••• ЗООЛОГІЯ ТА ЕКОЛОГІЯ ••• ZOOLOGY AND ECOLOGY •••

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Species composition and quantitative distribution of the macrozoobenthos of the lower part of the Araks River of Azerbaijan

S.I.Aliyev

Baku State University (Baku, Azerbaijan)
alisaleh@rambler.ru

In 2011–2013 investigation of the lower part of the Araks River was conducted. Species composition and quantitative distribution of the macrozoobenthos was studied. Ninety five species of invertebrate organisms belonging to 14 systematic groups were found. Mollusks (19 species) and chironomids (17 species) are most diverse. The total biomass of macrozoobenthos changed within 1.96–2.18 g/m^2 at the density of 529–639 individuals/sq.m. The maximum development was registered in 2012. In 2011 chironomids and mollusks were dominant. Hydrological characteristics of the Araks River were given.

Key words: *macrozoobentos, density, biomass, species composition, number of species.*

Видовой состав и количественное распределение макрозообентоса нижнего течения реки Аракс Азербайджана

С.И.Алиев

В 2011–2013 гг. проведены исследования нижнего течения реки Аракс: изучен видовой состав и количественное распределение макрозообентоса. Выявлено 95 видов беспозвоночных, относящихся к 14 систематическим группам. По числу видов доминируют моллюски (19 видов) и хирономиды (17 видов). Численность макрозообентоса изменялась в пределах 529–639 экз./м^2, а биомасса – 1,96–2,18 г/м^2. Максимальное развитие отмечалось в 2012 г. В 2011 г. по числу видов доминировали хирономиды и моллюски. Также дана гидрологическая характеристика р. Аракс.

Ключевые слова: *макрозообентос, численность, биомасса, видовой состав, количество видов.*

Introduction

The origin of main rivers of Azerbaijan goes back to the end of the tertiary period and has specific orographic and tectonic characters. The large rivers (Kura, Araks, Samur, etc.) flow at the bottom of intermountain hollows and valleys, while the mountain rivers of Caucasus Minor and Major flow in the longitudinal and cross valleys corresponding to lines of tectonic breaks. Thus, the rivers of Caucasus Minor are divided into two main groups: right-bank inflows of the Kura River and left-bank inflows of the Araks River. Left-bank inflows of the Araks flow down from the slopes of Daralagez, Zangezur and Karabakh ridges. Numerous streams and small rivers are united by general basin of the Araks River.

The Araks River is the biggest inflow of Kura River and takes its beginning from the northern slope of Bingel mountain ridge in Turkey. Its length is 1072 km and the area of reservoir is 101.9 sq.km. Throughout 600 km this river makes borders between Turkey, Azerbaijan and Iran. Beginning from Bakhramtapa water-engineering system and to the river mouth it flows in the territory of Azerbaijan. At the left side Akhurchay, Zangichay, Arpachay, Nakhchivanchay, Alindzhachay, Ohchuchay, Akarichay, Kendalanchay rivers and others join the Araks River, while on the right side over 100 small rivers join, and in the Kura-Araks valley no river enter the Araks throughout 100 km (Mammadov, 2002). The Araks River has great commercial value. The river is used for providing local population with water, for irrigating purposes, for obtaining energy, and fishery expansion. For the purpose of its effective use the water-engineering system (Nakhichevan reservoir), Myl-Mugan and Bakhramtapa water-engineering systems are constructed on the Araks River. The water regulated by a reservoir flows to the Mil-Mugan water-engineering system. The main Mil channel, which originates from that water-engineering system, provides the chance to improve water supply of available irrigated lands in the territory of Azerbaijan (Fizuli district) (Rustamov, Kashkay, 1978; Museyibov,

1998). And Mugan channel flowing in the territory of southern Azerbaijan provides with water thousands of hectares of virgin lands in Iran Islamic Republic (Mammadov, 2002).

The aim of this work was to study species composition and quantitative distribution of the macrozoobenthos in the lower part of the Araks River.

