

# ZOOPLANKTON STUDIES IN THE BOKA KOTORSKA BAY DURING 2002 - CHAETOGNATHA

Vera Vukanić \*and Dušan Vukanić

Institute of marine biology, Laboratory of Zooplankton Ecology, Kotor, Serbia and Monenegro

\* vukanic@cg.yu, v\_vukanic@yahoo.com

## Abstract

During 2002 a systematical ecological research of zooplankton was carried out in Boka Kotorska Bay in monthly intervals, including measurements of basic parameters (T°C, Sal‰, pH, O<sub>2</sub>, transparency by Secchi plate, color of the sea with Forel scale I-XXI). Special attention was paid to biodiversity, dynamic, abundance and distribution of the zooplankton. In this paper we present the hydrographic data of Boka Kotorska Bay, together with data on the presence, abundance and distribution of the eight species of the chaetognatha genus *Sagitta* found there: *S. minima*, *S. enflata*, *S. setoza*, *S. friderici*, *S. lyra*, *S. serratodentata*, *S. hexaptera* and *S. bipunctata*.

**Key words:** Boka Kotorska, hydrography, abundance, Chaetognatha

## Introduction

The Boka Kotorska Bay is under a strong influence of freshwater influx, as well as pronounced oscillations of hydrographic factors. The chaetognatha of Boka Kotorska Bay are barely known, based on a short-duration study (January to May) in the inner part of the Bay of Kotor [1]. Four species of the genus *Sagitta* were found: *S. enflata*, *S. setoza*, *S. serratodentata*, *S. minima*, and numerous juvenile stages in March. During 2002, monthly measurements of hydrographic parameters were conducted, and zooplankton samples collected. This paper deals with the data concerning the presence and distribution of the chaetognatha genus *Sagitta*.

## Material and methods

Our observations were based on the analysis of zooplankton samples collected monthly during 2002, in three shallow stations near the sea farming areas (P-M, P-O and P-IBM), and 4 stations in the middle of each small bay within Boka Kotorska (P-1, P-2, P-3, P-4 or Kotor, Risan, Tivat and Hercegovi bays, respectively) (Fig. 1). Zooplankton was collected with Nansen net (100 and 150 microns). Contemporaneously we measured T°C, Sal‰, pH, O<sub>2</sub>, transparency by Secchi plate, color of the sea with Forel scale I-XXI. The presence and abundance of Chaetognatha was analyzed in all samples.



Fig 1. Research plan of stations in Boka Kotorska Bay.

## Results and discussion

**Temperature** - Maximum temperature on the surface of the seawater was 27.7% in July, minimum 8.2% in February.

**Salinity** - The salinity in the shallow sea near the Institute (P-IBM) in September amounted to 2,30‰, the lowest value ever recorded in the Bay. At that time the sea was at Forel VI, and the whole Gulf was of light yellow-green color. Due to abundant rains throughout 2002, intensive inflow of fresh waters was recorded. Maximum salinity in July was (P<sub>1</sub>-K) 37.90‰ and 38.11‰ (P<sub>4</sub>-HN). Oxygen saturation was from 80% to 141%, Ph from 7.94 to 8.4, and transparency from 6 to 10m according to Secchi.

Boka Kotorska Bay has all characteristics of closed coastal waters of the East Adriatic. Zooplankton is mainly characterized by euritherm and eurihaline species, as well as open-sea species that enter into the Bay from the deep waters of the southern Adriatic and soon die.

In the course of the analyses of the representative samples and examination of complete samples, we identified eight species:

*S. minima*, *S. enflata*, *S. setoza*, *S. friderici*, *S. lyra*, *S. serratodentata*, *S. hexaptera*, *S. bipunctata*, and many juvenile forms whose number increased from the inner waters of the Boka Kotorska Bay towards the open sea. At the Station P<sub>4</sub>-HN in the total population Chaetognatha reached 96,6%.

*S. friderici*, *S. lyra*, *S. hexaptera* and *S. bipunctata* are recorded in the Boka Kotorska Bay for the first time. They were found in a small number by the end of the summer, and again in the autumn. We found a great number of *S. friderici* at P<sub>1</sub>-K in August (4300 No.-ind/m<sup>2</sup>), and a smaller number in September, but none in other months.

Table 1. Average value of abundance of *Chaetognatha* in the stations in the Boka Kotorska Bay during 2002.

STAT.	P <sub>1</sub> -K		P <sub>2</sub> -R		P <sub>3</sub> -T		P <sub>4</sub> -HN	
	PROF.		PROF.		PROF.		PROF.	
SPECIES	No.ind/m <sup>2</sup>	%	No.ind/m <sup>2</sup>	%	No.ind/m <sup>2</sup>	%	No.ind/m <sup>2</sup>	%
	<i>Sagitta minima</i>	58	4,3	75	8,7	25	2,2	25
<i>Sagitta enflata</i>	8	0,6	17	2	r		r	
<i>Sagitta setoza</i>	183	13,7	100	11,6	100	8,6	33	1,7
<i>Sagitta friderici</i>	375	28	-		8	0,7	r	
<i>Sagitta lyra</i>	50	37,3	r		41	3,5	8	0,4
<i>Sagitta serratodentata</i>	r		-		r		-	
<i>Sagitta hexaptera</i>	33	2,5	r		8	0,7	-	
<i>Sagitta bipunctata</i>	r		r		-		-	
<i>Chaetogn. juv.sp.</i>	633	47,2	667	77,7	975	84,2	1867	96,6
TOTAL	1340		859		1157		1933	

## References

- 1 - Benović, A. and V. Onofri, 1983. Contribution to the knowledge of net-zooplankton of the Bay of Kotor. *Studia Marina*, 13-14: 119-125.
- 2 - Furnestin, M.L., 1957. Chaetognathes et Zooplancton du secuteur Atlantique Marocain. *Rev. Trav. Inst. Pêche marit. Paris*, 21, 1 et 2, 366 p.
- 3 - Gamulin, T. et E. Ghirardelli, 1983. Les Chaetognathes de la mer Adriatique. *Rapp. Comm. int. Mer Médit.*, 28 : 9.