiştir.

Anahtar Kelimeler: *Odostomia*, *Liostomia*, *Noemiamea*, *Ondina*, Mollusca, Türkiye denizleri, Doğu Akdeniz, ekoloji, taksonomi, dağılım.

Introduction

A part of the pyramidellid fauna (*Chrysallida* Carpenter, 1856) distributed along the Turkish coasts has been recently investigated by Öztürk *et al.* (2011). The subject of the present study is Odostomiinae Pelseneer, 1928, which is a subfamily (in some works was promoted to family) within Pyramidellidae, including the Mediterranean genera *Odostomia*, *Liostomia*, *Noemiamea* and *Ondina* (Sabelli *et al.*, 1990 and CLEMAM).

Pyramidellids consist a speciose group of parasitic gastropods, comprising more than 6000 species (Schander *et al.*, 1999), characteristic for with their heterostrophic protoconch, which depends on the fact that in the larval state the animal is sinistral while in the adult stage it is dextral (Laseron, 1951). The other opinion on this subject is that of Fretter *et al.* (1986), and as to the authors, the direction of coiling remains constantly clockwise but because the protoconch coils upwards it appears sinistral when viewed in the conventional way.

According to Aartsen (1987) and Peñas *et al.* (1996), the heterostrophic protoconch of Odostomiinae species is being in three different types: type A (helicoid, forming an angle between 90° and 120°), type B (forming an angle between 130° and 160°, and generally with nucleus of the embryonic whorls partially or completely hidden) and type C (inclined of about 180°, with embryonic whorls hidden in the first teleoconch whorl). The protoconchs of type B and C are usually referred to as "intorted" (Aartsen *et al.*, 1998).

The Odostomiinae species of the Mediterranean basin and neighbouring region were subject of different studies in the past, both in specific and general level. Aartsen (1987) was the first author monographed the European coast *Odostomia* and *Ondina* species, in which study different diagnostic characters for their classification were treated, and a key for species identification was given. Then, the works by Micali (1987), Nofroni (1988), Warén (1991), Gaglini (1992), Mifsud (1993), Schander (1994, 1995), Nofroni and Schander (1994), Peñas *et al.* (1996), Aartsen *et al.* (1998), Peñas and Rolán (1999), Bogi and Galil (2000) and Buzzurro (2001) are some of the other considerable studies contributed to the knowledge of pyramidellids in general.

Our present goal is to develop the knowledge of the diversity and distributional ranges of the Turkish pyramidellid fauna, along with some statements on their taxonomy, ecology and distribution.

Material and Methods

The material and methods of the present study is similar to those given in Öztürk *et al.* (2011), except the fact that this work also includes a material from the Sea of Marmara and the material collected during the year 2011.

Protoconch and the other classification terminology follow Aartsen (1987) and Peñas *et al.* (1996). Some shell features of the identified species, such as total height (H) with \pm standard errors, mean diameter (D) with \pm standard errors, mean height (h) of the last whorl with \pm standard errors and maximum values for each species [.....] are given in the following order: H x D – h mm [..... mm].

The investigated specimens of each species, with individual catalogue numbers, have been deposited in the museum collections of the Faculty of Fisheries (ESFM), Ege University (İzmir-Turkey).

Results and Discussion

The examination of the collected benthic material (442 specimens with soft parts and 48 empty shells) revealed totally 28 Odostomiinae species, of which 20 species are of the genus *Odostomia* Fleming, 1813 (*O. acuta*, *O. angusta*, *O. barashi*, *O. carrozzai*, *O. conoidea*, *O. conspicua*, *O. erjaveciana*, *O. eulimoides*, *O. improbabilis*, *O. kromi*, *O. lorioli*, *O. lukisii*, *O. megerlei*, *O. plicata*, *O. scalaris*, *O. sicula*, *O. silesui*, *O. turriculata*, *O. turrita* and *O. unidentata*) 2 species of the genus *Liostomia* Sars, G. O., 1878 (*L. afzelii* and *L. clavula*), 1 species of the genus *Noemiamea* Hoyle, 1886 (*N. dolioliformis*) and 5 species of the genus *Ondina* de Folin, 1870 (*O. anceps*, *O. crystallina*, *O. diaphana*, *O. vitrea* and *O. warreni*). Of the genus *Odostomia*, 12 species were found along the Turkish Levantine coast (*O. acuta*, *O. conoidea*, *O. improbabilis*, *O. kromi*, *O. lorioli*, *O. lukisii*, *O. megerlei*, *O. plicata*, *O. scalaris*, *O. sicula*, *O. turriculata* and *O. unidentata*), 15 species in the Aegean Sea (*O. acuta*, *O. angusta*, *O. barashi*, *O. carrozzai*, *O. conoidea*, *O. conspicua*, *O. eulimoides*, *O. improbabilis*, *O. kromi*, *O. lorioli*, *O. lukisii*, *O. scalaris*, *O. silesui*, *O. turrita* and *O. unidentata*), 2 species in the Sea of Marmara (*O. eulimoides* and *O. scalaris*) and 2 species (*O. erjaveciana* and *O. eulimoides*) along the Turkish Black Sea coast.

Of the identified two *Liostomia* species, *L. afzelii* and *L. clavula* were encountered in the material sampled both in the Levantine and Aegean Seas. The single record of *Noemiamea dolioliformis*, which is the only representative of the genus in the Mediterranean, is from the Levantine Sea.

Within the genus *Ondina*, 3 species (*O. diaphana*, *O. vitrea* and *O. warreni*) were found in the material collected in the Levantine Sea, whereas in the Aegean Sea were encountered all of the studied *Ondina* species.

According to the relevant literatures, among the subjected species *Odostomia silesui* and *Ondina anceps* are new records for the eastern Mediterranean, *Liostomia afzelii* is new for the Levantine and Aegean Seas, *Odostomia megerlei* is new for the Levantine Sea, *Odostomia angusta*, *O. barashi* and *O. lorioli* are new for the Aegean Sea molluscan fauna, *Odostomia*



Figure 1. Map of the studied area with the location of the sampling sites.

Geographic coordinates of collecting stations : 1: 40°36'08"N-26°33'53"E; 2: 40°37'08"N-26°38'17"E; 3: 40°38'23"N-26°47'27"E; 4: 40°30'45"N-26°40'45"E; 5: 40°33'00"N-26°30'20"E; 6: 40°23'46"N-26°21'46"E; 7: 40°17'06"N-25°45'05"E; 8: 40°13'20"N-26°03'00"E; 9: 40°11'17"N-26°15'20"E; 10: 40°04'45"N-26°10'50"E; 11: 40°02'19"N-26°13'11"E; 12: 40°26'19"N-26°13'11"E; 13: 40°10'40"N-25°40'50"E; 14: 40°07'22"N-25°39'50"E; 15: 40°05'45"N-25°50'45"E; 16: 39°55'30"N-25°50'20"E; 17: 39°39'15"N-26°02'00"E; 18: 39°27'10"N-26°07'00"E; 19: 39°31'28"N-26°29'08"E; 20: 39°25'18"N-26°35'20"E; 21: 30°19'00"N-26°36'30"E; 22: 39°09'30"N-26°40'20"E; 23: 39°00'10"N-26°44'28"E; 24: 38°53'39"N-26°50'19"E; 25: 38°55'47"N-26°56'27"E; 26: 38°49'45"N-26°46'15"E; 27: 39°02'35"N-26°43'43"E; 28: 38°35'11"N-26°46'01"E; 29: 38°25'23"N-26°58'88"E; 30: 38°27'19"N-27°04'09"E; 31: 40°30'45"N-26°40'45"E; 32: 38°23'34"N-26°54'11"E; 33: 38°23'17"N-26°51'37"E; 34: 38°23'32"N-26°46'62"E; 35: 38°31'33"N-26°37'56"E; 36: 38°36'34"N-26°34'02"E; 37: 38°38'18"N-26°39'08"E; 38: 38°27'24"N-26°27'18"E; 39: 38°23'31"N-26°27'01"E; 40: 38°20'48"N-26°14'15"E; 41: 38°08'13"N-26°43'00"E; 42: 37°59'00"N-27°11'15"E; 43: 37°55'18"N-27°07'41"E; 44: 37°48'00"N-27°16'00"E; 45: 37°42'32"N-27°12'21"E; 46: 37°51'53"N-27°15'29"E; 47: 37°23'55"N-27°06'52"E; 48: 37°21'00"N-27°21'50"E; 49: 37°19'30"N-27°29'00"E; 50: 37°13'00"N-27°18'37"E; 51: 37°13'44"N-27°34'14"E; 52: 37°09'00"N-27°29'30"E; 53: 37°08'43"N-27°24'01"E; 54: 37°03'50"N-27°13'30"E; 55: 36°56'45"N-27°16'32"E; 56: 36°59'00"N-27°32'35"E; 57: 36°59'30"N-27°47'56"E; 58: 36°48'30"N-28°03'00"E; 59: 36°49'07"N-27°52'10"E; 60: 36°39'50"N-27°32'30"E; 61: 36°43'16"N-27°42'10"E; 62: 36°45'08"N-27°47'00"E; 63: 36°42'30"N-28°00'15"E; 64: 36°38'30"N-28°05'15"E; 65: 36°40'31"N-28°09'51"E; 66: 36°45'50"N-28°21'00"E; 67: 36°50'40"N-28°16'10"E; 68: 36°47'30"N-28°37'00"E; 69: 36°42'39"N-28°57'31"E; 70: 36°38'40"N-29°05'30"E; 71: 36°37'44"N-29°04'39"E; 72: 36°23'54"N-29°06'05"E; 73: 36°12'06"N-29°37'30"E; 74: 36°05'05"N-32°54'03"E; 75: 36°02'55"N-32°53'43"E; 76: 36°11'31"N-33°38'28"E; 77: 36°17'24"N-33°50'10"E; 78: 36°39'16"N-34°26'18"E; 79: 36°37'16"N-34°41'34"E; 80: 36°41'38"N-34°42'00"E; 81: 36°44'30"N-34°34'59"E; 82: 36°46'24"N-34°40'13"E; 83: 36°46'55"N-34°36'45"E; 84: 36°48'34"N-34°45'00"E; 85: 36°45'47"N-34°51'54"E; 86: 36°43'33"N-34°52'11"E; 87: 36°41'17"N-34°49'12"E; 88: 36°33'59"N-35°07'59"E; 89: 36°33'22"N-35°34'17"E; 90: 36°30'12"N-35°36'24"E; 91: 36°43'37"N-35°42'44"E; 92: 36°45'40"N-35°48'29"E; 93: 36°45'59"N-35°47'18"E; 94: 36°50'05"N-35°53'74"E; 95: 36°52'23"N-35°55'25"E; 96: 36°54'22"N-35°58'05"E; 97: 36°43'19"N-36°09'30"E; 98: 36°20'57"N-35°48'43"E; 99: 42°02'00"N-35°03'00"E; 100: 41°27'09"N - 41°16'53"E

carrozzai is new for the Turkish mollusc fauna, *Odostomia unidentata* is new for the Turkish Levantine and Aegean Seas, *Liostomia clavula* is new for the Turkish Levantine coast and 7 species (*Odostomia conspicua*, *O. erjaveciana*, *O. improbabilis*, *O. kromi*, *O. lukisii*, *O. turrita* and *Ondina diaphana*) are reported for the first time for the Turkish Aegean Sea fauna.

Of the encountered species, *O. conoidea* attracts attention as the most abundant and widely distributed *Odostomia* species along the Turkish coasts, known from all the seas, except for the Black Sea. However, several species, i. e., *Odostomia barashi*, *O. megerlei*, *O. silesui*, *Noemiamea dolioliformis*, *Ondina anceps* and *O. crystallina* are known from one locality and represented by a single specimen or a shell only.

Among the studied species, most of them are with Atlanto-Mediterranean origin or Mediterranean endemic. Only *Odostomia lorioli* is an alien species with Red Sea origin, known from the Mediterranean since 1974 (Aartsen, 1987).

The identified species in this study, and some

shell and biotope characteristics along with their distributional patterns, are given below.

Odostomia Fleming, 1813

The representatives of the genus *Odostomia*, with type species *Turbo plicatus* Montagu, 1803, are pyramidellids, which embryonic shell (protoconch) can be in three different types (Aartsen, 1987 and Peñas *et al.*, 1996) above described. In the genus *Odostomia*, along with the protoconch type, the direction of the growth lines (prosocline, orthocline or opisthocline), and the presence or absence of tooth or fold on the columella, are some of the considerable shell characters to be used for species determination.

