Contributions to the study of bentonic fauna of certain rivers of the zone of the future Iron Gates dam lake

by ELENA PRUNESCU-ARION

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B u c a r e s t

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CONTRIBUTIONS TO THE STUDY OF BENTONIC FAUNA OF CERTAIN RIVERS OF THE ZONE OF THE FUTURE PORȚILE DE FIER DAM LAKE

ELENA PRUNESCU-ARION

In the present work, several aspects regarding the faunistic composition of several rivers of the Porțile de Fier (Iron Gates) dam lake zone are presented. From our investigations, a varied and rich, typical mountain fauna was ascertained, not influenced by the Danube waters.

In the framework of the complex investigations which are being carried out in the zone of the future Iron Gates dam lake, the staff of the laboratory of limnology, of the "Traian Săvulescu" Institute has begun as from 1966 a hydrobiological study on certain rivers, tributaries to the Danube in this zone.

The first investigations concerning the fauna of the Iron Gates — Sviniţa zone, are due to M. BACESCU (1). Subsequently systematic hydrobiological studies were undertaken on the flora and fauna of the Orsova—Moldova-Veche region, as well as on the Cerna river (2, 5, 6, 7).

As regards our investigations, they were carried out in 1966 and 1967, on the rivers Vodiţa, Mraconia, Plavişeviţa, Elişeva, Cameniţa, Cruşoviţa and Vărad (Fig. 1) in the zone of their mouths (figs. 2, 3, 4, 5) in three seazons: spring, summer and autumn.

These rivers cross the Iron Gates Carpathians, an arca with a complicated lithological structure, madè up of crystalline schists granites, hard Jurasic limestones (8).

The speed of the current in common waters oscillates around 1 m/sec, with the exception of rapids, and of meanders (slow currents); in high waters and torrents the speed of water exceeds 2 m/sec. Seasonal variations have a great influence on the rivers studied. During heavy or torrential rains, rivers are transformed into real torrents carrying downstream large quantities of boulders. In summer, during droughty periods, and particularly in autumn, some take the aspect of brooks (Vodiţa, Plavişeviţa), others remain merely as a rill (Vărad), while yet other disapper under the river bed (Mraconia). The waters are clean, clear, with a high percentage of dissolved oxygen, oscillating between 79% in spring and 123% in autumn, and a pH value comprised between 7,8—8 indi-

Table 1

The chemical analysis (Values are given in mg/l)

No.	River	Period	Consumed MnO_4K	Rezidue fix	Alkalinity	Suspensions	Fe	C^{++}	Mg^{++}	So_4^{--}	Cl^-	HCO_3	NO_3	NO_2	NH_3	Hardness German degree		
																Total	Permanent	Temporary
1	Vărad river	VI. 1967	17	281	4,2	39,8	0,08	8,60	5,47	21,14	14,18	256,2	0,005	0,8	ab.	12,5	3,64	11,76
								4,3	0,45	0,44	0,4	4,2	—	—	—			
		X. 1967	18	232	3,4	7,8	abs.	72	11,55	53,4	7,09	207,4	ab.	ab.	ab.	12,74	3,22	9,52
								3,6	0,95	1,11	0,2	3,4	—	—	—			
2	Crușoviţa river	VI. 1967	22	80	1,7	abs.	0,08	21,0	6,08	15,22	7,09	103,7	traces	ab.	ab.	4,34	3,22	4,76
								1,05	0,5	0,31	0,2	1'7	—	—	—			
		X. 1967	32	36,9	5,5	66,0	ab.	76	18,84	53,07	14,18	33,55	ab.	ab.	ab.	14,98	1,20	13,78
								3,80	1,55	1,10	0,4	5,5	—	—	—			
3	Cameniţa river	VI. 1997	18	259	5,1	3,2	0,08	52	11,24	17,27	14,18	311,1	traces	0,2	ab.	9,8	2,52	14,28
								2,6	0,9	0,33	0,4	5,1	—	—	—			
		X. 1967	21	206	4,5	740,	abs.	80	9,12	15,01	7,09	274,5	ab.	ab.	ab.	13,30	0,70	12,60
								4,0	0,75	0,31	0,2	4,5	—	—	—			

cating a slight alkalinity. In the enclosed table (Table 1) some chemical data are presented, reflecting the natural, unimpurified aspect, no sources of pollution existing on those rivers.

Due to the fact that bottom fauna presents great stability, as compared to plankton, our investigation centered round the knowledge of the former, taking into consideration also the fact that it represents the chief trophic basis within the framework of river economy.

A complex of ecological factors acts upon these rivers, the more important ones being: speed of current, nature of substratum, physical character and chemical conditions of the water, a. s. o. (3, 4). As a consequence of the great variation of these factors, bottom fauna is ununiformly distributed, well specialized and adapted to existing conditions. An important role is held by the nature of substratum made up of: boulders, stones of various sizes, coarse sand, small slightey silted portions. Due generally to their mobility, sands do not represent an environment propitions to the development of a rich and varied fauna. The stony substratum, however, by the surfaces of submerged stones, both those exposed to the current, as well as the ones sheltered from it, the periphyton installed on a great proportion of the stones in the water, moss agglomerations established on some boulders in water rapids, coarse plant detritus, bank portions covered with grass and washed by water currents, represent real ecological recesses for a multitude of specific organisms, adapted to the respective substratum (Table 2).

Vegetation is reduced to small moss agglomerations dominated by *Fontynalis antypiretica* L. and the periphyton from the surface of boulders. In the Vărad river Charareae impreguated with limestone particles, an effect of the substratum, are to be found.

In the moss agglomerations the presence of many species of more frequent Hydracarina is recorded: *Torrenticola elliptica*, *T. anomala*, *Hygrobates caliger*, a. s. o., as well of dipteran larvae Tipulidae, Pschiodidae, Empididae, Stratiomyidae.

