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Research article

Three alien molluscs from Iskenderun Bay (SE Turkey)

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Abstract

This study reports the presence of three alien molluscs from Iskenderun Bay (SE Turkey). *Amathina tricarinata* (Linnaeus, 1767) and *Petricola hemprichi* Issel, 1869 have prior records from other regions of Mediterranean, but, *Cardites akabana* (Sturany, 1899) first recorded in this paper. Since all of them are present in the Red Sea or Suez Canal, they can be considered as Lessepsian immigrants.

Key words: Mollusca, alien species, Mediterranean, Turkey

Introduction

The Mediterranean Sea hosts about 8500 species of macroscopic animals. This rich biodiversity, representing 8-9 % of total species number of the world's seas, comprises temperate and sub-tropical elements together with endemic and alien species (Zenetos et al. 2002).

The introduction of alien species (also known as exotic, introduced or non-native species) into European seas is a dynamic and ongoing process. Of the 828 alien species reported from all European seas by 2004, the Mediterranean appears to be the major recipient area with 615 species, of which 60 % belong to zoobenthos (Streftaris et al. 2005). Mollusca form a very important part of these as documented by the fact that 139 of the mollusc species in the Mediterranean by 2002 were exotics (Gofas and Zenetos 2003).

Despite many introduction pathways of such alien organisms, Lessepsian immigrants play the most important role. The opening of the Suez Canal in 1869 allowed the entry of Indo-Pacific and Erythrean biota into the Mediterranean, so that 88 % of the exotic molluscs are Lessepsian immigrants in the eastern Mediterranean (Galil and Zenetos 2002). Detailed data about these species are available on the Internet (www.ciesm.org/atlas).

Either Lessepsian or non-Lessepsian, many new non-indigenous species continue to enter the Mediterranean.

The eastern Mediterranean is most vulnerable to invasion and should be continuously monitored. This study reports the presence of three non-indigenous species from Iskenderun Bay (SE Turkey).

Materials and Methods

The material of this study was obtained from dredge surveys of Iskenderun Bay between 1999-2005 (Figure 1). The collected material was rinsed through a sieve with 1 mm mesh size. Mollusc specimens were extracted, preserved in 4 % formaldehyde, and then identified to species level. Samples are deposited in the Hydro-biological Museum of the Department of Biology, Faculty of Science, Istanbul University.

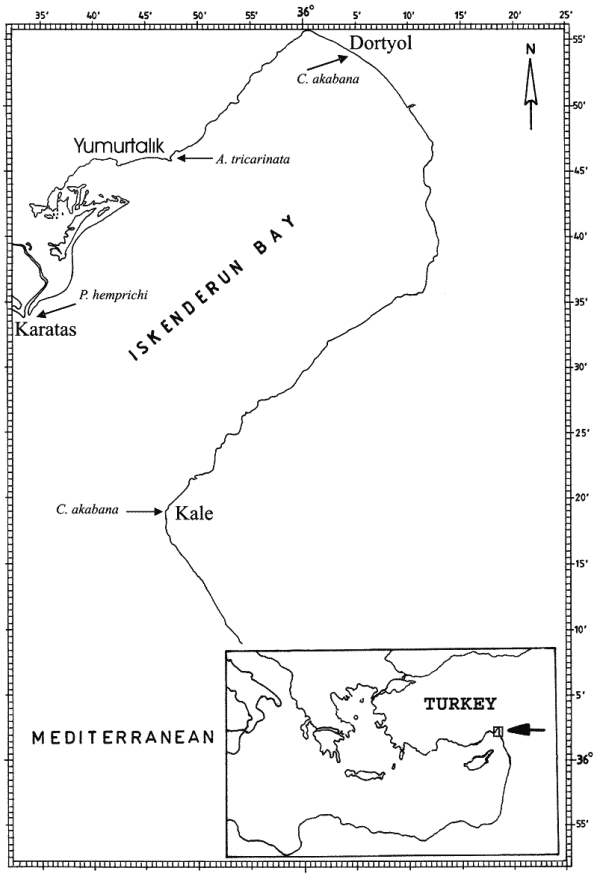

Figure 1. Map of Iskenderun Bay showing sampling locations of three alien molluscs

Results

Short descriptions and habitats of the three newly introduced alien molluscs are given below.

Amathina tricarinata (Linnaeus, 1767)

Description: Shell solid, cap-shaped, outline somewhat oval with narrower posterior. Apex directed slightly to the right and extends beyond the posterior margin of the shell. Three strong and rounded ridges radiate from the apex to the anterior margin where they minutely project. Weaker radial ribs are present on the posterior area of the shell. Outside white, periostracum yellowish-brown, inside creamy-white. Length maximum 8 mm (Figure 2).