Odostomia acuta Jeffreys, 1848 (Figure 2)

Odostomia acuta; Micali, 1983:33; fig.1; Aartsen *et al.*, 1984:51, fig. 246; Aartsen, 1987:8, 11, fig. 15; Peñas *et al.*, 1996:39-40, figs 108, 109, 111; Aartsen *et al.*, 1998:19, figs 20, 57; Peñas and Rolán,

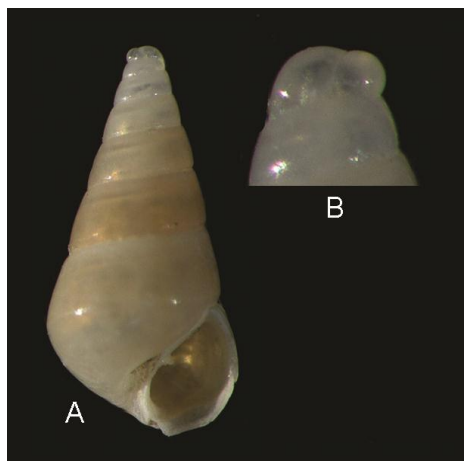


Figure 2. *Odostomia acuta*: general view of a specimen (A) and its protoconch (B) (A=2.9 mm, sta. 65, 44 m)

1999:58-60, 120 figs 131-136, 345.

Material: 03.08.2000, sta. 2, 32 m, muddy sand, 1 sh.; 04.08.2000, sta. 5, 82 m, sandy mud, 1 sh.; 13.08.2000, sta. 15, 27 m, *Posidonia oceanica*, 1 sp.; 04.06.2002, sta. 36, 44 m, sandy mud, 1 sp.; 16.09.2009, sta. 38, 45-54 m, mud and sandy mud, 1 sp.; 14.09.2000, sta. 40, 54 m, muddy sand, 6 sp.; 17.09.2000, sta. 52, 44 m, 1 sp.; 18.09.2000, sta. 56, 47 m, *Caulerpa* sp. + mud; 1 sp.; 21.09.2000, sta. 62, 27 m, algae + *P. oceanica* + sand, 1 sp.; 22.09.2000, sta. 65, 44 m, sand + algae, 2 sp. and 1 sh.; 03.10.2005, sta. 73, 0.2- 9 m, *P. oceanica*, 1 sp.; 19.10.2009, sta. 80, 43-47 m, mud and muddy sand, 1 sh., 31.07.2009, sta. 94, 5-25 m, 1 sh.

The species has a conical shell with helicoidal protoconch (type A), which could be generally seen as an entire circle outside of the first teleoconch whorl. Spire comprises 4-5 convex teleoconch whorls, and body whorl consists between 0.57-0.64 (depend on the specimens being adult or young) of the total shell height. Growth lines are orthocline or slightly prosocline. A clear umbilicus and a tooth on the columella are present. *Mean dimensions* (15 specimens and 5 shells): 1.64 (± 0.08) x 0.86 (± 0.03) – 1.05 (± 0.04) mm [2.8 x 1.4 – 1.6 mm]. The species lives as parasite on Bryozoans and on the polychaete *Myxicola infundibulum* (Fretter et al., 1986: 613 and Solustri and Micali, 2004:66).

Distribution: Eastern Atlantic and Mediterranean Sea (Aartsen et al., 1998: 21; Peñas and Rolán, 1999:120). *Turkish coasts:* Levantine Sea (Micali and Palazzi, 1992:86; Buzzurro and Greppi, 1996:8), Aegean Sea (Demir, 2003:115), Sea of Marmara (Ostroumoff, 1896: 80; Demir, 2003:115). The species is also known from the northern Black Sea (Wilke and Aartsen, 1998: 20), although it has not been recorded from the Turkish coast.

Odostomia angusta Jeffreys, 1867 (Figure 3)

Odostomia angusta; Warén, 1980: 37, pl. 6, fig. 18; Aartsen, 1987: 9, 13, fig. 23; Peñas et al., 1996:40, figs 123, 124; Peñas and Rolán, 1999: 90-91.

Material: 14.09.2000, sta. 40, 54 m, sandy mud, 1 sp.; 15.09.2000, sta. 50, 71 m, coralligenous sand, 1 sp.

Shell is conical and consists of 4.5-5 slightly convex teleoconch whorls. On the whorls, sometimes, very weak signs of spiral striation may be present. Protoconch is of type C. Growth lines are orthocline. Body whorl is more than half of the total shell height. A slight tooth on the columella and a narrow umbilicus are visible. The dimensions of the specimens found are 2.6 x 1.2-1.8 and 2.2 x 1.1-1.5 mm.

Distribution: Eastern Atlantic and Mediterranean Sea (Aartsen et al., 1998: 28; Peñas and Rolán, 1999: 91). *Turkish coasts:* Aegean Sea (the present study)

Odostomia barashi Bogi & Galil, 2000 (Figure 4)

Odostomia barashi; Bogi and Galil, 2000: 50-51, figs 1-2 (*original description*); 2006: 16-18, fig. 1d.

Material: 08.10.2005, sta. 46, 5 m, *Caulerpa racemosa* and sandy mud, 1 sp.

Shell is semitransparent and subcylindrical, consisting of four slightly convex teleoconch whorls. Protoconch is of type B and growth lines are orthocline or slightly prosocline. Body whorl is about 0.55 of the total shell height. A slight fold on the columella is present. Umbilicus is hardly visible. The dimensions of the single specimen found are 2.00 x 0.70 – 1.20 mm.

Distribution: Eastern Mediterranean (Bogi and Galil, 2006: 16-17). *Turkish coasts:* Levantine Sea (Öztürk and Aartsen, 2006: 243; it was erroneously listed among the alien species) and Aegean Sea (this study). *O. barashi* has a very restricted distribution along the Turkish coasts.

Odostomia carrozzai Aartsen, 1987 (Figure 5)

Odostomia carrozzai; Aartsen, 1987: 10, 13, fig. 30 (nomen novum for *Odostomia albella* auct., non Lovén, 1846)

Odostomia carrozzai; Peñas et al., 1996: 40, figs 129-131; Aartsen et al., 1998: 29; Peñas and Rolán, 1999:94-95, figs 253, 254, 343.

Material: 18.09.2000, sta. 56, 47 m, *Caulerpa*

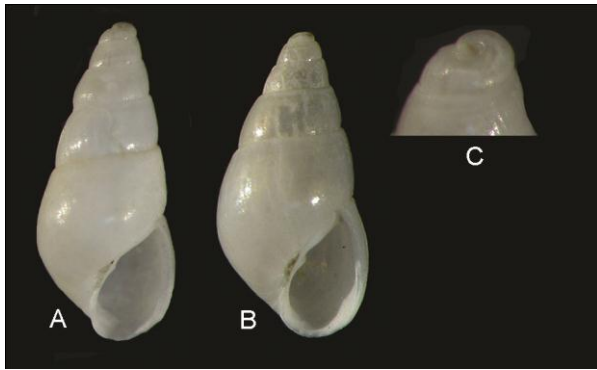


Figure 3. *Odostomia angusta*: general view of two specimens and the protoconch (C) of the specimen A. (A=2.6 mm, sta. 40, 54 m; B=2,7 mm, sta. 50, 71 m).

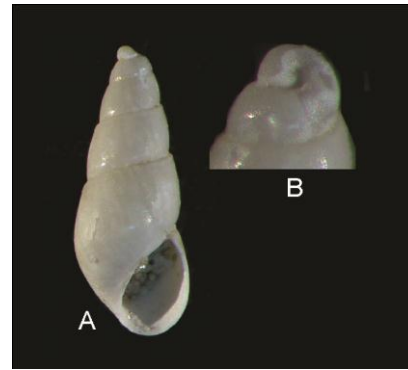


Figure 4. *Odostomia barashi*: general view of a specimen and its protoconch (B). (A=2.0 mm, sta. 46, 5 m).



Figure 5. *Odostomia carrozzai*: general view of three specimens and the protoconch (D) of the specimen C (A=2.7 mm, sta. 56, 47 m; B=1.6 mm, sta. 66, 86 m; C=1.5 mm, sta. 65, 44 m).

sp. + mud, 1 sp.; 20.09.2000, sta. 59, 12-54 m, algae and muddy sand, 1 sp.; 21.09.2000, sta. 63, 57 m, sand 1 sh.; 22.09.2000, sta. 65, 44 m, sand + algae, 1 sp.; 22.09.2000, sta. 66, 86 m, mud + sand, 1 sp.

The shell has a conical or a conical-oblong profile, with 3-4 teleoconch whorls. Protoconch is of type B, and somewhat tilted. Body whorl is about 0.50-0.60 of the total shell height. Growth lines are clearly prosocline. Inside of the outer lip is smooth. There is a tooth on the columella and it is more visible when the shell turns to the left. Umbilical groove is more or less evident, but no umbilicus. *Mean dimensions*: (4 specimens and 1 shell): 1.82 (± 0.22) x 0.80 (± 0.07)–1.14 (± 0.06) mm [2.7 x 1.1 – 1.3 mm].

Distribution: Eastern Atlantic and Mediterranean Sea (Aartsen, 1987: 13; Peñas and Rolán, 1999: 96 and Öztürk et al., 2003: 60). *Turkish coasts*: Aegean Sea (this study).

Odostomia conoidea (Brocchi, 1814) (Figure 6)

Turbo conoideus Brocchi, 1814

Odostomia conoidea; Micali, 1983: 31-32, fig. 4; Aartsen, 1987: 7, 10-11; fig. 12; Schander, 1994: 64, pl. 5, fig. C; Peñas et al., 1996: 42, figs 106-

107; Aartsen et al., 1998: 33-34, fig. 36; Peñas and Rolán, 1999: 26-30, figs 53-60, 91, 92, 97.

Material: 04.08.2000, sta. 1, 66 m, mud, 11 sp.; 03.08.2000, sta. 2, 32 m, muddy sand, 27 sp. + 4 sh.; 03.08.2000, sta. 3, 12-20 m, mud and muddy sand, 55 sp.; 03.08.2000, sta. 4, 47 m, mud, 1 sp.; 03.08.2000, sta. 6, 105 m, muddy sand, 2 sp.; 02.08.2000, sta. 8, 36 m, mud, 1 sp.; 02.08.2000, sta. 9, 20 m, *P. oceanica*, 2 sp.; 13.08.2000, sta. 10, 29 m, sand, 4 sp.; 13.08.2000, sta. 13, 104 m, mud, 1 sp.; 13.08.2000, sta. 15, 27 m, *P. oceanica*, 3 sp.; 30.07.2000, sta. 16, 77 m, sand, 2 sp.; 29.07.2000, sta. 17, 70 m, sandy mud, 1 sp. + 1 sh.; 17.08.2000, sta. 19, 24 m, mud, 2 sp.; 18.08.2000, sta. 20, 93 m, mud, 2 sp.; 17.08.2000, sta. 21, 25 m, mud, 1 sp.; 28.07.2000, sta. 22, 30 m, *P. oceanica* + *Caulerpa* sp., 2 sp.; 28.07.2000, sta. 23, 25-50 m, sand, 4 sp.; 03.10.2007, sta. 23, 25-50 m, sandy mud, 1 sp.; 07.03.2000, sta. 24, 46 m, sand + *P. oceanica*, 1 sp.; 20.08.2000, sta. 25, 15 m, mud, 1 sp.; 20.08.2000, sta. 26, 136 m, sand, 1 sp.; 29.07.2009, sta. 27, 1-60 m, mud and *Cladocora caespitosa*, 1 sp.; 12.11.2009, sta. 27, 1-60 m, mud and *Cladocora caespitosa*, 1 sp.; 03.07.2009, sta. 28, 35 m, mud, 11 sp.; 30.07.2009, sta. 28, 35 m, mud, 1 sp.; 30.07.2009, sta. 29, 24 m, mud, 1 sp.; 19.09.2003, sta. 30,

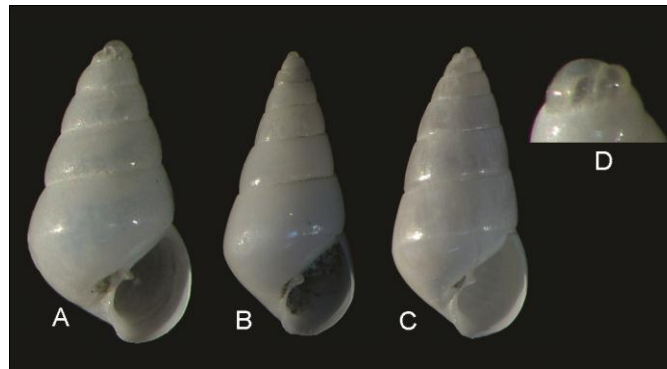


Figure 6. *Odostomia conoidea*: general view of three specimens and the protoconch (D) of the specimen A (A=2.1 mm, sta. 2, 22-32 m; B= 4.3 mm, sta. 73, 0.2-9 m; C=3.7 mm, sta. 26, 136 m).