On the surface of boulders not covered by periphyton, numerous insect larvae find living conditions: Ephemeroptera which in some samples reach percentages of 64,28% (Vărad), 52,87% (Cruşovița) or 25% (Cameniţa), with frequent species such as: *Ecdyonurus sp*, *Epeorus similis*, *Baëtis rhodani*, *Baëtis venustulus*, *Ecdyonurus fluminum*, *Ephemerella ignita*, *Rhitrogena semicolorata*, fond of a more rapid current, and species living in safer places: *Caenis macrura*, *Taniopterix* sp., *Habrophlebia fusca*, am. o. Among Plecoptera, which in some samples from rivers reach percentages up to 60,53% (Vărad), 33,49% (Cameniţa), we mention: *Leuctra* sp., *Capnia* sp., *Nemoura* sp. a. o., in stronger currents also *Perla burmeisteriana*, *Isoperla grammatica*, a. o. on stony portions better protected from the current. The Trichoptera are present with frequent species, such as *Ryacophila tristis*, *R. obliterata*, *Psychomia pusilla*, *Hydropsiche angustipennis*, *Hydroptila* sp., a. o. (the last two living better protected from the current) indicated the highest percentage (53,21%) in the Plavişeviţa river, in other rivers presenting a smaller frequency. The Coleoptera were represented by species such as: *Elmis megeolei*, *Esolus* sp., *Limnius* sp. a. o., the Blepharoceridae by *Liponeura minor*, *Liponeura cordata*, *Blepharocera fasciata*, present particularly in spring, then the 5 Simuliidae, which reach their

DISTRIBUTION OF SPECIES

SPECIES	Vodița river			Mraconia river					
	km 950,3			km 967					
	1966			1966			1967		
	III	VII	X	III	VII	X	III	VI	X
Coelentera									
Hydra sp.	—	—	—	—	—	—	—	—	—
Turbelaria									
Polycelis nigra O.F.M.	×	—	—	—	—	—	—	—	—
Nematoda	—	—	—	—	—	—	—	—	×
Oligochaeta									
Nais simplex Pig.	×	—	—	—	—	—	—	—	—
Nais communis Pig.	—	—	—	—	—	—	×	—	—
Nais bretscheri Pig.	—	—	—	×	—	×	—	—	×
Nais elinguis Müller	×	—	—	×	×	×	—	×	—
Nais pardalis Pig.	—	—	—	—	—	—	—	—	×
Ophidonais sérpentive Mül.	—	—	—	—	—	—	—	—	—
Limnodrilus hoffmeister Clap.	—	—	—	—	×	—	—	—	—
Limnodrilus sp.	—	—	—	—	—	—	—	—	—
Trichodrilus sp.	—	—	—	—	—	—	—	—	—
Enchitraeus albidus Henle.	—	—	—	—	×	—	—	—	—
Eiseniella tetraëdra Sov.	—	—	—	—	—	—	—	—	—
Eiseniella sp.	—	—	—	—	×	—	—	—	—
Chaetogaster cristallinus Vejd.	—	—	—	—	—	—	—	—	—
Pristina longiseta Ehr.	—	—	—	—	—	—	—	—	—
Pristina rosea Pig.	—	—	—	—	—	—	—	—	—
Lumbriculus variegatus Müll.	—	—	—	—	—	—	—	—	—
Tubifex tubifex Müll.	—	—	—	—	—	—	—	—	—
Hirudinea									
Erpopdella octoculata L.	—	—	—	—	—	—	—	—	—
Gasteropoda									
Ancylus fluviatilis Müll.	×	—	—	×	×	×	×	×	—
Radix ovata Drep.	—	—	—	—	—	×	—	—	—
Radix peregra Müll.	—	—	—	—	—	—	—	×	—
Vallonia pulchella Müll.	—	—	—	—	—	—	—	—	—
Physa acuta Drop.	—	—	—	—	—	—	×	—	—
Ostracoda									
Ilyodromus olivaceus (Br. et Morm.)	—	—	—	×	—	—	—	—	—
Ilyocypris brady Sars	—	—	—	×	—	—	—	—	—
Ilyocypris sp.	—	—	—	—	—	—	—	—	×
Candona fasciolata Petck.*	—	—	—	—	—	—	—	—	—
Candona sp.	—	—	—	—	—	—	—	—	—
Heterocypris brady Sars	—	—	—	—	—	—	—	—	×
Heterocypris fretensis (Br. et Rob.)	—	—	—	—	—	—	—	—	—

* New for Rumania.

IN THE SEVEN RIVERS

Table 2

Plavişeviţa river			Elişeva river						Cameniţa river			Crişoviţa river			Vărad river		
km 981			km 1 011						km 1 025,7			km 1 030			km 1 042,5		
1966			1966			1967			1967			1967			1967		
III	VII	X	III	VII	X	III	VI	X	III	VI	X	III	VI	X	III	VI	X
—	—	—	—	—	×	—	—	×	—	×	—	—	×	—	—	—	—
×	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	×	—	—	—	—	—	—	×	—	×	—	—	—	—	—	×
—	—	×	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
×	—	×	—	—	—	×	—	—	—	—	—	×	×	×	—	—	—
—	—	—	—	—	—	—	—	—	—	—	×	—	—	—	—	—	—
—	—	—	—	—	—	—	—	×	—	×	—	—	—	—	—	—	—
×	—	×	×	—	×	—	—	×	—	—	×	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	×	×	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	×	×	—	—	—	—	×	×	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	×
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	×
—	—	—	—	—	—	—	—	×	×	—	—	×	—	—	×	—	—
—	—	—	—	—	—	—	—	—	×	—	—	—	—	—	×	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	×	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	×	—	—	—	×	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	×	—	—	—	—	—	—	×
—	—	—	—	—	—	×	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	×	×	—	—	—	—	—	—	—	—	×
×	—	—	×	—	—	—	—	—	—	—	—	—	—	—	—	—	—
×	×	—	×	—	×	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	×	—	—	—	—	—
—	—	—	—	—	—	—	—	—	×	—	—	—	—	—	×	—	—
—	—	—	—	—	—	—	—	—	×	—	—	—	—	—	—	—	—
—	—	×	—	—	—	—	—	—	×	—	—	—	—	—	—	×	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	×	—	—	—	—	—	×	—	×	—	—	—	×	—	—	—
—	—	—	—	—	—	—	—	—	—	×	×	—	—	—	—	—	—
—	—	×	—	—	—	—	—	×	—	×	×	—	—	×	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	×	—	×	×	—	—	×	—	—	—

