

## Occurrence of *Pleurobranchus testudinarius* Cantraine, 1835 in Iskenderun Bay, Turkey (Southern Mediterranean)

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**Abstract.** One specimen of *Pleurobranchus testudinarius* Cantraine, 1835 was photographed during a SCUBA diving expedition on October 25<sup>th</sup>, 2018 at 15 meter of depth from Kaleköy (Arsuz), Iskenderun Bay. Although, *P. testudinarius* has distributed in the Mediterranean Sea and reported from the western Mediterranean coast of Turkey, the present study is the first confirmed report of the species from southern Mediterranean coast of Turkey. Besides, this report is the first observation for the location and fills another gap in the distribution range of *P. testudinarius*.

**Key words:** Sea slug, Turtle snail, *Pleurobranchus testudinarius*, Arsuz coast, Kaleköy, eastern Mediterranean, Iskenderun Bay

The genus *Pleurobranchus* (Pleurobranchidae) are commonly distributed in the temperate and coastal waters. Over than 70 species of *Pleurobranchus* was identified and described in the last years. However, these identification still based only on morphometry as characteristics of the internal shell and external specimen coloration (Martynov & Schrödl 2009, Goodheart et al. 2015). Recently, with the comprehensive morphology and molecular studies (Goodheart et al. 2015, Alvim & Pimenta 2016) only 20 *Pleurobranchus* species were definitely recognized in the world.

In the case of *P. testudinarius* Cantraine, 1835, this latest was recorded for the first time on the coast of Israel (Barash & Danin 1971). Thereafter, several records were reported in the Mediterranean waters (Yokes 2002, Cervera et al. 2004, Poursanidis et al. 2009). The first observation of *P. testudinarius* from the Turkish waters was reported in Üçadalar in 2002 (Yokeş 2002) and then it was recorded from Adrasan and Datça in 2004 (Okuş et al. 2004), and from Adrasan, Beşadalar in 2005 (Türkmen & Demirsoy 2009). Later, the species was reported from southwestern Turkish coast in 2012 (Tural & Yokeş 2012) and from Phaselis and Antalya (Gökoğlu et al. (2018).

Although several occurrences of *P. testudinarius* were already reported from different coasts of Turkish waters and Aegean Sea, *P. testudinarius* was not reported from the southeastern Mediterranean coast of Turkey particularly in Iskenderun Bay. The present study is the first record of *P. testudinarius* in natural habitat during underwater observation from Iskenderun Bay.

On 25 October 2018, one specimen of *P. testudinarius* (22 cm) was photographed during a SCUBA diving research expedition at 15 meters depth from Iskenderun Bay (Kaleköy/Arsuz) (Fig. 1). The recorded site (36°17' 56" N, 35°46' 48" E) is located 35 km northeastern Iskenderun city. The specimen was sighted on rocky bottoms partially covered with algae (Fig. 2). The water temperature was 25 °C. The specimen was identified according its external morphology and coloration (Cattaneo-Vietti 1986, Goodheart et al. 2015). After identification, the specimen was fixed in formalin and preserved in 70% ethanol for long term storage.

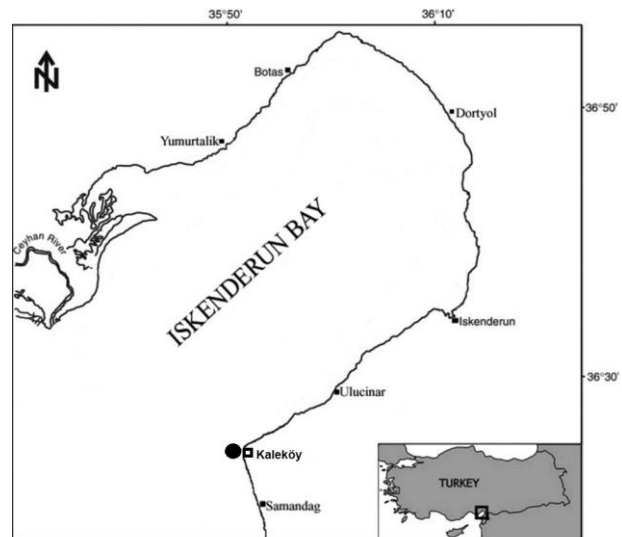


Figure 1. Sampling locations of *Pleurobranchus testudinarius*.



Figure 2. Photographed specimen of *Pleurobranchus testudinarius* Cantraine, 1835 from Kaleköy (Arsuz), Iskenderun Bay (photos by Necdet Uygur).