10-12 m, mud, 2 sp.; 22.12.2001, sta. 31, 22-29 m, mud, 1 sp.; 14.02.2002, sta. 31, 22-29 m, mud, 1 sp.; 05.11.1994, sta. 32, 34 m, sandy mud, 1 sp.; 14.02.2002, sta. 33, 48 m, mud, 2 sp.; 03.04.2009, sta. 34, 23-49 m, sandy mud, 1 sp.; 15.04.2009, sta. 34, 23-49 m, mud, 4 sp.; 30.09.2009, sta. 34, 23-49 m, sandy mud, 8 sp.; 12.11.2009, sta. 34, 23-49 m, mud, 1 sp.; 25.12.2002, sta. 35, 20-23 m, sandy mud and *P. oceanica*, 1 sp.; 08.03.2000, sta. 37, 66 m, mud, 1 sp.; 29.07.2009, sta. 37, 66 m, mud, 2 sp.; 12.11.2009, sta. 37, 66 m, mud, 1 sp.; 08.01.2009, sta. 38, 46-54 m, mud, 2 sp.; 26.03.2009, sta. 38, 45-54 m, mud and sandy mud, 2 sp.; 25.06.2009, sta. 38, 45-54 m, mud and sandy mud, 10 sp.; 05.10.2006, sta. 39, 15-55 m, sandy mud, 3 sp.; 09.05.2007, sta. 39, 15-55 m, muddy sand, 1 sp.; 11.09.2007, sta. 39, 15-55 m, muddy sand, 1 sp.; 14.09.2000, sta. 40, 54 m, muddy sand, 17 sp.; 30.09.2000, sta. 41, 150 m, sandy mud, 5 sp.; 30.09.2000, sta. 42, 32 m, mud, 9 sp. + 2 sh.; 29.09.2000, sta. 44, 11-31 m, mud, 3 sp.; 15.09.2000, sta. 47, 71 m, mud, 1 sp.; 16.09.2000, sta. 48, 14 m, *P. oceanica*, 1 sp.; 17.09.2000, sta. 52, 44 m, sandy mud, 5 sp.; 17.09.2000, sta. 54, 37 m, sandy mud + *Caulerpa* sp., 4 sp.; 19.09.2000, sta. 58, 17-25 m; *P. oceanica*, 2 sp.; 20.09.2000, sta. 60, 86 m, muddy sand, 1 sp.; 21.09.2000, sta. 62, 27 m, algae + *P. oceanica*, 2 sp.; 21.09.2000, sta. 64, 13 m, *P. oceanica* + sand, 7 sp.; 22.09.2000, sta. 65, 44 m, sand + algae, 2 sp.; 23.09.2000, sta. 67, 19 m, mud, 1 sh.; 23.09.2000, sta. 68, 10 m, sand + *Zostera* sp.; 1 sp.; 13.09.2008, sta. 69, 30 m, *Halophila stipulacea*, 1 sp.; 03.10.2005, sta. 73, 0.2- 9 m, *J. rubens* + *Corallina* sp. + *P. oceanica*, 1 sp.; 03.08.2009, sta. 79, 70 m, mud with shell fragments, 6 sp.; 03.02.2009, sta. 80, 43-47 m, mud and muddy sand, 1 sh.; 04.02.2009, sta. 82, 14 m, mud, 10 sp.; 04.08.2009, sta. 82, 14 m, mud, 2 sp. + 1 sh.; 18.09.2005, sta. 84, 1-3 m, sand, 2 sp.; 17.09.2005, sta. 85, 5 m, mud, 3 sp.; 04.02.2009, sta. 86, 8-10 m, sandy mud, 2 sp.; 04.08.2009, sta. 86, 8-10 m, mud, 8 sp.; 20.10.2009, sta. 86, 8-10 m, mud, 3 sp.; 04.02.2009, sta. 88, 20 m, muddy sand, 2 sp.; 05.08.2009, sta. 88, 20 m, muddy sand, 2 sh.; 18.09.2005, sta. 89, 10 m, muddy sand, 10 sp.;

10.09.2005, sta. 90, 70 m, mud, 1 sp.; 10.09.2005, sta. 91, 9 m, muddy sand, 1 sp.; 09.09.2005, sta. 92, 50 m, sandy mud, 1 sp.; 17.10.2009, sta. 94, 5-25 m, sandy mud, 1 sp.; 30.07.2011, sta. 95, 0.1-15 m, mud, 1 sp.; 09.09.2005, sta. 97, 50 m, sandy mud, 4 sp.

The shell of the species is conical, solid and consists of 5-6 more or less convex teleoconch whorls. Protoconch is of type A. In some shells, a part of the embryonic whorls could be hidden in the first teleoconch whorl. Growth lines are orthocone. Body whorl in adult specimens consists about 0.50 of the total shell height, and its periphery is mostly carinated. According to Aartsen (1987:10), littoral forms tend to have an evenly rounded last whorl, whereas the specimens of deeper water show more or less a pronounced carina at the periphery of the body whorl. Inside of outer lip there are concentric striations, which is an important characteristic of the subgenus *Megastomia*. A well developed and acute tooth on the columella is present. Umbilicus is evident, and in some adult specimens it could be narrower but deep. *Mean dimensions* (304 specimens and 12 shells): 2.15 (± 0.04) x 1.06 (± 0.01) – 1.39 (± 0.02) mm [7.0 x 2.8 – 3.6 mm]. *O. conoidea* has been reported in association with the starfish *Astropecten irregularis* (Fretter et al., 1986: 617), and possibly it is also associated with other hosts because it has a very wide geographic and bathymetric distribution.

Distribution: Eastern Atlantic and Mediterranean Sea (Peñas and Rolán, 1999: 30). *Turkish coasts:* Levantine Sea (Micali and Palazzi, 1992:86; Buzzurro and Greppi, 1996:8), Aegean Sea (Micali and Palazzi, 1992: 86; Demir, 2003: 115) and Sea of Marmara (Ostroumoff, 1896: 61-89; Oberling (1969-1971: 190). *O. conoidea* is the most abundant species of the genus distributed along the Turkish coasts.

***Odostomia conspicua* Alder, 1850** (Figure 7)

Odostomia conspicua; Micali, 1983: 32, fig. 5; Aartsen, 1987: 7-10; figs 10-11; Peñas et al., 1996:

44, fig.105; Aartsen *et al.*, 1998: 34; Peñas and Rolán, 1999: 22-24, figs 22-27.

Material: 02.08.2000, sta. 9, 20 m, *Posidonia oceanica*, 1 sp.; 18.09.2000, sta. 56, 47 m, *Caulerpa* sp., 1 sp.; 18.09.2000, sta. 57, 64 m, coralligenous sand, 1 sp.

Shell is conical with convex teleoconch whorls and deep suture. Protoconch is helicoid (type A), and the growth lines on the teleoconch whorls are prosocline. Body whorl occupies between 0.55-0.60 of the total shell height. An evident tooth on the columella and a denticulation inside of outer lip (in fully mature specimens) are also present. There is a trace of umbilical groove, but no umbilicus. It is also distinguished from the other *Odostomia* species by its reddish-brown shell colour. *Mean dimensions* (3 specimens): 3.34 (± 1.34) x 1.37 (± 0.46) – 1.90 (± 0.70) mm [6.02 x 2.30 – 3.32 mm].

Distribution: Eastern Atlantic and Mediterranean Sea (Peñas and Rolán, 1999:17). *Turkish coasts:* Levantine Sea (Micali and Palazzi, 1992: 86; Buzzurro and Greppi, 1996: 8), Aegean Sea (the present study).

***Odostomia erjaveciana* Brusina, 1869** (Figure 8)

Odostomia erjaveciana; Aartsen *et al.*, 1984:53, fig. 251; Aartsen, 1987: 16, 18, fig. 42; Micali, 1988:

22, figs 1, 1a, 1b; Peñas *et al.*, 1996: 44, fig. 101; Peñas and Rolán, 1999: 106, figs 284-289.

Material: 05.07.2001, sta. 99, 5 m, sand, 2 sp.

Shell is cylindrical or slightly conical with 4-5 slightly convex teleoconch whorls. Protoconch is of type C. Growth lines are orthocline or a little prosocline at the lower half. Body whorl comprises more than 0.60 of the total shell height. A fold (no tooth) on the columella is present (a significant characteristic of the subgenus *Auristomia*). Umbilical groove is small or absent. The dimensions of both investigated specimens are 1.60 x 0.73–1.10 mm.

Distribution: Eastern Atlantic and Mediterranean Sea (Aartsen, 1987: 18; Peñas and Rolán, 1999: 106). *Turkish coasts:* Levantine Sea (Micali and Palazzi, 1992: 86; Buzzurro and Greppi, 1996: 8), Sea of Marmara (Oberling, 1969-1971: 190; Wilke and Aartsen, 1998: 13, 21) and Black Sea (Wilke and Aartsen, 1998:13).

***Odostomia eulimoides* Hanley, 1844** (Figure 9)

Brachystomia eulimoides; Schander, 1995: 59, fig. 1b.

Odostomia eulimoides; Aartsen *et al.*, 1984: 53; Aartsen, 1987:10, 14, figs 31-32; Peñas *et al.*, 1996: 44, figs 132-133; Aartsen *et al.*, 1998: 29; Peñas and Rolán, 1999: 96, figs 255-259, 346-347; Solustri and

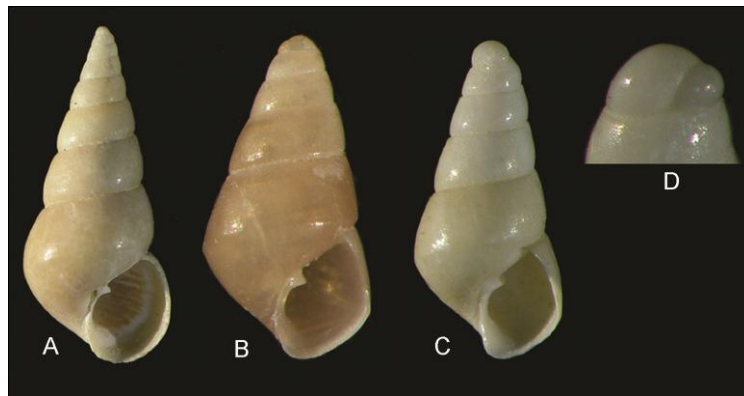


Figure 7. *Odostomia conspicua*: general view of three specimens and the protoconch (D) of the specimen C (A=6.0 mm, sta. 57, 64 m; B=1.7 mm, sta. 56, 47 m; C= 2.3 mm, sta. 9, 20 m).

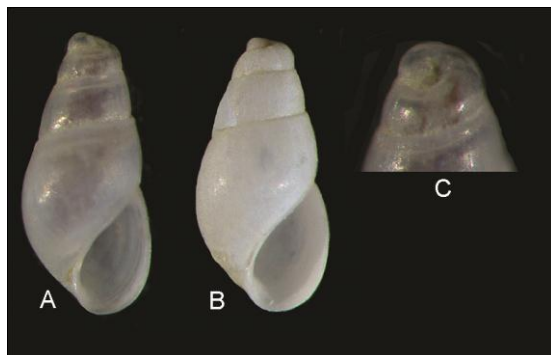


Figure 8. *Odostomia erjaveciana*: general view of two specimens and the protoconch (C) of the specimen A (A=B=1.6 mm, sta. 99, 5 m).



Figure 9. *Odostomia eulimoides*: general view of two specimens and the protoconch (C) of the specimen A (A= 2.0 mm, sta. 40, 54 m; B=1.8 mm, sta. 18, 70-90 m).

Micali, 2004: 66.

Material: 03.08.2000, sta. 3, 12-20 m, mud and muddy sand, 1 sh.; 09.08.2008, sta. 12, 17 m, muddy sand, 1 sp.; 29.07.2000, sta. 18, 70-90 m, sand, 1 sp.; 14.09.2000, sta. 40, 54 m, muddy sand, 6 sp.; 30.05.1999, sta. 100, 16 m, mud, 1 sh.

Shell is conical and consists of 4-5 slightly convex teleoconch whorls. Protoconch is of type B, and the growth lines are prosocline. Body whorl is approximately 0.60 of the total shell height. A columellar tooth is present, which is more visible on turning the shell to the left. *Mean dimensions* (8 specimens and 2 shells): 1.69 (± 0.07) x 0.87 (± 0.03) – 1.19 (± 0.05) mm [2.2 x 1.1 – 1.4 mm]. The species lives as parasite on some polychaetes, i. e., *Pomatoceros triqueter* and *Sabellaria alveolata* (Solustri and Micali, 2004: 66).

