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## ARE THE ANGELS, *BARNEA CANDIDA* (MYOIDA, PHOLADIDAE), BACKING TO THE DANUBE DELTA IN THE BLACK SEA?

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**Are the Angels, *Barnea candida* (Myoida, Pholadidae), Backing to the Danube Delta in the Black Sea? Alexandrov, B.** — Bivalve marine mollusc *Barnea candida* (= *Pholas candidus*) from Pholadidae family is sensitive to the high concentration of organic matter in sea water and recently has been included into the list of indicator species for the Black Sea (Alexandrov, Zaitsev, 2016). Its recording in Ukrainian part of the Danube Delta after more than 60 years since its first registration is probably the evidence of reduction of eutrophication and gradual restoration of local aquatic ecosystem biodiversity.  
Key words: mollusc, *Barnea candida*, Myoida, Pholadidae, eutrophication, Danube Delta, Black Sea.

Bivalve marine mollusc *Barnea candida* (= *Pholas candidus*) from Pholadidae family, known as East Atlantic (including the entirely Mediterranean Basin) piddocks or angel wings. It is sensitive to the high concentration of organic matter in sea water and recently has been included into the list of indicator species for the Black Sea (Alexandrov, Zaitsev, 2016). This species is also occurring in the Sea of Azov along protected areas, e. g. in Biryuchy split at Azov-Sivash National nature Park of Ukraine in Western part of the Sea of Azov (e. g. Anistratenko et al., 2011). The closest to the Danube Delta location (about 100 km along the shore), where alive molluscs and their shells are regularly found is eastern border of National Nature Park of Ukraine “Tuzlovsky lymans” near Lebedivka village (personal communication of Mikhail Son, Institute of Marine Biology NASU).

*B. candida* belongs to molluscs-borers. At crossings of radial and concentric edges in upper part of its valves, sharp teeth (cloves) are located, using which the mollusc can dig deeply into such substrate as limestone, clay and/or wood. It occurs from Norway south to the Mediterranean and West Africa (Mordukhaya-Boltovskoy, 1972; Poppe, Goto, 1993; Ballerstedt, 2006).

Valves of the mollusc are white and when opened, look like angel’s wings (fig. 1). It can be found near the river mouths. The shell of *B. candida* is very fragile and if the mollusc gets washed out from the substrate, where it lives (usually clay), its valves can be easily broken by waves. On 19th of October 2016, during marine coastal survey in the Danube Biosphere Reserve (Ukraine), well-preserved valves of this mollusc were found (fig. 2). The average number is around 1–2 valves per running meter of coastline.

For the first time, this specie was registered in Ukrainian part of the Danube Delta during surveys conducted in 1949. It was mentioned for salty bays of the Danube Delta (Markovsky, 1955). The mollusc was found in small quantity, because there is no data

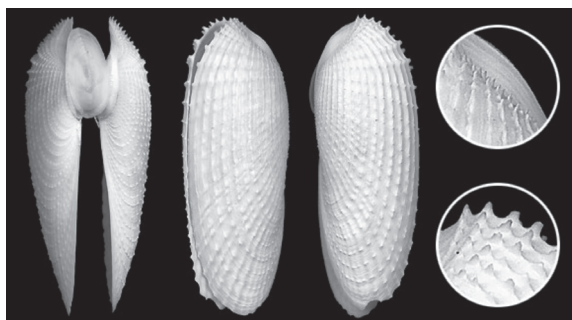


Fig. 1. External view of "Angel's wings" shell *Barnea candida* (Linnaeus, 1758). [http://www.idscaro.net/sci/04\\_med/class/fam5/species/barnea\\_candida1.htm](http://www.idscaro.net/sci/04_med/class/fam5/species/barnea_candida1.htm)



Fig. 2. Right valve of mollusc *B. candida*, found in Ukrainian part of Danube delta (19 October, 2016).

concerned the quantitative distribution in the text. The next mention of this species (Polishchuk, 1974) was a copy of the reference of Yu. M. Markovskiy (1955) and belongs to the same period, as the first record, prior large-scale man-caused eutrophication of the Danube Delta and the whole northern-western part of the Black Sea (Zaitsev, Mamaev, 1997). All further reviews of invertebrate fauna in the Ukrainian part of Danube Delta for the period 1980–1999 (period of water ecosystems degradation under the human impact), do not include any information on this species (Kharchenko et al., 1993; Biodiversity of the Danube..., 1999). At present, valves of *B. candida* were recorded in 2013 at marine part of Ukrainian Danube Biosphere Reserve (Invasive species..., 2014).

The finding of *B. candida* in Ukrainian part of the Danube Delta after more than 60 years since its first registration is, probably, the evidence of reduction of eutrophication and gradual restoration of local aquatic ecosystem biodiversity.

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