Acta et Commentationes, Exact and Natural Sciences ISSN: 2537-6284
Volume 19(1), 2025, Pages 211–225 E-ISSN: 2587-3644
CZU: 592:574.58(478) DOI: 10.36120/2587-3644.v19i1.211-225

Benthic macroinvertebrates of the Botna River and their influence on the Dniester River

Oxana Munjiu

Abstract. From spring 2024 to winter 2025, 30 zoobenthos samples were collected in the rivers Botna and Dniester. A total of 85 taxa were identified, including 48 benthic invertebrate taxa in the Dniester upstream the mouth of the Botna River, 19 taxa at the mouth of the Botna River, and 46 taxa in the Dniester River downstream of the mouth of the Botna River. The saprobic index ranged from 1.87 in the Dniester River upstream of the mouth of the Botna River, which is class II and corresponds to "Good" water quality, to 3.23 in the mouth of the Botna River, which corresponds to class V ("Very polluted").
Keywords: benthos, density, biomass, saprobity.

Macronevertebratele bentonice din râul Botna și influența acestora asupra fluviului Nistru

Rezumat. În perioada primăvara 2024 - iarna 2025 au fost colectate 30 de probe de zoobentos din r. Botna şi fl. Nistru. Au fost identificați în total 85 de taxoni, inclusiv 48 de taxoni de nevertebrate bentonice în fl. Nistru, amonte r. Botna, 19 taxoni în gura de vărsare a r. Botna și 46 de taxoni în fl. Nistru, aval r. Botna. Indicele de saprobitate a variat de la 1,87 în fl. Nistru, amonte r. Botna ce se referă la Clasa II și corespunde calității apelor "Bună", până la - 3,23 în gura de vărsare r. Botna, ce se referă la Clasa V ("Foarte poluata").
Cuvinte-cheie: bentos, densitate, biomasă, saprobitate.

1. Introduction

Zoobenthos are invertebrate animals that live on the bottom of water bodies, on various substrates and in the lower layer of water. Zoobenthos is represented by oligochaetes, chironomids, molluscs, crustaceans, mayflies, caddisflies, stoneflies, and other groups of aquatic animals [1, 4, 18].

Various characteristics of benthic communities are used in many water quality bioindicator systems, as they reflect the combined impact of environmental factors on the state of aquatic ecosystems. An increase in the level of water pollution leads to the disappearance of pollution-sensitive species that have reached the tolerance limit, while a stable biodiversity of macrobenthic communities indicates favourable ecological conditions in the water body [1, 4, 18].

Comprehensive studies of zoobenthos on the territory of the Republic of Moldova began in 1947-1951 by Yarosenko and his colleagues [28] and have continued to the present day. The main focus of these studies was on our main water bodies, such as the rivers Dniester and Prut [9, 11, 13, 14, 18, 27, 28, 29]. Additional studies have been carried out on the mouths of Dniester tributaries (small rivers) as well as on various types of reservoirs, including those built on small rivers [8, 10, 11, 12, 13, 14, 27, 28, 30]. The following groups of macroinvertebrates have been studied in more detail on the small rivers of the Republic of Moldova: Oligochaeta [6, 29], Mollusca [11], Mysida and Amphipoda [13, 14], Collembola [2], and Chironomidae [20].

Nevertheless, studies of macroinvertebrate communities of small rivers were and remain rare and (or) fragmentary [3, 12, 15, 16, 17, 19, 30]. For example, the macroinvertebrates of the Botna River were studied as contributions to the development of aquaculture during 1962-1968 [12], first of all in the reservoirs built on the Botna River: Ulmu (72 ha), Costești (182 ha) and Răzeni (194 ha). The study identified 64 taxa of benthic macroinvertebrates, including the dominant species of oligochaetes, chironomids, molluscs, one species of mayflies and two species of hemipterans. Zoobenthos density varied from 240 to 2860 ind/m^2, while the biomass ranged from 1.2 to 7.6 g/m^2. It should be noted here that these studies are practically unknown to the international scientific community, primarily due to limited access to literature.

However, small rivers and, consequently, macroinvertebrates communities of these water bodies are the most vulnerable due to small river runoff or small volume of water flowing along the river bed. These rivers often freeze completely during winter and may experience severe desiccation or even complete drying during summer.

At the same time, it is necessary to take into account the high degree of anthropogenic load on these water bodies and climate change. Therefore, the objective of studying the macroinvertebrates of the Botna River is relevant.