Distribution: Atlantic Ocean and Mediterranean Sea (Schander, 1995:60; Wilke and Aartsen, 1998: 14; Aartsen et al., 1998: 29). *Turkish coasts:* Aegean Sea (Demir, 2003: 115); Sea of Marmara (Ostroumoff, 1896: 61; Wilke and Aartsen, 1998: 14) and Black Sea (Wilke and Aartsen, 1998:14, 21; Demir, 2003:115).

***Odostomia improbabilis* Oberling, 1970** (Figure 10)

Odostomia improbabilis; Oberling, 1970: 5.

Odostomia verduini; Aartsen, 1987: 5, 9, 13, fig. 24; Peñas et al., 1996: 54, figs 125-126; Aartsen et al., 1998: 31; Peñas and Rolán, 1999: 86, fig. 233.

Material: 09.10.2005, sta. 45, 0.2 m, *Jania rubens*, 1 sp.; 05.10.2005, sta. 70, 0.1-3 m, 3 sp.; 09.01.2004, sta. 72, 30 m, *Halophila stipulacea* + sand, 1 sp., 15.09.2005, sta. 93, 1 m, sand, 1 sh.

The species has a conical shell with 3-4 slightly convex teleoconch whorls. Protoconch is of type B, and the growth lines are strongly prosocline. On the

teleoconch whorls there is a spirally incised line below the suture. Body whorl occupies nearly 0.64 of the total shell height. The columella is concave, with a clear tooth on it. No umbilicus is present. *Mean dimensions* (5 specimens and 1 shell): 1.71 (± 0.21) x 0.83 (± 0.09) – 1.11 (± 0.13) mm [2.5 x 1.1 – 1.5 mm].

Distribution: Eastern Atlantic and Mediterranean Sea (Aartsen et al., 1998: 31; Peñas and Rolán, 1999: 88; Oliverio, 2008). *Turkish coasts:* Levantine Sea (Bitlis Bakır et al., 2012: 178) and Aegean Sea (this study).

***Odostomia kromi* Aartsen, Menkhorst & Gittenberger, 1984** (Figure 11)

?*Odostomia imponderabilior*; Oberling, 1970: 5; Nofroni and Tringali, 1995: 37.

Odostomia kromi; Aartsen et al., 1984: 52, fig. 249 (original description); Aartsen, 1987:9, 12, fig. 20; Peñas et al., 1996: 46, figs 120-121.

Material: 05.07.1995, sta. 11, 0.5 m, *Padina pavonica*, 7 sp.; 13.08.2000, sta. 14, 15 m, sand, 1 sh.; 20.09.2005, sta. 76, 5 m, sand, 1 sp.; 15.09.2005, sta. 93, 0.5-1 m, sand and *J. rubens*, 1 sp.; 10.09.2005, sta. 98, 10 m, sand, 1 sp.

Shell is cylindro-conical with slightly or moderately convex teleoconch whorls. Protoconch is of type B, but in some specimens a part of the embryonic whorls could be seen. Growth lines are orthocline to slightly prosocline. Columella is slightly concave, with a clear central tooth. Umbilical groove is less significant, with no umbilicus. *Mean dimensions* (10 specimens + 1 shell): 1.52 (± 0.07) x 0.70 (± 0.02) – 0.94 (± 0.04) mm [1.80 x 0.80 – 1.10 mm].

Distribution: *O. kromi* seems as a Mediterranean endemic species, since it has not been recorded from outside of the region (Aartsen et al., 1984: 52; Peñas

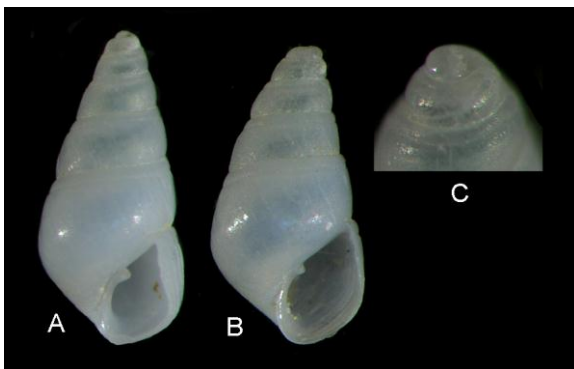


Figure 10. *Odostomia improbabilis* : general view of two specimens and the protoconch (C) of the specimen (B) (A=2.5 mm, B=2.2 mm, sta. 70, 0.1-3 m).

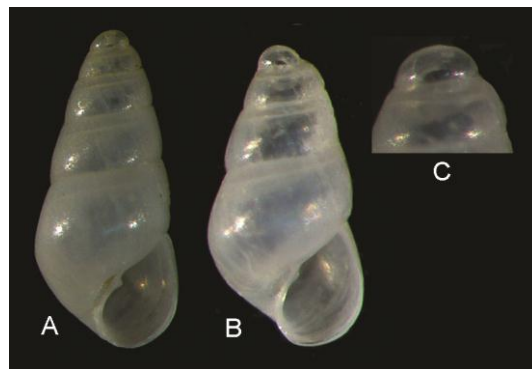


Figure 11. *Odostomia kromi* : general view of two specimens and the protoconch (C) of the specimen (B) (A= 1.8 mm, B=1.2 mm, sta. 11, 0.5 m).

et al., 1996: 46; Mienis and Ben-David-Zaslow, 2004: 28). *Turkish coasts*: Levantine Sea (Tringali and Villa, 1990: 35; Bitlis Bakır et al., 2012: 178) and Aegean Sea (this study).

***Odostomia lorioli* (Hornung & Mermod, 1924)**
(Figure 12)

Syrnola lorioli; Hornung and Mermod, 1924: 289, fig. 4.

Odostomia lorioli; Aartsen, 1987: 7, 11, fig. 14; Aartsen et al., 1989: 70; Buzzurro and Greppi, 1995: 7, figs 5-6.

Material: 27.07.1995, sta. 51, 0.5-2 m, rocks covered by algae, 1 sp.; 19.10.2009, sta. 80, 43-47 m, mud and muddy sand, 5 sp.; 03.02.2009, sta. 80, 43-47 m, mud and muddy sand, 1 sh.; 03.02.2009, sta. 81, 20 m, muddy sand, 8 sp.; 02.08.2009, sta. 81, 20 m, muddy sand, 3 sp.; 04.08.2009, sta. 82, 14 m, mud, 1 sp.; 05.02.2009, sta. 87, 38 m; muddy sand, 1 sp. + 1 sh.; 04.02.2009, sta. 88, 20 m; muddy sand, 1 sp.; 05.07.2007, sta. 95, 0.1-15 m, muddy sand, 1 sp.; 30.07.2011; sta. 95, 0.1-15 m, mud, 5 sp.; 14.09.2005, sta. 96, 0.2-5 m, sand, 1 sp.

Shell is conical, with 5-6 less convex teleoconch whorls. Shell surface may show very weak spiral threads. Protoconch is of type C, completely flat.

There is a clear tooth on the middle part of the columella and narrow teeth inside the outer lip. The body whorl is about 0.60-0.65 of the total shell height. *Mean dimensions* (27 specimens + 2 shells): 2.02 (± 0.08) x 1.00 (± 0.03) – 1.36 (± 0.04) mm [2.9 x 1.3 – 1.8 mm].

Distribution: Red Sea and eastern Mediterranean Sea (Buzzurro and Greppi, 1995: 7; Aartsen, 1987: 11). *Turkish coasts*: Levantine Sea (Delongueville and Scaillet, 2007: 63; Bitlis Bakır et al., 2012: 178) and Aegean Sea (the present study).

***Odostomia lukisii* Jeffreys, 1859**(Figure 13)

Brachystomia lukisi; Fretter et al., 1986: 605, figs 417-419.

Odostomia lukisii; Aartsen et al., 1984:53, pl. 124 fig. 253; Aartsen, 1987: 8, 12, pl. 30 fig. 19; Peñas et al., 1996: 46, figs 138-139; Aartsen et al., 1998: 31; Peñas and Rolán, 1999: 74, figs 188-190.

Material: 03.10.2007, sta. 39, 15-55 m, muddy sand, 1 sp.; 14.09.2000, sta. 43, 78 m, sandy mud, 1 sp.; 03.10.2005, sta. 73, 0.2- 9 m, *J. rubens* + *Corallina* sp. + *P. oceanica*, 1 sp + 1sh.

Shell is conical and somewhat ovoid, with 4-5 teleoconch whorls, which are moderately convex.

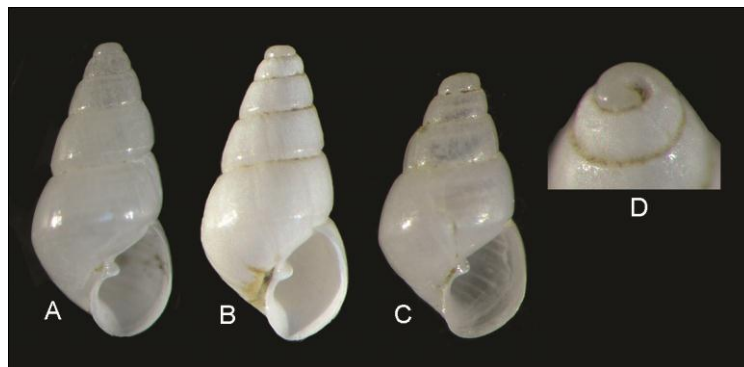


Figure 12. *Odostomia lorioli* : general view of three specimens and the protoconch (D) of the specimen (B) (A=2.5 mm, C=1.8 mm, sta. 95, 0.1-15 m; B=2.4 mm, sta. 80, 43-47 m).



Figure 13. *Odostomia lukisii*: general view of two specimens and the protoconch (C) of the specimen (A) (A=1.4 mm, sta. 39, 15-55 m; B=1.5 mm, sta. 43, 78 m).

Protoconch is of type C, and the growth lines are more or less orthocone. The body whorl occupies nearly 0.65 of the total shell height. A little tooth on the columella is present. The umbilicus is evident. *Mean dimensions* (3 specimens + 1 shell): 1.53 (± 0.08) x 0.76 (± 0.06) – 1.03 (± 0.03) mm [1.7 x 0.9 – 1.1 mm].

Distribution: Eastern Atlantic and Mediterranean Sea (Peñas *et al.*, 1996: 48; Aartsen *et al.*, 1998: 31). *Turkish coasts:* Levantine Sea (Micali and Palazzi, 1992: 86; Buzzurro and Greppi, 1996: 8) and Aegean Sea (this study)

***Odostomia megerlei* (Locard, 1886)** (Figure 14)

Ptychostomon megerlei; Locard, 1886: 779, nom. nov. pro *Odostomia glabrata sensu* Forbes and Hanley, 1850.

Odostomia glabrata sensu Forbes and Hanley, 1850: 283, non Mühlfeldt, 1824.

Odostomia cf. glabrata; Aartsen, 1987: 9, 11, fig. 26.

Odostomia megerlei; Peñas *et al.*, 1996: 48, fig. 134, 135.

Material: 09.09.2005, sta. 92, 50 m, sandy mud with shell fragments, 1 sh.

Shell is conical-oblong, with three (or some more) convex teleoconch whorls. Protoconch is of type B, and growth lines are prosocline. Body whorl consists about 0.60 of the total shell height. There is a small and internal tooth on the columella. No umbilicus is present. The dimensions of the single shell found are 1.5 x 0.6 – 0.9 mm.

The nomenclatural status of the species was commented by Aartsen (1987: 13) and Peñas *et al.* (1996: 48). In the present study the specific name is given according to CLEMAM.

Distribution: North Sea (Shetland) (Forbes and Hanley, 1850: 283) and Mediterranean Sea (Aartsen, 1987:13; Peñas *et al.*, 1996: 48). *Turkish coasts:*

Levantine Sea (the present study).

***Odostomia plicata* (Montagu, 1803)** (Figure 15)

Turbo plicatus Montagu, 1803.

Odostomia plicata; Aartsen *et al.*, 1984: 52, fig. 250; Micali, 1984: 48, fig. 2; Aartsen, 1987: 8, 11, fig. 16; Peñas *et al.*, 1996: 50, figs 112-113; Peñas and Rolán, 1999: 56, figs 124-125.

Material: 22.09. 2005, sta. 74, 0.1 m, *P. pavonica*, 1 sp.; 18.09.2005, sta. 78, 0.2 m, among the *Brachidontes pharaonis* population, 1 sp.; 17.09.2005, sta. 83, 0.1 m, *Ulva* sp., 1 sp.; 02.08.2009, sta. 95, 0.1-15 m, sandy mud, 1 sp.; 14.09.2005, sta. 96, 0.2-5 m; sand, 1 sp. + 1 sh.

