

FIRST RECORD OF *PLAGIOBRISSUS COSTAI* (GASCO, 1867) (ECHINOIDEA, BRISSIDAE) IN THE ADRIATIC SEA

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The finding of an irregular sea urchin test in Mljet Channel near Pelješac Peninsula has provided first information on the presence of the rare endobenthic *Plagiobrissus costai* in the Eastern Adriatic. With this species, in the last 270 years, ten irregular echinoderm species have been recorded in the Adriatic Sea.

Key words: Echinoidea Irregularia, Brissidae, *Plagiobrissus costai*, Adriatic Sea, Croatia

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Nalazom prazne ljušture iregularnog ježinca u Mljetskom kanalu kod poluotoka Pelješca utvrđena je prisutnost rijetke vrste pjeskovitog dna *Plagiobrissus costai* u istočnom dijelu Jadranskog mora. Nakon ovog nalaza u proteklih 270 godina do danas u Jadranu je zabilježeno ukupno deset vrsta iregularnih ježinaca.

Ključne riječi: iregularni ježinci, Brissidae, *Plagiobrissus costai*, Adriatic Sea, Croatia

INTRODUCTION

Since the classic biological research by DONATI (1750) and OLIVI (1792), nine irregular sea urchins have been recorded in the Adriatic Sea (DESPALATOVIĆ *et al.*, 2017). They were reviewed by HELLER (1868), CARUS (1895), KOLOSVÁRY (1937), ZAVODNIK (1961), TORTONESE (1965), BRUNO (1972), FREDJ (1974), VIDOVIĆ MATVEJEV (1978), KAŠĆELAN *et al.* (2009), MATARRESE (2010), and in reports of museum and study collections (TORTONESE, 1935, 1956, 1977, 1984; MARCUZZI, 1972; ZAVODNIK *et al.*, 2001). In coastal areas the material was mostly collected in fishermen's gear, sometimes by snorkeling and sophisticated scientific equipment, and more recently in scuba diving adventures. Consequently, the Eastern Adriatic echinoid fauna seems to be at first sight a well known systematic group of benthic macrofauna, although published documented records of species like the Brissidae group are relatively poor in the Central and Southern Adriatic (Fig. 1). Therefore, the record of new species appeared unlikely, apart from invaders from other parts of the Mediterranean.

In 2017 a team of amateur scuba divers undertook an excursion to survey the wreck of the German Navy torpedo boat named S 57 (FRKA & MESIĆ, 2003; ANDRIĆ, 2012). It was set on fire and sunk in a night battle with British ships on 19 August