2. Materials and Methods

The Botna River is a right-bank tributary of the Dniester River, located in the Republic of Moldova. It has a total length of 152 km, making it the sixth longest river in the country (Figure 1). The area of hydrographic basin is 1540 km^2, while the mean annual flow is 33.6 mln. m^3/s, with an average discharge of 1.1 m^3/s [33].

Samples were collected in accordance with international and national standards and unanimously generally accepted methods in hydrobiology [1, 4]. The samples have been

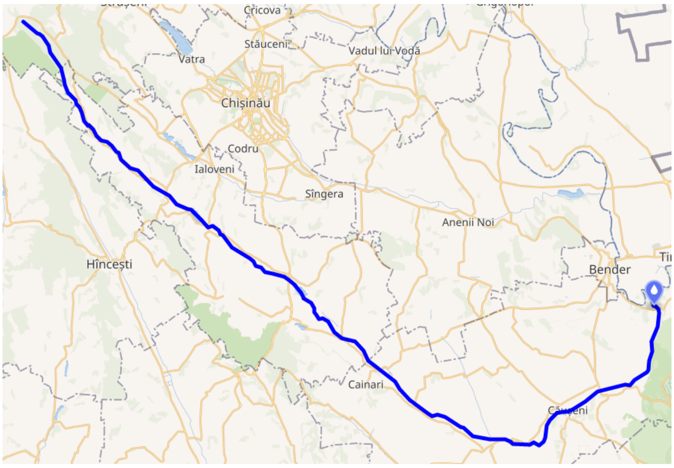

Figure 1. Map of the Botna River [https://en.wikipedia.org/wiki/Botna#/map/0]

collected in sampling points of the ecosystems of the Botna River and the Dniester River: Botna River, village of Horodca; Botna River, village of Costeşti; Dniester River, upstream of the Botna River confluence; Botna River, near the mouth of the river (near the bridge, approximately 500 m upstream of the mouth); Botna River, mouth of the river; Dniester River, downstream of the Botna River confluence.

The Ekman grab (area of capture of 0.025 m^2) and a dredge (area of capture of 8 m^2) were used for quantitative sampling and a hand net for qualitative sampling. The preservation of the samples has been made by adding 96% ethyl alcohol.

Zoobenthos was sorted and identified in the laboratory to the smallest possible taxon, using identification guides [5, 7, 21, 22, 23, 24, 25, 26], and a stereomicroscope SteREO *Discovery.V8* (Zeiss), and an upright microscope *Axio Imager A.2* (Zeiss). The biomass has been determined on an analytical balance ABS 80-4 Kern (0.001 g precision) and an ISOLAB balance (0.01 g precision). The density and biomass of macroinvertebrates were converted to ind/m^2 and g/m^2, respectively.

3. Results and Discussions

During the research conducted in the spring, summer and autumn of 2024 and winter of 2025, 30 zoobenthos samples were collected. Sampling was carried out at 6 sampling points within the ecosystems of the Botna River and the Dniester River (Figure 2 and 4).

According to the results obtained, the highest density of total zoobenthos was recorded at the Botna River, the village of Costești sampling point (14880 ind/m^2), while the lowest density was recorded in the spring period, at the Botna River mouth sampling point (240 ind/m^2) (Figure 3).