SPECIES	Vodița river			Mraconia river					
	km 950,3			km 967					
	1966			1966			1967		
	III	VII	X	III	VII	X	III	VI	X
Heterocypris reptans (Baiard) *	—	—	—	—	—	—	—	—	—
Heterocypris incongruens (Ramd.)	—	—	—	—	—	—	—	—	—
Heterocypris brevicaudata Kauf. *	—	—	—	—	—	—	—	—	—
Heterocypris rotunda Bronstein	—	—	—	—	—	—	—	—	—
Potamocypris variegata (Br. et Rob.) *	—	—	—	—	—	—	—	—	×
Eucypris pigra (Fisch.)	—	—	—	—	—	—	—	—	×
Amphipoda									
Rivulogammarus pulex (L.)	×	—	—	—	×	—	—	×	×
Hidracarina									
Sperchon clupeifer Piersig.	—	—	—	—	—	×	—	—	—
Sperchon denticulatus Koenike	—	—	—	—	—	—	—	—	—
Libertia maglioi Thor.	—	—	—	—	—	—	—	—	—
Libertia porosa Thor.	—	—	—	—	—	—	—	—	—
Libertia insignis Neuman	—	×	—	—	—	—	—	—	—
Hygrobates calliger Piersig.	—	—	—	—	—	×	—	—	—
Hygrobates fluviatilis (Ström.)	—	—	—	—	—	—	×	×	—
Atractides gibberipalpis (Piersig.)	—	—	—	—	—	—	×	×	—
Atractides distans Viets.	—	×	—	—	—	—	—	—	—
Aturus fontinalis Lundblab.	—	—	—	—	—	×	—	—	—
Mideopsis orbicularis (Müll.)	—	×	—	—	—	—	×	×	—
Torrenticola (C. L. Koch)	×	—	—	—	—	×	—	—	—
Torrenticola elliptica Moglio.	×	—	—	—	—	×	—	—	—
Collembola									
Isotomurus palustris (Müll.)	—	—	—	—	—	×	—	×	—
Isotomurus schaefferi (Krausbaueri)	—	—	—	—	—	—	—	—	—
Hypogastrura armata (Nicolit.)	—	—	—	—	—	—	—	—	—
Sminthurus viridis (Linné)	—	—	—	—	—	—	—	—	—
Ephemeroptera									
Baëtis venustulus Eaton	×	—	—	×	×	—	×	—	×
Baëtis rhodani (Pictet)	×	×	—	×	×	—	×	—	—
Baëtis bioculatus (L.)	×	×	—	—	—	—	—	—	—
Baëtis vernus Curtis	—	—	—	—	—	—	—	—	—
Baëtis pumilus (Burmeister)	—	—	—	—	—	—	—	—	—
Baetis sp.	—	—	—	×	—	×	—	—	—
Ecdyonurus fluminum (Pictet)	×	—	—	×	—	—	×	—	—
Ecdyonurus lateralis Curtis	—	—	—	—	—	—	—	—	—
Ecdyonurus sp.	—	—	—	—	×	—	—	—	—
Epeorus assimilis Eaton	—	—	—	—	—	—	—	—	—
Habroleptoides modesta (Hagen)	×	—	—	—	—	—	—	—	—
Habrophlebia lăuta Mhc.	—	—	—	—	—	—	—	—	—
Caenis macrura Stephens	—	—	—	×	—	×	×	×	—
Torleya major Klapalek	—	—	—	—	—	—	—	—	—
Torleya sp.	—	—	—	—	—	—	—	—	—
Rhitrogena semicolorata Curtis	×	—	—	—	—	—	—	—	—

* New for Rumania.

Plavişeviţa river			Elişeva river						Camenița river			Crușoviţa river			Vărad river		
km 981			km 1 011						km 1 025,7			km 1 030			km 1 042,5		
1966			1966			1967			1967			1967			1967		
III	VII	X	III	VII	X	III	VI	X	III	VI	X	III	VI	X	III	VI	X
—	—	—	—	—	—	—	—	—	—	—	×	—	—	×	—	—	—
—	—	—	—	—	—	—	—	—	—	×	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	×	×	—	—	—	—	—	—
—	—	×	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	×	—	—	—	—	—	—	—	—	—	—	×	×	×	—	×	×
—	—	—	×	—	×	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	×	—	—	×	—	—	—	—	—
—	—	—	—	—	—	—	—	—	×	—	—	×	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	×	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	×	×	×	×	×	—	—	—	—	—	—	—	—	—	—	—	—
—	×	×	—	×	—	—	—	—	×	×	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	×	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	×	×	×	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	×	×	×	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	×	—	—	—	×	—
—	—	—	—	—	—	—	—	—	—	—	—	×	—	—	—	×	—
—	—	—	—	—	—	—	—	—	×	—	—	×	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	×	—	—	—	—
×	—	—	×	—	—	×	—	×	—	×	—	—	—	—	—	—	—
×	×	—	×	—	—	×	—	×	×	×	—	—	×	×	×	—	×
—	—	—	—	—	—	—	—	—	×	—	—	×	×	×	—	—	—
×	—	—	×	—	—	—	—	—	—	×	—	—	—	—	—	×	—
—	—	—	—	—	—	—	—	—	×	—	—	×	×	×	—	—	—
—	—	—	×	—	×	—	—	—	—	—	—	—	—	—	—	—	—
×	—	—	×	—	—	—	—	—	—	—	—	×	×	×	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	×	—	—	—	—
×	×	×	×	—	—	—	—	—	—	—	—	—	—	×	—	—	—
—	—	×	×	—	—	×	×	—	—	—	—	×	×	×	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	×	×	—	—	—
×	—	×	—	—	—	—	—	—	×	×	—	×	×	×	—	—	—
—	—	—	—	—	—	—	—	—	×	—	—	—	—	—	—	—	—
—	—	—	×	—	—	—	—	—	×	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