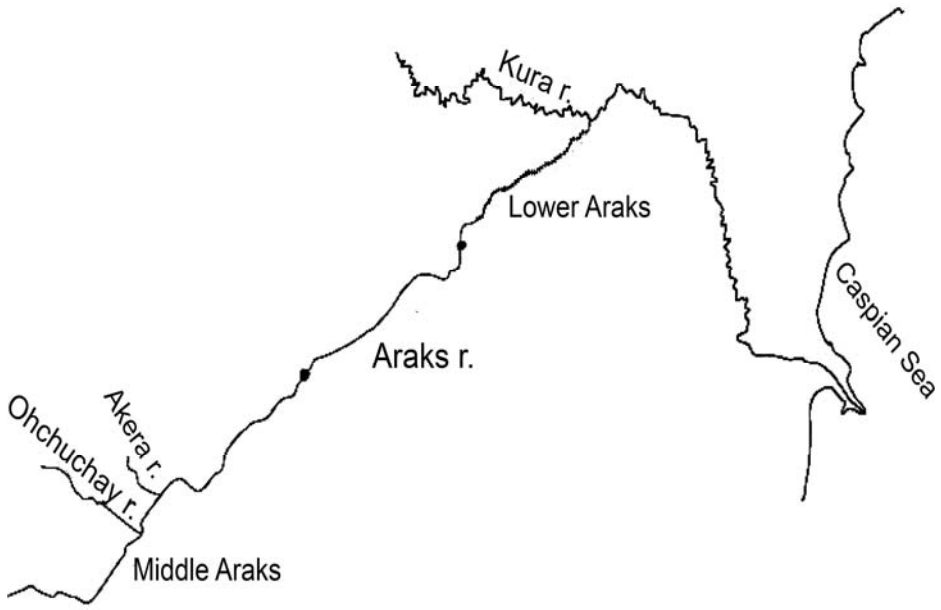

Fig. The Araks River

Material and methods

Material for this investigation was collected in spring and summer of 2011–2012 in the territory from Bakhramtapa water-engineering system to the Kura River (lower Araks). Qualitative samples of macrozoobenthos were made with a net and a scraper, and quantitative samples were made in stations by a ladle bottom-scraper Peterson-type with an area of capture of bottom of 1/40 sq.m (Mammadov, 2002). For identification of types of communities, the ranking of species index of density (p) was carried out. It should be noted that because the territories of Zangelan, Dzhebrail and Fizuli Districts of the Araks River are occupied by Armenian Army since 1993, it is not possible to conduct investigations there. Therefore, for obtaining full information on a macrozoobenthos of the Araks in 2011–2012, we decided to conduct our studies in the territory of lower part of Araks basin from the Bakhramtapa River dam to the Kura River (Zhadin, 1956).

Results and discussion

The water of the Araks is hydrocarbonate. Average mineralization is of 300–500 mg/l. The bed of the river is covered by sand, pebble and gravel. In some places, especially in ponds, near the bed of the river the clay, sand-oozy and plant biotopes are found. In stagnant places of the bed of the river the water vegetation is strongly developed. Transparency of water according to standard code constitutes <1–10 cm in cold half of the year, and 3–20 cm in warm period. Water temperature in transit zone of a drain changes with in large limits throughout the year, from 5,4 to 5,4 до 29,5ºC. Seasonal changes of the main quality indicators are given in table 1.

In the result of investigation of ground communities in the lower part of the Araks river 95 species of invertebrates belonging to 14 systematic groups (table 2) have been revealed. Geleids are represented by 2 species, oligochaets by 4, bloodsuckers by 3, mollusks by 19 (11 gastropods, 8 types two-fold), crustaceans by 10, mites by 2, insects by 19. Insects belong to 6 orders (dragonflies, mayflies, bugs, beetles, caddis flies, flies). Among the last group larvae of chironomids (17 species) are most diverse. The revealed species are

recorded for the first time for the fauna of the lower Araks. The most abundant species in the lower Araks are *Piscicola geometra, Lymnaea stagnalis, Lymnaea auricularia, Costatella acuta, Colletopterum cyrea cyrea, Gammarus lacustris, Pontogammarus sarsi, Astacus leptodactylus, Potamon ibericum, Palaemon elegans, Hydropsyche ornatula, Hydropsyche instabilis, Ecnomus tenellus, Leptocerus tineiformis, Oecetis furva, Limnophilus flavicornis, Micrasema bifoliatum, Limnophilia* sp.*, Helius* sp.*, Helobia* sp.*, Atherixsp., Tabanus* sp.*, Ephydras* sp. etc. All these species were found in mass quantity in all samples (table 2).