Shell is conical, with four (or some more) slightly convex teleoconch whorls. Protoconch is of type A, and the growth lines are orthocone to slightly prosocline. Body whorl consists about 0.60 of the total shell height. A tooth on the columella and a narrow deep umbilical groove are evident. *Mean dimensions* (5 specimens and 1 shell): 1.55 (± 0.08) + 0.71 (± 0.01) – 0.96 (± 0.03) mm [1.90 + 0.80 – 1.10 mm].

Distribution: Eastern Atlantic and Mediterranean Sea (Peñas and Rolán, 1999: 56). *Turkish coasts:* Levantine Sea (Micali and Palazzi, 1992: 86; Buzzurro and Greppi, 1996: 8), Sea of Marmara (Ostroumoff, 1896: 61, 68; Oberling, 1969-1971: 190) and Black Sea (Wilke and Aartsen, 1998:14, 21).

***Odostomia scalaris* Mac Gillivray, 1843** (Figure 16)

Odostomia scalaris, Aartsen *et al.*, 1984: 53, fig. 254; Aartsen, 1987: 9, 12, fig. 22; Peñas *et al.*, 1996: 52, figs 136-137; Aartsen *et al.*, 1998: 31; Peñas and Rolán, 1999: 76, figs 191-207, 341, 342.

Odostomia rissoides; Grossu, 1986:377, fig. 161.

Odostomia rissoiformis; Milaschewitch, 1916:



Figure 14. *Odostomia megerlei* : general view of a shell and its protoconch (B) (A=1.5 mm, sta. 92, 50 m).

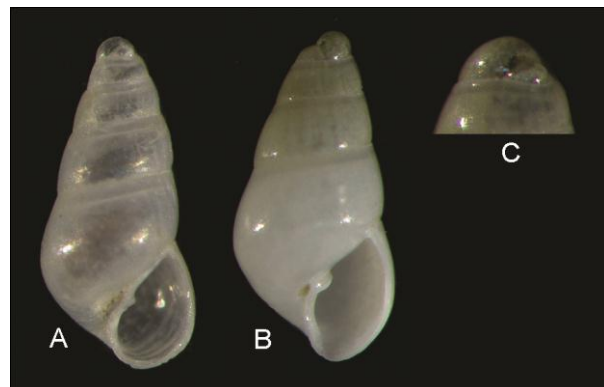


Figure 15. *Odostomia plicata*: general view of two specimens and the protoconch (C) of the specimen (B) (A=1.6 mm, sta. 96, 0.2-5 m; B=1.6 mm, sta. 95, 0.1-15 m)

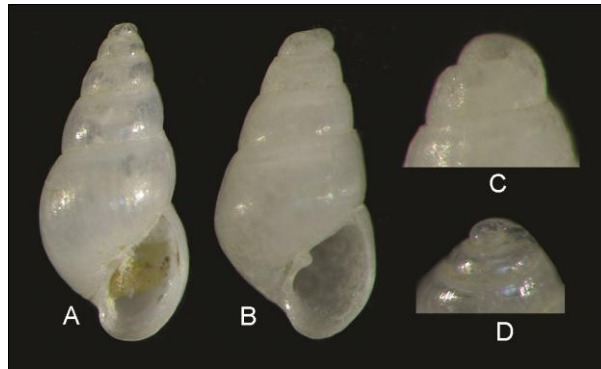


Figure 16. *Odostomia scalaris*: general view of two specimens and the protoconch (C) of the specimen (B) and the protoconch (D) of the specimen (A): (A=2.2 mm, sta. 12, 17 m; B=1.6 mm, sta. 76, 5 m).

87, pl. 3, fig.32-34.

Material: 03.08.2000, sta. 3, 12-20 m, mud and muddy sand, 1 sh.; 09.08.2008, sta. 12, 17 m, muddy sand, 1 sp.; 20.09.2005, sta. 76, 5 m, sand, 1 sp.

Shell is conical with 4-5 convex teleoconch whorls. Protoconch is of type C and large. Growth lines are orthocone to slightly prosocline. Body whorl consists about 0.65 of the total shell height. A tooth on the columella is present, which is more visible on turning the shell to the left. Umbilicus varies from open to less evident one.

The specimen recorded from the Sea of Marmara (Figure 16A, 16D) we tentatively included to this species. Regarding the shape of the shell, it has resemblance with the shell of *Odostomia rissoiformis* Milaschewitsch, 1909 (= *O. scalaris*), with no evident umbilicus. On the other hand, compared to *O. scalaris*, which has usually larger and depressed protoconch, the protoconch of this specimen is smaller and more erected. It may belong to a different species, which statue will probably be clarified in further studies concerning the genus. *Mean dimensions* (2 specimens + 1 shell): 1.90 (± 0.17) x 1.00 (± 0.05) – 1.30 (± 0.11) mm [2.20 + 1.10 – 1.50 mm]. *O. scalaris* usually lives as parasite on some invertebrates, i. e., *Littorina saxatilis*, *Hydrobia ulvae*, *Rissoa membranacea*, *Buccinum undatum* and *Cerastoderma edule* (in Solustri and Micali, 2004: 66).

Distribution: Eastern Atlantic and Mediterranean Sea (Aartsen *et al.*, 1998: 31; Wilke and Aartsen, 1998: 14). *Turkish coasts:* Levantine Sea (Micali and Palazzi, 1992: 86), Aegean Sea (Demir, 2003: 115), Sea of Marmara (Ostroumoff, 1896: 61, 77; Wilke and Aartsen, 1998: 14) and Black Sea (Wilke and Aartsen, 1998: 14, 21; Mutlu, 1994: 280).

Odostomia sicula Philippi, 1851 (Figure 17)

Odostomia sicula; Aartsen, 1987: 7, 11, fig. 13; Aartsen *et al.*, 1989: 67; Aartsen, 1993: 7, fig. 2; Nofroni and Tringali, 1995:38-40.

Material: 03.02.2009, sta. 80, 43-47 m, mud and muddy sand, 1 sp + 2 sh.; 03.02.2009, sta. 81, 20 m, mud, 2 sp.; 04.08.2009, sta. 82, 14 m, mud, 4 sp. + 4 sh.

The shell of the species is conical and includes 4-5 less convex teleoconch whorls. Body whorl is carinated at the periphery and consists about 0.55-0.60 of the total shell height. There are a clear tooth on the middle part of the columella and narrow teeth inside the outer lip. Umbilicus is evident. The shell of the species is very similar to the shell of *O. conoidea* (with protoconch of type A), from which it differs by its protoconch of type B. *Mean dimensions* (7 specimens + 6 shells): 1.98 (± 0.09) x 1.10 (± 0.02) – 1.21 (± 0.04) mm [2.60 x 1.30 – 1.50 mm].

The nomenclatural status and the distribution of *O. sicula* are well commented by Nofroni and Tringali (1995:38-40).

Distribution: Mediterranean Sea (Aartsen, 1987: 11; Aartsen *et al.*, 1989: 67; Öztürk *et al.*, 2003: 60). *Turkish coasts:* Levantine Sea (Micali and Palazzi, 1992: 86).

Odostomia silesui Nofroni, 1988 (Figure 18)

Odostomia silesui; Nofroni, 1988:11, 15, figs 4-5 (original description).

Material: 15.05.2001, sta. 7, 875 m, mud, 1 sp.

Shell is broadly conical with 4-5 slightly convex teleoconch whorls. Protoconch is of type B. Growth lines on the teleoconch whorls are clearly opisthocline and slightly flexuous. Body whorl occupies about 0.65 of the total shell height (in young specimens some more; in our sample 0.77). Columella is concave, and neither a tooth nor a fold is present on it. There is a small and narrow umbilical groove. The dimensions of the single specimen found are 1.45 x 0.92 – 1.12 mm.

Nofroni (1988:11) states that among the *Odostomia* species distributed along the European

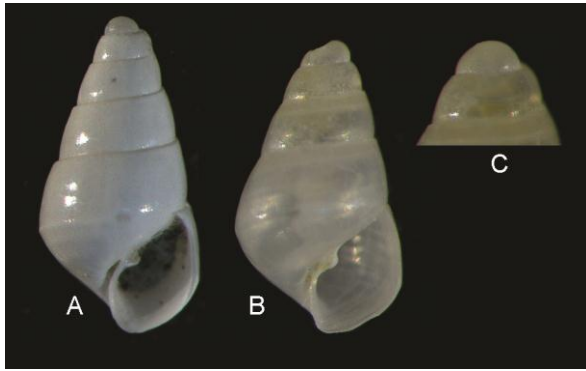


Figure 17. *Odostomia sicula*: general view of two specimens and the protoconch (C) of the specimen (B) (A=2.1 mm, sta. 81, 20 m; B=1.2 mm, sta. 80, 47 m).

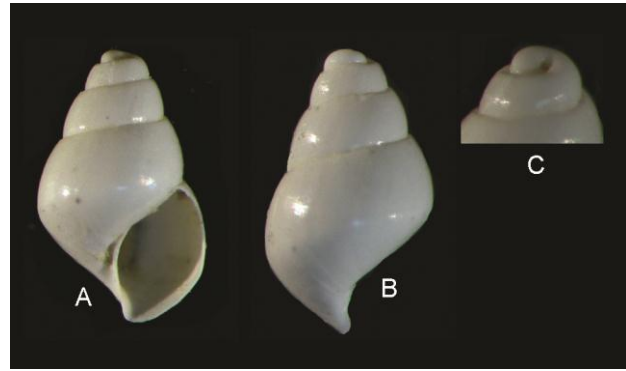


Figure 18. *Odostomia silesui*: ventral (A) and dorsal (B) view of the specimen found, and its protoconch (C). (A=B=1.5 mm, sta. 7, 875 m).

coasts, *O. silesui* is the only one, which lacks tooth or fold on the columella and has opisthocline growth lines.

Distribution: Mediterranean Sea (Nofroni, 1988). *Turkish coasts:* Aegean Sea (this study).

***Odostomia turriculata* Monterosato, 1869** (Figure 19)

Odostomia turriculata; Aartsen, 1987: 5, 28 fig. 3; Peñas et al., 1996: 54, figs 118-119.

Material: 17.10.2009, sta. 94, 5-25 m, muddy sand, 2 sp.; 23.07.2008, sta. 95, 0.1-15 m, sandy mud, 1 sh.

The species has a slender conical shell, with 5-6 nearly flat teleoconch whorls. Protoconch is of type B. Growth lines are sinuous and opisthocline. Body whorl is about 0.55 of the total shell height. There is a significant tooth on the columella. Umbilical groove is narrow and, more or less, evident. *Mean dimensions* (2 specimens + 1 shell): 1.80 (± 0.15) x 0.73 (± 0.03) – 1.00 (± 0.05) mm [2.00 x 0.80 – 1.10 mm].

Distribution: Mediterranean Sea (Peñas et al., 1996: 54). *Turkish coasts:* Levantine Sea (Buzurro and Greppi, 1996:8).

***Odostomia turrita* Hanley, 1844** (Figure 20)

Odostomia turrita; Aartsen et al., 1984: 51, fig. 248; Micali, 1984: 4-5, fig. 1; Fretter et al., 1986: 610-612 fig. 422; Aartsen, 1987:8, 12 fig. 18; Schander, 1995: 59, fig. 1c; Peñas et al., 1996: 54, figs 116-117; Aartsen et al., 1998: 27; Peñas and Rolán, 1999: 56-58, figs 126-130.

Material: 08.05.1996, sta. 27, 1-60 m, mud and *Cladocora caespitosa*, 2 sp.; 22.07.1995, sta. 53, 0.5-1.0 m, *Cystoseira crinita*, 2 sp.

Shell is conical with convex and round 4-5 teleoconch whorls. Protoconch is of type A. The growth lines are clearly prosocline, and in some

shells, a less visible fine striation may also occur. Body whorl is about 0.65 (lesser in adult specimens) of the total shell height. Columella is concave and there is a clear tooth on it. A narrow umbilical groove is present only. *Mean dimensions* (4 specimens): 1.46 (± 0.23) x 0.75 (± 0.08) – 0.92 (± 0.10) mm [1.90 x 0.90 – 1.10 mm].

Distribution: Atlantic Ocean and Mediterranean Sea (Schander, 1995:59; Peñas and Rolán, 1999: 56-58; Öztürk et al., 2003: 60). *Turkish coasts:* Levantine Sea (Micali and Palazzi, 1992: 86; Buzurro and Greppi, 1996: 8), Aegean Sea study (this study), Sea of Marmara (Ostroumoff, 1896: 77).