SPECIES	Vodița river			Mraconia river					
	km 950,3			km 967					
	1966			1966			1967		
	III	VII	X	III	VII	X	III	VI	X
Rhitrogena sp.	—	—	—	—	—	—	—	—	—
Ephemerella ignita Poda	—	—	—	×	—	—	×	—	—
Ephemera vulgata Linné	—	—	—	—	—	—	—	—	—
Centroptilum luteolum (Müller)	—	—	—	—	—	—	—	—	—
Plecoptera									
Taeniopterix schoenemundi Mert.	—	—	—	—	—	—	—	—	×
Taeniopterix sp.	—	—	—	—	—	×	—	—	—
Perla burmeisteriana Claussen	—	—	—	—	—	—	—	—	×
Perla marginata (Panzer)	×	—	—	—	—	—	—	—	—
Isoperla grammatica Pod.	—	—	—	—	—	—	—	—	—
Isoperla sp.	—	—	—	—	—	—	—	—	—
Nemura cinerea Retz.	—	—	—	—	—	—	—	—	—
Nemura sp.	×	—	—	—	—	—	—	—	—
Amphinemura sp.	×	—	—	—	—	—	—	—	—
Protonemura sp.	—	—	—	—	—	—	—	—	—
Leuctra fusca L.	—	—	—	—	—	—	—	—	×
Leuctra nigra Ol.	—	—	—	—	—	—	—	—	—
Leuctra sp.	—	—	—	×	—	—	—	—	—
Brachyptera sp.	×	—	—	—	—	—	—	—	—
Capnia nigra Pict.	—	—	—	—	×	—	—	—	—
Capnia sp.	—	—	—	—	×	—	—	—	—
Odonata									
Onychogomphus forcipatus (L.)	—	—	—	—	—	—	—	—	—
Calopterix (Agrion) virgo (L.)	—	—	—	—	—	—	—	—	×
Calopterix splendens Harris	—	—	—	—	—	—	—	—	×
Heteroptera									
Corixa sp. Juv.	—	—	—	—	—	—	—	—	—
Micronecta sp.	—	—	—	—	—	×	—	—	—
Coleoptera									
Esolus sp.	—	—	—	—	—	×	—	×	×
Helodes sp.	—	—	—	—	—	—	—	—	—
Elmis megeolei (Duft.)	—	—	—	—	—	×	—	×	×
Hydraena nigrita Germ.	—	—	—	—	—	—	—	—	—
Hydraena pachyptera Apf.	—	—	—	—	—	—	—	—	—
Helichus substriatus Müll.	—	—	—	—	—	—	—	—	—
Linnebius stagnalis Guill.	—	—	—	—	—	—	—	—	—
Laccobius gracilis Motsch.	—	—	—	—	—	—	—	—	—
Limnius sp.	—	—	—	—	—	×	—	—	—
Octhebius sp.	—	—	—	—	—	×	—	—	—
Trichoptera									
Rhyacophila nubila Zetter.	×	—	—	×	—	—	—	×	—
Rhyacophila obliterata MacLan	—	—	—	—	—	—	—	—	—
Rhyacophila sp.	—	—	—	—	—	—	—	—	×
Plectroçnemia sp.	×	—	—	—	—	—	—	—	—

