UDC 57

MACROZOOBENTHOS COMMUNITIES OF LITTORAL PART OF AZOV SEA TAMAN BAY

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Monitoring providing and detailed study of macrozoobenthos in Taman bay littoral zone is connected not only with constant changes inside the benthic communities in the region, where ecological minimum are combined for Azov sea and Black sea eurybionts, but also with a person massive activity, in the result of which alteration of bottom silt types takes place in the researched side of Azov sea. The aim of the given work is the irreversible alterations research in the benthic communities of Taman bay littoral zone under the influence of antropogenic factors.

Probes, selected in Taman bay in the course of coast expedition in July 2013 served as the material. Total amount of probes comprised 54 quantitative probes of macrozoobenthos by Petersen bottom-grab with a gripping area of 0,034 m^2 in 3-rd replications at 18 stations at the depth to 1,5m. Gathering and processing of probes was conducted according to standard hydrobiological methods. Macrozoobenthos types were identified with the help of popular determinants. Medium values of numerical strength and biomass at the station are given in the work. Communities are separated according to biomass.

The medium values of numerical strength and biomass of macrozoobenthos in the littoral part of Taman bay comprised 7237 exem/m^2 and 86 g/m^2 accordingly. Total numerical strength and biomass altered from 160 exem/m^2 to 23670 exem/m^2 and from 0,4g/m^2 to 402 g/m^2 accordingly. Minimum biomass values are marked at the solid sandy ground and shelly material (Taman bay open part) and marshy sludgy bottom (salt lagoon at the spit Tuzla). High biomasses were connected with wide development of big mussels of *Cerastoderma glaucum* (Poiret, 1789), *Anadara kagoshimensis* (Tokunaga, 1906) and *Abra segmenta* (Récluz, 1843).

Seven biocenosis are separated in the littoral part of Taman bay, the most part of which is taken by two (at slimy grounds) communities with dominance of *C. glaucum* and *A. segmenta*.

Community of Cerastoderma glaucum was met at the sludgy and also sandy grounds with dominant biomass from 32 to 113 g/m^2 and from 1 to 34 g/m^2 accordingly.

Community of Abra segmenta was widespread in salt lagoons at Tuzla and Rubanov spits , and in the apex part of Dinskoy Bay with dominant biomass from 3 to 126 g/m^2.

Community of Mytilus galloprovincialis (Lamarck, 1819) is marked at the sandy ground with presence of shelly material (1 g/m^2) and at the solid clay with shelly material (138 g/m^2).

Community of Anadara kagoshimensis was met at the one station (at the sandy ground without plant formation) with numerical strength and dominant biomass of 10 exem/m^2 and 122 g/m^2 accordingly.

Community of Hydrobia acuta A.Costa, 1853 was marked at the slightly silty sandy ground with numerical strength and dominant biomass of 1333 exem/m^2 and 1,5 g/m^2 accordingly.

Community of Ampelisca diadema A.Costa, 1853 was met at the solid sandy ground, covered with thickets *Zostera noltii* Hornem with numerical strength and biomass of 11220 exem/m^2 and 11 g/m^2 accordingly.

Community of Idothea baltica basteri Audoin, 1827 was met at the slimy ground with water plants and dirty sand with shell material without vegetation with numerical strength and dominant biomass from 660 to 1059 exem/m^2 and 14 g/m^2 accordingly.