Material: Seven specimens were found under the spines of the bivalve *Spondylus spinosus* Schreibers, 1793 from 25 m depth at Yumurtalık (36°46'17" N, 35°49'57" E) on 12 January 2000.

Figure 2. *Amathina tricarinata*, view from dorsal

Cardites akabana (Sturany, 1899)

Description: Shell stout, inflated, inequilateral, equivalve, outline subcircular. Umbones slightly anterior to midline and prominent. Lunule short and cordate. Ligament external. Sculpture of 17 squamose broad radial ribs equal to interstices. Pallial line without a sinus. Internal margin crenulate. Outside and inside white. Length maximum 4 mm (Figure 3).
Material: Three specimens were found on muddy-sand bottom from 10 m depth at Dortyol (36°53'50" N, 36°04'34" E) and Kale (36°19'31" N, 35°46'49" E) on 11 November 2005.

Figure 3. *Cardites akabana*, outside of left valve

Petricola hemprichi Issel, 1869

Description: Shell thin, inequilateral, equivalve, outline subovate. Umbones infront of mid-line. No lunule or escutcheon. Ligament external. Radial sculpture of riblets anteriorly, coarser and scaly ribs posteriorly. Pallial sinus large and not confluent with pallial line. Internal margin smooth. Outside and inside white. Length maximum 14 mm (Figure 4).
Material: Eleven specimens were found in holes on the shells of *Spondylus spinosus* from 7 m depth at Karatas (36°34'12" N, 35°34'30" E) on 11 August 1999.

Figure 4. *Petricola hemprichi*, outside of right valve

Discussion

According to Gofas and Zenetos (2003), alien species form 7.7 % (139 of 1.800) of the Mediterranean molluscan fauna. A similar ratio is seen in Turkish seas, where 9.1 % of gastropods and 5.4 % of bivalves are alien species. If only the Mediterranean coasts of Turkey are considered, this percentage increases to 13.1 for gastropods and to 7.8 for bivalves (Öztürk and Çevik 2000). After the publication of Öztürk's and Çevik's (2000) check-list, many new alien molluscs were added to the Turkish list of malacofauna by several authors such as Albayrak and Çeviker (2001), Albayrak et al. (2001), Çeviker and Albayrak (2002), Çevik et al. (2005) and Öztürk and Poutiers (2005). Established or rarely found, many non-indigenous species continue to enter to the Mediterranean basin. This study reports one species new to the Mediterranean and two species new to the Turkish fauna.

Amathina tricarinata is known from the Red Sea (Dekker and Orlin 2000) and was reported for the first time in the Mediterranean from Lebanon (Scapolatempo et al. 2003). This is the second location where *A. tricarinata* is recorded and indicates that the species is spreading possibly following the invasive character of *Spondylus*. As reported by Scapolatempo et al. (2003), *A. tricarinata* is an established species in the Mediterranean. Also, *A. tricarinata* is a commensal/parasite of large bivalves,

particularly *Pinna* and oysters, and could become a pest of cultivated bivalves (Ponder 1987).

Cardites akabana is known from the Red Sea and Suez Canal (Oliver 1992). This species is reported from the Mediterranean for the first time by this study.

Petricola hemprichi had been reported from Port Said in the early 1900s (Tillier and Bavay 1905), but it is mentioned in the list of excluded species (i.e. species with uncertain invasion status) in Zenetos et al. (2003). Therefore, our finding cannot be accepted as the first record in the Mediterranean. Because of doubts about the presence of *P. hemprichi* in the Mediterranean, a comparison with other Red Sea species of the genus is useful. Two other species of *Petricola* present in the Red Sea and Suez Canal are *P. lapicida* (Gmelin, 1791) and *P. gracilis* Deshayes, 1853. The differentiating characters of *P. hemprichi* from these two species are: *P. lapicida* has umbones very close to the anterior end of the shell and delicate divaricate striae also on the anterior; *P. gracilis* has a shell with narrowly elongate outline and faint riblets on the posterior of the shell (Oliver 1992, Bosch et al. 1995).

All these three species are present in the Red Sea or Suez Canal which indicates that Lessepsian migration is the most probable means of their introduction. However, the absence of *Cardites akabana* from other SE Mediterranean localities to date and the fact that it was found near Iskenderun, a favoured destination for alien marine species and a port of call for many tankers may lead suggest that shipping may be its mode of transport.

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