Plavişeviţa river			Elişeva river						Cameniţa river			Cruşoviţa river			Vărad river		
km 981			km 1 011						km 1 025,7			km 1 030			km 1 042,5		
1966			1966			1967			1967			1967			1967		
III	VII	X	III	VII	X	III	VI	X	III	VI	X	III	VI	X	III	VI	X
×	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
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SPECIES	Vodiţa river			Mraconia river					
	km 950,3			km 967					
	1966			1966			1967		
	III	VII	X	III	VII	X	III	VI	X
Polycentropus sp.	—	—	—	—	×	×	—	—	×
Agapetus sp.	—	—	—	—	—	—	—	—	—
Psychomya pussilla Fabr.	—	—	—	—	—	—	—	—	×
Hydropsiche pellucidula Curtis	—	—	—	×	—	×	—	—	×
Hydropsiche saxonica MacLach	×	—	—	×	—	—	—	—	—
Hydropsiche angustipennis Curtis	—	—	—	—	×	—	—	—	—
Hydropsiche guttata Pictet	—	—	—	—	—	—	—	—	—
Hydropsiche sp.	×	×	—	×	—	×	—	×	×
Cheumatopsiche lepida Pictet	—	—	—	×	×	—	—	—	×
Stactobia sp.	—	—	—	—	—	—	—	×	×
Hydroptila sp.	×	×	—	×	—	×	—	×	×
Potamophylax nigricornis Pictet	—	—	—	×	—	—	—	—	—
Leptocerus sp.	—	—	—	—	—	—	—	×	—
Mystacides	—	—	—	—	—	—	—	×	—
Wormaldia	—	—	—	—	—	—	—	—	—
Silo sp.	—	—	—	×	—	—	—	—	—
Lype sp.	—	—	—	×	—	—	—	—	—
Lepidostomatidae	—	—	—	—	×	—	—	—	—
Limnophilus sp.	—	—	—	—	—	—	—	—	—
Diptera	—	—	—	—	—	—	—	—	—
Tipulidae	—	—	—	×	—	—	—	×	×
Anthoca sp.	—	—	—	×	×	×	—	—	—
Psichodidae	—	—	—	×	—	—	—	—	×
Pericoma sp.	×	—	—	—	—	×	—	—	—
Dixidae	—	—	—	—	—	—	—	—	—
Blepharocridae									
Liponeura minor Bischoff	×	—	—	—	—	—	—	—	—
Liponeura cordata Wimmer	×	—	—	—	—	—	—	—	—
Blepharocera fasciata Westwoor	—	—	—	—	—	—	—	—	—
Simuliidae									
Wilhelmia balcanica severinensis (Din.)	—	—	—	—	—	—	—	—	—
W. balcanica balcanica (End.)	—	—	—	—	—	—	—	×	—
W. salopiensis danubiensis (Zwok.)	×	—	—	×	—	—	—	×	—
W. ivashentzovi (Rubz.)	×	—	—	×	—	—	—	—	—
W. veltistshevi (Rubz.)	—	—	—	—	—	—	—	—	—
W. mediteranea (Puri)	×	—	—	—	—	—	—	—	—
W. equina (L.)	—	—	—	—	—	—	—	—	—
Odagmia ornata ornata (Mg.)	—	—	—	—	—	—	—	—	—
Od. ornata pratorum (Mg.)	×	—	—	—	—	—	—	—	—
Simulium argyreatum (Rubz.)	—	—	—	—	—	—	—	—	—
Simulium venustum Rubz.	×	—	—	—	—	—	—	—	—
Eusimulium securiforme (Rubz.)	—	—	—	—	—	—	—	—	—
Eusimulium aureum (Fries.)	×	—	—	×	×	×	—	×	—
Cnephia trigonia (Lundstr.)	—	—	—	—	—	—	—	—	—
Cnephia tredecimata (Edw.)	—	—	—	×	—	—	—	—	—
Gnus malysevi albipes (Rubz.)	—	—	—	—	—	—	—	—	—
Gnus degranjei (Dor. şi Gren.)	—	—	—	—	—	—	—	×	—
G. saccatum (Rubz.)	—	×	—	×	—	—	—	—	—

Plavişeviţa river			Elişeva river						Cameniţa river			Crişoviţa river			Vărad river		
km 981			km 1 011						km 1 025,7			km 1 030			km 1 042,5		
1966			1966			1967			1967			1967			1967		
III	VII	X	III	VII	X	III	VI	X	III	VI	X	III	VI	X	III	VI	X
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SPECIES	Vodiţa river			Mraconia river					
	km. 950,3			km 967					
	1966			1966			1967		
	III	VII	X	III	VII	X	III	VI	X
Friesia condici (Bar.)	×	—	—	×	—	—	—	—	—
Friesia crinita (Rubz.)	×	—	—	—	—	—	—	—	—
Friesia alogensis hiemalis (Rubz.)	×	—	—	—	—	—	—	—	—
Schönbaueria sp. (matthiesseni) End.	—	—	—	—	—	—	—	—	—
Ceratopogonidae	—	—	—	—	—	—	—	—	—
Chironomidae									
Orthocladiinae g. ? l. fontana Pankv.	—	—	—	—	—	—	—	—	×
Orthocladiinae g. ? l.	—	—	—	—	×	—	—	—	—
Orthocladius saxicola Kieff.	×	—	—	—	×	×	—	×	×
Orthocladius gr. botaphilus Kieff.	—	—	—	—	×	—	—	—	—
Orthocladius pothamophilus Tshern.	—	—	—	—	—	—	—	—	—
Orthocladius semivirens Edw.	—	—	—	—	—	—	—	—	—
Cricotopus gr. algarum Kieff.	×	—	—	—	×	—	—	—	—
Lauterbornia	—	—	—	—	—	—	—	—	×
Tanytarsus gr. mancus v.d. Walk.	—	—	—	—	—	×	—	—	×
Tanytarsus gr. exiguus Joh.	—	—	—	—	—	×	—	—	×
Eukiefferiella quadridentata Tshern.	—	—	—	—	—	—	—	—	—
Eukiefferiella elyptica Kieff.	—	—	—	—	—	—	—	—	—
Diamesa gr. prolongata Kieff.	—	—	—	—	—	—	—	—	—
Diamesa l. carpatica Botn. Cure.	—	—	—	—	—	×	—	×	—
Diamesa campestris Edw.	×	—	—	—	—	—	—	—	—
Limnophyes l. pseudo-prolongata Bot. et Cure	—	—	—	—	—	—	—	—	—
Ablabesmya gr. tetrastricta Kieff.	×	—	—	—	—	×	—	—	×
Ablabesmya gr. lentiginosa Fries.	×	—	—	—	—	—	—	—	—
Ablabesmya gr. monilis L.	—	—	—	—	—	—	—	—	×
Tendipedini g. l. monoculata Bot. Cure	×	—	—	—	—	×	—	—	—
Pelopia villipennis Kieff.	—	—	—	—	—	—	—	—	—
Brillia gr. modesta Mg.	×	—	—	—	—	—	—	—	—
Micropsectra curvicornis Tschern.	—	—	—	—	—	—	—	—	×
Micropsectra gr. praecox Mg.	—	—	—	—	—	—	—	—	×
Microtendipes sp.	—	—	—	—	—	—	—	—	×
Thienemanniella sp.	—	—	—	—	—	—	—	—	×
Stratiomydae	—	—	—	—	—	—	—	—	—
Tabanidae	—	—	—	×	—	×	—	—	×
Empididae									
Widemania sp.	×	—	—	×	—	—	—	—	—
Hemerodromia sp.	×	—	—	×	—	—	—	—	—
Briozoa									
Plumatella sp.	—	—	—	—	—	×	—	×	×