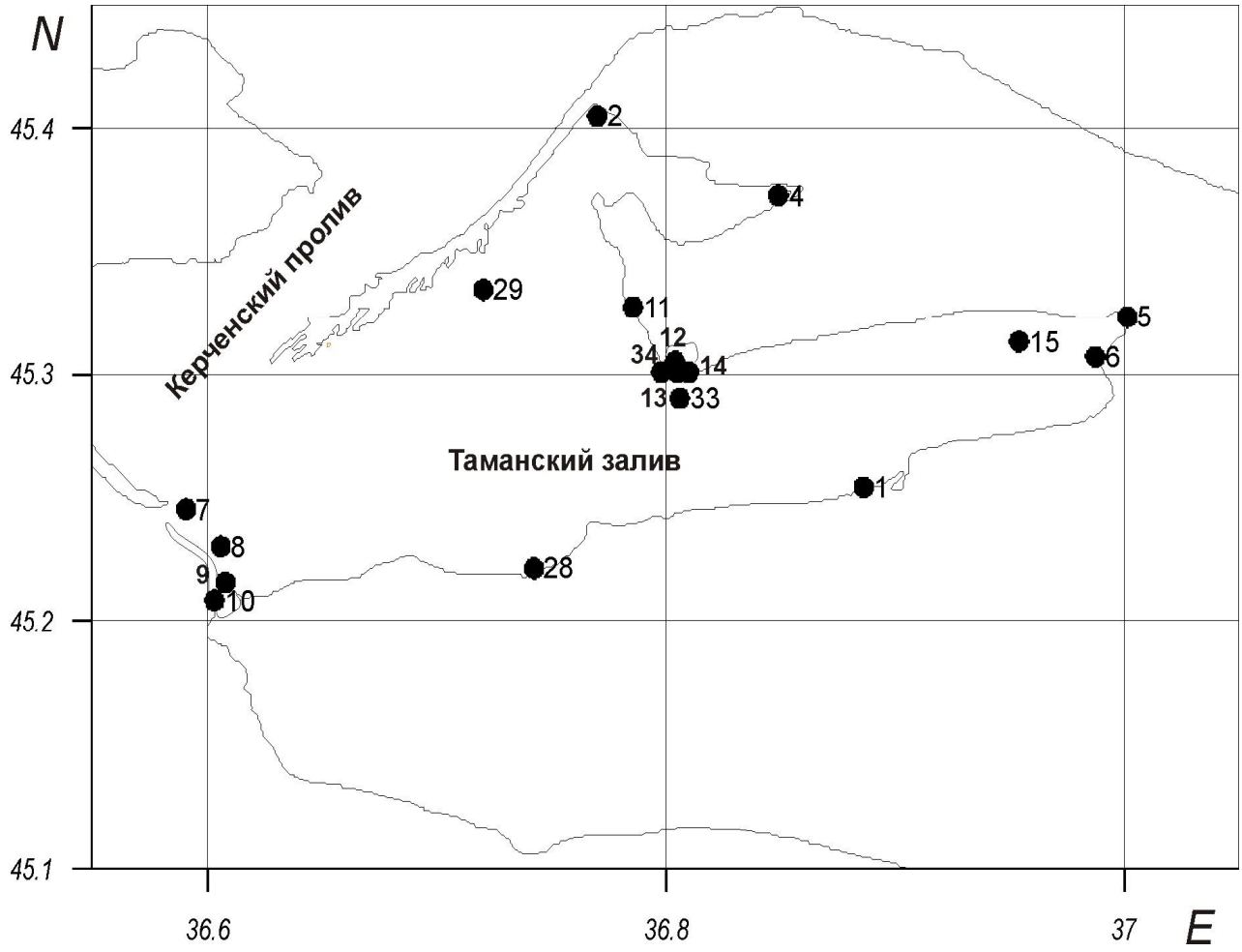
In 2013 one marked 90 macrozoobenthos taxons related to 10 types. The most mass groups: Mollusca (Bivalvia, Gastropoda), Annelida (Polychaeta) and Arthropoda (Crustacea).Various macrozoobenthos communities distribution in Taman bay littoral zone at the depth to 1,5m. is connected with mosaic distribution of sandy-shell and sludgy benthal depositions of various grain-size classification composition in the researched area. Siltenduring biocenosis increase is marked (Cerastoderma and Abra) that is considered to be the consequence of Taman bay siltage.

Key words: Taman bay, community, seaside zone, macrozoobenthos, the Azov sea.

