

## РОЗДІЛ II. ЗООЛОГІЯ ТА ЕКОЛОГІЯ ТВАРИН

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### TO THE STUDY OF MACROZOOBENTHOS OF THE RIVERS, SITUATED IN THE SOUTHERN SLOPES OF GREATER CAUCASUS

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During the years of 2010-2011 in the area of the South Caucasus Ahoxchay, Axsuchay, Bumchay, Demiraparanchay, Girdimanchay, Goychay, Vandamchay, Turyanchay rivers systematically included in the group of 15 macrobenthic organism of 106 species were found. Molluscs in the number of species (12 species) dominated. Other groups are represented with 2-11 species. The maximum number of Ahoxchayda species (66 species), while the minimum number of Damiraparan river (45 species) have been recorded. Biostructure of organisms 0,18-0,72 g/m<sup>2</sup>, and the number of individuals fluctuated between 52-124 specimen/m<sup>2</sup>. At the same time, the rate of saprobity has been set.

*Key words: macrozoobenthos, biomass, saprobity, indicator.*

Алієв С.І. ДО ВИВЧЕННЯ МАКРОЗООБЕНТОСУ РІЧОК ПІВДЕННИХ СХИЛІВ ВЕЛИКОГО КАВКАЗУ / Бакинський державний університет, AZ 1 148, Азербайджан, Баку, вул. Захід Халілов, 23  
Упродовж 2010-2011 рр. у річках Ахохчай, Ахсучай, Бумчай, Дямірапаранчай, Гірдіманчай, Геокчай, Вандамчай, Турьянчай південних схилів Великого Кавказу було виявлено 106 видів макробентичних організмів. Максимальна чисельність видів відзначена в р. Геокчай (66 видів), а мінімальна – у р. Дамірапаранчай (45 видів). За кількістю видів домінують молюски (12 видів), решту групи представлено 2-11 видами. Біомаса організмів змінювалася в межах 0,18-0,72 г/м<sup>2</sup>, а чисельність – 52-124 екз./м<sup>2</sup>. Одночасно було визначено сапробність води річок.

*Ключові слова: макрзообентос, біомаса, сапробність, індикатор.*

Алиев С.И. К ИЗУЧЕНИЮ МАКРОЗООБЕНТОСА РЕК ЮЖНЫХ СКЛОНОВ БОЛЬШОГО КАВКАЗА / Бакинский государственный университет, AZ 1148, Азербайджан, Баку, ул. Захид Халилов, 23

В течение 2010–2011 гг. в реках Ахохчай, Ахсучай, Бумчай, Дямирапаранчай, Гирдиманчай, Геокчай, Вандамчай, Турьянчай южных склонов Большого Кавказа было выявлено 106 видов макробентических организмов. Максимальная численность видов отмечена в р. Геокчай (66 видов), а минимальная – в р. Дамирапаранчай (45 видов). По количеству видов доминируют моллюски (12 видов), остальные группы представлены 2-11 видами. Биомасса организмов менялась в пределах 0,18-0,72 г/м<sup>2</sup>, а численность – 52-124 экз./м<sup>2</sup>. Одновременно была определена сапробность воды рек.

*Ключевые слова: макрзообентос, биомасса, сапробность, индикатор.*

### INTRODUCTION

Studying of species composition and quantitative distribution of macrozoobentos in some rivers of the Southern slopes of the Greater Caucasus within Azerbaijan.

The southern slope of the Greater Caucasus is rich in rivers. These water streams have all the properties, specific for mountainous rivers: the fast-flowing, low water temperature, oxygen-rich, etc. also they have an important economic value as sources for water supply, irrigation, power supply, fisheries development. However, hydrofauna and zoobenthos of the rivers, situated in the southern slopes of Great Caucasus have not been studied properly. It is known that the macrobenthic organisms play an important role in the formation of the biological productivity of water basins. Also, these organisms are active in the biological purification of water, play a role of a natural indicator of water pollution by organic substances and serve as a link in the food chain in ecosystems.