Plavişeviţa river			Elişeva river						Cameniţa river			Cruşoviţa river			Vărad river		
km 981			km 1 011						km 1 025,7			km 1 030			km 1 042,5		
1966			1966			1967			1967			1967			1967		
III	VII	X	III	VII	X	III	VI	X	III	VI	X	III	VI	X	III	VI	X
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
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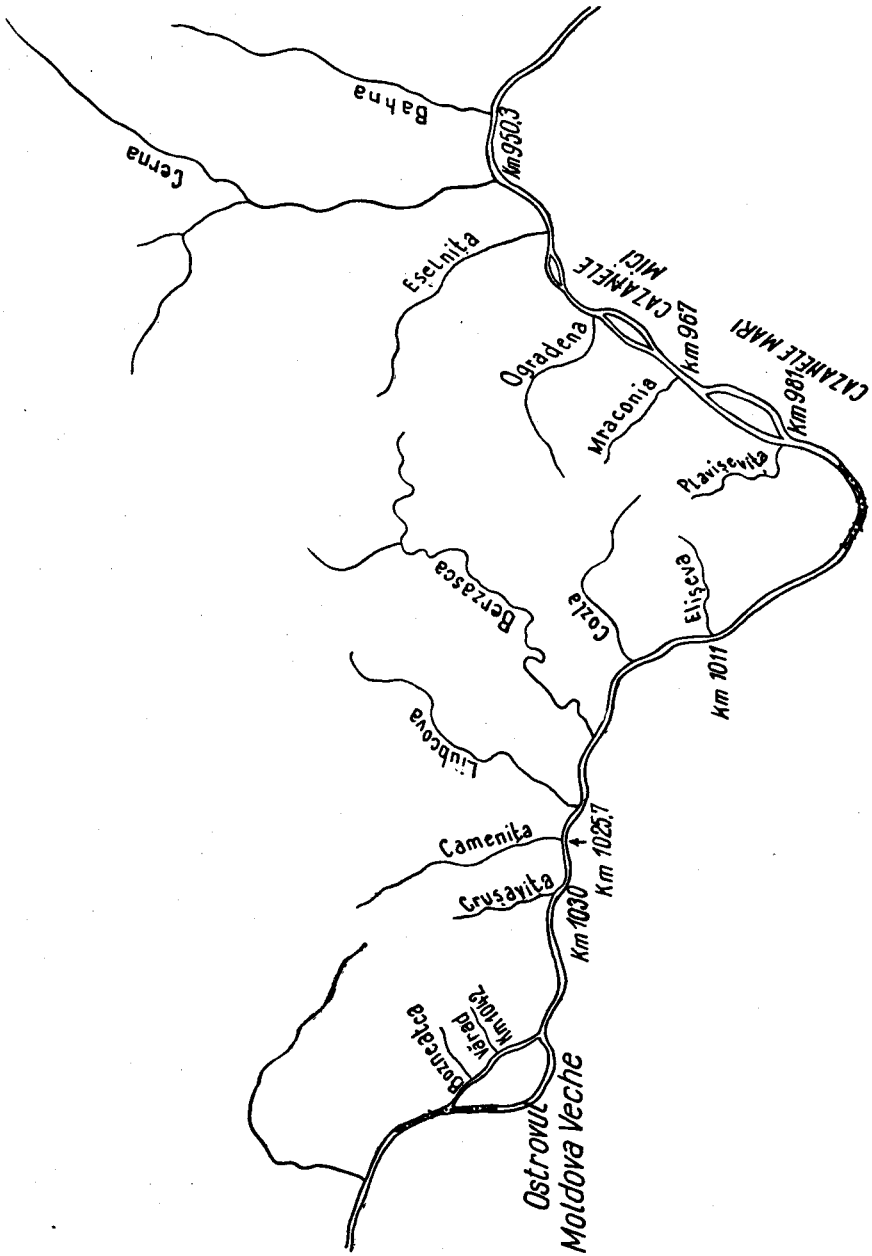

Fig. 1. — The Danube with the rivers investigated.

maximum development likewise in spring attaining a percentage of 78,87% in some samples from the Mraconia river (Fig. 2).

Among the frequent species we mention: *Simulium argyreatum*, *Eusimulium securiforme*, *Eusimulium aureum*, *Odagmia ornata*. Other cocenonteous organisms present baside the above mentioned ones were: flatworms — *Polycelis nigra*, leaches — *Herpobdella octoculata*, snails — *Ancylus fiuviatilis*, Bryozoa — *Plumatella* sp.

In the periphyton, covering entire surfaces of boulders, made up of numerou frequent Diatomeae: *Achnantes* sp., *Diatoma* sp., *Cymbella* sp., *Diatoma* sp., *Synedra* sp., a. s. o., green algae such sa: *Spyrogira* sp., *Cladophora* sp. a.s.o., blue alge — *Oscillatoria* sp., *Merismopedia* sp., *Lyngbia* sp., a.s.p, numerous species of Chironomidae find a favourable environment for development, reaching in some samples percentages of 87,90% (Vodița), 81,70% (Elișeva) or 63,92% (Mraconia) of the total number of organisms.