Monitoring providing and detailed study of macrozoobenthos in Taman bay littoral zone is connected not only with constant changes inside the benthic communities in the region, where ecological minimum are combined (temperature, brinishness, oxygen concentration) for Azov sea and Black sea eurybionts, but also with massive anthropogenic activity (channel dredging, large terminals and ports creation, Tuzla dam building, accidents of tankers and bulk-carriers during the storm, construction of transport passage through Kerch Strait). Development of various macrozoobenthos communities in the littoral zone of Taman bay at the depth to 1,5m. is connected with mosaic distribution of sandy-shelly and sludgy bottom silts of various grain-size classification in the investigated area.

After the building of Tuzla dam (2003–2004) noticeable changes of flow diagram took place [6] and anticyclonic circulation which earlier was not observed appeared in Taman bay [13]. This led to slopes ablation of Tuzla island and alluviums accumulation in the north-east slope [7, 13], and the consequence of this process appeared to beTaman bay siltage and accumulative bodies formation in the form of spits and beaches with width to 25 [17]. The results of the first researchers of Taman bay littoral part macrozoobenthos communities are presented in the works of AZI SSC RAS and Azov branch of MMBI KSC RAS employees [1-3, 12, 15]. Oil-product accidental spill in Kerch Strait in November 2007 led to researches intensification of benthal communities condition in this region [5, 16, 18-20]. The research of irreversible alterations in littoral zone benthic communities of Taman bay under the influence of antropogenic factors is appeared to be the aim of the given work.

Probes, selected in Taman bay in the course of coast expedition in July 2013 served as the material. 54 quantitative probes of macrozoobenthos were selected by Petersen bottom-grab with gripping area of 0,034 m^2 in 3-rd orders at 18 stations at the depths to 1,5m (pic.1). Gathering and processing of probes was conducted according to standard hydrobiological methods [8, 14]. Macrozoobenthos kinds were identified by means of determinants [4, 9-11]. Medium values of number and biomass at the station are indicated in the work. Communities were separated according to biomass.



Pic.1. Selection schematic map of benthic probes in Taman Bay of Azov Sea in July 2013 (expedition AZI SSC RAS).

In the period of material collection brinishness changed from 13,5 % (p. 6) to 31 % (in the salt lake p. 12), at an average in Taman Bay comprised 16 %. The number of kinds at the stations was changed from 6 (p. 10) to 53 (p. 15) (table 1.). The medium values of numerical strength and macrozoobenthos biomass in the littoral part of Taman Bay comprised 7237 exem/m^2 and 86 g/m^2 accordingly. Summary numerical strength changed from 160 exem/m^2 (p. 15) to 23670 exem/m^2 (p. 2). The macrozoobenthos total biomass was minimum at the station 8 (0,4g/m^2) and maximum at the 4 (402 g/m^2). Minimum biomass values are marked at the thick sandy ground and shelly material (p. 6, 7, 8 and 13) and marshy slimy ground in the salt lagoon (p. 10) (table 1.).

Table. Numerical strength, biomass, number of macrozoobenthos species at the stations in Taman bay are based on the results of researches in July 2013.

