

## New record for the mollusca fauna of the black sea coast (sinop peninsula) of turkey: white belted shell, *Tornus subcarinatus* (Montagu, 1803), (Gastropoda, Tornidae)

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The present study is concerned with one prosobranch gastropod species [*Tornus subcarinatus* (Montagu, 1803)], obtained during the benthic sampling by surveying at the upper-infralittoral zone (10-20 m.) of the Sinop Peninsula coasts between the years 2010 and 2011. A total of 155 species of marine Gastropoda (Mollusca) are known in the Black Sea coast of Turkey. However, the Prosobranch gastropod *Tornus subcarinatus* (Montagu, 1803) is recorded for the first time from the central Black Sea of Turkey. Previous records of the species were confined to the southern part of the Turkey, its occurrence at Turkish coast of the Black Sea extends its distribution range to the Black Sea continued to Turkish coastal waters of Black Sea.

[**Keywords:** *Tornus subcarinatus*; New record; Gastropoda; Mollusca; Black sea]

### Introduction

Benthic mollusk play important roles in the ecosystem structure and biodiversity maintenance<sup>1</sup>. Furthermore, some mollusk have been widely used in monitoring studies of various contaminants worldwide because of their economic and ecological importance<sup>2</sup>. Also, information on the spatial and temporal distribution of species is important for understanding biotic and abiotic interactions in marine soft sediments<sup>3,4</sup>. Marine molluscs considerably contribute in maintaining the ecosystem and more importantly some species can be directly utilized as indicators of environmental health or degradation<sup>5</sup>. Only about 20–25 % of the zoobenthos of the Mediterranean Sea is shared with the Black Sea, due to the less saline water which is unsuitable for most Atlantic and Mediterranean species, and due to the restriction of suitable habitats to the upper water layers because there are deep zones with anoxic conditions containing hydrogen sulphide<sup>6</sup>.

Investigations concerned with Prosobranchia species in the Black sea coasts of Turkey is quite scant and limited regarding depth and details except Russian and Romanian coasts of The Black Sea<sup>7,8,9</sup>. Among the coasts of Turkey, the lowest number of molluscan species was recorded from the

Black Sea with 155 species belonging to Polyplacophora (2 species), Gastropoda (72 species) and Bivalvia (81 species). Also, the highest number of molluscan species was recorded from the Aegean Sea (825 species), followed by the Levantine Sea (807 species), and Sea of Marmara (537 species)<sup>10</sup>. Tornidae Family was reported 3 species [*Circulus striatus* (Philippi, 1836); *Tornus mienisi* van Aartsen, Carrozza & Menkhorst, 1998; *Tornus subcarinatus* (Montagu, 1803)] at Turkish coasts except for Black Sea coasts of Turkey by Ozturk *et al.*<sup>10</sup>. Of these species, *Tornus subcarinatus* (Montagu, 1803) is new record for the Turkish Black Sea coast.

### Materials and Methods

#### *Collection and evaluation of the study material*

The present study was performed with the aim to determine species of prosobranch mollusk distributed in the coastal ecosystem of Sinop peninsula and its shallow coast (Fig. 1). The benthic samples was collected at Hamsilos stations (42°03'05"N; 35°03'10"E) and Kale Yazısı stations (42°01'55"N; 35° 08'21" E) in depth from 0, 5 to 20 m between the years 2010-2011 by using a sampling equipment [Van Veen grab (0.1 m<sup>2</sup>)]. The grab was used at depth of 0-10-20 m on a fine sand and close to stones and



Fig. 1 — Map of the study area with the location of sampling stations

rocks surrounded by sand. Then, the collected material was fixed in 4 % formalin solution and examined in the laboratory. Material was washed through a sieve with 0.5mm and 1 mm mesh sizes, with the help of pressurized water, and was then stored in 70 % alcohol. Also, specimens were classified into groups using a stereomicroscope (Olympus SZ61 model), and species were identified. The gastropods were identified based on their morphometric characters such as the shape, operculum, number of whorls, colour pattern of shell etc.<sup>5</sup>. Identification was performed according to shell characteristics and several reference sources, including a lot of study<sup>(11-16)</sup> were used. The methods<sup>10,16</sup> and the Check List of European Marine Mollusca<sup>17</sup> were followed for the systematic status of the species. The specimens were photographed and will be deposited afterwards in the invertebrate collections of the Hydrobiology department

laboratory, Faculty of Fisheries, Sinop University with catalogue code: SNU-FF/ CRS/2012-01x.