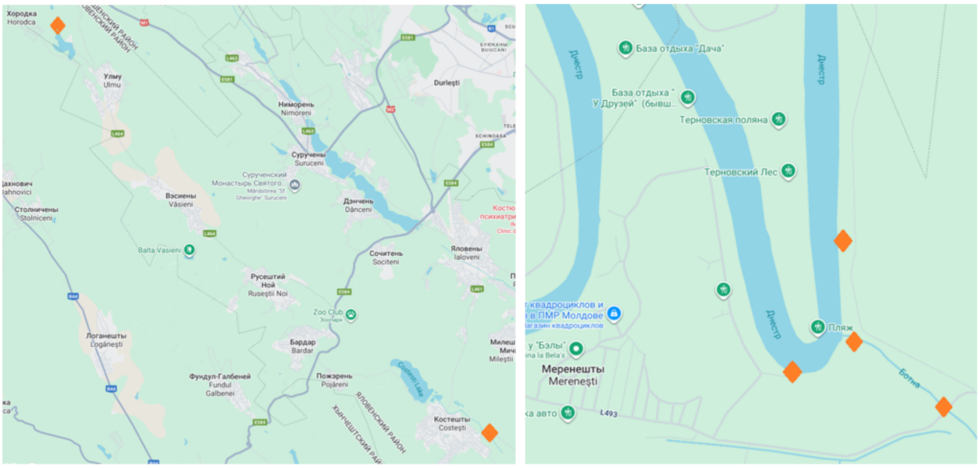

Figure 2. Map of sampling points in the ecosystems of the Botna River and the Dniester River. ◆ Sampling points. Fragment Google maps [`https://www.google.com/maps`]

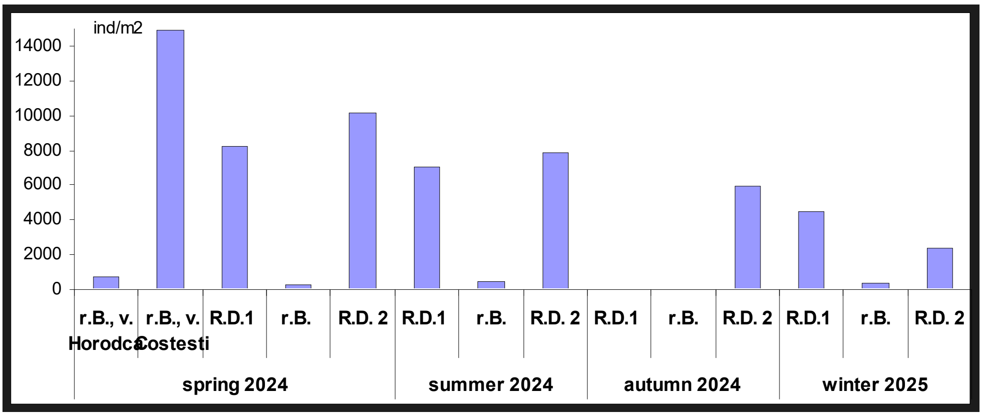

Figure 3. Density (ind/m^2) of total zoobenthos of the Botna River and the Dniester River upstream and downstream of the mouth of the Botna River in 2024-2025 (r.B.v. Horodca - the Botna River, in the village of Horodca; r.B.v. Costești - the Botna River, in the village of Costești; r.B. - the Botna River at the mouth, R.D.1 - the Dniester River upstream of the Botna River confluence, R.D.2 - the Dniester River downstream of the Botna River confluence)

The highest total zoobenthos biomass was recorded at the Dniester River sampling point, downstream of the Botna River confluence (2489 g/m^2), while the lowest biomass was recorded in winter at the Botna River mouth sampling point of the river (0.18 g/m^2).

Investigation of the taxonomic diversity of zoobenthos showed that the highest biodiversity was recorded in the sampling point Dniester River, upstream the Botna River confluence - 48 taxa of benthic invertebrates, in the Botna River - 44 (of which 19 taxa at the mouth of the river) and 46 taxa of benthic invertebrates in the Dniester River, downstream Botna River confluence.

The total number of benthic invertebrate taxa reached 85 (Table 1), comprising: Annelida - 8, Mollusca - 18, Crustacea - 17, Ephemeroptera - 3, Trichoptera - 2, Chironomidae - 25, and other groups - 12.

Figure 4. 1) Botna River, village of Horodca; 2) Botna River, village of Costeşti; 3) Dniester River, upstream of the Botna River confluence; 4) Botna River, near the mouth of the river (near the bridge, approx. 500 m upstream of the mouth); 5) Botna River, mouth of the river; 6) Dniester River, downstream of the Botna River confluence

Table 1. Zoobenthos diversity in the Botna River (R.B.) and the Dniester River upstream (R.D.1) and downstream (R.D.2) of the Botna River confluence, 2024-2025