## MATERIAL AND METHODS

During the 2010-2011 years for the first time for Greater Caucasus in different habitats of Akhokhchay, Aksuchay, Bumchay, Demiraparanchay, Girdimanchay, Goychay, Vendamchay, Turyanchay rivers, situated on its southern slopes samples of macrozoobenthos were collected and analyzed. Methods of research conducted by Jadin [4]. In the rivers of the region 106 species of benthic organisms from 15 taxonomic groups were discovered.

## RESULTS AND DISCUSSION

Akhokhchay, being a right tributary of the Ayrichayriver, originates on the southern slopes of the Greater Caucasus (2000 meters). The length of the river – 25 km, the area of the water basin 691 km<sup>2</sup>, flows through Ismayilli [1, 2, 3]. The main part of the catchment area is formed by the storm waters. The streams and mud flows occur fairly often. During the observation period, the water temperature was 9,6-22,4 °C, pH – 7,1-7,4, oxygen regime was equal to 8,6-8,8 mg/l. As a result of analysis of the materials collected from the rivers, 66 species of benthic organisms from 14 taxonomic groups were recorded. Mollusks are dominated in the biodiversity of macrozoobenthos (8 species). Minimal quantity of decapods and water fleas were observed (2 species of each taxon). The second place on species composition is occupied by dragonfly larvae. Other groups were represented by 3-6 species. The most common are the following species: *Costatella acuta*, *Anisus spiroibis*, *Valvata pulchella*, *Corbicula cor*, *Sphaericum lacustre*, *Ephemerella ignita*, *Baetis rhodani*, *Caenis macrura*, *Ordella macrura*, *Notonecta lutea*, *Bidessus pusillus*, *Ecnomus tenellus*, *Limnophilus flavicornis*, *Leptocerus tineiformis*, *Oecetis furva*.

The total biomass of benthic organisms was equal to 0,18 gr/m<sup>2</sup>, the quantity fluctuated between 52 specimens/m<sup>2</sup> (Table 2).

Akhsuchay originates from the southern slopes of the Greater Caucasus Mountains. The length of the river is 75 km, the total basin area – 631 km<sup>2</sup> [1, 2, 3].

During the observation period, the water temperature was equal to 14-25 °C, pH – 7,8-7,9 mg/l. In the river 57 species from 14 taxonomic groups were found. The first place occupies the caddis flies (8 species). Other groups are represented by 2-8 species. Among these species the prevalent are following: *Naiscommunis*, *Branchiurasowerbyi*, *Eisenellatetraedra*, *Piscicolageometra*, *Hydrobia longiscata*, *Ecnomus tenellus*, *Hydropsyche ornatula*, *Limnophilus flavicornis*, *Leptocerus tineiformis*, *Oecetis furva*, *Corixa punctata*, *Berosus spinosus*, *Procladius choreus* etc.

In the river, the biomass of benthic organisms was equal to 0,50 gr/m<sup>2</sup>, number of animals – 124 specimen/m<sup>2</sup>. The biomass of organisms ranged from 0,04 – 0,14 gr/m<sup>2</sup> in taxonomic groups and 8-32 specimen/m<sup>2</sup> by the number of animals. According to the numeral dynamics and biomass the caddisfly larvae were prevailed (32 specimen/m<sup>2</sup>; 0,14 gr/m<sup>2</sup>).

Bumchay originates from the southern slopes of the mountain range of the South Caucasus (3400 meters high). Is a left branch of the river Turyanchay, the length of 51 km, the basin area 450 km. It flows through the territory of Gabala region [1, 2, 3].