Additionally, the physicochemical parameters of the sampling stations were measured *in-situ* seasonally from the surface to a depth of approx. 5-10m, using a YSI 556 MPS water quality meter probe (Table 1).

## Results and Discussion

### *Ecological and systematic assessment*

This species was reported for the first time by *Ostroumoff*<sup>8</sup>, *Oberling*<sup>19</sup> and *Demir*<sup>20</sup> for the Marmara Sea; by *Van Aartsen and Kinzelbach*<sup>21</sup> and *Demir*<sup>20</sup> for Aegean Sea; by *Buzzurro and Greppi*<sup>22</sup> and *Demir*<sup>20</sup> for Levantine Sea; by *Pallary*<sup>23</sup> for Dardanelles (*Ozturk et. al.*<sup>24</sup>). But, up to date, there was no record on the species from Boshporus and the Black Sea coasts of Turkey (*Ozturk and Cevik*<sup>25</sup>; *Ozturk et. al.*<sup>10</sup>). Nevertheless, *Ozturk et. al.*<sup>10</sup>,

Table 1 — Physicochemical parameters of the stations

Variables	Abbrevia.	Units	Analytical method	Hamsilos station (42°03'05"N; 35°03'10"E)		Kale Yazısı station (42°01'55" N; 35°08'21"E)	
				Mean±SD	Min-Max	Mean±SD	Min-Max
Temperature	Temp.	°C	YSI 556 MPS / SET handheld meter	15.67 ± 7,27	7.12 23.71	14.36 ± 6.56	7.62 22.53
Salinity	Saline	‰ (ppt)	YSI 556 MPS / SET handheld meter	17.32 ± 0.79	15.21 18.14	17.55± 0.80	16.79 18.37
pH	pH	µS cm-1	YSI 556 MPS / SET handheld meter	7.56 ± 1.03	6.10 8.47	8.11± 0.74	7.13 8.89
Dissolved Oxygen	DO	mg l-1	YSI 556 MPS / SET handheld meter	6.37 ± 0.63	5.58 7.05	6.09 ± 0.52	5.40 6.69
Conductivity	EC	µS cm-1	YSI 556 MPS / SET handheld meter	23.52 ± 0.71	22.72 24.50	24.54± 1.05	23.16 25.60