***Odostomia unidentata* (Montagu, 1803)** (Figure 21)

Turbo unidentatus Montagu, 1803.

Odostomia unidentata; Micali, 1983: 35, fig. 2; Fretter et al., 1986: 614-615, figs 425-426; Aartsen, 1987: 8, 11, fig. 17; Schander, 1995: 57, fig. 1a; Peñas et al., 1996: 54, figs 114-115; Aartsen et al., 1998: 23, fig. 24; Peñas and Rolán, 1999: 63-65, figs 153-161.

Material: 15.09.2000, sta. 47, 71 m, mud, 1 sp.; 06.10.2005, sta. 71, 10 m, *P. oceanica*, 1 sp.

Shell is conical with a relatively broad base. Teleoconch consists of 5-6 flat or slightly convex whorls, on which sometimes very fine striation could be visible. Protoconch is of type A, and growth lines are prosocline. Body whorl is carinated at the periphery and occupies about 0.55 (in adult specimens) of the total shell height. There is a clear tooth on the columella. Sometimes a narrow umbilical groove could be also visible. The dimensions of the investigated specimens are: 3.7 x 1.7 - 2.1 mm and 0.9 x 0.7- 0.6 mm (juv).

Distribution: Atlantic Ocean and Mediterranean Sea (Schander, 1995:59; Peñas and Rolán, 1999:63-

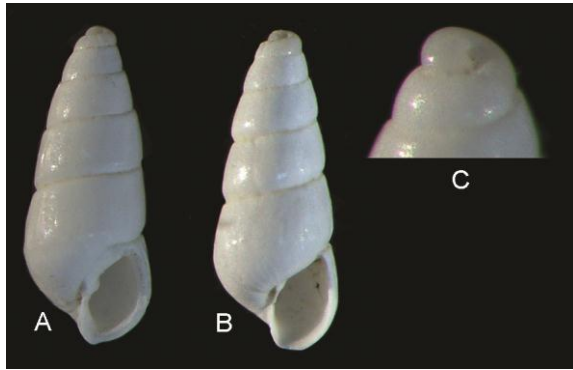


Figure 19. *Odostomia turriculata*: general view of two specimens and the protoconch (C) of the specimen (B) (A= 2.0 mm, sta. 94, 5-25 m; B=1.9 mm, sta. 95, 0.1-15 m).



Figure 20. *Odostomia turrita*: general view of two specimens and the protoconch (C) of the specimen A (A=1.9 mm, sta. 27, 1-4 m; B=1.2 mm, sta. 53, 0.5-1 m).

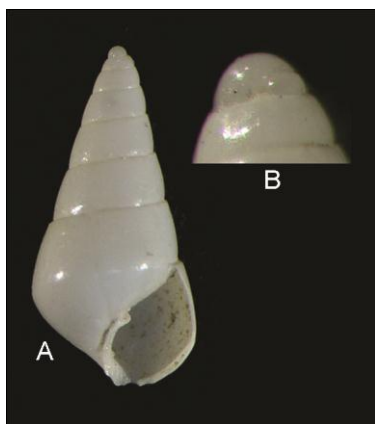


Figure 21. *Odostomia unidentata*: general view of a specimen and its protoconch (B) (A=3.9 mm, sta. 71, 10 m)

64; Aartsen *et al.*, 1998: 23). *Turkish coasts*: Levantine Sea (this study), Aegean Sea (this study), Sea of Marmara (Ostroumoff, 1896: 67).

Liostomia Sars, G. O., 1878

Liostomia, with type species *Turbonilla clavula* Lovén, 1846, was sometimes used as subgenus in *Odostomia*. Warén (1991) promoted it to a full genus, which is characterised by total absence of a columellar tooth, and by a smooth shell with cylindrical shape.

Liostomia afzelii Warén, 1991 (Figure 22)

Liostomia afzelii; Warén, 1991: 106, figs a, b (original description).

Liostomia clavula; Aartsen, 1987: 6, fig. 6 (not Lovén, 1846).

Odostomia afzelii; Peñas *et al.*, 1996: 38, 40, fig. 97.

Material: 11.11.2009, sta. 34, 23-49 m, sandy mud, 1 sp.; 17.09.2000, sta. 52, 44 m, sandy mud, 2 sp.; 23.09.2000, sta. 67, 19 m, mud, 1 sh.; 03.02.2009,

sta. 80, 43-47 m, muddy sand, 1 sp.

Shell is cylindrical, small, with a truncated apex, and consists of about 3.5 less convex teleoconch whorls. Protoconch is of type C and the growth lines are nearly orthocone. Last whorl occupies more than 0.60 of the total shell height. There is a deep umbilicus, and no tooth or fold on the columella. *L. afzelii* is distinguished from the other *Liostomia* species (*L. clavula*) distributed along the Turkish coasts, being a bit shorter, broader and having less convex teleoconch whorls. The umbilical groove is also larger than that in *L. clavula*. The differences between two species were discussed by Warén (1991:108). *Mean dimensions* (4 specimens + 1 shell): 1.32 (± 0.04) x 0.67 (± 0.04) – 0.83 (± 0.03) mm [1.40 x 0.75 – 0.90 mm].

Distribution: Western Norway to the Mediterranean (Warén, 1991). *Turkish coasts*: Levantine Sea (the present study) and Aegean Sea (the present study).

Liostomia clavula (Lovén, 1846) (Figure 23)

Turbonilla clavula Lovén, 1846.

Liostomia clavula; Warén, 1991: 106, figs 35c, 35d, 35g.

Odostomia clavula; Aartsen, 1987:6, fig. 7; Aartsen *et al.*, 1998: 36.

Odostomia clavulus; Peñas *et al.*, 1996: 38, 42, fig. 96; Peñas and Rolán, 1999: 116, figs 309, 310.

Material: 28.07.2000, sta. 22, 30 m, *P. oceanica* + *Caulerpa* sp., 1 sp.; 14.09.2000, sta. 40, 54 m, muddy sand, 5 sp.; 30.09.2000, sta. 42, 32 m, mud, 1 sp.; 21.09.2000, sta. 61, 47 m, sandy mud, 1 sp.; 09.09.2005, sta. 97, 50 m, sandy mud, 1 sp.

Shell is small and cylindrical with a truncated apex. The teleoconch of the investigated specimens consists of 3.5-4 (sometimes a bit more) more or less convex whorls. Protoconch is of type C, and growth lines are orthocone. Body whorl is about 0.55 of the total shell height (this ratio is probably lower in the



Figure 22. *Liostomia afzelii*: general view of two specimens (A=1.35 mm, sta. 34, 23-49 m; B=1.35 mm, sta. 80, 47 m).

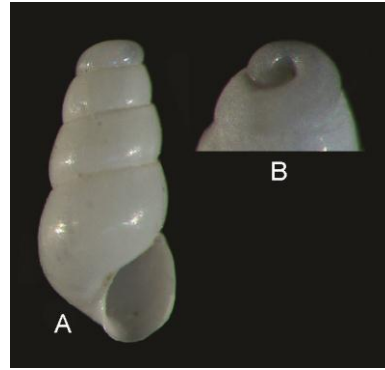


Figure 23. *Liostomia clavula*: general view of a specimen and its protoconch (B) (A=1.5 mm, sta. 22, 30 m).

bigger specimens). Neither tooth nor fold on the columella is present. Umbilicus is clear. *Mean dimensions* (9 specimens): 1.40 (± 0.08) x 0.62 (± 0.01) – 0.77 (± 0.03) mm [1.50 x 0.65 – 0.85 mm]. The species is probable ectoparasite on *Pennatula* spp. (Cnidaria) (Fretter *et al.*, 1986: 590)

Distribution: Eastern Atlantic and Mediterranean Sea (Warén, 1991: 106; Aartsen *et al.*, 1998: 36). *Turkish coasts:* Levantine Sea (this study), Aegean Sea (Demir, 2003: 115)

***Noemiamea* Hoyle, 1886**

The genus has as type species *Noemia valida* de Folin, 1872 (= *Odostomia dolioliformis* Jeffreys, 1848) and includes species having a globose shell with coarse concentric spirals on the whorls, and an evident tooth on the columella.

***Noemiamea dolioliformis* (Jeffreys, 1848) (Figure 24)**

Odostomia dolioliformis; Warén, 1980: 38, pl. 6 fig. 32.

Noemiamea dolioliformis; Fretter *et al.*, 1986: 622, figs 432-433; Peñas *et al.*, 1996: 55, figs 141, 142; Peñas and Rolán, 1999: 130, figs 309, 310.

Material: 18.09.2005, sta. 84, 1-3 m, sand, 1 sh.

The species has a globose-ovoid shell with a small spire. There are 2 or 3 teleoconch whorls, of which the body whorl occupies the major part (0.80-0.85) of the shell. Concentric spirals on the whorls are clearly evident. Prosocline growth lines are present. Protoconch is helicoid [in our sample the upper part of the nucleus being hardly visible, the protoconch tends to type B. In addition, the nucleus is not so evident as it was given in Fretter *et al.* (1986:622, fig. 432) and Peñas *et al.* (1996: 53, figs 141, 142)]. Umbilicus and a tooth on the columella are present. The dimensions of the single shell found are 1.85 x 1.25-1.60 mm.

Distribution: Eastern Atlantic Ocean and

Mediterranean Sea (Peñas and Rolán, 1999: 131). *Turkish coasts:* Levantine Sea (Buzzurro and Greppi, 1996: 8; Micalli and Palazzi, 1992: 86) and Sea of Marmara (Oberling, 1969-71: 190).

This species is the unique representative of the genus in the Mediterranean and it has very rare distribution along the Turkish coasts.

***Ondina* de Folin, 1870**

The genus *Ondina*, with type species *Ondina semiornata* de Folin, 1872 [= *Ondina warreni*, (Thompson, 1845)], includes the pyramidellids with a nearly conical or oval thin shell. They may consist up of 4-5 teleoconch whorls, sometimes with spirals on the surface. Growth lines are generally more or less opisthocline, often flexuous. Protoconch varies from B (in some species very elevated, tending to A) to C, and the columella is with very weak or without fold.

***Ondina anceps* Gaglini, 1992 (Figure 25)**

Ondina anceps; Gaglini, 1992:158-159, fig. 171 (original description).

Ondina anceps; Micali, 1995: 17, fig. 11.

Material: 28.07.2000, sta. 22, 30 m, *P. oceanica*, 1 sh.

Shell is oval-elongated consisting of three descending convex teleoconch whorls. Fine spirals at the base of the last whorl are visible. Spirals can be also seen at the abapical portion of the penultimate whorl, near the suture. Protoconch is of type B and detached from the following postlarval whorl. Body whorl occupies about 0.70 of the total shell height. A narrow umbilical groove and a small unclear fold on the columella are present. The dimensions of the single shell found are 1.55 x 0.65 - 1.10 mm. The distinguishing characters of the species from *Ondina diaphana* and *O. obliqua* were commented by Gaglini (1992: 159) and Micali (1995:17).

Distribution: Mediterranean Sea (Gaglini,



Figure 24. *Noemiamea dolioliformis*: ventral (A) and dorsal (B) view of the shell found, and its protoconch (C).

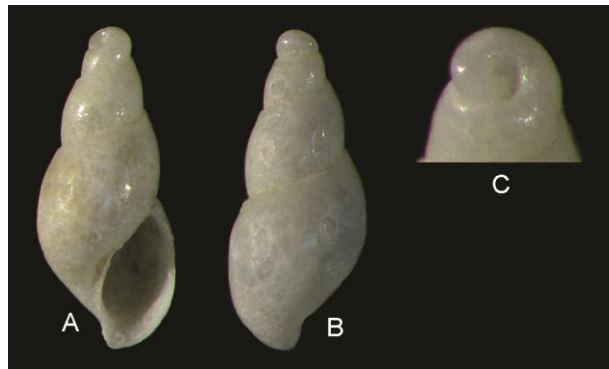


Figure 25 *Ondina anceps*: ventral (A) and dorsal (B) view of the shell found, and its protoconch (C).

1992:159, Micali, 1995: 17 and Oliverio, 2008:275). *Turkish coasts*: Aegean Sea (this study). The species has not been recorded from the eastern Mediterranean until the present study.

***Ondina crystallina* (Locard, 1892)** (Figure 26)

Ondina crystallina; Locard, 1892 (*nom. nov.* for *Odostomia cristallina* Monterosato, 1878, *nomen nudum*).

Ondina crystallina; Aartsen *et al.*, 1984: 54; Aartsen, 1987: 14, 18, figs 51, 52; Micali, 1995: 19, fig. 9.

Material: 20.09.2000, sta. 59, 12-54 m, algae and muddy sand, 1 sp.