Taxonomic name	R.D.1	R.B.	R.D.2
Phylum Porifera			
Spongilla lacustris (Linnaeus, 1759)	+		+
Phylum Bryozoa			
Bryozoa	+		
Phylum Cnidaria			
Hydra vulgaris Pallas, 1766		+	
Phylum Platyhelminthes			
Polycelis sp.			+
Phylum Nematomorpha			
Gordius aquaticus, Linnaeus, 1758		+	
Phylum Nematoda			
Nematoda	+	+	+
Phylum Annelida			
Subclass Oligochaeta			
Chaetogaster limnaei K von Baer, 1872	+		+
Ophidonais serpentina (Müller, 1774)	+	+	+
Potamothrix moldaviensis Vejdovsky & Mrazek, 1903	+		
Stylaria lacustris (Linnaeus, 1767)	+		+
Tubifex tubifex (Müller, 1774)		+	
Tubifex sp. div.	+	+	+
Subclass Hirudinea			
Erpobdella octoculata (Linnaeus, 1758)		+	
Phylum Mollusca			
Class Bivalvia			
Dreissena polymorpha (Pallas, 1771)	+		+
Dreissena rostriformis bugensis Andrusov, 1897	+		
Pisidium personatum Malm, 1855		+	+
Unio tumidus Retzius, 1788	+		
Class Gastropoda			
Clathrocaspia knipowitschii (Makarov, 1938) = *Caspia gmelini*	+		

Bithynia tentaculata (Linnaeus, 1758)	+		
Fagotia acicularis (Férussac, 1823)	+		+
Fagotia esperi (Férussac, 1823)	+		+
Lithoglyphus naticoides (Pfeiffer, 1828)	+		
Lymnaea auricularia (Linnaeus, 1758)			+
Lymnaea fragilis (Linnaeus, 1758)		+	
Physella acuta (Draparnaud, 1805) = *Physa acuta* Draparnaud, 1805	+	+	+
Physa fontinalis (Linnaeus, 1758)			+
Planorbis planorbis (Linnaeus, 1758)		+	
Radix peregra (Müller, 1774)		+	
Theodoxus fluviatilis (Linnaeus, 1758)	+		+
Viviparus viviparus (Linne, 1758)	+	+	+
Phylum Tardigrada			
Tardigrada		+	
Phylum Arthropoda			
Subphylum Crustacea			
Order Mysida			
Katamysis warpachowskyi G.O. Sars, 1893	+		+
Limnomysis benedeni Czerniavsky, 1882			+
Order Cumacea			
Pseudocuma (Stenocuma) cercaroides G.O. Sars, 1894	+		
Order Isopoda			
Jaera (Jaera) sarsi Valkanov, 1936	+		+
Asellus (Asellus) aquaticus (Linnaeus, 1758)		+	
Order Amphipoda			
Dikerogammarus bispinosus Martynov, 1925	+		+
Dikerogammarus haemobaphes (Eichwald, 1841)	+	+	+
Dikerogammarus villosus (Sowinsky, 1894)	+		+
Echinogammarus ischnus (Stebbing, 1899)	+		+
Echinogammarus warpachowskyi (Sars, 1894)			+
Gammarus kischineffensis Schellenberg, 1937		+	
Obesogammarus obesus (G.O. Sars, 1894)	+	+	+
Pontogammarus robustoides (Sars, 1894)	+		

Stenogammarus sp.		+	
Chelicorophium robustum (G.O. Sars, 1895)	+		+
Chelicorophium chelicorne (G.O. Sars, 1895)	+		
Corophium sp.	+		+
Class Collembola			
Isotomurus palustris (Muller, 1776)	+	+	
Class Insecta			
Order Ephemeroptera			
Baetis sp.		+	
Cloeon dipterum (Linnaeus, 1761)			+
Cloeon sp.		+	
Order Odonata			
Coenagrion sp.	+		
Order Coleoptera			
Dytiscus sp. (larvae)			+
Order Hemiptera			
Corixa sp.			+
Order Trichoptera			
Ecnomus tenellus (Rambur, 1842)	+	+	
Hydropsyche ornatula McLachlan, 1878	+		+
Order Diptera			
Family Simuliidae	+	+	+
Family Ceratopogonidae			+
Culicoides sp.			+
Family Chironomidae			
Camptocladius sp.		+	
Chironomus (Chironomus) riparius Meigen, 1804			+
Chironomus sp.		+	+
Chironomus simplex Goetghebuer 1921 syn.*Harnischia fuscimanus* Kieffer, 1921		+	
Cladotanytarsus (Cladotanytarsus) mancus (Walker, 1856)	+	+	+
Cricotopus (Cricotopus) algarum (Kieffer, 1911)	+	+	+