During the period of study, the 60 species of benthic organisms from 10 taxonomic groups were recorded. The first place among the detected species was occupied by chironomids (9 species); the second – the larvae of dragonflies (8 species). The 7 species from each taxonomic group were occupied by oligochaetes, hemipterans and dipteran (Table 2). Other taxonomic groups are represented by 3 – 5 species. The, ost common species are *Branchiura sowerbyi*, *Lumbricillus lineatus*, *Eisenella tetraedra*, *Costatella integra*, *Valvata pulchella*, *Hydrobia longiscata*, *Gammarus lacustris*, *Eylais hamata*, *Lestes sponsa*, *Baetis rhodani*, *Siphonurus linnaenus*,

*Cloen dipterum*, *Corixa punctata*, *Sigara falleni*, *Berosus spinosus*, *Tabanus* sp., *Stempelina bausei*, *Micropsectra praecox*, *Chironomus thummi*, etc.

The biomass of benthic organisms in the river reach 0,30 gr/m<sup>2</sup>, size – 90 specimen/m<sup>2</sup>. Biomass by taxonomic groups of organisms ranged from 0,03-0,08 gr/m<sup>2</sup>, quantity – within 12-28 specimen/m<sup>2</sup> (Table 2).

Demiraparanchay originates in the southern slopes of the Greater Caucasus mountains (altitude 3859 meters). This river is one of the main sources for the formation of the river Turyanchay. It flows through the territory of Gabala region. Its length is 69 km, the area of the water basin – 596 km<sup>2</sup>.

During the period of investigations the temperature of water were equaled 15,1-24,2 °C, pH – 7,4-7,6, oxygen regime – 8,6-8,8 mg/lit.

The 45 benthic species from 14 systematic groups were recorded in this river. The larvae of caddis fly are dominated on the quantity of species (7 species). The other groups were represented by 1-5 species (table 1, picture 1).

Table 1 – The quantity of macrozoobenthos of Southern Slopes of the Great Caucasus on taxonomic groups

№	Taxonomic group	Total quality	Rivers							
			Akhokhchay	Akhsuchay	Bumchay	Demiraparanchay	Girdimanchay	Goychay	Vandamchay	Turyanchay
1	<i>Oligochaeta</i>	7	6	5	7	3	4	4	3	5
2	<i>Hirudinea</i>	6	3	4	-	1	1	-	6	3
3	<i>Mollusca</i>	12	8	4	3	5	3	8	6	4
4	<i>Ostracoda</i>	3	3	-	-	-	3	2	2	-
5	<i>Amphipoda</i>	7	4	3	2	3	5	4	3	2
6	<i>Decapoda</i>	3	2	2	-	2	2	2	1	3
7	<i>Hydracarina</i>	4	2	2	-	-	2	2	1	2
8	<i>Odonata</i>	8	5	6	6	4	4	7	6	8
9	<i>Ephemeroptera</i>	10	5	9	8	5	6	8	7	4
10	<i>Trichoptera</i>	8	6	8	5	7	7	8	7	3
11	<i>Hemiptera</i>	7	5	4	7	3	3	5	4	2
12	<i>Coleoptera</i>	10	4	4	6	4	5	8	7	5
13	<i>Diptera</i>	8	3	4	7	3	4	5	4	3
14	<i>Chironomidae</i>	11	4	5	9	5	4	9	8	6
15	<i>Ceratopogonidae</i>	2	-	2	-	1	2	-	2	-
	Total:	106	66	57	60	45	55	72	67	50

By the frequency of occurrence the species *Auloforusfurcatus*, *Lymnaeastagnalis*, *Anisusspirorbis*, *Gammarusmatienus*, *Argionvirgo*, *Anax imperator*, *Ecnomustenellus*, *Hydropsycheornatula*, *Leptocerustineiformis*, *Oecetisfurva*, *Hydrometrastagnorum*, *Velia rivulorum*, *Colymbetesfuscus*, *Limnochironomustritonus*, *Endochironomusdispar*, etc. were prevailed.

The biomass of benthic organisms in the river was equaled 0,51 gr/m<sup>2</sup>, the quantity – 111 specimen/m<sup>2</sup>. By the quantity and biomass the chironomid larvae (20 specimen/m<sup>2</sup>, 0,08 gr/m<sup>2</sup>) were dominated (table 2).