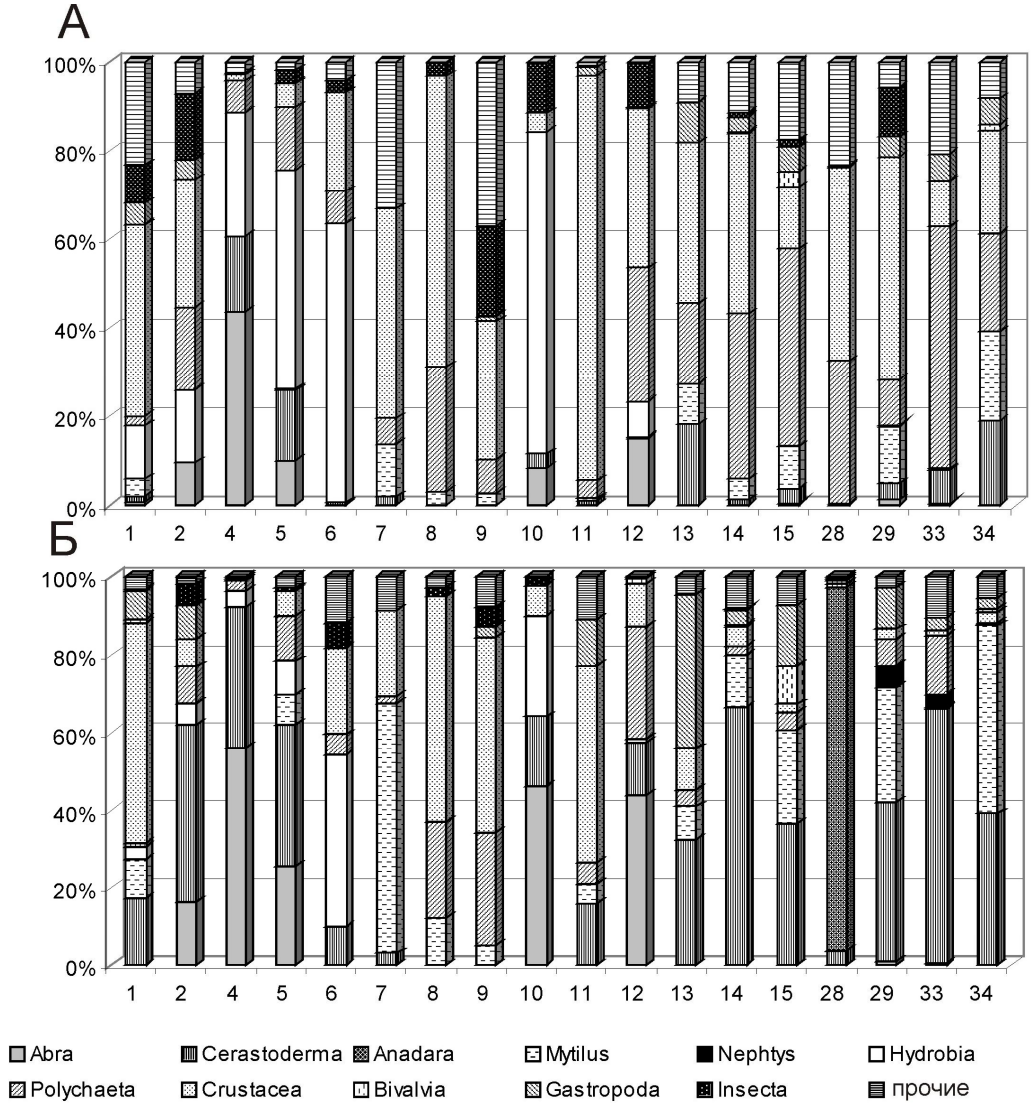
station, No	total nmber (exem/m^2)	Total biomass (g/m^2)	Species number according to types:										Total number
			Porifera	Cnidaria	Nemertini	Plathelminthes	Annelida	Tentaculata	Phoronida	Arthropoda	Mollusca	Chordata	
1	7057	36	0	1	1	0	6	0	0	10	10	1	30
2	23670	70	0	1	1	1	8	0	0	8	6	0	25
4	19639	402	0	1	0	1	7	0	0	3	4	0	16
5	9600	94	0	1	1	1	5	0	0	6	5	0	19
6	2114	3	0	1	0	0	3	0	0	8	2	0	14
7	746	1,5	0	0	1	0	3	0	0	3	2	0	9
8	311	0,4	0	1	0	0	2	0	0	6	1	0	12
9	3863	28,5	0	2	1	1	7	0	0	7	4	0	22
10	930	6	0	0	0	0	0	0	0	3	3	0	6
11	12938	22	0	2	1	1	8	0	0	6	4	0	22
12	2801	68	0	0	1	0	5	0	0	5	4	0	15
13	159	2	0	1	0	0	2	0	0	2	3	0	8
14	4755	35	1	3	1	1	8	0	0	11	5	1	31
15	6797	96	0	3	1	1	20	1	0	16	10	1	53
28	5407	130	0	0	0	0	6	0	0	9	3	0	18
29	13000	87	0	2	1	1	14	0	0	9	9	1	37
33	9179	171	0	3	1	1	14	0	1	7	11	1	39
34	7308	286	0	1	1	0	16	0	1	8	10	4	41