Cricotopus (Cricotopus) fuscus (Kieffer, 1909). syn.*Cricotopus biformis*		+	
Cricotopus (Isocladius) sylvestris (Fabricius, 1794)	+		+
Cricotopus sp.	+	+	+
Cryptochironomus (Cryptochironomus) defectus (Kieffer, 1913)		+	
Dicrotendipes nervosus (Staeger, 1839)	+	+	+
Endochironomus impar (Walker, 1856)		+	
Micropsectra junci (Meigen, 1818)	+	+	
Orthocladius sp.	+	+	+
Paratanytarsus lauterborni (Kieffer, 1909)	+	+	
Paratendipes albimanus (Meigen, 1818)		+	
Polypedilum (Tripodura) bicrenatum Kieffer, 1921		+	+
Polypedilum (Uresipedilum) convictum (Walker, 1856)			+
Polypedilum sp.	+		
Tanypus (Tanypus) punctipennis Meigen, 1818		+	
Tanypus (Tanypus) vilipennis (Kieffer, 1918)		+	+
Tanypus sp.		+	
Tanytarsus sp.	+		+
Thienemaniella sp.	+	+	
Trissocladius sp.	+	+	

Ponto-Caspian species have been identified: *Dreissena polymorpha* (Pallas, 1771), *Dreissena rostriformis bugensis* Andrusov, 1897, *Fagotia acicularis* (Férussac, 1823), *Fagotia esperi* (Férussac, 1823), *Lithoglyphus naticoides* (Pfeiffer, 1828), *Katamysis warpachowskyi* G.O. Sars, 1893, *Limnomysis benedeni* Czerniavsky, 1882, *Jaera (Jaera) sarsi* Valkanov, 1936, *Pseudocuma (Stenocuma) cercaroides* G.O. Sars, 1894, *Dikerogammarus bispinosus* Martynov, 1925, *D. haemobaphes* (Eichwald, 1841), *D. villosus* (Sowinsky, 1894), *Echinogammarus warpachowskyi* (Sars, 1894), *Obesogammarus obesus* (G.O. Sars, 1894), *Pontogammarus robustoides* (Sars, 1894), *Chelicorophium robustum* (G.O. Sars, 1895), and *C. chelicorne* (G.O. Sars, 1895). The rare gastropod species *Clathrocaspia knipowitschii* (Makarov, 1938), synonymous with *Caspia gmelini* was also identified.

The most common gammarid species in the small rivers of the Republic of Moldova, *Gammarus kischineffensis* Schellenberg, 1937, was identified in the Botna River but was absent from the Dniester River.

Mollusc species (*Pisidium personatum* Malm, 1855 and *Pisidium supinum* A. Schmidt, 1851) and trichopteran species (*Agraylea sexmaculata* Curtis, 1834, *Ecnomus tenellus* (Rambur, 1842), *Oecetis lacustris* (Pictet, 1834), *Oecetis ochracea* (Curtis, 1825)) that are sensitive to water pollution were also recorded.

It should be noted here that downstream of the village of Horodca, Plecoptera species characteristic of clean, flowing waters were recorded in the stream.

According to the obtained results, the largest number of taxa in the sample (28), was recorded in the Botna River at the village of Costesti sampling point in spring. A similarity high number of taxa (27-28) was recorded in the Dniester River upstream and downstream of the Botna River confluence in summer. The lowest number of taxa in a sample (3) was recorded at the mouth of the Botna River (Figure 5).