The Girdimanchayriver originates from the 1 km on the Southern-East of the Babadag pass (2900 km). It connects with Kura river from the left side by the use of artificial canal. The length of river is 88 km, the water basin is equaled 727 km<sup>2</sup>. The mineralization of water equals 560 mg/lit, with sulfur-natrium chemical composition.

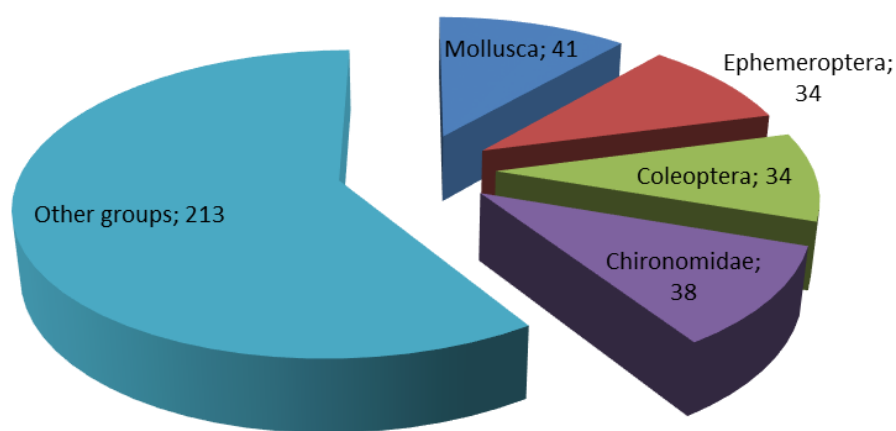


Fig.1. The Quantity of Rivers in South Slopes of Great Caucasus (radians)

During the period of observations the 55 benthic species were recorded. By the quantity of species the larvae of caddis fly are dominated. The other groups are represented by 1-5 species (table 1). By the frequency of occurrence the species *Nais elinguis*, *Lymnaea auricularia*, *Ancylus fluviatilis*, *Corbicula fluminalis*, *Pontogammarus robustoides*, *Ecnomus tenellus*, *Hydropsyche ornatula*, *H.instabilis*, *Leptocerus tineiformis*, *Oecetis furva*, *Gyrinus minutus*, etc. were prevailed.

The biomass of benthic organisms was equaled to 0,29 gr/lit, the quantity – 90 specimen/m<sup>2</sup> (table 2).

The Goychayriver originates from the Southern slopes of the Great Caucasus (altitude 1980 meters), connects with the Kura river from the left side by the use of artificial canal. It is distinguished by high water level in comparison with the other rivers, that flow from the Southern slopes.

During the period of studies the temperature of water was equaled 12,3-21,8 °C, pH 7,4-7,5, the oxygen regime 8,1-8,4.

The 72 species from the 13 systematic groups were recorded in the river (table 1). By the species quantity the chironomid larvae (9 species), molluscs, the dragonfly larvae, caddis flies, coleopteran were dominated (8 species from the each taxonomic group). The next places were occupied by damselfly larvae (7 species) and hemipterans (5 species). By the frequency of occurrence the species *Lymnaea auricularia*, *Costatella acuta*, *Corbicula cor*, *Coenagrion scitulum*, *Lestes sponsa*, *Agrion virgo*, *Ecnomus tenellus*, *Hydropsyche ornatula*, *H.instabilis*, *Oecetis furva*, *Notonecta lutea*, *Gerris lacustris*, *Hydroporus planus*, *Tabanus*

sp., *Cryptochironomus defectus*, *Ch.thummi*, *Einfeldia pagana*, *Limnochironomus nervosus*, *Endochironomus tendens*, *Microtendipes chloris*, etc. were prevailed.