The shell of the species is conical and non-transparent, including three (or some more) teleoconch whorls. On the whorls, a bit sinuous opisthocline growth lines can be recognized. Under magnification (x 40) trace of very weak spirals could be also noticed. Protoconch is truncate and of type C. Body whorl occupies nearly 0.70 of the total shell height. A columellar fold and a narrow umbilicus are visible. The dimensions of the single specimen found are 1.50 x 0.75-1.05 mm. The nomenclatural status of the species was commented by Aartsen (1987:14) and Micali (1995: 19).

Distribution: Mediterranean Sea (Micali, 1995:

19; Cecalupo and Quadri, 1996:110). *Turkish coasts*: Aegean Sea (the present study).

***Ondina diaphana* (Jeffreys, 1848)** (Figure 27)

Odostomia diaphana; Jeffreys, 1848 (original description); Warén, 1980: 37, pl. 6 fig. 18.

Ondina diaphana; Aartsen, 1987: 18, figs 53, 54; Schander, 1995: 60, 1 e; Peñas and Rolán, 1999: 128, fig. 316.

Evalea diaphana; Fretter *et al.*, 1986:583, figs 397, 398.

Material: 14.09.2000, sta. 40, 54 m, muddy sand, 2 sp.; 16.09.2000, sta. 48, 14 m, *P. oceanica*, 1 sp.; 18.09.2000, sta. 56, 47 m, *Caulerpa* sp. + mud, 1 sp.; 03.10.2005, sta. 73, 0.2- 9 m, *J. rubens* + *Corallina* sp. + *P. oceanica*, 1 sp; 05.08.2009, sta. 88, 20 m, sandy mud, 1 sh.

The conical semitransparent shell consists of nearly four teleoconch whorls. Protoconch is of type B. Shell surface is plain, but periostracum may indicate fine spirals, which are more noticed on the last and penultimate whorls (Fig. 27A). Growth lines on the spire whorls are opisthocline, whereas on the body whorl they are more or less orthocline. Body whorl is about 0.70 of the total shell height. An umbilicus and a weak fold on the columella are evident. *Mean dimensions* (5 specimens + 1 shell):

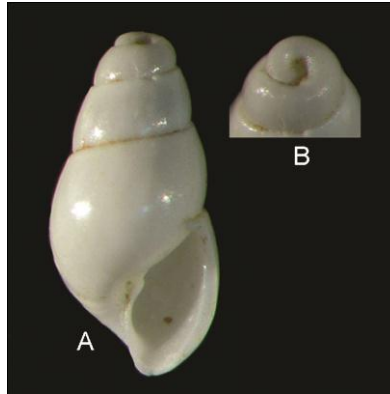


Figure 26. *Ondina crystallina*: general view of the specimen found, and its protoconch (B).

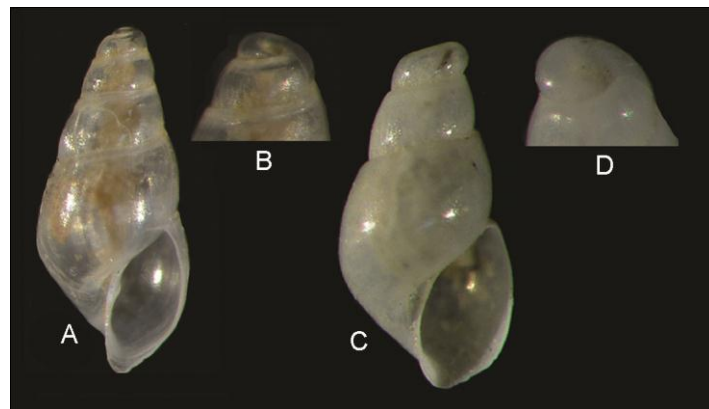


Figure 27 *Ondina diaphana*: general view of two specimens and the protoconch (B) of the specimen (A) and the protoconch (D) of the specimen (C). (A=1.8 mm, sta. 48, 14 m; C= 1.3 mm, sta. 56, 47 m).

1.58 (± 0.09) x 0.74 (± 0.02) -1.09 (± 0.06) mm [1.85 x 0.85-1.30 mm].

Distribution: Atlantic Ocean and Mediterranean Sea (Schander, 1995:61; Fretter *et al.*, 1986: 584; Peñas and Rolán, 1999: 128. *Turkish coasts:* Levantine Sea (Buzzurro and Greppi, 1996: 8) and Aegean Sea (this study).

***Ondina vitrea* (Brusina, 1866)** (Figure 28)

Monoptygma vitrea Brusina, 1866.

Ondina vitrea; Aartsen, 1987: 17, 19, fig. 45; Micali, 1995: 16, fig. 1; Peñas *et al.*, 1996: 57, fig. 144.

Material: 02.08.2000, sta. 9, 20 m, *P. oceanica*, 1 sp.; 28.07.2000, sta. 22, 30 m, *P. oceanica*, 1 sp.; 29.07. 2009, sta. 34, 23-49 m, mud, 2 sp. and 1 sh.; 08.02.2002, sta. 35, 20-23 m, sandy mud and *P. oceanica*, 1 sp.; 03.10.2007, sta. 39, 15-55 m, sand, sandy mud and *P. oceanica*, 3 sp.; 16.09.2000, sta. 48, 14 m, *P. oceanica*, 2 sp.; 16.09.2000, sta. 49, 19 m, sandy mud, 1 sp.; 17.09.2000, sta. 55, 31 m, sand + algae, 1 sp.; 18.09.2000, sta. 56, 47 m, *Caulerpa* sp. + mud, 1 sh.; 21.09.2000, sta. 63, 57 m, sand, 1 sh.;

03.10.2005, sta. 73, 0.2- 9 m, *J. rubens* + *Corallina* sp. + *P. oceanica*, 1 sp.; 23.09.2000, sta. 75, 25 m, *C. prolifera* + muddy sand, 1 sh.; 20.09.2005, sta. 76, 5 m, sand, 1 sh.; 20.09.2005, sta. 77, 0.1-5 m, coralligenous, 1 sp.; 04.02.2009, sta. 82, 14 m, mud, 1 sh.; 09.09.2005, sta. 92, 50 m, sandy mud with shell fragments, 1 sh.; 09.09.2005, sta. 97, 50 m, sandy mud, 1 sp.

Shell is conical, semitransparent or opaque, and consists of 5-6 convex teleoconch whorls. There are fine spirals throughout the whorls, and, in some shells, they can be less evident. Protoconch is planispiral and growth lines on the teleoconch whorls are orthocone and somewhat flexuous. Body whorl consists about 0.55 - 0.60 of the total shell height. An unclear columellar fold and an umbilical groove are also. *Mean dimensions* (15 specimens + 7 shells): 3.11 (± 0.15) x 1.27 (± 0.04)-1.90 (± 0.06) mm [4.80 x 1.70-2.70 mm].

Distribution: Eastern Atlantic and Mediterranean Sea (Aartsen, 1987: 19; Cecalupo and Quadri, 1996: 110). *Turkish coasts:* Levantine Sea (Micali and Palazzi, 1992: 86; Buzzurro and Greppi, 1996:8) and Aegean Sea (Micali and Palazzi, 1992: 86).

***Ondina warreni* (Thompson, 1845)** (Figure 29)

Rissoa warreni Thompson, 1845.

Ondina warreni; Aartsen *et al.*, 1984: 53, fig. 256; Fretter *et al.*, 1986:586, 587, figs 400, 401; Aartsen, 1987: 17, 19, fig. 47; Warén, 1991:104, 105, fig. 34e; Micali, 1995: 17, 18, figs 2-5; Peñas *et al.*, 1996: 53, 57, 61, figs 146, 147; Aartsen *et al.*, 1998: 19; Peñas and Rolán, 1999: 128, 129.

Material: 03.08.2000, sta. 2, 32 m, muddy sand, 2 sh.; 10.09.2005, sta. 98, 10 m, sand, 1 sp.

The small shell is conical and fragile, and consists of 3.5 or some more teleoconch whorls. Shell is rather variable. In some shells teleoconch whorls are striated throughout, in other ones, however, the striation is evident at the base only. Growth lines are nearly opisthocline (or orthocline). Protoconch is of type C. Umbilicus is evident. On the columella there is a very weak columellar fold. The nomenclatural status of the species was well commented by Micali (1995: 17).

Mean dimensions (1 specimen + 2 shells): 1.50 (± 0.14) x 0.76 (± 0.07) – 1.08 (± 0.10) mm [1.75 x 0.90 – 1.25 mm].

Distribution: Eastern Atlantic and

Mediterranean Sea (Peñas and Rolán, 1999: 129).

Turkish coasts: Levantine Sea (Buzurro and Greppi, 1996:8; Micali and Palazzi, 1992: 86), Aegean Sea (Demir, 2003:115) and Sea of Marmara (Demir, 2003:115)

From a taxonomic perspective, the present study registered 28 species of Odostominae, of which 20 species belong to *Odostomia*, 2 species to *Liostomia*, 1 species to *Noemiamea* and 5 species to the genus *Ondina*, respectively. The genus *Odostomia* is one of the largest genera within Pyramidellidae, such as *Chrysallida* and *Turbonilla*, including a lot of species with different ecological and distributional features. Along the Turkish coasts, the most abundant *Odostomia* species is *O. conoidea* (it has not been recorded in the Black Sea only), but some species, i. e., *O. acuta*, *O. plicata* and *O. sicula*, being encountered along all the Turkish coasts, have the widest distribution. On the other hand, *Odostomia barashi*, *O. megerlei* and *O. silesui* are the rarest species, recorded in a single specimen or a shell only. Of those species, *O. megerlei*, which was found at 50 m depth on the Levantine coast, was previously reported from the Alboran Sea (Peñas *et al.*, 1996: 48) and from the western and southern coast of Italy (Oliverio, 2008: 274). *Odostomia silesui* is the

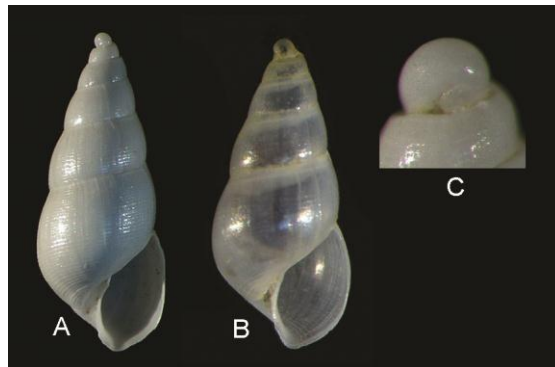


Figure 28. *Ondina vitrea*: general view of two specimens and the protoconch (C) of the specimen (B) (A=4.2 mm, sta. 49, 19 m; B=2.7 mm, sta. 55, 31 m).

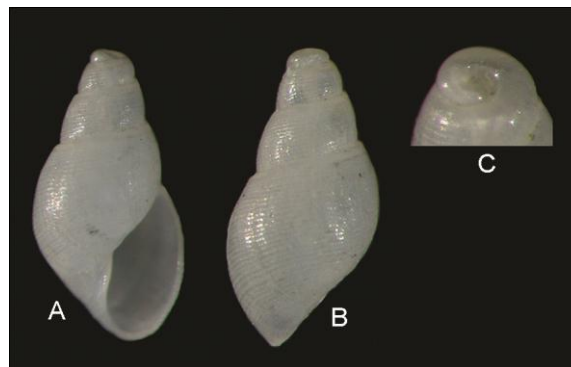


Figure 29. *Ondina warreni*: ventral (A) and dorsal (B) view of a specimen and its protoconch (C). (A=B=1.7 mm, sta. 98,10 m).

deepest *Odostomia* species found in the present study, sampled at 875 m depth in the Aegean Sea. It was originally described by Nofroni (1988) from a locality south of Capo Carbonara (southern Sardinia, Tyrrhenian Sea) in a depth between 800-950 m. The other very rare species, *O. barashi*, seems to be an eastern Mediterranean endemic. Its known localities up to date were from the Israeli coast (Bogi and Galil, 2000; 2006) and Turkish Levantine coast (Öztürk and Aartsen, 2006:243). In the present study it was found in Kuşadası Bay, which is its first record from the Aegean Sea. The other new record for the Aegean Sea is *O. angusta*, of which species were found two specimens in depths of 54 and 71 m (Fig. 3). In the eastern Mediterranean, the species was previously noted from the Maltese Islands by Cachia et al. (2001: 99). All of the remaining *Odostomia* species dealt with this study were previously reported from the Turkish coasts (from one or more localities). In the present study, however, was not encountered *Odostomia striolata*, which was previously recorded in the Levantine and Aegean Seas by Buzzurro and Greppi (1996: 8) and Demir (2003: 115). On the other hand, in the checklist by Öztürk and Çevik (2000) was noted the presence of *Odostomia suboblunga* in the Sea of Marmara, which seems incorrect information based on relevant literature, and the species was not taken into consideration. As a result, the present work increased the number of *Odostomia* representatives known from the Turkish coasts to 20 species. In addition, with the present study have been corrected the generic or specific name of some records given in a precedent work by the first author (Öztürk et al., 2008).