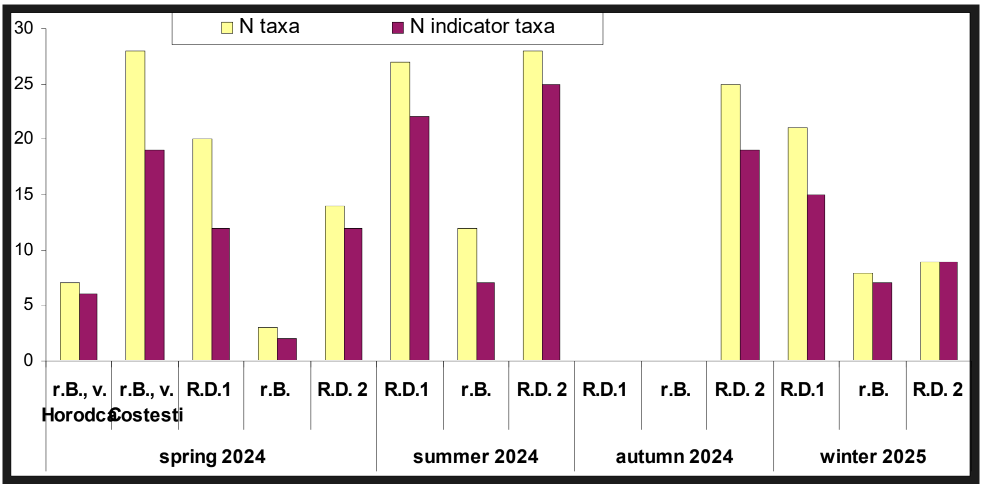

Figure 5. Number of zoobenthos taxa in the Botna River and the Dniester River upstream and downstream of the mouth of the Botna River in 2024-2025 (r.B.v. Horodca - the Botna River, in the village of Horodca; r.B.v. Costești - the Botna River, in the village of Costești; r.B. - the Botna River at the mouth, R.D.1 - the Dniester River upstream of the Botna River confluence, R.D.2 - the Dniester River downstream of the Botna River confluence)

According to the study results, the influence of the Botna River on the macrobenthos of the Dniester River was not observed in spring, summer, or autumn. However, in winter, there was a significant reduction in the number of zoobenthos taxa in the Dniester

River downstream of the Botna River confluence, which was two times lower than in the Dniester River upstream of the Botna River confluence (Figure 5), with a significant increase in the number of *Tubifex* sp. div. It should be noted here that in the autumn of 2024, a complete absence of water was observed at the mouth of the Botna River, possibly due to the improvement works carried out on the Botna River riverbed, approximately 500 m upstream of the mouth (Figure 6).

Figure 6. Improvement of the Botna riverbed upstream (approximately 500 m) of the mouth, autumn 2024

The current saprobity levels and surface water quality classes of the rivers Botna and Dniester were assessed using the Zelinka & Marvan and Pantle-Buck saprobity indices.

The saprobity index varied seasonally, ranging from 1.87 at the sampling point on the Dniester River upstream from the Botna River confluence, which corresponds to class II and ”Good” water quality, to 3.23 at the Botna River mouth, which corresponds to class V and ”Very polluted” water quality (Table 2).

Table 2. Saprobity of zoobenthos and water quality class of the rivers Botna and Dniester, 2024–2025

Sampling time	Sampling location	Value of the Saprobic Index		Water quality class
		ZM*	PB*	
spring 2024	R. Botna, v. Horodca	2.31	2.36	III
	R. Botna, v. Costesti	2.43	2.42	III
	R. Dniester, upstream r. Botna	2.38	2.37	III
	R. Botna, at the mouth	3.23	2.75	IV-V
	R. Dniester, downstream r. Botna	2.61	2.61	III
summer 2024	R. Dniester, upstream, r. Botna	1.87	1.96	II
	R. Botna, at the mouth	3.14	2.69	III-IV
	R. Dniester, downstream r. Botna	2.14	2.25	II
autumn 2024	R. Dniester, upstream, r. Botna	-	-	-
	R. Botna, at the mouth	-	-	-
	R. Dniester, downstream r. Botna	2.42	2.43	III
winter 2025	R. Dniester, upstream, r. Botna	2.48	2.57	III
	R. Botna, at the mouth	2.78	2.59	III-IV
	R. Dniester, downstream r. Botna	3.15	2.95	IV

ZM* - according to the Zelinka & Marvan; PB* - according to the Pantle-Buck saprobity indices; R - river, v. - the village of.

4. Conclusions

The data on the taxonomic composition, density, and biomass of zoobenthos during the research period indicate that quite favourable conditions for the development of benthic invertebrates were recorded at the sampling points on the Botna River, near the village of Costesti and the Dniester River, upstream of the Botna River confluence.

Significant changes in species composition, density, and biomass within the zoobenthos community were recorded along the course of the Botna River.

To restore the biodiversity of the Botna River, it is necessary to restore habitats and treat wastewater, which is especially important in the conditions of climate change and negative human impact.

According to the results of the investigation, the influence of the Botna River on the macrobenthos of the Dniester River was not detected in the spring, summer, and autumn periods, while in winter there was a significant decrease in the number of zoobenthos taxa in the Dniester River downstream of the Botna River confluence, which was two times lower compared to the Dniester station upstream from the Botna River.