The biomass of benthic organisms in the river was equaled to 0,72 gr/m<sup>2</sup>, quantity – 124 specimen/m<sup>2</sup>. The molluscs were prevailed in quantity (0,72 gr/m<sup>2</sup>). By systematic groups the biomass and quantity of organisms was equaled to 0,04-0,20 gr/m<sup>2</sup> and 6-40 specimen/m<sup>2</sup> accordingly (table 2).

Table 2 – The Quantity and Biomass of Rivers in South Slopes of Great Caucasus (specimen/gr x m<sup>2</sup>)

№	Taxonomic group	Rivers							
		Akhokhchay	Akhsuchay	Bumchay	Demiraparanchay	Girdimanchay	Goychay	Vandamchay	Turyanchay
1	<i>Oligochaeta</i>	—	—	—	—	$\frac{12}{0,04}$	—	—	—
2	<i>Mollusca</i>	$\frac{18}{0,05}$	$\frac{26}{0,10}$	$\frac{28}{0,08}$	$\frac{10}{0,05}$	$\frac{20}{0,08}$	$\frac{40}{0,20}$	$\frac{22}{0,10}$	—
3	<i>Amphipoda</i>	—	$\frac{14}{0,04}$	—	$\frac{18}{0,07}$	—	$\frac{28}{0,10}$	—	$\frac{21}{0,04}$
4	<i>Decapoda</i>	$\frac{2}{0,04}$	—	—	$\frac{7}{0,12}$	—	$\frac{6}{0,21}$	—	—
5	<i>Odonata</i>	—	$\frac{20}{0,08}$	—	$\frac{10}{0,04}$	—	—	$\frac{16}{0,03}$	$\frac{20}{0,07}$
6	<i>Ephemeroptera</i>	$\frac{12}{0,02}$	$\frac{32}{0,14}$	$\frac{24}{0,08}$	—	$\frac{10}{0,04}$	—	$\frac{30}{0,08}$	$\frac{26}{0,06}$
7	<i>Trichoptera</i>	$\frac{20}{0,07}$	$\frac{14}{0,06}$	$\frac{12}{0,03}$	$\frac{20}{0,06}$	—	$\frac{10}{0,04}$	—	—
8	<i>Hemiptera</i>	—	$\frac{10}{0,04}$	—	—	$\frac{18}{0,06}$	—	—	—
9	<i>Coleoptera</i>	—	—	$\frac{12}{0,04}$	$\frac{14}{0,06}$	$\frac{12}{0,05}$	—	—	$\frac{12}{0,04}$
10	<i>Diptera</i>	—	—	—	$\frac{12}{0,03}$	$\frac{18}{0,06}$	$\frac{10}{0,07}$	$\frac{20}{0,08}$	$\frac{28}{0,08}$
11	<i>Chironomidae</i>	—	$\frac{8}{0,04}$	$\frac{14}{0,07}$	$\frac{20}{0,08}$	—	$\frac{30}{0,10}$	$\frac{6}{0,01}$	$\frac{11}{0,02}$
	Total:	$\frac{52}{0,18}$	$\frac{124}{0,50}$	$\frac{90}{0,30}$	$\frac{111}{0,51}$	$\frac{90}{0,29}$	$\frac{124}{0,72}$	$\frac{94}{0,30}$	$\frac{122}{0,31}$

Vandamchay is the right branch of the Goychayriver, connect with the Kura river. The length is 98 km, area of basin – 629 km<sup>2</sup>.

During the period of investigations the temperature of water was equaled 13,4-19,6 °C, pH – 7,1-7,2, oxygen regime – 8,9-9,0 mg/l.

The 67 species of benthic organisms from 15 systematic groups were recorded in the river. The chironomid larvae (8 species), dragonfly and caddis fly larvae, coleopteran (by 7 species from the each taxonomic group) were dominated. The other species were presented to 1-6 species. By the frequency of occurrence the species *Auloforus furcatus*, *Lymnaea auricularia*, *Corbicula cor*, *Valvata pulchella*, *Gammarus lacustris*, *Palaemon elegans*, *Sympucna fusca*, *Ischnura elegans*, *Ephemerella ignita*, *Caenis macrura*, *Cloeon dipterum*, *Laccophilus hyalinus*, *Gyrinus minutus*, *Hydropus piceus*, *Lymnophilia sp.*, *Ephydra sp.*, *Procladius choreus*, etc. were prevailed.

