

MORPHOMETRIC VARIABILITY BETWEEN NORTH AND SOUTH ADRIATIC POPULATIONS OF SAGITTA ENFLATA

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Abstract

Results of a biometric study of *Sagitta enflata* from two different ecological areas— one in the North and the other in the South Adriatic – demonstrate differences in body dimensions. This may represent adaptations to different environmental variables experienced by the two populations, especially as regards seasonal changes in water temperature and food availability.

Keywords: *Chaetognatha*, *Sagitta enflata*, morphometric variability, Adriatic Sea

Introduction

Sagitta enflata is an oceanic or semi-neritic chaetognath typical of surface waters and especially abundant over continental shelves. It is eurythermic and euryhaline, but it prefers temperature ranges between 18 and 21 °C and salinity above 35 ppt (1).

This study investigated morphological differences in populations of *Sagitta enflata* in two different ecological areas. The North Adriatic is shallow (average depth ~ 50 m) and influenced by river discharge, especially that of the Po. The South Adriatic, on the other hand, is the deepest (max. 1242 m) and most oligotrophic part of the Adriatic (2). It is influenced mainly by warm Mediterranean waters in the central and eastern parts of its basin (3).

Material and methods

Plankton was collected on four cruises of R/V *Andrija Mohorovicic* from 1974 to 1976 (Table 1). Morphometric measurements were made on adult specimens isolated from five stations in the North Adriatic (above the Ancona -Lošinj transect), and three stations in the eastern South Adriatic (Dubrovnik - Bari transect).

Table 1. Temperature and salinity ranges in the North (from surface to bottom) and South Adriatic (0-50 m).

	North Adriatic		South Adriatic	
	T (°C)	Salinity	T (°C)	Salinity
Sep.-Oct. 1974	15.5-22.2	36.3-38.0	14.0-21.5	38.3-38.6
February 1976	8.9-10.0	37.7-38.3	13.6-14.2	38.6-38.7
Apr.-May 1975	10.0-17.2	37.6-38.4	13.7-16.2	38.5-38.7
July 1976	10.5-24.8	36.8-38.4	14.8-25.8	38.1-38.8

Body length (L)– the top of the head to the tip of the tail fin– was measured with a stereomicroscope at 25x. Maximum width (W), length of head (Lh), width of head (Wh), length of ovaries (Lov), tail length (Lt), and tail width (Wt) were measured with a Wild microscope at 100x.

Student's t-test was used to test differences between populations.

Temperature and salinity data may be found in "Reports and Results of Oceanographic Research in the Adriatic Sea (1974 - 1976)", published by the Hydrographic Institute, Split (Croatia).

Results and discussion

Morphometric characteristics of *Sagitta enflata* are presented in Table 2.

In both the North and South Adriatic in February and April-May, periods in which temperature was low (Table 2), individuals were longer than in July and September-October. This agrees with findings for other chaetognaths (c.f 4). Further, the longest individuals were found when copepod– the main food of chaetognaths– was greatest (5). Rao and Kelly (6) found a similar situation for *S. enflata* in the Indian Ocean.

Regardless of the temperature and food conditions, there was a significant difference ($p < 0.05$) in body dimensions between individuals from the North and South Adriatic for all cruises: Chaetognaths from the south were always larger in all body dimensions than those from the north.

These morphological differences between North and South Adriatic populations may reflect an adaptation to the significantly different

environmental conditions to which each of these populations is exposed.

Table 2. Morphometric characteristics of *Sagitta enflata* in the North and South Adriatic.

	North Adriatic		South Adriatic		
	min-max	avg±std	min-max	avg±std	
Septem.-Octob. 1974, n=50	L	9.0-13.0	11.7±1.2	12.0-16.5	14.5±1.3
	W	0.87-1.35	1.11±0.12	1.06-1.82	1.40±0.17
	Lh	0.16-0.86	0.63±0.08	0.73-0.96	0.82±0.05
	Wh	0.43-0.89	0.66±0.10	0.73-1.22	0.94±0.10
	Lov	0.20-0.89	0.46±0.19	0.33-1.72	0.99±0.39
	Lt	1.45-1.98	1.77±0.14	1.72-2.48	2.13±0.20
Wt	0.36-0.56	0.46±0.05	0.46-0.63	0.55±0.05	
February, 1976 n=44	L	8.5-16.0	12.6±2.1	13.0-19.0	15.9±1.7
	W	0.67-1.33	0.96±0.20	1.00-1.82	1.51±0.20
	Lh	0.40-0.90	0.61±0.14	0.53-0.93	0.78±0.08
	Wh	0.47-0.90	0.69±0.12	0.73-1.13	0.93±0.12
	Lov	0.17-1.10	0.51±0.27	0.13-1.33	0.85±0.28
	Lt	1.40-2.46	1.92±0.29	2.00-2.90	2.50±0.22
Wt	0.30-0.53	0.41±0.08	0.37-0.73	0.60±0.08	
April-May, 1975 n=45	L	11.0-15.0	12.4±1.3	12.0-19.0	15.7±1.5
	W	0.82-1.85	1.05±0.26	0.93-2.00	1.51±0.28
	Lh	0.49-0.91	0.66±0.11	0.53-1.00	0.78±0.12
	Wh	0.53-1.33	0.68±0.26	0.60-1.76	0.97±0.28
	Lov	0.23-0.67	0.40±0.13	0.27-2.06	0.96±0.42
	Lt	1.73-2.30	1.99±0.12	1.15-3.33	2.47±0.42
Wt	0.34-0.63	0.48±0.11	0.40-0.80	0.60±0.10	
July 1976 n=43	L	8.5-12.5	10.0±1.1	10.0-14.0	11.8±1.2
	W	0.67-1.13	0.90±0.12	0.90-1.60	1.18±0.15
	Lh	0.50-0.67	0.56±0.05	0.53-0.77	0.67±0.06
	Wh	0.53-0.83	0.66±0.07	0.63-1.03	0.82±0.09
	Lov	0.23-0.67	0.37±0.13	0.23-0.87	0.44±0.14
	Lt	1.20-2.00	1.55±0.22	1.43-2.20	1.87±0.18
Wt	0.33-0.50	0.39±0.05	0.23-0.57	0.47±0.07	

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