Of the species met with, we mention: *Ortocladiinae Orthocladiinae fontana*, *Orthocladius saxicola*, *Cricotopus algarum*, *Eukiefferiella quadridentata*, a. s. o. In these places Oligochaeta with varied species and of a lesser frequency likewise develop well, reaching in some samples percentages up to 40%. Among the species found we mention *Nais pardalis*, *Nais communis*, *Nais behningi*, *Nais bretscheri*, *Fridericia striata*, *Eiseniella tetraedra*, a. s. o., beside these the Nematoda, Ostracoda — *Ilyocypris* sp., *Candona* sp., seldom the Collembola — *Isotomurus schaefferi*, are likewise met with.

On the slightly silted portions certain species of Chironomidae, Oligochaeta, such as *Tubifex tubifex*, and Nematods are well developed.

In the coarse plant detritus, as well as in grassy bank portions washed by water currents, Gammaridae, belonging to the genus Rivulogammarus are met with.

From our observations we may state that, though at high waters, the Danube goes far upstream the valley of some of these rivers, the faunistic composition does not present any modifications.

CONCLUSION

From our investigations we may draw the following conclusions:

1. The rivers investigated belong to the category of mountain rivers, with clean, well-oxygenated waters, rapid currents, much influenced by seasonal variations.

We are greatly indebted for identification of several species to: Oligocheta — Fr. Botea; Molusca — A. Negrea; Ostracoda — D. Danielopol; Hidracarina — J. Tanasache; Colembola — M. Gruia; Odonata — V. Decu; Ephemeroptera — Prof. V. Bogoescu; Coleoptera — prof. M. Ieniștea; Trichoptere — Prof. A. Murgoci; Chironomidae — V. Cure; Blepharoceridae — V. Fără; Simuliidae — N. Covătaru.

Fig. 2. — Boulder with Simuliidae from the Mraconia river.

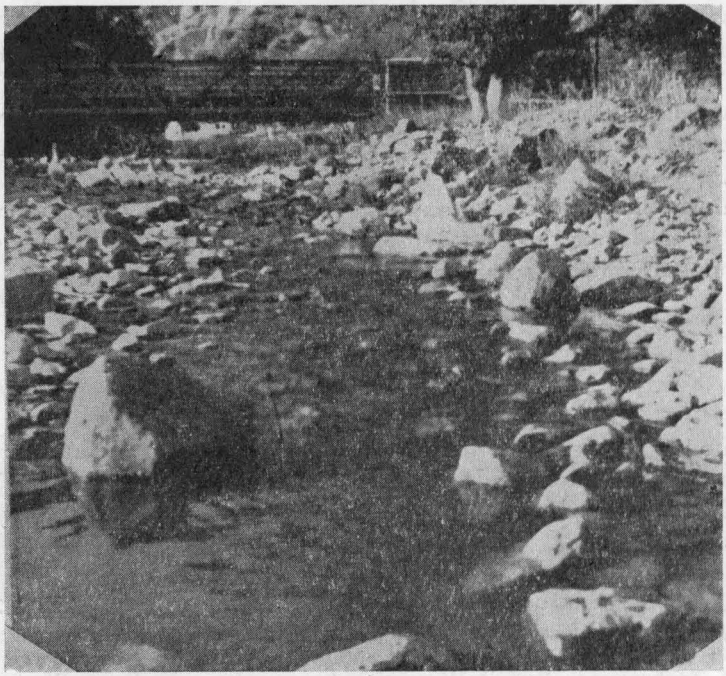

Fig. 3. — Aspect from the Plavișeviță river.

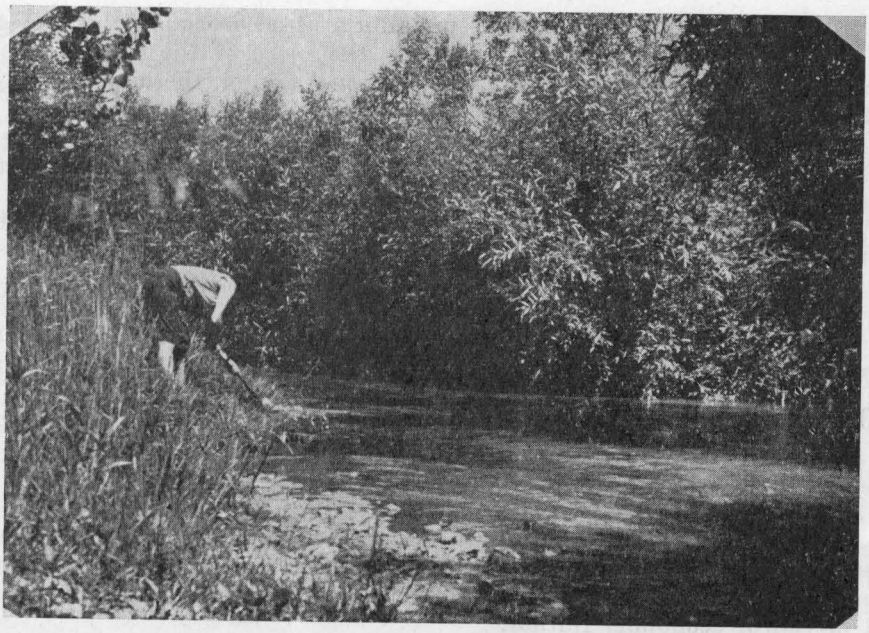

Fig. 4. — Aspect from the Camenița river.