The change of the water quality class, during the research period, along the course of the Botna River, from class III to IV-V according to Zelinka & Marvan and Pantle-Buck saprobity indices was also observed.

Acknowledgements

This study was conducted within the following projects: "Investigation of changes in the aquatic environment and hydrobiocenoses of the Lower Dniester ecosystem, assessment of the impact of tributaries (Răut, Bâc, Botna), development of proposals for sustainable valorization and prevention of degradation of lotic and lentic aquatic ecosystems" AO ECOTOX; "Assessment of the state of hydrobiocenoses, the functioning of lotic and lentic ecosystems, major biotic and abiotic factors with negative impact on hydrobiocenoses and water quality" subprogram 010701 Moldova State University, Institute of Zoology.

References

[1] AQEM CONSORTIUM. Manual for the application of the AQEM system a comprehensive method to assess European streams using benthic macroinvertebrates, developed for the purpose of the Water Framework Directive. Version 1.0, 2002. `www.aqem`

[2] BUŞMACHIU, G. *Fauna colembolelor (Hexapoda: Collembola) din Republica Mldova*. Chișinău, Căpăţină Print, 2021, 200 p. ISBN 978-9975-3477-1-6

[3] MUNJIU, O., TODERAŞ, I., ANDREEV, N. *Nevertebrate bentonice*. Prevenirea poluării și gestionarea durabilă a resurselor acvatice în bazinul r. Răut (Ghid metodologic). Chișinău: AO Ecotox, Institutul de Zoologie, 2019, pp. 50–55.

[4] MUNJIU, O., TODERASH, I., ANDREEV, N. Macrozoobenthos. In: BILEŢCHI, L., ZUBCOV, E., eds. *Guidance on the monitoring of water quality and assessment of the ecological status of aquatic ecosystems*. Chişinău: Institutul de Zoologie, 2020, pp. 66–74. ISBN 978-9975-157-05-6

[5] SKVORTSOV, V.E. *The dragonflies of Eastern Europe and Caucasus: An illustrated guide*. Moscow: KMK Scientific Press Ltd, 2010. 623 p.

[6] VITION, P. The biodiversity (Annelida, Oligochaeta) in different aquatic ecosystems of the Republic of Moldova. Интегрированное управление трансграничным бассейном Днестра: Платформа для сотрудничества и современные вызовы, 26-27 octombrie 2017, Tiraspol. Tiraspol: Eco-TIRAS, 2017, Ediția a VIII-a, pp. 56–59. ISBN 978-9975-66-591-9.

[7] WARINGER, J., GRAF, W. *Atlas of Central European Trichoptera larvae*. Dinkelscherben: Erik Mauch Verlag, 2011. 468 p.

[8] БЫЗГУ, С.Е., ДЫМЧИШИНА-КРИВЕНЦОВА, Т.Д., НАБЕРЕЖНЫЙ, А.И., ТОМНАТИК, Е.Н., ШАЛАРЬ, В.М., ЯРОШЕНКО, М.Ф. Дубоссарское водохранилище. Москва, Наука, 1964. 229 с.

[9] ВЛАДИМИРОВ, М.З., ТОДЕРАШ, И.К. Видовая структура и количественное развитие зообентоса. Экосистема Нижнего Днестра в условиях усиленного антропогенного воздействия. Кишинев, 1990, с. 169–177.

[10] ВЛАДИМИРОВ, М.З., ТОДЕРАШ, И.К. Качественный состав и количественное развитие макрозообентоса. Биопродукционные процессы в водохранилищах-охладителях ТЭС. Кишинев: Штиинца, 1988, с. 130–138.

[11] ГОНТЯ, Ф.А. Малакофауна водоемов Днестра. Автореферат диссертации канд. биол. наук. Кишинев, 1985. 22 с.

[12] ГРИМАЛЬСКИЙ, В.В., МУЩИНСКИЙ, В.Г. Формирование биоценозов малых водоемов центральной зоны Молдавии. В: Ярошенко М.Ф. (ред.): Биологические ресурсы водоемов Молдовы. Кишинев: Штиинца, 1973, с. 41–52.

[13] ДЕДЮ, И.И. Амфиподы и мизиды бассейнов рек Днестра и Прута. Москва, Наука, 1967. 172 с.

[14] ДЕДЮ, И.И. Амфиподы пресных и солоноватых вод юго-запада СССР. Кишинев, Штиинца, 1980. 224 с.

