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DIVERSITY OF MOLLUSC COMMUNITIES IN SOME AQUATIC HABITATS OF SHATSK LAKE AREA

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Background. The paper presents the results of an original research on groups of freshwater molluscs in some water habitats of Shatsk Lake Area. The Shatsk National Nature Park belongs to the Volynian Polissia according to physical and geographical zoning. Aesthetic appeal, clear water, clean sandy lake bottoms, pine forests, etc., are attracting more visitors to the park every year. The recreational value of the Shatsk National Nature Park in the summer season is significant. The high anthropogenic load accelerates the intensity of eutrophication of lakes and promotes the overgrowth of the shores with macrophytes, which eventually leads to an increase in the density of the macrobenthos, in particular the malacofauna of the lakes.

Material and Methods. Research was conducted in the summer period of 2013–2014 and 2018–2020 on some water bodies of the Shatsk National Nature Park with different trophic state including Lakes Svityaz, Pisochne, Lyutsymer, Krymne, Ostrivyanske and Somynets.

Results. Freshwater molluscs are convenient subjects for water pollution studies because they are good indicators of habitat quality. Svityaz and Pisochne Lakes belong to slightly mesotrophic water bodies, which are actively used for recreational purposes. Among water bodies under study, Lake Svityaz is characterized by the most significant species diversity of molluscs (23 species). Lakes Lyutsymer and Krymne are mesotrophic water bodies exposed to a high anthropogenic load. The largest number of bivalve molluscs of the genera *Unio* and *Anodonta* is characteristic of Lake Lyutsymer, while in Lake Krymne, the lowest species diversity of malacofauna (13 species) was observed. Lakes Ostrivyanske and Somynets are mesotrophic shallow water bodies. We detected a significant increase in the species composition of molluscs in these lakes during the research period.

Conclusions. The research of the qualitative and quantitative composition of the malacofauna revealed an increase in the number and species diversity of molluscs. In addition, the spread of an invasive New Zealand snail *Potamopyrgus antipodarum* to new water bodies on the territory of Shatsk Lake Area has been recorded.

Keywords: freshwater molluscs, Shatsk National Nature Park, trophic state, anthropogenic load

INTRODUCTION

One of the features of intensive eutrophication resulting from anthropogenic impacts is the overgrowth of the coastline with macrophytes, which eventually leads to an increase in the density of macrobenthos, particularly freshwater molluscs. Freshwater molluscs are convenient subjects for water pollution studies because they are good indicators of the habitat quality (Vaughn *et al.*, 2016). Molluscs are able to accumulate toxic substances in their body directly, due to local exposure to substances entering the body with food, or indirectly, through macrophytes that are the microbiotope of their habitat.

According to physical and geographical zoning, the Shatsk National Nature Park (SHNNP) belongs to the Volynian Polissia. The unique environment of the park developed due to the Main European watershed that passes through its territory delimiting the basins of the Pripyat and Zahidny Bug Rivers. The area includes a complex of lakes of various origins, 23 of which are within the SHNNP, with a total area of 6338.9 ha. Part of the SHNNP territory belongs to the regulated recreation (26.5 % of the park area) and stationary recreation (2.0 % of the park area) zones (Yurchuk *et al.*, 2014).

Malacologist R. I. Gural noted that the Volynian Polissia has the richest taxonomic composition of freshwater molluscs in the west of Ukraine. 67 species, 29 genera, and 15 families were registered there based on the results of field collections from 1996 to 2019, collection materials from the State Museum of Natural History and the Zoological Museum of Ivan Franko National University of Lviv, as well as literature data from the second half of the 19th to the 21st centuries (Gural, 2020).