Table 1.

Seasonal dynamics of main qualitative indexes in the Araks River

№	Season of the year	Sum of ions	pH	Rigidity, mg-eqv./l	Dissolved Oxygen, mg/l
1	Winter	486–1097	7,79–8,40	3,35–7,69	8,81–11,48
2	Spring	549–673	8,02–8,32	3,70–6,35	10,33–11,04
3	Summer	774–1464	7,49–8,45	3,70–15,59	6,12–8,25
4	Autumn	566–948	7,68–8,15	3,6–10,56	9,05–9,25

Table 2.

Species composition of macrozoobenthos in lower Araks (2011–2012)

#	**Names of organisms**	**2011**	**2012**
	Oligochaeta		
1	*Stylarial acustris* L.	+	+
2	*Aulodrilus pigueti* Kowal	+	-
3	*Peloscolex ferox* Eisen.	-	+
4	*Branchiura sowerbyi* Bedd.	-	+
	Hirudinea		
5	*Helobdella stagnalis* L.	-	+
6	*Piscicola geometra* L.	++	++
7	*P. fasciatus* Kollar.	+	+
	Mollusca		
8	*Lymnaea stagnalis* L.	++	++
9	*L. auricularia* L.	++	++
10	*Costatella acuta* Drap.	++	++
11	*Planorbis planorbis* L.	+	-
12	*Anisus spirorbis* L.	+	-
13	*Gyraulus albus* Muller.	-	+
14	*Valvata pulchella* Studer	-	+
15	*Hydrobia longiscata* Bour.	-	+
16	*Pyrgula* sp.	-	+
17	*Theodoxus danubialis* C.Pfeiff.	-	+
18	*T. pallasi* Ldh.	+	-
19	*Corbicula fluminalis* Muller.	+	+
20	*Colleotopterum cyreacyrea* Dr.	++	++
21	*Sphaerium corneus* L.	+	+
22	*Sph. lacustris* Müller	++	++
23	*Pisidium casertanum* Poli	-	+
24	*Musculum hyngarium* (Cleis.)	+	+
25	*Shadinia* sp.		
26	*Sh.acromowskii* Shadin.	+	+
	Amphipoda		
27	*Dikerogammarus haemobaphes* Eichw.	+	-
28	*Gammarus lacustris* Sars.	-	++

29	*G.komareki araxenus* Derj.	-	+
30	*G. balcanicus alarodius* Derj.	-	++
31	*G. matienus* Derj.	+	+
32	*Pontogammarus sarsi* Sov.	++	++
33	*Niphargus abricossovi* Birst.	+	+
	Decapoda		
34	*Astacus leptodactylus* Esch.	++	++
35	*Potamon ibericum* Bieb (Olev.)	+	+
36	*Palaemon elegans* Rathke.	+	+
	Hydrocarina		
37	*Eylais hamata* Koen.	+	-
38	*E. degenerata* Koen.	+	+
	Odonata		
39	*Aeschna juncea* L.	-	+
40	*Anax imperator* Leach	+	-
41	*Coenagrion hastulatum* Charp.	+	+
42	*C. scitulum* Ramb.	+	-
43	*Orthetrum sabina* Dr.	-	+
44	*O. albistylum* Fonse.	+	-
	Ephemeroptera		
45	*Siphlonurus linnaeanus* Etn.	+	+
46	*Baetis rhodani* Pict.	+	-
47	*Ephemerella ignita* Poda	+	+
48	*Centroptilum luteolum* Müller.	+	-
49	*Prosopistoma foliaceum* Fourc	+	-
50	*Ordella macrura* Steph.	+	-
	Hemiptera		
51	*Corixa punctata* Illig.	+	+
52	*Nepa cinerea* (L.)	++	++
53	*Ranatra linearis* (L.)	++	++
54	*Gerris lacustris* (L.)	+	+
	Trichoptera		
55	*Cheumatopsyche lepida* De Geer	+	+
56	*Lype reducta* Hay	+	+
57	*Micrasema bifoliatum* Mart.		
58	*Hydropsyche ornatula* Mcl.	+	+
59	*H. instabilis* Curt.	+	+
60	*H. pellucidula* Curt	+	+
61	*Ecnomus tenellus* Ramb.	++	++
62	*Leptocerus tineiformis* Curt.	+	+
63	*Oecetis furva* Ramb.	+	+
64	*Limnophilus flavicornis* Fabr.	+	+
	Coleoptera		
65	*Laccophilus hyalinus* Deg.	++	++
66	*Haliplus fulvus* Fabr.	+	-
67	*Noterus clavicornis* Deg.	-	+
68	*Cybister tripunctatus* Hochh.	+	-
	Diptera		
70	*Limnophila* sp.	++	++
71	*Helius* sp.	++	++
72	*Helobia* sp.	++	++
73	*Atherix* sp.	+	+
74	*Tabanus* sp.	+	+

