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Dynamics of the State of Macrobenthos in the Gulf of Tub-Karagan

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Abstract. The paper shows the results of studies conducted in the area of the Tub-Karagan Bay for the 2015 seasons. In the winter, 22 taxa of macrozoobenthos were presented at the Tub-Karagan Bay. They were dominated by a group of worms that met at all stations. In spring, in the area of Tyubkaragan Bay, the dominant species and abundance were representatives of crustaceans. During the summer, makrozoobentose insects are marked on the Tubkaragansky Bay (18 species/m²). In the fall, the species composition of macrobenthos was represented by 28 taxa if the previous 3 seasons had four groups, the fall in the number of major groups was five: Worms, shellfish, crustaceans, insects and others represented in the main class of Gidrozoi. A group of insects occurs pointwise. Most of this group was marked on the section Tyubkaragansky Bay as before, this brackish-water species Chironomusalbidus, a permanent inhabitant of the bottom biocenose in this region of the sea.
Keywords: Caspian Sea; Gulf of Tube-Karagan; Macrozoobenthos.

1. Introduction

The structure of the Tube-Karagan, based on seismic works and geological surveys carried out in the early 21st century, has caused hope of oil and gas bearing, but the results of the exploration drilling on the structure have refuted the prediction of hydrocarbons stock availability [1-2].

Today, both above the structures of the Tub-Karagan and below the Gulf, are developing large as per our view that the petroleum exploration work in this structure will not stop because the Caspian Sea is in the north and the south, with promising oil structures are open. Therefore, the background state of the hydrobionts must be surveyed in this area.

In this connection, the land users and Akimats of Atyrau and Mangystau oblasts are continuing this work.

We previously published the results of the monitoring work carried out in 2014 [1-2].

As in previous years, the main three species of zooplankton were found: rotifers, cladocerans and copepods crustaceans, and species composition and abundance was dominated by copepod crustaceans 48, 87 %, and the biomass of the other 78 %.

Research object and methods. The object of the study selected region of Tubkaragan Gulf. Samples of makrozoobentosa were selected from the seabed by a Peterson grab and were fixed by 4% formalin.

In the laboratory samples were processed by conventional methods [3-6]; was determined the taxonomic composition, abundance (species per 1 m2) and biomass (mg. per 1 m^2).

2. Results and Discussions

Study and analysis of the variability of the ecological state of the environment in terms of the development of oil and gas fields is one of the most important tasks of environmental protection. As in

2014, samples of bottom sediments for the study was collected from 9 monitoring stations, three North, three East and three from the North-East side. The species composition of macrobenthos is shown in table 1.

The qualitative composition of macrozoobenthos in Tupkaragan Gulf was slightly changed depending on the season. Thus, during the period of the winter-spring, a group of shellfish consists of three species. In the summer, up to 2 species are reduced, due to the loss of Dreissenapolymorpha from the samples, which is small in the given sea region and occurs pointwise. In the autumn the number of species increases to 5 species. The most constant number of species was observed in the Group of Worms-6 species. Changes in the group of crustaceans also occurred due to the loss of the least numerous species, which is confirmed by the rates of occurrence of these taxa by season. The most crustaceans were presented in the autumn. The average number is noticeably decreasing from winter to summer by reducing the abundance of worms. In parallel, the role of crustaceans and shellfish in the formation of the total number is increasing. There is an inverse dependence of the numbers and biomass of shellfish. So, with minimum average winter abundance, the mollusks have the highest biomass and make up its basis.

This is due to the rise of shellfish and the predominance in winter photography of large specials with large individual weights. In the period of winter, biomass is being reduced, with the consequent increase in the fall.

In the winter of 2015, the macrozoobenthos in the explored section of the Tupkaragan Bay was represented by 22 taxa. They were dominated by a group of worms that met at all stations. A group of worms was represented by 6 species. The frequency of occurrence was dominated by oligochaetes and nereses - 93% (each), subdominalHypaniolakowalewskii and Manayunkiacaspica - 89% and 70%. High rates of frequency of occurrence differ mollusks which are presented by 3 kinds: Abra ovata-89%, Cerastoderma Lamarcki-70%, Dreissena hansenula-4%. Shellfish also have the greatest biomass value. Station 7 has the highest biomass of shellfish-34943 mg/m^2. Crustaceans are represented by 12 species. The most common representative of this group is SchizorhynchusEudorelloides, whose frequency is 70 per cent. The average number of crustaceans is 136 species/m^2. The largest number of crustaceans is reported at station 9-380 species/m2. The group of insects is represented by one species of Chironomusalbidus, which occurs in 70% of the stations, but has a small number and biomass.

