



ORIGINAL RESEARCH PAPER

## OCCURRENCE OF ENDEMIC ECHINODERMS IN THE BENTHIC COMMUNITIES ON SHELF OF THE MONTENEGRIN COAST

Slavica PETOVIĆ and Dragana DRAKULOVIĆ

Institute of Marine Biology, Dobrota bb, Kotor, Montenegro.  
E-mail: kascelanslavica@gmail.com; ddrakulovic@ibmk.org

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**Ključne riječi:**  
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jugo-istočni Jadran.

### SYNOPSIS

Paper presents results of research of echinoderms in the coastal waters of the Montenegrin coast. Collecting material was done by SCUBA diving and by trawl in the period 2006-2010. The results show that total number of echinoderm species recorded in benthic communities on continental shelf of the Montenegro coast was fifty and eleven species are Mediterranean endemics and two species are Mediterranean sub endemics.

### SINOPSIS

#### ZASTUPLJENOST ENDEMIČNIH BODLJOKOŽACA U BENTOSNIM ZAJEDNICAMA NA KONTINENTALNOJ RAVNI CRNOGORSKOG PRIMORJA

U radu su prikazani rezultati istraživanja bodljokožaca u priobalnim vodama crnogorskog primorja. Istraživanja su rađena putem autonomnog ronjenja i pomoću povlačnih mreža-koča u periodu od 2006-2010. Na osnovu obrađenog materijala dobijeni rezultati pokazuju da ukupno 50 vrsta bodljokožaca naseljava pridnene zajednice na kontinentalnoj ravni crnogorskog primorja, od kojih je jedanaet Mediteranskih endema i dva mediteranska podendema.

### INTRODUCTION

Research of echinoderms in the benthic biocoenosis of the Adriatic Sea began in the eighteenth century (Olivi, 1792). After him for research purposes numerous expeditions were done that resulted in the new knowledge about species, their distribution and quantities (Marenzeller, 1895; Kolosváry, 1936/37; Zavodnik, 1972; Riedl, 1963). More detailed studies on echinoderms from continental shelf area of the Montenegrin coast have been made in the last fifty years (Milojević, 1979; Kaščelan et al., 2009; Petović, 2011).

During the research, special attention is given to the presence of endemic species of echinoderms fauna in order to analyze the influence of Mediterranean water in the investigated area.

### MATERIAL AND METHODS

Material was collected by SCUBA diving from 12 transects and 16 randomly chosen locations on the south Adriatic continental shelf, inside the Bay of Kotor and in the open sea, while additional 7 sites were sampled by trawling (Fig. 1). Maximal depth reached by SCUBA diving was about 40 m while trawl sampled deeper, up to 120 m in depth. Sampling was done in the period 2006-2010. Collected material was immediately anesthetized with the saturated solution of menthol in sea water and later preserved in 70% alcohol. The identification was done according to Tortonese (1965) and corrected by Hansson (2001). The general distribution of each species is specified according to Zavodnik (2003), Tanti & Schembri (2006) and Koukouras et al. (2007).

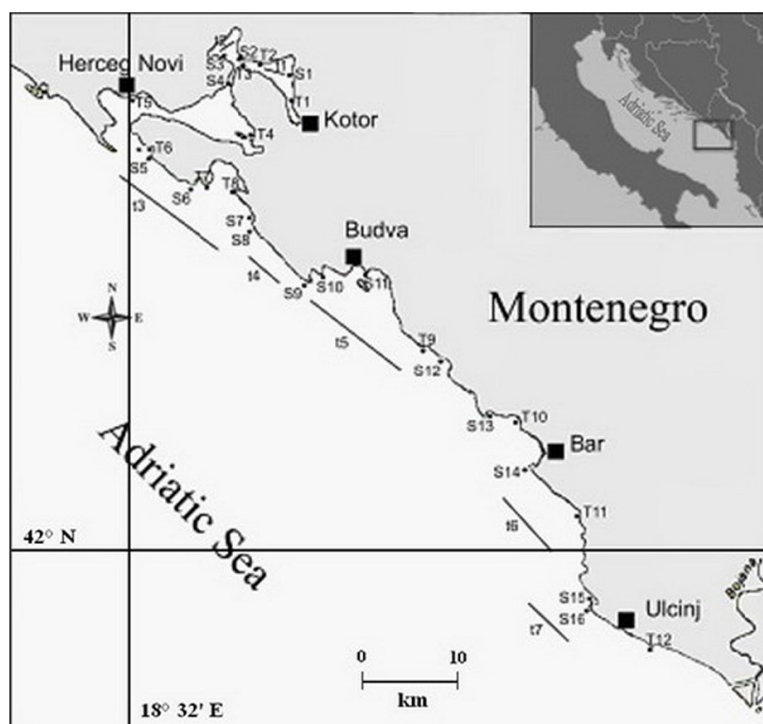


Figure 1:  
Investigated area  
(T-transects,  
S- randomly chosen  
locations,  
t-trawl).