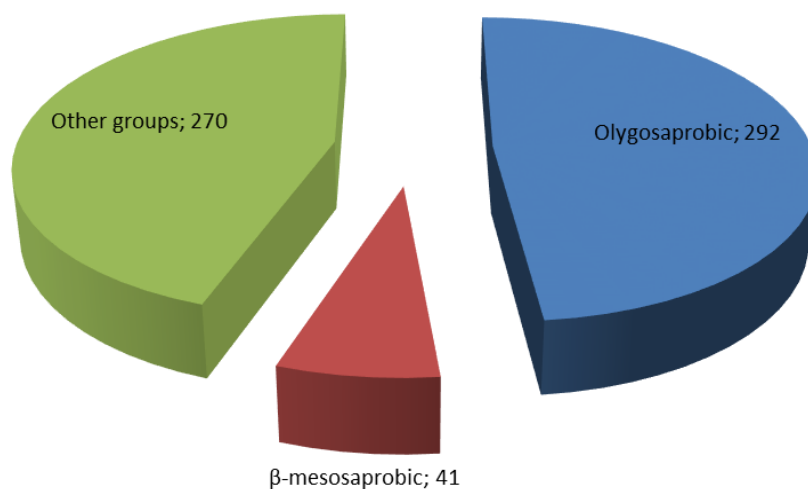


Fig.2. The attitude of indicator species by the total number of species in rivers in South Slopes of Great Caucasus

The biomass of benthic organisms in the river was equaled to 0,30 gr/m<sup>2</sup>, quantity – 94 specimen/m<sup>2</sup>. The dragonfly larvae (30 specimen/m<sup>2</sup>) and molluscs(0,10 gr/m<sup>2</sup>) were prevailed on quantity and biomass, accordingly (table 2).

Turyanchay is the left branch of the Kura river, flows through the territories of Gabala, Ujar, Agdash and Zardab regions. The length of river is 180 km, the area of water basin – 1840 km<sup>2</sup> [1, 2, 3].

It originates from the South-West slopes of the Bazarduzu mountain (3680 meters altitude).

During the period of observations 50 species of benthic organisms were recorded. By the frequency of occurrence the species *Nais communis*, *N.elinguis*, *Lymnaea auricularia*, *Corbicula cor*, *Coenagrion concinnum*, *C.scitulum*, *Agrion virgo*, *Ephemerella ignita*, *Baetis rhodani*, *Ecnomus tenellus*, *Hydropsyche ornatula*, *Leptocerus tineiformis*, *Chironomus thummi*, etc. were prevailed.

The population changes of benthic organisms in the river were fluctuated. The biomass and quantity of organisms were equaled 0,02-0,08 gr/m<sup>2</sup> and 12-28 specimen/m<sup>2</sup> accordingly. The total biomass of benthic organisms was equaled 0,31 gr/m<sup>2</sup>, quantity – 122 specimen/m<sup>2</sup>.

Also the distribution of benthic organisms in saprobic zones was investigated by A. V. Makrukhin [5], V. P. Semeny [6], P.B. Tankevitch [7]. The 86, 12 and 8 species from 106

studied species were defined, as oligosaprobic,  $\beta$ -mesosaprobic and other groups, accordingly (picture 1, 2).

It is known, that the development of benthic organisms in rivers is changed in accordance with season and water velocity. As follows from the table 1, the molluscs (12 species), dragonfly larvae (10 species), coleopteran (10 species) and other groups (2-8 species) were represented in the river. It should be noted, that the findings are very encouraging for fish-breeding (trouts) development in the region.

Prospects for further research. Study of changes in hydrobiological regime in the rivers studied.

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