Table 1. Species composition of macrobenthos by seasons in 2015

Types	Winter	Spring	Summer	Autumn
Vermes/Worms	6	6	5	6
Mollusca/Shellfish	3	3	2	5
Crustacea/Crustacean	12	11	10	13
Insecta/L. Insects	1	1	1	2
Others/Other	-	-	-	2
Total taxa	22	21	18	28

Tables 2 and 3 represent the number and biomass of major groups of Macrobenthosbe seasons in 2015.

Table 2. The number of major macrozoobenthos groups by 2015 seasons

Station			1	2	3	4	5	6	7	8	9	average
	Vermes	W*	3177	480	4827	4227	4943	6200	6337	2477	3477	4016
		S	3517	673	3387	3267	3357	2107	3913	1877	2490	2732
		A	1040	1446	2503	1227	1050	1540	1633	547	837	2659
		A	1337	2987	113	3217	1270	1023	1974		510	1853
	Mollusca	W*	713	0	580	310	347	193	283	347	87	318
		S	270	0	113	210	677	73	327	403	140	246
		S	887	1700	760	227	503	263	397	167	107	557
		A	2560	53	2553	5010	890	967	900		843	1722
	Crustacea	W*	57	47	33	150	40	87	347	80	380	106
		S	147	13	87	400	23	103	553	197	340	106
		S	127	700	177	97	17	203	250	150	313	207
		A	40	267	40	90	20	137	143		113	226
piece /m2	Insecta	W*	40	0	30	7	63	67	0	23	100	106
		S	13	0	50	17	87	43	0	30	63	37
		S	3	0	30	33	13	20	23	7	33	34
		A	340	0	180	483	297	393	290		500	18
	Others	W*	0	0	0	0	0	0	0	0	0	310
		S	0	0	0	0	0	0	0	0	0	0
		S	0	0	0	0	0	0	0	0	0	0
		A	10	0	0	17	0	0	0		0	3
	Total	W*	3987	527	5470	4693	5393	6547	6967	2927	4043	4506
		S	3947	687	3637	3893	4143	2327	4793	2507	3033	3219
		S	2057	16867	2560	1583	1583	2027	230	870	1290	3460
		A	4287	3307	5277	8817	2477	2520	3307		1967	3995

W*- season of the year

Table 3. Biomass of the main macrozoobenthos groups by 2015 seasons

Station			1	2	3	4	5	6	7	8	9	average
Mg/m2	Vermes	W*	4861	6	6563	5386	8850	9554	8644	7312	6133	6368
		S	5169	29	7733	5553	10986	3994	9460	6274	5964	6129
		A	4338	145	5747	3870	3619	4758	6894	2148	3175	3855
		A	4649	27	6281	6588	3705	9195	8899		4874	5527
	Mollusca	W*	19907	0	34720	24870	16367	15960	34943	33390	5530	20632
		S	8907	0	10270	16853	34057	5960	31963	24663	12390	16118
		S	19433	5100	16280	9363	29847	10103	28940	3613	4980	14184
		A	16416	340	34207	27257	14786	6369	13075		6359	14851
	Crustacea	W*	583	150	162	878	545	144	17699	15	1437	2401
		S	3383	267	1655	1140	26	54	11978	117	237	2095
		S	32	467	457	20	1288	1426	1861	33	58	627
		A	123	140	28	34	206	31	1957		39	219
	Insecta	W*	47	0	40	3	70	47	0	15	93	35
		S	18	0	60	17	123	60	0	67	130	53
		S	10	0	25	38	35	22	12	3	47	21
		A	242	0	68	205	332	323	175		410	
	Others	W*	0	0	0	0	0	0	0	0	0	0
		S	0	0	0	0	0	0	0	0	0	0
		S	0	0	0	0	0	0	0	0	0	0
		A	0	0	0	1	0	0	0	0	0	0
	Total	W*	25397	156	41485	31137	25831	25705	61287	40732	13193	29436
		S	17478	295	19718	23563	45192	10068	53401	31121	18721	24395
		S	3813	5711	2508	3291	4789	6308	7706	5798	8259	18687
		A	21430	507	40583	34084	19029	15918	24107		11682	20917

Figures 1-4 show the abundance and biomass of the main macrozoobenthos in 2014 and 2015.

