

# ON THE OCCURRENCE OF AMPHIOXUS (*BRANCHIOSTOMA LANCEOLATUM*, PALLAS, 1744) IN THERMAIKOS GULF (GREECE)

Chintiroglou C. \*, Kousteni V. and Antoniadou C.

Aristotle University, School of Biology, Department of Zoology, Thessaloniki, Greece - \* chintigl@bio.auth.gr

## Abstract

This study deals with the "Amphioxus sand" community in Thermaikos Gulf. 4767 individuals, classified at 75 species, were collected with quantitative sampling over a 2-year period. Gastropoda and Polychaeta were the dominant taxa, both in terms of species richness and numerical abundance. The degradation of this community was evident in its structure and related to the increasing organic pollution in the broader study area.

## Introduction

Besides the intense quantitative research on soft substrate communities, little is known about the *Branchiostoma lanceolatum* facies, often called as "Amphioxus sand" (1). Most of the relevant information derives from studies in the Western Mediterranean and the Adriatic (1,2,3), as there is only one reference from the Eastern basin (4) and the Black Sea (5). Recently, the "Amphioxus sand" community have been detected in Thermaikos gulf, offering an opportunity to study its structure under conditions of organic pollution.

## Materials and Methods

### Data Collection - Analysis

After preliminary sampling at the NE side of Thermaikos Gulf the "Amphioxus sand" community was found at 2 sites at a depth ranging from 3 to 10 m. Sampling was carried out twice each year (August and January) from summer 2001 to winter 2003. 3 to 5 replicates were collected by SCUBA diving with a corer sampler (3180 cm<sup>3</sup>) at each period (6).

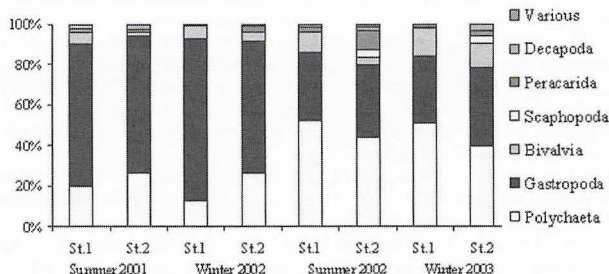
Common biocoenotic methods were employed to analyze the data, e.g. population density, mean dominance, frequency, Margalef's richness, Shannon-Wiener and Pielou's evenness (1,4).

Numerical abundance data were analyzed by ANOVA, in order to examine the effect of three different factors: a) site, b) season and c) year of sampling.

## Results and Discussion

Overall 4767 individuals were counted, belonging to 75 species. From these species 55 were "common" (15 Polychaeta, 36 Mollusca, 4 Crustacea), according to population density values and their frequency, exceeding 60% (Table 1). Gastropods dominate in the first year and polychaetes in the second. The dispersion of Gastropoda and Bivalvia was unequal in time for the first group, and in both time and space for the second. All diversity indices showed high values (Table 1).

Comparing our results with relevant descriptions we can note the diversified composition of the "Amphioxus sand" (Table 1). This community normally extends on gravel and coarse sand with shell fragments, often containing big populations of venerid bivalves. However, muddy areas have expanded during the last decade as a result of increasing eutrophication and organic pollution, causing a considerable decrease in *B. lanceolatum*'s population density and also a change on its community structure. In the 1970, the "Amphioxus sand" community was common in Thermaikos Gulf, but today its presence is limited. *B. lanceolatum* is still traced, but its community structure is altered, since most of the species are related to organic pollution.



## References

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**Table 1. Mean abundance (A/m<sup>3</sup>) of the common species, total number of individuals (N), species richness (S), Margalef's index (d), Shannon-Wiener (H) and Pielou's Evenness (J).**