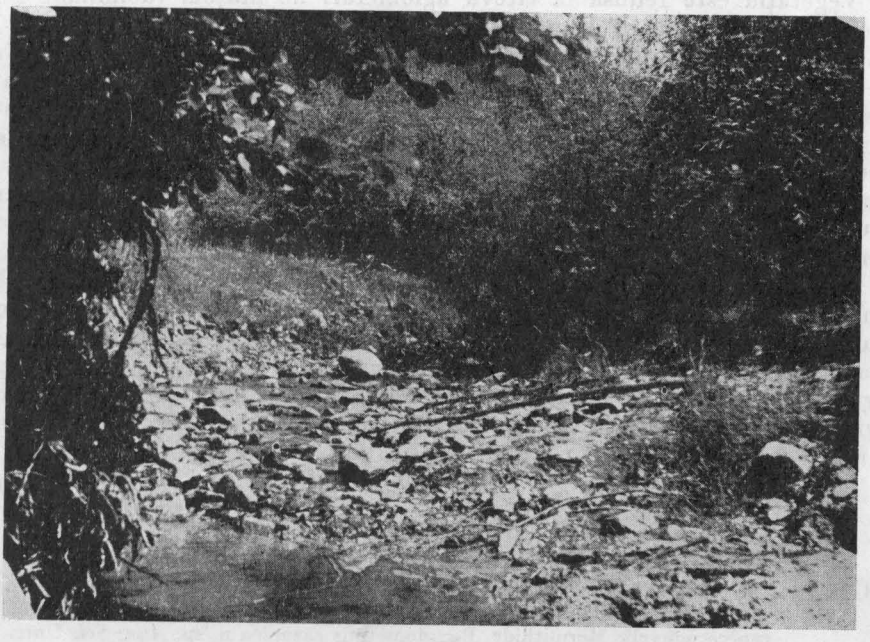

Fig. 5. — Aspect from the Crușovița river.

2. Bottom fauna distribution is ununiform as a consequence of the great variation of ecological factors, particularly the speed of the current, the nature of substratum, physico-chemical conditions a. s. o., the major role being that of the nature of substratum.

3. The great variety of substratum, represented by bouldors, stones, sand, periphyton, distributed under the aspect of a mosaic determined the establishing of a specialized fauna, adapted to this ecological recesess.

4. Though, at high, waters, part of the rivers investigated are inundated by the Danube, their faunistic composition is not altered.

CONTRIBUȚII LA STUDIUL HIDRAGIOLOGIC AL UNOR RÎURI DIN ZONA VIITORULUI LAC DE BARAJ PORȚILE DE FIER

REZUMAT

Cercetările noastre s-au efectuat în rîurile: Vodița, Mraconia, Plavișevița, Elișeva, Cameniță, Crușovița și Vărad în apropiere de confluența cu Dunărea, cu privire la componența faunei bentonice, care reprezintă principala bază trofică în cadrul economiei rîurilor.

Rîuri cu caracter montan, oxigenare puternică, apă curată, curs rapid, sînt mult influențate de variațiile sezoniere.

Vegetația este redusă la cîteva aglomerări de mușchi (dominant Fontinalis) și perifitonul care acoperă o mare parte din pietrele submerse.

Complexul factorilor ecologici în principal: viteza curentului, natura substratului, condițiile fizico-chimice prezintă o mare variație. Ca o consecință a acestui fapt, fauna bentonică este neuniform distribuită pe diferitele substraturi.

Astfel pe substratul pietros sînt bine reprezentate numeroase larve de insecte: efemeroptere, plecoptere, trichoptere, simulide, blefaroceride, psychodide, tabanide, stratiomiyde, coleoptere etc. cantonate atît pe suprafețe pietrelor expuse sau ferite de curent cît și în aglomerările de mușchi. Alături de acestea se mai găsesc planarii, gasteropode etc.

În perifiton își găsesc adăpost numeroase specii de chironomide, oligochete, nematode etc. De asemenea porțiunile reduse de la maluri puțin mîlite oferă locuri bune de dezvoltare unor specii de chironomide și oligochete, iar în detritusul vegetal din apă numeroase gammaride aparținînd genului Rivulogammarus își găsesc mediu prielnic dezvoltării. Nu s-au găsit organisme specifice fluviului deși multe din văile acestor rîuri sînt inundate de apele Dunării la viituri.

BIBLIOGRAPHY

1. BĂCESCU M. 1948—Quelques observations sur la faune benthonique du défilé roumaine du Danube; son importance zoogéographique et pratique; la description d'une espèce nouvelle Mermithide, Pseudomermis cazanica n. sp. *Ann. Sci. Univ. Jassy* **31** 240—253.

2. BREZEANU GH., VIRGINIA-MARINESCU POPESCU 1964 — Studiul hidrobiologic al bazinului inferior al Cernei (Cerna, Belareca şi Mehadica). *Hidrobiologia* **5**, 65—94.
3. DUSSART B. 1966 — Limnologie. L'Etude des eaux continentales. *Paris* 1—678.
4. JOACHIM ILLIES et LAZARE BOTOŞENEANU 1963 — Problemès et méthodes de la classification et de la zonation écologique des eaux courantes, considerées surtout du point de vue faunistique. *Mitteil. Comunic.* **12**, Stuttgart.
5. POPESCU ECATERINA şi ELENA PRUNESCU-ARION 1961 — Contribuţii la studiul faunei bentonice din Dunăre în regiunea cataractelor (km. 1042—955). *Stud. cercet. Acad. R.P.R. ser. biol. anim.* **2**, 237—256.
6. POPESCU ECATERINA, ELENA PRUNESCU-ARION şi ST. DRĂGĂŞANU 1962 — Condiţiile ecologice din zona de vărsare a rîului Cerna şi rolul acestei zone în dezvoltarea faunei piscicole dunărene. *Comunic. Acad. R.P.R.* **8** 929—935.
7. PRUNESCU-ARION ELENA, LUCREŢIA ELIAN 1966 — Principalele biocenoze ale unor rîuri din sudul Carpaţilor. *Hidrobiologia* **7**, 55—66.
8. MIHĂILESCU V. 1963 — Carpaţii sud-estici 295—298. Edit. Ştiinţ. *Bucureşti.*