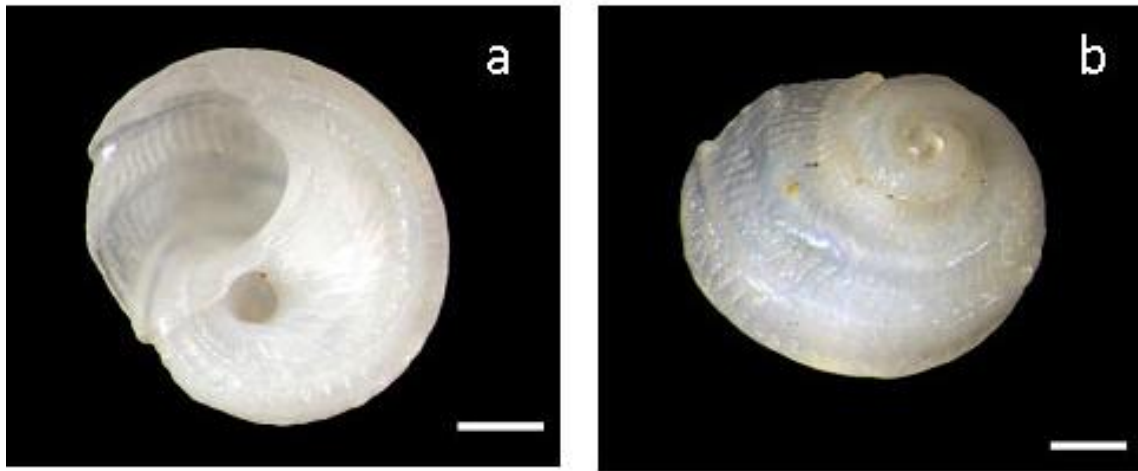


Fig. 2 — General view of *Tornus subcarinatus*, a: ventral b: dorsal, found in Sinop peninsula, Scale: 500 µm (photo by Culha)

compiling the updated list on the identification atlas of the marine mollusc species of Turkey, have reported that Tornidae Family composed 2 genus and 3 species at Turkish seas except for Black Sea coast of Turkey. In this study, eight individuals of *Tornus subcarinatus* were found in soft substratum material sampled at the off shore of Sinop Peninsula (Central Black Sea coast of Turkey) by using a Van Veen grab (0.1 m<sup>2</sup>) (Fig. 2).

Systematic situation according to Gofas<sup>26</sup>;

*Tornus subcarinatus* (Montagu, 1803)

Material examined: 5 specimens at Hamsilos station; 3 specimens at Kale Yazısı station, Sinop Peninsula, Black Sea

Synonymised names;

*Cyclostrema mirandum* Bartsch, 1918 (dubious synonym)

*Delphinula pusilla* Calcara, 1839 (synonym)

*Helix subcarinata* Montagu, 1803 (original combination)

*Turbo rugosus* Brown, 1818 (synonym)

Kingdom : Animalia

Phylum : Mollusca

Classis: Gastropoda

Subclassis: Caenogastropoda

Order: Littorinimorpha

Superfamily: Truncatelloidea

Family: Tornidae

Genus: *Tornus*

Species: *Tornus subcarinatus* (Montagu, 1803)

Also,<sup>(27-29)</sup> reported that this Tornidae species was found under boulders in well oxygenated sand at depths between 0, 5 and 3 m. Likewise, this species (*T. subcarinatus*) was found on the soft bottoms (sand, mud, sandy mud, muddy sand, silt) with algae (*Jania rubens*, *Cystoseira* spp., *Padina pavonica*, *Dictyota dicotoma*, *Ulva* sp., *Styopodium schimferi*) at depths between 0,5 and 10 m in Iskenderun bay at Turkish coasts of Eastern Mediterranean<sup>30</sup>. According to de Kluijver *et al.*<sup>28</sup>, the general distribution of the species is along from Mediterranean to southern North Sea, where it is uncommon. The present recording is extending the distribution range of this species, *Tornus subcarinatus* (Montagu, 1803), to the Turkish coasts of central Black Sea (Fig. 3). Also, the species was checked for the present valid nomenclature according to the Clemam<sup>17</sup> and WoRMS<sup>26</sup> database.



Fig. 3 — The distribution of *Tornus subcarinatus* (Montagu, 1803) along the Turkish coasts the present study (circle); - previous records (Ozturk *et. al.*<sup>10</sup>)

### Conclusion

Tornidae Family was reported 3 species [*Circulus striatus* (Philippi, 1836); *Tornus mienisi* van Aartsen, Carrozza & Menkhorst, 1998; *Tornus subcarinatus* (Montagu, 1803)] at Turkish coasts except for Black Sea coasts of Turkey<sup>10</sup>. The Prosobranch gastropod *Tornus subcarinatus* (Montagu, 1803) is recorded for the first time from the Central Black Sea of Turkey.

As a consequence, a lot of study on ecology and taxonomy must be conducted in mediolittoral zone of the Black Sea coasts of Turkey. Also, the further advance of this species to the coasts of Eastern Black Sea must be monitored and reported.

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