Taxa	Summer 2001		Winter 2002		Summer 2002		Winter 2002	
	St.1	St.2	St.1	St.2	St.1	St.2	St.1	St.2
Polychaeta								
<i>Aonides oxycephala</i>				628.9		277	465	101
<i>Aricidea fragilis</i>	20.96	104.8			69.2	12.6	12.6	
<i>Caulerella biculata</i>								62.9
<i>Capitella capitata</i>	1090	2201	388	870	277	723	616	327
<i>Chone filicaudata</i>								101
<i>Eunice vittata</i>	41.93		21	62.89	12.6	37.7	44	18.9
<i>Glycera tridactyla</i>	41.93	524.1	31.4	115.3	75.5	25.2	37.7	94.3
<i>Lumbrineris gracilis</i>	157.2	209.6	31.4	62.89	44	88.1	56.6	25.2
<i>Maldane glebifex</i>					25.2	62.9		18.9
<i>Mellina palmata</i>							88.1	12.6
<i>Notomastus latericeus</i>	73.38	1468		10.48	6.29	69.2		25.2
<i>Pista cristata</i>					75.5			6.29
<i>Piromis eruca</i>				199	52.41			
<i>Protodorrillea kefersteini</i>	10.48	1468		566	272.5		6.29	18.9
<i>Syllis prolifera</i>	83.86	104.8	105	62.89				
Mollusca								
<i>Alvania cimex</i>	115.3	209.6	62.9	20.96	37.7	6.29	69.2	12.6
<i>Alvania montagui</i>	41.93	524.1			12.6			
<i>Britium reticulatum</i>	2987	20650		482.2	1352	1918	478	415
<i>Caecum trachea</i>				62.9			37.7	88.1
<i>Cerithium vulgatum</i>	10.48	209.6			6.29	6.29		
<i>Chrysalidia doctolium</i>	31.45	419.3			18.9	11.3		6.29
<i>Cythereella coarctata</i>	125.8	733.8			151	239		
<i>Gibbula adansoni</i>	503.1	5660		146.8	6.29	12.6		
<i>Hadrina oretea</i>	115.3	419.3			6.29	31.4		
<i>Lunatia catena</i>		314.5			12.6	81.8		
<i>Manronia crassa</i>	10.48	209.6			37.7			
<i>Nassarius incrassata</i>	62.89	209.6	21	10.48	18.9	119	151	50.3
<i>Nassarius limata</i>	52.41				50.3	145		
<i>Nassarius ret. mamillata</i>		209.6		10.48	6.29	18.9	18.9	18.9
<i>Neverita josephinae</i>				73.4	6.29		44	12.6
<i>Pusiniella radiata</i>	1247	9644	126	136.3	428	874	220	151
<i>Smaragdia viridis</i>	31.45	314.5	105	73.38		12.6		
<i>Tricolia pullus pullus</i>	209.6	3459	220	62.89	6.29	6.29	12.6	
<i>Turbonilla lactea</i>		314.5		10.48	12.6	81.8	31.4	12.6
<i>Dentalium dentale</i>							119	81.8
<i>Ara alba</i>	10.48		10.5	52.41			37.7	75.5
<i>Corbula gibba</i>					21		12.6	25.2
<i>Donax variegatus</i>		104.8		21			6.29	
<i>Dosinia lupinus</i>		628.9				6.29		6.29
<i>Gastrana fragilis</i>					262.1			
<i>Lucinella divaricata</i>	52.41		31.4	188.7	6.29	50.3		18.9
<i>Macoma cumana</i>	31.45				6.29	25.2		
<i>Modiolus barbatus</i>	104.8	838.6	62.9	10.48		31.4		
<i>Mysia undata</i>				73.4			12.6	31.4
<i>Nucula nitida</i>				41.93	12.6			18.9
<i>Nucula sulcata</i>				10.5	12.6	69.2	18.9	25.2
<i>Parvicardium exiguum</i>		209.6						
<i>Psammobia depressa</i>		524.1	10.5		12.6			
<i>Tellina planata</i>	220.1	419.3		10.48		44	6.29	44
<i>Venerupis aurea aurea</i>	10.48	419.3						
<i>Venus verrucosa</i>	20.96	104.8	10.5	20.96				
Crustacea								
<i>Ampelisca diadema</i>				10.48	25.2	138	50.3	12.6
<i>Eiasmopus rapax</i>	41.93	104.8			6.29	182	12.6	
<i>Cestopagurus timidus</i>	52.41	104.8		52.41	56.6	18.9	18.9	6.29
<i>Pisidia longimana</i>	104.8		21		18.9	6.29	25.2	62.9
N	764	527	1002	945	762	506	409	338
S	51	56	48	68	39	54	41	47
d	7.53	8.77		9.78	6.76	8.51	6.65	7.9
H	3.42	3.54	353	3.89	4.2	4.19	4.07	4.44
J	0.60	0.60	0.62	0.64	0.79	0.73	0.76	0.79

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