The genus *Liostomia* have four representatives (*L. afzelii*, *L. clavula*, *L. hansgei* and *L. mamoi*) in the Mediterranean. *L. clavula* is the widest distributed species, whereas the other ones are more or less rarely distributed. *Liostomia afzelii* is known from the western Mediterranean (Peñas et al., 1996: 40), Tunisian coast (Warén, 1991:106) and eastern coast of Italy (Oliverio, 2008: 275). With the present study it extends its distribution to the Levantine and Aegean Seas. In the Mediterranean, *L. hansgei* is also known from the western part of the basin (Peñas et al., 1996: 46), whereas the distribution area of *L. mamoi* is the Maltese Island (Mifsud, 1993).

Among the 13 *Ondina* species distributed along the European coast (CLEMAM), 5 species (*O. anceps*, *O. crystallina*, *O. diaphana*, *O. vitrea* and *O. warreni*) were found in the present study. *Ondina anceps* and *O. crystallina* have not been before recorded in the investigated region. *Ondina anceps* described by Gaglini (1992) from Trapani (Sicily) attracts attention with its very rare distribution. In the present study, only a single shell was found at 30 m depth in the northern Aegean Sea. As for *O. crystallina*, its known distribution is a bit wider and, in the eastern Mediterranean, it was previously reported from Cypriot coast (Cecalupo and Quadri,

1996: 110). Of the *Ondina* species recorded along the Turkish coasts during various studies in the past (Micali and Palazzi, 1992: 86; Buzzurro and Greppi, 1996:8 and Demir, 2003:115), only *Ondina obliqua* was not encountered in the present study.

Acknowledgements

The first author is indebted to J.J. van Aartsen (The Netherlands) and Italo Nofroni (Italy) for their helps in providing related literatures, and identification of some specimens in the past. This work has been partially supported by TUBITAK (Project Numbers: 103 T 154 and 104 Y 065) and Ege University (Project Number: 2007 SUF 011).

References

- Aartsen, J.J. van. 1987. European Pyramidellidae: III. *Odostomia* and *Ondina*. Bollettino Malacologico, 23 (1-4): 1-34.
- Aartsen, J.J. van. 1993. Crete: Note on littoral Mollusca. La Conchiglia, 25 (267): 6-8.
- Aartsen, J.J. van. Menkhorst, H.P.M.G. and Gittenberger, E. 1984. The marine Mollusca of the bay of Algeciras, Spain, with general notes on *Mitrella*, Marginellidae and Turridae. Basteria, 2: 1-135.
- Aartsen, J.J. van., Barash, A. and Carrozza, F. 1989. Addition to the knowledge of the Mediterranean mollusca of Israel and Sinai. Bollettino Malacologico, 25: 63-76.
- Aartsen, J.J. van Gittenberger, E. and Goud, J. 1998. Pyramidellidae (Mollusca, Gastropoda, Heterobranchia) collected during the Dutch CANCAP and MAURITANIA expeditions in the south-eastern part of the North Atlantic Ocean. Zoologische Verhandlungen, 321:3-57.
- Bitlis, B. Öztürk, B. Doğan, A. and Önen, M. 2012. Mollusc fauna of Iskenderun Bay with a checklist of the region. Turk. J. Fish. Aquat. Sci., 12: 171-184. doi:10.4194/1303-2712-v12_1_20
- Bogi, C. and Galil, B. 2000. New findings along the Israeli coast. *Odostomia (Auristomia)barashi* n. sp. La Conchiglia, 293:50-51.
- Bogi, C. and Galil, B. 2006. Nuovi ritrovamenti lungo le coste Israeliane. Notiziario S.I.M., 24 (5-8): 16-18.
- Buzzurro, G. 2001. A new *Odostomia* sp. from Cyprus. La Conchiglia, 301:14-16.
- Buzzurro, G. and Greppi, E. 1995. Note sul materiale tipico di origine lessepsiana della collezione Hornung and Mermod. Notiziario CISMA, 17:5-16.
- Buzzurro, G. and Greppi, E. 1996. The lessepsian molluscs of Tasuçu (southeast Turkey). La Conchiglia (suppl. to issue n. 279): 3-22.
- Cachia, C., Mifsud, C. and Sammut, P. M. 2001. The Marine Mollusca of the Maltese Islands. Subclass Prosobranchia to subclass Pulmonata, order Basommatophora.. Backhuys Publ., Leiden, 266 p.
- Cecalupo, A. and Quadri, P. 1996. Contributo alla conoscenza malacologica per il nord dell'isola di Cipro. Bollettino Malacologico, 31 (5-8): 95-118.
- CLEMAM, 01.06.2012. <http://www.somali.asso.fr/clemam/index.php>
- Delongueville, C. and Scaillet, R. 2007. Les espèces invasives de molusques en Méditerranée. Novapex/

- Societe, 8(2): 47-70.
- Demir, M. 2003. Shells of Mollusca collected from the seas of Turkey. Turkish Journal of Zoology, 27: 101-140.
- Forbes, E. and Hanley, S. 1850. A history of British Mollusca and their shells. Vol. 3. London, Johnvan Voorst, 616 pp.
- Fretter, V. Graham, A. and Andrews, E. 1986. The Prosobranch molluscs of Britain and Denmark. Part 9-Pyramidellicea. The Journal of Molluscan Studies, Supplement, 16: 557- 649.
- Gaglioli, A. 1992. Terze Spigolature...Monterosatiene. Argonauta, 7 (1-6): 125-180.
- Grossu, A.V. 1986. Gastropoda Romaniae. I. Caracterele generale, istoricul și biologia gasteropodelor. II. Subclasa Prosobranchia și Opisthobranchia. Bucharest, 524 pp.
- Hornung, A. and G. Mermod, G. 1924. Mollusques de la mer Rouge recueillis par A. Issel. Faisant des collections du Musée Civique d'Histoire Naturelle de Genes, 51:1-29 (283-311).
- Laseron, C.F. 1951. The New South Wales Pyramidellidae and the genus *Mathilda*. Records of the Australian Museum, 22(4):298-334.doi:10.3853/j.0067-1975.22.1951.610
- Locard, A. 1886. Prodrome de malacologie francaise. Catalogue général de mollusques vivants de France. Mollusque marins. Baillière, Lyon, Paris, 779 pp.
- Micali, P. 1984. Il genere *Odostomia* in Mediterraneo. Parte 2. (Opisthobranchia: Pyramidellidae). Notiziario CISMA, 6 (1-2): 47-50.
- Micali, P. 1987. *Odostomia lorellae* n. sp. Bollettino Malacologico, 23(9-10): 311-314.
- Micali, P. 1988. Il genere *Odostomia* in Mediterraneo. Parte 3. (Opisthobranchia :Pyramidellidae). Notiziario CISMA, 11: 20-25.
- Micali, P. 1995. Il genere *Ondina* (Gastropoda, Pyramidellidae) in mar Mediterraneo. Notiziario CISMA, 16: 15-22.
- Micali, P. and Palazzi, S. 1992. Contributo alla conoscenza dei Pyramidellidae della Turchia, segnalazione di due nuove immigrazioni dal Mar Rosso. Bollettino Malacologico, 28: 83-90.
- Mienis, H.K. and Ben-David-Zaslow, R. 2004. A preliminary list of the marine molluscs of the National Park and Nature Reserve of Akhziv-Rosh Haniqra. Triton, 10: 13-37.
- Mifsud, C. 1993. Due nuove specie di gasteropodi di Malta. La Conchiglia, 266: 14-28.
- Milaschewitch, K.O. 1916. The fauna of Russia and the bordering states. The Molluscs of the Russian Seas, 1: 1-312 (in Russian).
- Mutlu, E. 1994. Qualitative and quantitative distributions of benthic molluscs along the Turkish Black Sea. Bollettino Malacologico, 30 (9-12):277-286.
- Nofroni, I. 1988. Two new *Odostomia* from the Mediterranean. La Conchiglia, 20 (234-235): 10-15.
- Nofroni, I. and Schander, C. 1994. Description of three new species of Pyramidellidae (Gastropoda, Heterobranchia) from West Africa. Notiziario del CISMA, 15: 1-10.
- Nofroni, I. and Tringali, L.P. 1995. Random notes on eastern Atlantic, Mediterranean and lessepsian Pyramidellidae (Gastropoda: Heterobranchia: Pyramidelloidea). Notiziario CISMA, 17: 21-49.
- Oberling, J.J. 1970. Quelques espèces nouvelles de Gastropodes du bassin Méditerranéen. Kleine Mitteilungen, Naturhistorisches Museum Bern, 1: 1-7
- Oberling, J.J. 1969-1971. On the littoral Mollusca of Sea of Marmara. Jahrbuch des Naturhistorischen Museums, 4: 183-218.
- Oliverio M., 2008. Gastropoda Prosobranchia. In: Relini G. (Ed.). Checklist della flora e della fauna dei mari italiani. Biologia Marina Mediterranea, 15(1): 235-278.
- Ostroumoff, A. 1896. Otçet o dragirovkah i planktonniyh ulovaht ekspeditsia "Selyanica". Bulletin de l'Académie Impériale des Sciences de St. Petersburg, 5: 1-92.
- Öztürk, B. and Aartsen, J.J. van. 2006. Indo-Pacific species in the Mediterranean. 5. *Chrysallida micronana* nom. nov. for *Chrysallida nana* (Hornung and Mermod, 1924) (Gastropoda: Pyramidellidae). Aquatic Invasions, 1: 241-244. doi: /10.3391/ai.2006.1.4.7
- Öztürk, B. and Çevik, C. 2000. Molluscs Fauna of Turkish Seas. Club Conchylia Informationen, 32: 27-53.
- Öztürk, B. Bitlis, B. and Er-Filiz, M. 2011. *Chrysallida* Carpenter 1856 (Gastropoda, Heterostropha) species distributed along the Turkish coasts. Zoology in the Middle East, 54: 53-78.
- Öztürk, B. Buzzurro, G. and Benli, H.A. 2003. Marine molluscs from Cyprus: new data and checklist. Bollettino Malacologico, 39: 49-78.
- Peñas, A. and Rolán, E. 1999. The family Pyramidellidae Gray, 1840 (Mollusca, Gastropoda, Heterostropha) en África Occidental. 4. Los géneros *Megastomia*, *Odostomia*, *Ondina*, *Noemiamea* y *Syrnola*. Iberus, 5: 1-150.
- Peñas, A. Templado, J. and Martnez, J. L. 1996. Contribution to the knowledge of the Pyramidelloidea (Gastropoda, Heterostropha) in the Spanish Mediterranean coasts. Iberus, 14: 1-82.
- Sabelli, B. R. Giannuzzi-Savelli, R. and Bedulli, D. 1990. Catalogo Annotato dei Molluschi Marini del Mediterraneo. Bologna, Libreria Naturalistica Bolognese, 348 pp.
- Schander, C. 1994. Twenty-eight new species of Pyramidellidae (Gastropoda, Heterobranchia) from West Africa. Notiziario CISMA, 15: 11-78.
- Schander, C. 1995. Pyramidellidae (Mollusca, Gastropoda, Heterobranchia) of the Faeroe Islands. Sarsia, 80: 55-65.
- Schander, C., Aartsen, J. J. van, and Corgan, J. X. 1999. Families and Genera of the Pyramidelloidea (Mollusca: Gastropoda). Bollettino Malacologico, 34: 145-166.
- Solustri, C. and Micali, P. 2004. Pyramidellidae (Gastropoda: Heterobranchia) di un'area costiera del medio Adriatico ed ipotesi di associazione con i possibili ospiti. Bollettino Malacologico, 40 (5-8): 60-69.
- Tringali, L. and Villa, R. 1990. Rinvenimenti malacologici delle coste Turche (Gastropoda, Polyplacophora, Bivalvia). Notiziario CISMA, 11: 33-41.
- Warén, A. 1980. Marine Mollusca described by John Gwyn Jeffreys, with the location of the type material. Conchological Society of Great Britain and Ireland, Special Publication No. 1: 1-60, London, 8 pp.
- Warén, A. 1991. New and little known Mollusca from Iceland and Scandinavia. Sarsia, 76: 53-124.
- Wilke, T. and Aartsen, J.J. van. 1998. The family Pyramidellidae (Heterostropha, Gastropoda) in the Black Sea. Basteria, 62:7-24.