At the sandy grounds (p. 11, 14, и 28) with high numerical strength were marked *Fabricia sabella* Ehrenberg, 1837, *Orchestia bottae* M.-Edwards, 1840 and *Ampelisca diadema* A.Costa, 1853. At slimy ground with shelly material (station) there is high numerical strength of *Phoronis euxinicola* S.-Long., 1907, *Microdeutopus gryllotalpa* A.Costa, 1853, *Lagis neapolitana* (Claparede, 1868) and *Iphinoe elisae* Bacescu, 1950. At slimy grounds (p. 2, 4, 5, and 33) *Hydrobia acuta* (Draparnaud, 1805), *Abra segmenta* (Récluz, 1843), *Cerastoderma glaucum* (Poiret, 1789) were met with high density. High biomasses were connected with wide development of large mussels *Cerastoderma glaucum*, *Anadara kagoshimensis* (Tokunaga, 1906) and *Abra segmenta.*

Community with dominance of Cerastoderma glaucum (pic.2) were met at the sludgy (p. 2, 5, 29 and 33), and also sandy grounds (p. 13, 14 and 15) with dominant biomass from 32 to 113 g/m^2 and from 1 to 34 g/m^2 accordingly. *M. gryllotalpa* (to 4600 exem/m^2) are marked with high density in the biocenosis. High numerical strength indicators in the given community (*H. acuta, Neanthes succinea* Frey et Leuckart, 1847, *Chironomidae sp.*)

and biomass (*Abra segmenta, H. acuta, N. succinea, Nephtys cirrosa* Ehlers, 1868) are specific for slimy ground, but according to the numerical strength and biomass subdominant was *M.galloprovincialis* at the sandy ground. There was no mass development of *C. glaucum* in 2013, as it was in 2003, 2005 and 2012 in Tuzla system of firths (p. 10) and salt lake at Rubanov spit [1, 2, 15]. Probably, this is connected with the fact that in 2013 only quantitative material was selected, but large numerically insignificant exemplars just were not included into dredge probes.

Community with dominance of Abra segmenta (pic.2) was widespread in the salt lagoons at the spits of Tuzla and Rubanov, and in the apex part of Dinskoy bay (p. 4, 10 and 12) with dominant biomass from 3 (p. 10) to 126 g/m^2 (p. 4). *C. glaucum* appears to be subdominant*, H. acuta* and *Chironomidae sp* also were met in the society with high density. It is important to note mass development of *Gammarus* (*Marinogammarus*) *olivii* M.-Edwards in the salt lake (p. 12), 1830 with numerical strength of 902 exem/m^2 and biomass 7 g/m^2. In the open part of Taman bay *A. segmenta* was noticed only at the slimy ground, but it did not dominate.



Pic. 2. Numerical strength weighting (A) and biomass (B) of mass species and basic groups of macrozoobenthos in the region of researches at the stations.

Community with dominance of Mytilus galloprovincialis (Lamarck, 1819) **(**pic. 2.) is marked at the stations 7, 8 (sandy ground, shelly material presence) and at the station 34 (shelly material at the heavy clay) with dominant biomass from 1 to 138 g/m^2. Very low total biomass is marked at the stations 7 and 8 (table 1.) and crustaceans *M. gryllotalpa* (p. 7) and *I. elisae* with *O.bottae* (p. 8) dominated there according to the numerical strength. On the contrary biomass is significantly higher at the station 34 (table 1.) and there is marked mass development of mussel *C. glaucum* (subdominant according to numerical strength and biomass)**,** bristle worms *Heteromastus filiformis* Claparede, 1864 and shellfish *M. gryllotalpa.*