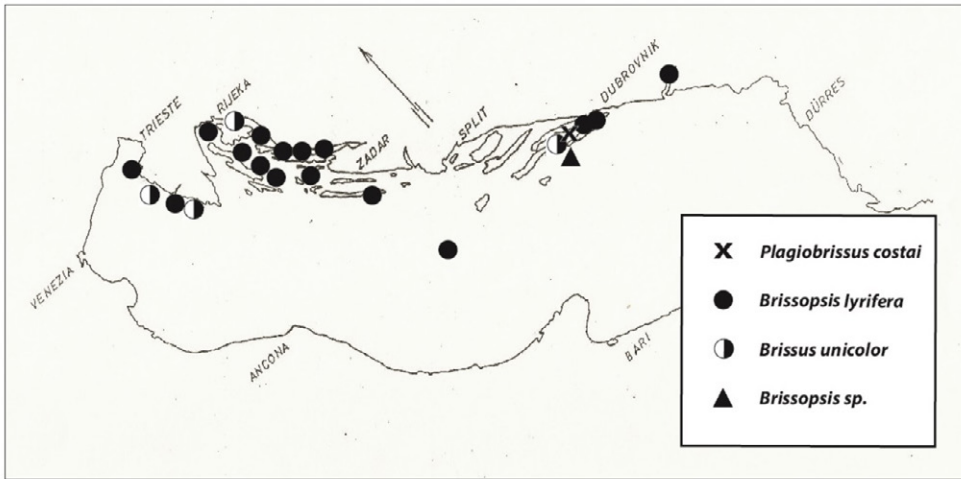


Fig. 1. Record sites of Brissidae species in the Eastern Adriatic, areas of Slovenia, Croatia, Montenegro and Albania (KOLOSVÁRY, 1938, 1940; ZAVODNIK, 1971, 1992, 1996, 1998, 2003; BRUNO, 1972; TORTONESE, 1984; ZAVODNIK & KOVAČIĆ, 2000; ZAVODNIK *et al.*, 2006; KAŠĆELAN *et al.*, 2009).

1944 in Mljet Island Channel. The wreck lies on gently sloping barren rough sandy bottom void of any kind of marine vegetation. While diving the author accidentally saw and collected some tests of irregular echinoids, and among them there was one test of a species so far never found in Eastern Adriatic. The present paper is a detailed report on this finding.

MATERIAL AND METHODS

In Mljet Island Channel in the vicinity of the coastal cliffs of the Pelješac peninsula, at GPS: 42° 51' 21'' N, 17° 29' 37'' E, UTM XH33, near the wreck of the German Navy torpedo boat one test of irregular Echinoidea from the Brisseidae group was collected by author by hand from the surface of the rough sand slope at a depth of 26-38 m (Fig. 2). It was filled with sandy sediment, void of pedicelariae and spines, and slightly damaged in the anal area (Fig. 3). The sediment was easily removed through the oral aperture and the anal area was lacking in plates. No teratological features similar to those reported in *Brissopsis lyrifera* by BRATTSTRÖM (1946) were observed. The test was not infested by fouling organisms. Due to lack of time the benthic community in the sandy area around the torpedo-boat S 57 wreck was not analyzed in detail. However, on the areal sediment surface a lot of *Echinocardium* sp. and *Spatangus purpureus* tests were observed. Adults of these species normally inhabit rough sands, shallowly hidden in the ground. It seems therefore that at the locality surveyed there is a community of rough sands under bottom currents (SGCF) (PÉRÈS & PICARD, 1964; STRENGER, 1970; PÉRÈS & GAMULIN-BRIDA, 1973; MASSÉ, 1994; BAKRAN-PETRICIOLI, 2011). It should be added that the fouling community settled on the metal construction of the wreck was similar to occurrence on numerous vessels sunken in the shallow coastal areas of the eastern Adriatic.



Fig. 2. Community of rough sand under bottom current next to the wreck of the torpedo boat S 57. Depth: 26-38 m (photo P. Budicin).



Fig. 3. *Plagiobrissus costai* (Gasco, 1867) test from Mljet Chanel. Left: dorsal (aboral) side. Right: ventral (oral) side (photo P. Budicin).

The morphology, size, location and number of primary tubercles of our test were applied by identification of the irregular urchin tests (KOEHLER, 1927; TORTONESE, 1965). Dr. Dušan Zavodnik confirmed the species identification. The voucher specimen is kept in a private collection.

RESULTS AND DISCUSSION

The dimensions of the collected test are: length 76 mm, width 64 mm, and height 38 mm (Fig. 3). Peripetal fasciole is slightly asymmetrical, 57 mm long. Anal fasciole is damaged. Large spine tubercles inside peripetal fasciole are 17 in the left side of the test, and 18 in the right side. The dried test colour is dirty white. It is rather frail, similar to lovenioid sea urchins. According to the outer morphology

of the test surface and in comparison with similar irregular sea urchins (KOEHLER, 1927; MORTENSEN, 1951; TORTONESE, 1965) this specimen has been identified as *Plagiobrissus (Rhabdobrissus) costae* (Gasco, 1876).