[15] МУНЖИУ, О.В. Исследование зообентоса реки Балцата, притока реки Днестр. Академику Л.С. Бергу 145 лет. Eco-Tiras. Сборник научных статей. Бендеры, 2021, с. 418–422.

[16] МУНЖИУ, О.В. К вопросу о разнообразии амфибионтных насекомых в притоках реки Днестр на территории Республики Молдова. Биоразнообразие и рациональное использование природных ресурсов: Материалы докладов IX Всероссийской научно-практической конференции с межд. участием, 21 мая 2021, Махачкала, с. 76–78.

[17] МУНЖИУ, О.В., БУШМАКИУ, Г.Н., ТОДЕРАШ, И.К., ШУБЕРНЕЦКИЙ, И.В. Новые виды беспозвоночных на территории Республики Молдова. Биоразнообразие и рациональное использование природных ресурсов: Материалы докладов VI Всероссийской научно-практической конференции, с международным участием, 29-30 марта 2018, Махачкала, с. 128–131.

[18] МУНЖИУ, О.В. Бентосные беспозвоночные рек Днестр и Прут в пределах Республики Молдова. Ред. И. ТОДЕРАШ. Кишинёв: Universitatea de Stat din Moldova, Institutul de Zoologie, 2024 (CEP USM). 223 p. ISBN 978-9975-62-696-5

[19] МУНЖИУ, О., БУШМАКИУ, Г., ШУБЕРНЕЦКИЙ, И. Бентосные и почвенные беспозвоночные бассейна реки Реут. В: Биоразнообразие и рациональное использование природных ресурсов: Материалы докладов VI Всероссийской научно-практической конференции с международным участием, 29-30 марта 2019, Махачкала, с. 91–94.

[20] ТОДЕРАШ, И.К. Функциональное значение хирономид в экосистемах водоемов Молдавии. Кишинев, Штиинца, 1984. 170 с.

[21] ЦАЛОЛИХИН, С. Определитель пресноводных беспозвоночных России и сопредельных стран. Том 1. Низшие беспозвоночные. Санкт-Петербург: Наука, 1994. 394 с.

[22] ЦАЛОЛИХИН, С. Определитель пресноводных беспозвоночных России и сопредельных стран. Том 2. Ракообразные. Санкт-Петербург: Наука, 1995. 627 с.

[23] ЦАЛОЛИХИН, С. Определитель пресноводных беспозвоночных России и сопредельных стран. Том 3. Паукообразные. Низшие насекомые. Санкт-Петербург: Наука, 1997. 439 с.

[24] ЦАЛОЛИХИН, С. Определитель пресноводных беспозвоночных России и сопредельных стран. Том 4. Двукрылые насекомые. Санкт-Петербург: Наука, 2000. 997 с.

[25] ЦАЛОЛИХИН, С. Определитель пресноводных беспозвоночных России и сопредельных стран. Том 5. Высшие насекомые. Санкт-Петербург: Наука, 2001. 836 с.

[26] ЦАЛОЛИХИН, С. Определитель пресноводных беспозвоночных России и сопредельных стран. Том 6. Моллюски, Полихеты, Немертины. Санкт-Петербург, Наука, 2004. 528 с.

[27] ЯРОШЕНКО, М.Ф. (ред.) Кучурганский лиман — охладитель Молдавской ГРЭС. Кишинев, Штиинца, 1973. 207 с.

[28] ЯРОШЕНКО, М.Ф. Гидрофауна Днестра. Москва, 1957. 169 с.

[29] ЯРОШЕНКО, М.Ф. Олигохеты водоемов бассейна реки Днестр. Биологические ресурсы водемов Молдавии. Кишинев: Изд. АН МССР., 1970, вып. 6., с. 76–96.

[30] ЯРОШЕНКО, М.Ф. Формирование донной фауны водохранилищ Молдавии. Биологические ресурсы водемов Молдавии. Кишинев, Изд. АН МССР, 1964. 102 с.

[31] https://en.wikipedia.org/wiki/Botna#/map/0

[32] https://www.google.com/maps

[33] http://cim.mediu.gov.md/raport2004/en/tables.htm

Received: May 06, 2025 *Accepted: July 22, 2025*

(Oxana Munjiu) Institute of Zoology, Laboratory of Hydrobiology and Ecotoxicology,
Moldova State University
E-mail address: oksana.munjiu@gmail.com