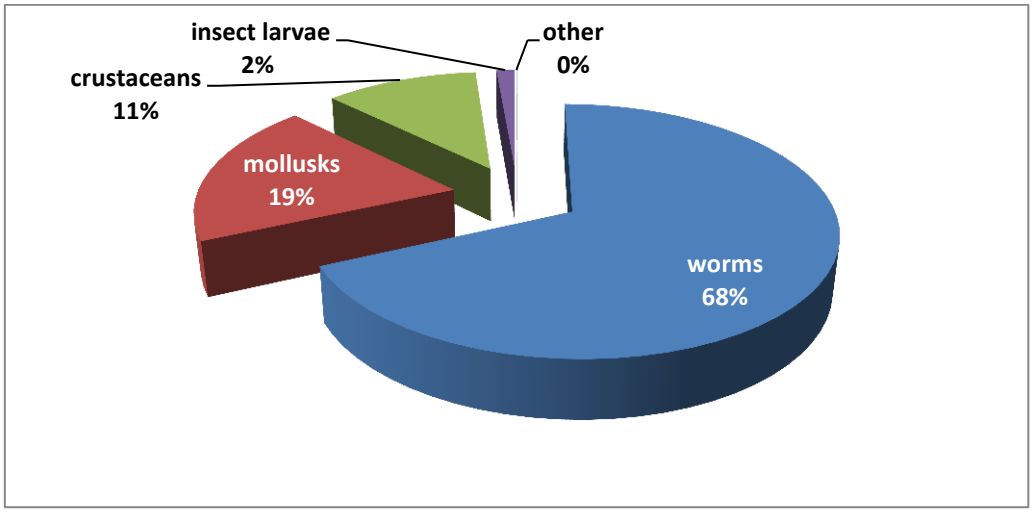

Figure 1. Number of major groups of Macrobenthos in 2014

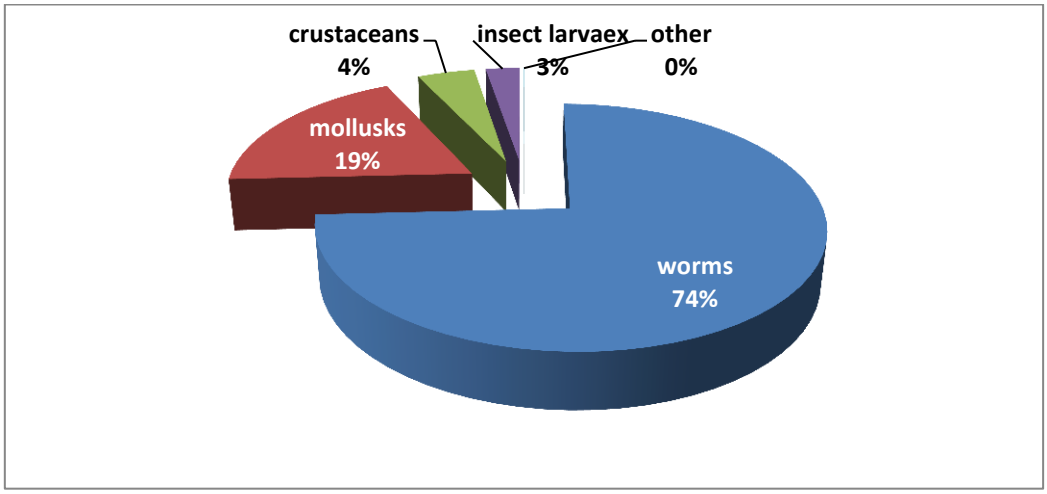

Figure 2. Number of major groupsmacrobenthos in 2015

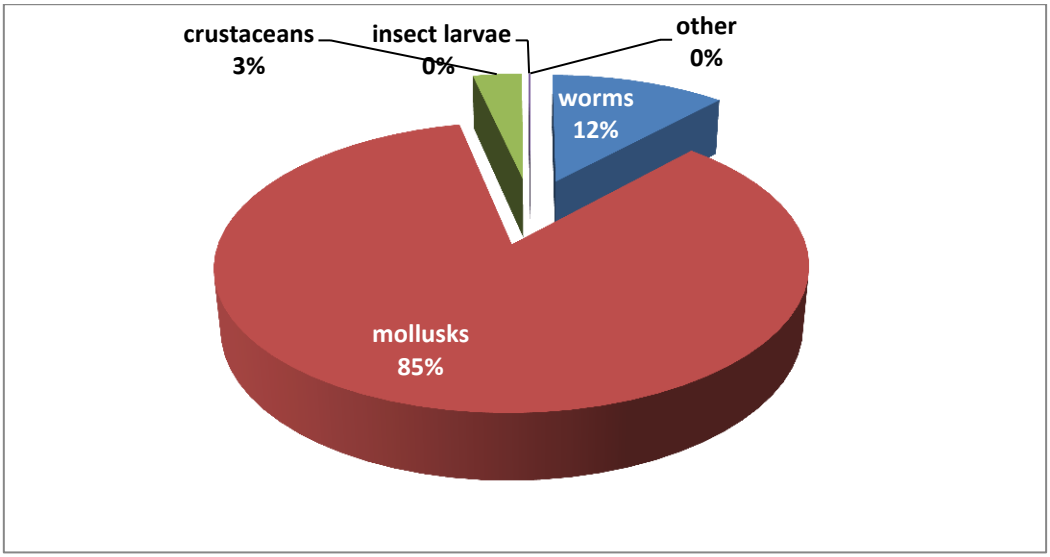

Figure 3. The biomass of major groups of macrobenthosby 2014 seasons.

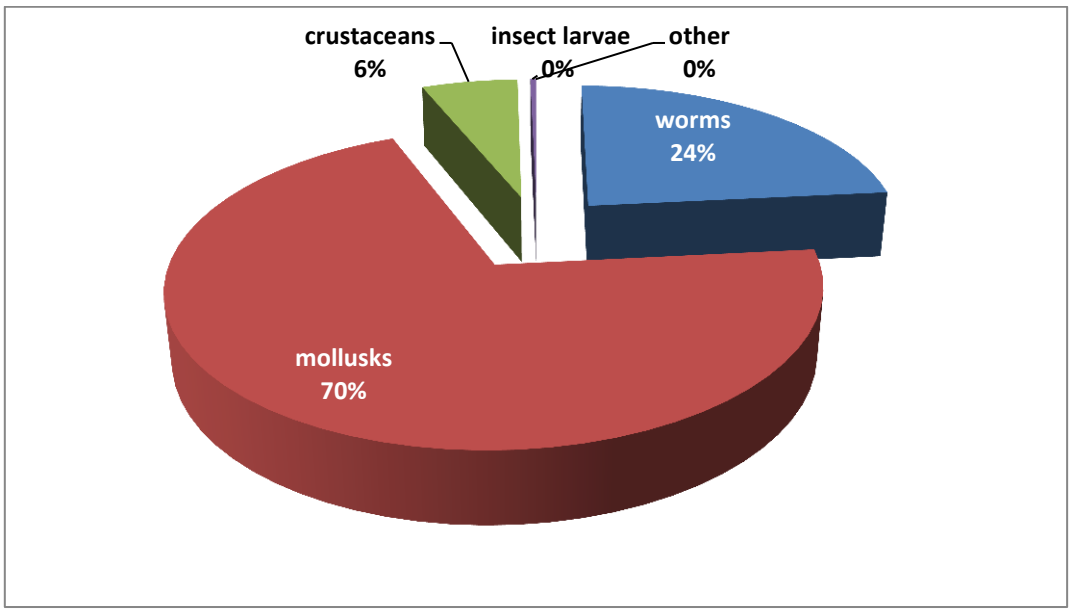

Figure 4.The biomass of major groupsmacrobenthosby seasons in 2015

In the spring of 2015, the Tupkaragan Gulf was dominated by species diversity and number of crustaceans.

During the summer, makrozoobenthose insects are marked on the Tubkaragansky Bay (18 species/m²).

In the fall of 2015, the species composition of macrobenthos was determined by five major groups: Worms, shellfish, crustaceans, insects and others represented in the main class of Gidrozoi. A group of insects occurs pointwise. Most commonly, this group is marked on the Tupkaraganskij Bay, as it was previously the Solonovatovodnyj species of Chironomusalbidus, a permanent resident of bottom biocenosis in a given area of the sea.

3. References

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