Plagiobrissus costai is a typical endobenthic irregular sea urchin (Echinodermata: Echinoidea: Clypeasteroidea: Brissidae). In general, adult irregulars inhabit coastal and offshore sandy and silty sediments, burrowing in the ground from a few to forty and more centimetres deep (TORTONESE, 1965; GARCIA RASO *et al.*, 1992; ZAVODNIK, 1992). Exact depth of the sediment layer suitable for adult individuals in most of the Adriatic Sea irregular echinoids is not known. It seems that Clypeasteroid behaviour habits are the main reason for the rather rare capture records of live specimens worldwide. On the other hand, tests lacking in spines and pedicellariae occasionally were collected by means of bottom trawls and grabs. At present by far the most efficient collection of echinoid tests visible on sediment surface is by autonomic (scuba) divers.

Endobenthic irregular echinoids (Clypeasteroidea) are well distributed in European seas (VASSEUR & CARLSEN, 1948; HANSSON, 2001). Until the present, the Adriatic Sea records of clypeasteroids consisted of total of 9 species pertaining to the families Fibulariidae (*Echinocyamus pusillus*), Spatangidae (*Spatangus purpureus*), Schizasteridae (*Schizaster canaliferus*), Loveniidae (*Echinocardium cordatum*, *E. fenauxi*, *E. mortenseni*), and Brissidae (*Brissopsis lyrifera*, *Brissopsis cf. atlantica mediterranea* Mortensen, 1913 and *Brissus unicolor*). Some species are well distributed elsewhere in the Mediterranean and Adriatic Sea, especially *Echinocyamus pusillus*, *Spatangus purpureus*, *Schizaster canaliferus*, and *Brissopsis lyrifera* (TORTONESE, 1935; 1965; ZAVODNIK, 1992; KAŠĆELAN *et al.*, 2009; DHORA, 2010; MATARRESE, 2010; BAKRAN-PETRICIOLI, 2011).

Now we can add *Plagiobrissus costai* to the Adriatic list of irregular echinoids. In the Mediterranean, outside the Adriatic Sea it was recorded in Tyrrhenian Sea of Capri Islands (*locus typicus* by GASCO (1876), and KOEHLER (1927) under the name *Metalia costae*; TORTONESE, 1965), at Taranto (Ionian Sea, by TORTONESE, 1961, 1977), in Haifa Bay (Levantine area, TORTONESE, 1957), at Ischia, Stromboli and Genoa in Italian coastal waters (TORTONESE, 1977; MATARRESE, 2010), and the Balearic Islands in the Western Mediterranean (KOEHLER, 1927; TORTONESE, 1965; FREDJ, 1974). Specimens of *Plagiobrissus* were collected on sandy bottom, somewhere within sea grass associations (PASTORINO & CANU, 1965), at 5-75 m depth (TORTONESE, 1977). It is the only species of this genus recorded in European seas (KOEHLER, 1927; HANSSON, 2001).

The specimen test we have studied apparently is rather fragile and its condition suggests that it was not exposed to fast bottom currents. The absence of fouling organisms settled on the test surface, like the bryozoan colonies and sedentary polychaetes on the shells of the big fan mussel *Pinna nobilis* (ZAVODNIK, 1963; LEGAC, 2012), on radioles of cidaroid echinoids (TORTONESE, 1965), and on tests of the irregular sea urchin *Spatangus purpureus* (ZAVODNIK & ŠIMUNOVIĆ, 1997) suggest that the exposure period of our *Plagiobrissus* test to a free water environment was not long.

The biology and test variations in some common irregular sea urchins, such as in *Echinocyamus pusillus*, *Spatangus purpureus*, some *Echinocardium* species, *Schizaster canaliferus*, and *Brissopsis lyrifera* are rather well known (BRATTSTRÖM,

1946; VASSEUR & CARLSEN, 1948; TORTONESE, 1965). On the other hand, in the rather rare *Plagiobrissus costai* reports, no information is available on its test and spine variability, the behaviour and population density, or on the ecological significance of this endobenthic species. Therefore, from the zoogeographical point of view an important question appeared: does this species belong to a steady Adriatic indigenous population, or is it perhaps a recent immigrant from other parts of the Mediterranean Sea?

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