75	*Ephydra* sp.	+	+
76	*Chaoborus crystallinus* De Geer.	-	+
	Chironomidae		
77	*Stempelina bausei* Kieffer	-	+
78	*Micropsectra praecox* Mg.	-	+
79	*Tanytarsus exiguus* Jon.	++	++
80	*T. gregarius* Kieffer.	-	+
81	*T. lauterborni* Kieffer.	+	-
82	*T. lobatifrons* Kieffer.	-	+
83	*Cryptochironomus camptolabis* Kieffer.	-	+
84	*C. defectus* Kieffer.	++	++
85	*C. fuscimanus* Kieffer.	-	+
86	*C. viridus* Fabr.	-	+
87	*Limnochironomus nervosus* Staeg.	-	+
88	*Microtendipes chloris* Mg.	+	+
89	*Chironomus plumosus* L.	+	-
90	*Cricotopus biformis* Edw.	+	+
91	*Anatopynia plumipes* F.	+	+
92	*Procladius choreus* Mg.	++	++
93	*Pelopia punctipennis* Kieffer.	+	+
	Ceratopogonidae		
94	*Culucoides* sp.	+	+
95	*Bezzia* sp.	+	+
	Total	88	92

Note: ++ abundant species.

The total biomass of macrozoobenthos changed within 1.96–2.18 g/m^{2}at the density of 529–639 individuals/sq.m. The dominant groups were insects (table 3).

Table 3.

Number of species, mean annual density and biomass of macrozoobenthos in the Araks River (2011–2012)

Groups	2011			2012		
	N	C	B	N	C	B
Oligochaeta	6	48	0,16	7	56	0,20
Hirudinea	5	14	0,16	7	56	0,20
Mollusca	9	72	0,28	8	84	0,30
Amphipoda	7	34	0,12	5	44	0,18
Decapoda	3	1	0,02	2	-	-
Hydrocarina	2	26	0,07	2	34	0,09
Odonata	6	44	0,15	8	59	0,22
Ephemeroptera	5	30	0,10	6	38	0,12
Hemiptera	8	28	0,09	8	30	0,11
Coleoptera	6	64	0,22	9	46	0,14
Trichoptera	8	84	0,30	9	72	0,20
Diptera	4	18	0,04	4	30	0,10
Chironomidae	8	66	0,25	10	90	0,32
Ceratopogonidae	2	-	-	2	-	-
Total	88	529	1,96	92	639	2,18

Note: N – number of species, C – density, B – biomass (g/m^2).

Conclusions

1) Investigation of the lower part of the Araks River was conducted in 2011–2012. Ninety five species of invertebrate organisms belonging to 14 systematic groups were found. Of these 56 species are water living insects and 19 species belong to mollusks.

2) During the period of the study the density and biomass of organisms varied considerably. In 2011 biomass of organisms was 1.96 g/m^2 and density – 529 individuals/sq.m. In 2012 biomass of organisms was 2.18 g/m^2 and density – 639 individuals/sq.m.

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