## RESULTS AND DISCUSSION

Analysis of the collected material shows that explored area is inhabited by fifty species of echinoderms, which are grouped into five classes (Kaščelan et al., 2009). Of the total number of recorded species eleven are Mediterranean endemics and two are Mediterranean sub endemics (Tab. 1).

**Table 1: List of endemic echinoderm species with emphasis to localities, depth range (m), number of specimens and zoogeographical characterization (ME-Mediterranean endemics, MSE-Mediterranean subendemics).**

Taxa	Locality	Depth range (m)	No of specimens	ZC
<i>Antedon mediterranea</i> (Lamarck, 1816)	T5,S5,S8,S14, t3,t5,t6,t7	3-120	220	ME
<i>Astropecten bispinosus</i> (Otto, 1823)	S8,t6	25-53	12	ME
<i>Astropecten irregularis pentacanthus</i> (Delle Chiaje, 1827)	S1,t1,t2,t3, t4,t5,t6,t7	10-120	204	ME
<i>Astropecten jonstoni</i> (Delle Chiaje, 1827)	T12,S15	8-11	10	ME
<i>Astropecten platyacanthus</i> (Philippi, 1837)	T5,T11,S9	15-25	8	ME
<i>Astropecten spinulosus</i> (Philippi, 1837)	S11	10-13	2	ME
<i>Schizaster canaliferus</i> (Lamarck, 1816)	T6	5-35	12	MSE
<i>Psammechinus microtuberculatus</i> (Blainville, 1825)	T6	80-120	3	ME
<i>Echinocardium fenauxi</i> Péquignat, 1963	T6	15-20	5	MSE
<i>Leptopentacta tergestina</i> (M. Sars, 1857)	t1	27-37	15	ME
<i>Ocnus syracusanus</i> (Grube, 1840)	T4,S14,t2,t6	5-50	11	ME
<i>Holothuria (Holothuria) mammata</i> Grube, 1840	T2,T3,T4,T5,T6,T7,T9, T10,S11,S15	5-30	80	ME
<i>Holothuria (Thymiosycia) impatiens</i> (Forskål, 1775)	T6,T8	5-25	9	ME

Mediterranean endemics echinoderms species that appear on southeast Adriatic's continental shelf are presented by one crinoid (Crinoidea): *A. mediterranea*; five asteroides (Asteroidea): *A. bispinosus*, *A. irregularis penthaca-*

*nthus*, *A. jonstoni*, *A. platyacanthus*, *A. spinulosus*; tree echinoids (Echinoidea): *S. canaliferus*, *P. microtuberculatus*, *E. fenauxi* and four holothurians (Holothuroidea): *L. tergestina*, *O. syracusanus*, *H. mammata*, *H. impatiens*.

During investigation *A. mediterranea* is collected from depth range 3-120 m. In shallow water (0-40m) was rare and we collected a few specimens by scuba diving, only. But some hundred of specimens were collected by trawling from depth up to 120m.

Among the star fish group, family Astropectinidae is characterized by large number of endemic species. There is doubt between authors about distribution of some species. So Tanti and Schembri (2006) cited *A. bispinosus* and *A. irregularis penthacanthus* as Mediterranean endemics while Koukouras et al. (2007) describe as species with Atlanto-Mediterranean distribution. Conducted study shows that *A. irregularis penthacanthus* was mostly present in deep water where dozens of specimens were collected from depth up to 120 m while from shallow water is registered on one site (S1), only. Other endemics species of sea star are collected as single specimens from depth range 0-40 m.

From class Echinoidea two species (*S. canaliferus* and *E. fenauxi*) are new for the fauna of Montenegro. Both species are Mediterranean sub endemics (Kaščelan et al., 2009). Zavodnik (2003) and Koukouras et al. (2007) cited them as Mediterranean endemics while Tanti and Schembri (2006) doesn't give their distribution. During our study species are registered on one sampling site (T6) in outer part of Boka Kotorska Bay where impact of open sea is strong.

Four endemics holothurians are collected during our research. One of them (*H. mammata*) is new record for the fauna of Montenegro. Species is common and numerous on almost all explored positions. Other holothurians (*L. tergestina*, *O. syracusanus*, *H. impatiens*) are registered as single specimens, only. Regarding to Tanti and Schembri (2006) *H. mammata* and *H. impatiens* has Mediterranean distribution while Koukouras et al. (2007) cited *H. mammata* as Atlanto-Mediterranean species and *H. impatiens* as cosmopolitan species.

## CONCLUSION

First extensive investigation of echinoderms fauna of Montenegrin coast was conducted in period 2006-2010. Total number of 35 stations was explored by SCUBA diving up to 40 m and by trawling up to 120 m in depth.

Obtained results show presence of 50 species of echinoderms on the Montenegrin continental shelf. Of the total number of recorded species eleven are Mediterranean endemics and two species are Mediterranean subendemics.

Presence of a significant number of endemic Mediterranean species of echinoderms in the relatively small field confirms the great influence of Mediterranean water (Zavodnik, 1972; Tortonese, 1965).

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