

## First record of *Echinolittorina punctata* (Gmelin, 1791) (Gastropoda) in the Adriatic Sea

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*The presence of Echinolittorina punctata (Gmelin, 1791) in the Adriatic Sea has been confirmed for the first time. In total, six specimens of this species were found near the city of Split. This species is considered as a tropicalization indicator in the Mediterranean Sea. The status of this species in the Adriatic Sea should be evaluated through future research.*

**Key words:** *Echinolittorina punctata*, Littorinidae, first record, northward spreading, Adriatic Sea

### INTRODUCTION

The gastropod fauna of the eastern Adriatic Sea has been the subject of numerous studies, with scientific reports dating back to the early eighteenth century until the culmination of more elaborate investigations during the second part of the twentieth century (see ŠIMUNOVIĆ, 1995). However, in recent decades, research has shifted toward more applied studies research, while basic biodiversity investigations were predominantly driven by mere enthusiasm. Although changes in communities of economically important animal groups were investigated to a certain extent, particularly fish species (DULČIĆ & DRAGIČEVIĆ, 2011), groups of low commercial value are usually overlooked. However, the presence of some previously unknown soft-bodied gastropods, especially nudibranchs and other opisthobranchs, has been reported in the eastern

Adriatic during recent years (DESPALATOVIĆ *et al.*, 2002; TURK, 2005; MAVRIČ & LIPEJ, 2012).

*Echinolittorina punctata* (Gmelin, 1791) is a caenogastropod, which is indigenous to the Mediterranean Sea where it is mainly distributed along the southern and eastern coasts, but is also present in the eastern Atlantic on northwestern African shores (REID, 2011). REID (2011) has reviewed its taxonomy, geographical distribution and ecology. According to ALBANO *et al.* (2010), it seems that this species has extended its distribution toward the north, possibly as a consequence of climate change; therefore, it is of particular interest as a tropicalization indicator. Its current and historical distribution in the Mediterranean Sea has been reviewed by ALBANO (2015).

In this paper, we present the first record of this species in the Adriatic Sea.

## MATERIAL AND METHODS

Specimens of *E. punctata* were found in Kašjuni cove at the southern side of Marjan hill in the vicinity of city of Split (middle Adriatic, eastern coast) (Fig. 1). In total, six specimens were collected from the same area (43°30'28"N; 16°23'47"E): three specimens were collected on August 21, 2014; two specimens were collected on October 11, 2014; and one specimen was collected on April 16, 2015. A few specimens were photographed *in situ* and then collected afterwards (Fig. 2).

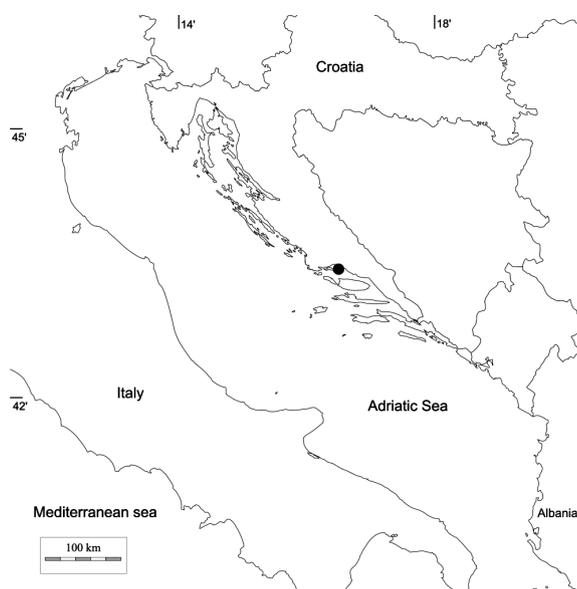


Fig. 1. Map showing the investigated area. The dot indicates the location of the Kašjuni cove where the specimens were collected

Upon collection, the specimens were determined following GIANUZZI-SAVELLI *et al.* (1996) and then the height and width of the specimens was measured with a digital caliper with an accuracy of 0.1 mm. Three specimens were stored dry, while the other three were deposited in 70% ethanol. Latter specimens were deposited in the Museum of Natural History in Split under inventory number 1730.

## RESULTS AND DISCUSSION

The heights of the specimens collected in August 2014 and October 2014 ranged from 6.0 to 10.7 mm (mean 7.86; stdev  $\pm$  1.73 mm) and their widths ranged from 4 to 7.6 mm (mean



Fig. 2. Photograph of *E. punctata* specimen taken *in situ* together with cluster of five specimens of *Melarhaphé neritoides*

5.34; stdev  $\pm$  1.37 mm). Fig. 2 shows one of the specimens prior to collection. Furthermore, the specimen collected in April 2015 measured 5.9 mm in height and 4 mm in width.

One of the authors (T.M.) found the specimens during a brief visual inspection of the supralittoral communities at the local beach. They were found on three occasions on large stones protruding from the water where they were settled on the parts of the stones that were sheltered from the waves, in narrow crevices. The first batch of specimens was found on a large rock at a position of approximately 30 cm above the surface of the sea during low tide. The second batch was found two months later on a similar rock 5 m away from the first one. The last specimen was found in the same area during April of 2015. However, during this last inspection, a 100 m transect of the rocky shore was thoroughly investigated, but only one specimen was found, which indicates a sparse population. The same habitat was occupied by other species: *Patella* sp., *Chthalamus* sp., *Pachygrapsus marmoratus* and *Melarhaphé neritoides*. The latter species was numerous at the location while specimens of *E. punctata* were scattered among the small groups of this species. However, unlike *M. neritoides*, the specimens of *E. punctata* were not grouped in clumps.

ALBANO *et al.* (2010) first reported the northward expansion of *E. punctata* in Italian waters and suggested that this phenomenon is unreported from other Mediterranean countries probably due to the lack of monitoring. Additionally, the same author recently reported new occurrences of this species in Greece, France and Italy that corroborates the theory of the northward

spreading of this species (ALBANO, 2015). The occurrences presented in this paper can also be attributed to northward spreading; however, due to the lack of monitoring of supralittoral communities, it is hard to establish the chronology or intensity of the spreading. Furthermore, the area where the specimens were found is situated in the middle of the eastern Adriatic coast, so it is quite possible that more colonies of this species exist further south in the warmer areas of the Adriatic; this should be examined with future research.

Our findings indicate not only the existence of a population of *E. punctata* in the investigated area, but also the possibility that the population is able to survive the cold season, which is indicated by the discovery of one live adult specimen in April, which likely settled during the

preceding summer reproductive season (review by REID, 2011). Further research is needed to evaluate the status of this species in the eastern Adriatic Sea.

Adriatic Sea is undergoing significant changes in distribution of native and non-native biota and causes for this can be attributed to a range of factors with anthropogenic activity and climate change topping the list (see DESPALATOVIĆ *et al.*, 2008; DULČIĆ & DRAGIČEVIĆ, 2011).

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## Prvi nalaz vrste *Echinolittorina punctata* (Gmelin, 1791) (Gastropoda) u Jadranskom moru

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### SAŽETAK

Prisustvo vrste *Echinolittorina punctata* (Gmelin, 1791) po prvi puta je potvrđeno u Jadranskom moru. Ukupno 6 primjeraka ove vrste pronađeno je na lokaciji u blizini Splita. Pronađena vrsta smatra se indikatorom tropikalizacije u Sredozemnom moru. Stanje populacije ove vrste u Jadranu trebalo bi utvrditi budućim istraživanjima.

**Ključne riječi:** *Echinolittorina punctata*, Littorinidae, prvi nalaz, širenje prema sjeveru, Jadransko more