Community with dominance of Anadara kagoshimensis (pic. 2) was noticed at the one station (28) at the sandy ground without plant formation with numerical strength and dominant biomass 10 exem/m^2 and 122 g/m^2 accordingly (pic. 2). With more numerical strength, but very small biomass, there one can notice Oligochaeta sp., *H. filiformis*, Spionidae sp., and *I. elisae.* Solitary one can find *C. glaucum, Ampelisca diadema* A.Costa, 1853, *Idothea baltica basteri* Audoin, 1827 and *Dexamine spinosa* (Montagu, 1813) in the community.

Community with dominance of Hydrobia acuta was marked on the p. 6 (pic. 1, 2) with very low biomass of macrozoobenthos (table 1.) on the slightly silty sandy ground with numerical strength and biomass dominant of 1333 exem/m^2 and 1,5 g/m^2 accordingly. Only in numerical strength *H. acuta* was a dominant on the p.5 (pic. 2) (to 4750 exem/m^2), and also in the salt lagoon on Tuzla spit (p. 10). In biomass *C. glaucum* (p. 5) and*A. segmenta* (p. 10) dominated. In Taman Bay *H. acuta* was not entirely met at all stations with sandy and shell ground (p. 7-9, 11, 13-15, 28 and 34), was absent at the Rubanov spit (p. 33) on the slimy ground (there it dominated in numerical strength 2003) [15], though was marked (numerical strength 225 exem/m^2) in the salt lake (p. 12), connected with the sea.

Community with dominance of Ampelisca diadema is marked on the solid sandy ground (p. 11, Crustacea) (pic. 1, 2), then thickets *Zostera noltii* Hornem with numerical strength and biomass of dominant of 11220 exem/m^2 and 11 g/m^2 accordingly. Also *C.glaucum, Bittium reticulatum* (da Costa, 1778), *Rissoa benzi* (Aradas et Maggiore, 1844) were met at the station, the representatives of the family *Sagartidae* (cf. *Actinothoe clavata*). *A. diadema* are marked in Taman Bay at the stations with solid sandy and shell ground (p. 7, 8, 14, 15, 28, 34) and also at the sludgy ground with a plant detritus (p. 2).

Community with dominance of Idothea baltica basteri was met on the slimy ground with water plants (p. 1) and in the dirty sand with shell material without vegetation (p. 9) with numerical strength and dominant biomass from 660 to 1059 exem/m^2 and 14 g/m^2 accordingly. Also *Nemertini gen. sp. Chironomidae gen. sp., M. galloprovincialis* were numerous in the society*. C.glaucum, M. galloprovincialis, N. succinea* are considered to be subdominant in biomasss. *I. baltica* was massively met at the stations with sandy ground and thickets *Z.noltii* and *Z.marina* L. (p. 14) and plant detritus on the slimy ground (p. 2), but absolutely was not noticed on the grounds without vegetation (p. 4, 7 and 33), and also

solid grounds with shell material and thickets of chara-shell and filamentous alga (p. 29 and 34).

In 2013 it was noticed 90 sippes of macrozoobenthos relating to 10 types (table1.) The most mass groups are: Mollusca (Bivalvia, Gastropoda), Annelida (Polychaeta) and Arthropoda (Crustacea). About 7 types of biocenosis, the most part of which is taken by two (on the slimy ground) in the littoral part of Taman Bay – communities with dominance of *C. glaucum* and *A. segmenta*. Distribution of various macrozoobenthos communities in the littoral zone (at the depth of 1,5 m) of Taman Bay is mainly connected with mosaic distribution of sandy-shell and sludgy bottom silts. One marks the space increase of siltenduring biocenosis (Cerastoderma and Abra) in comparison with preceding years [2, 3 and 15], that is appeared to be the consequence of Taman Bay siltage.

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