Table 1. Records of *Pleurobranchus testudinarius* species from Mediterranean during the period from 2002 to 2018.

Location	Country	Date	Depth (m)	Number of Species	Length (cm)	Habitat	Author(s)
Üç Adalar, Antalya	Turkey	May 2002	13	1	20	Sandy	Yokeş (2002)
Adrasan and Datça	Turkey	2004	-	2	-	-	Okuş et al. (2004)
Adrasan (Beşadalar), Antalya	Turkey	May 2005	20	1	-	Rocky substrata with rich algal vegetation	Türkmen & Demirsoy (2009)
Southwest coast (Gökova Bay)	Turkey	2012	-	1	-	-	Tural & Yokeş (2012)
Cagnes, French Mediterranean	France	July 2008	8	1	20	Muddy substrate	Horst (2008)
Phaselis, Antalya	Turkey	2018	4	1	15	Stony place	Gökoğlu et al. (2018)
Naxos Island, Aegean Sea	Greece	July 2005	50	2	20-22	Muddy with <i>Caulerpa racemosa</i>	Mpardanis (2007)
Lesvos Is, NE Aegean Sea	Greece	2004	10-20	1	-	Rocky substrates covered with algae	Poursanidis (2007)
Northern and Southern Aegean Sea	Greece	September 2005	6-30	7	-	Rocky substrates covered with algae	Poursanidis et al. (2009)
Kalamos and Paxos Islands Ioanian Sea	Greece	2005	6-30	2	-	Sand and Posidonia meadows	Poursanidis et al. (2009)
Southern Mediterranean (Iskenderun Bay)	Turkey	October 2018	15	1	22	Rocky substrata with rich algal vegetation	This study

The mantle of *P. testudinarius* is very domed and broad with completely covered foot. Pattern of polygonal rings is on dorsum. The mantle is characterized by canonical protuberances that are larger in the center, and whose bases are surrounded by thin violet lines.

Species coloration is large light brown and bright yellow pleurobranch with elongate tubercles projecting on dorsum with clear white rings around the tubercles. The foot present a yellowish coloration (Rudman 1993).

Up to day, *P. testudinarius* was reported from eastern Atlantic (Canary and Selvagens Islands, Madeira, the Azores) (Cervera et al. 2004), western Atlantic (Brazil) (Rudman 2005), western Mediterranean (eastern Andalusia, Algeria, Spanish Levant Catalonia, France, Balearic Islands, Italy, Sicily) (Pruvot-Fol 1954, Cervera et al. 2004), and eastern Mediterranean (Israel, Turkey and Greece) (Barash & Danin 1971, Yokeş 2002, Poursanidis, et al. 2009). Those historical recorded in the Mediterranean waters between 2002 to 2018 were presented in the Table 1.

*Pleurobranchus testudinarius* is a rather large species, also called turtle snail. It can be distinguished by large, polygonal tubercles present on the mantle that occupy a mesh of a rose-carmine network (Pilsbr 1895-1896). According Ballesteros et al. (2012-2019), *P. testudinarius* can reach more than 20 cm with a common length varies between 9 and 25 cm (Yokeş 2002).

Morphologically, *P. forskalii* is very similar to *P. testudinarius*; the tubercles size of this latest were much bigger than those of *P. forskalii*. Moreover, for this species last one there are several tubercles within each polygonal area, opposite to *P. testudinarius* with only one. Additionally, the two species were shown a variant coloration. Indeed, and according Rudman, 1993 many species of *Pleurobranchus* show a quite variation in its background coloration from pale yellow to dark brown and even reddish purple.

*Pleurobranchus testudinarius* is well distributed for both eastern and western coasts of Mediterranean Sea, as for the Atlantic (Goodheart et al. 2015). *Pleurobranchus* spp. are generally found between 5-30 m depths of coastal areas (Wirtz &

Martins 1993). Those species are more observable during the day, usually on rock crevices, rock and stone bottoms and it's are hidden inside cave and become active at night (Wirtz & Martins 1993). For the present study, the specimen observed during diving was naturally inhabiting among algae communities on the rock at nighttime. Although, there is no information about the feeding of this species, it reported that feeds commonly on tunicates (Rudman 2008).

Thus, this paper confirms the occurrence of *P. testudinarius* in Iskenderun Bay (Southern Mediterranean coast of Turkey) by direct observation of the species. This new record was confirm the expansion of *P. testudinarius* along the northeast coast of Mediterranean Sea. This enlarged extension of the species may indicates several environmental changes of the marine waters in the area especially in Iskenderun Bay.

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