MATERIALS AND METHODS

The studies of mollusc communities were conducted in the summer periods of 2013–2014 and 2018–2020 in deep stratified lakes Svityaz, Pisochne, Lyutsymer, Krymne and non-stratified shallow lakes Ostrivyanske and Somynets. The material was collected during the survey of the coastal zone of water bodies using the manual method of collection; the bottom sediments were washed using a hydrobiological sieve (Cummings *et al.*, 2016). Five research sites with an area of 2 m^2 were chosen for each lake. The sites differed in the degree of anthropogenic load, shading, overgrowth of banks, etc. Due to quarantine restrictions aimed at preventing the spread of acute respiratory disease COVID-19 in 2020, not all research transects were available for inspection, which partially affected the results of the study. Molluscs were identified by conchological features using common methods (Anistratenko, 1998; Glöer & Meier-Brook, 1998; Gural & Gural-Sverlova, 2016a,b, 2022; Jackiewicz 1998; Lopes-Lima *et al.*, 2017; Piechocki & Wawrzyniak-Wydrowska, 2016; Uvaeva, 2007).

The water bodies were grouped according to their trophic state, the degree of overgrowth, the shoreline shape, and the nature of the substrate based on the research by V. G. Drabkova, V. K. Kuznetsova, and I. S. Trifonova (1994). We singled out separate groups of model lakes with differences in the distribution of molluscs (Shevchuk *et al.*, 2013).

RESULTS AND DISCUSSION

1. Large deep stratified lakes with surface areas from 1.5 to 25 km^2 and depths of more than 4 m.

A) Slightly mesotrophic, transparent (up to 4 m) and faintly colored, with a low content of biogenic elements (P<40 μg/L, N<700 μg/L), actively used for recreational purposes (Svytyaz, Pisochne). Such water bodies are characterized by a silty-sandy or sandy bottom, a pronounced coastline and a slight overgrowth.

Lakes Svityaz and Pisochne are the most popular lakes of the Shatsk Lake Group used for recreation. Various recreation facilities, hotels, cottages, sanatoriums, etc., which accommodate more and more tourists every year, are located around the lakes. With the rapid increase of anthropogenic load on lakes, these water bodies undergo the process of eutrophication that leads to changes in the aquatic ecosystem. Phytoplankton and macrophytes, which are the primary producers of water bodies, react to an increase in the concentration of biogenic and organic substances in the water first of all.

For the past eight years of studies of the malacofauna of Lake Pisochne, we observed an increase in the number and species diversity of freshwater molluscs (**Fig. 1**). Thus, in 2013, we encountered representatives of seven species of molluscs (*L. stagnalis, L. ampla, L. auricularia, P. corneus, P. planorbis, V. contectus, V. viviparus*). The dominant species observed in each of the studied transects with the highest frequency of occurrence was *V. contectus* (11 individuals). In 2014, we observed a similar situation – representatives of six species of molluscs (*L. stagnalis, L. ampla, L. auricularia, P. corneus, V. contectus, V. viviparus*), but then *P. corneus* was predominant (23 individuals). In 2018, a significant increase in the number and species diversity of mollusks was observed – representatives of ten species (*L. stagnalis, L. palustris, L. ampla, L. auricularia, P. corneus, S. nitida, V. contectus, V. viviparus, U. pictorum, P. amnicum*) were recorded. Among them *L. stagnalis* (109 individuals) was dominant, but *P. corneus* (34 individuals) and *V. contectus* (25 individuals) were also observed with high frequency of occurrence. In 2019, an even greater increase in mollusc numbers was detected along with the appearance of the invasive New Zealand snail *Potamopyrgus antipodarum* in Lake Pisochne (Nentwig *et al.*, 2018). A total of 15 species of mollusks were found (*L. stagnalis, L. palustris, L. ampla, L. auricularia, L. ovata, L. peregra, L. corvus, P. corneus, G. leavis, V. contectus, V. viviparus , B. tentaculata, P. antipodarum, A. anatina, P. amnicum*) with the highest frequency of occurrence in *L. stagnalis* (75 individuals), *P. corneus* (38 individuals), and *V. contectus* (29 individuals). Due to quarantine restrictions, not all transects under study were available for inspection in 2020. Therefore, we observed a slightly lower species diversity of molluscs – 9 species (*L. stagnalis, L. ampla, L. auricularia, P. corneus, V. contectus, P. antipodarum, A. anatina, P. amnicum, S. corneum*), but the population density of the dominant species was significant – *P. antipodarum* (176 individuals), *L. stagnalis* (29 individuals), *V. contectus* (28 individuals), *P. corneus* (25 individuals) (Koltun *et al.*, 2021).

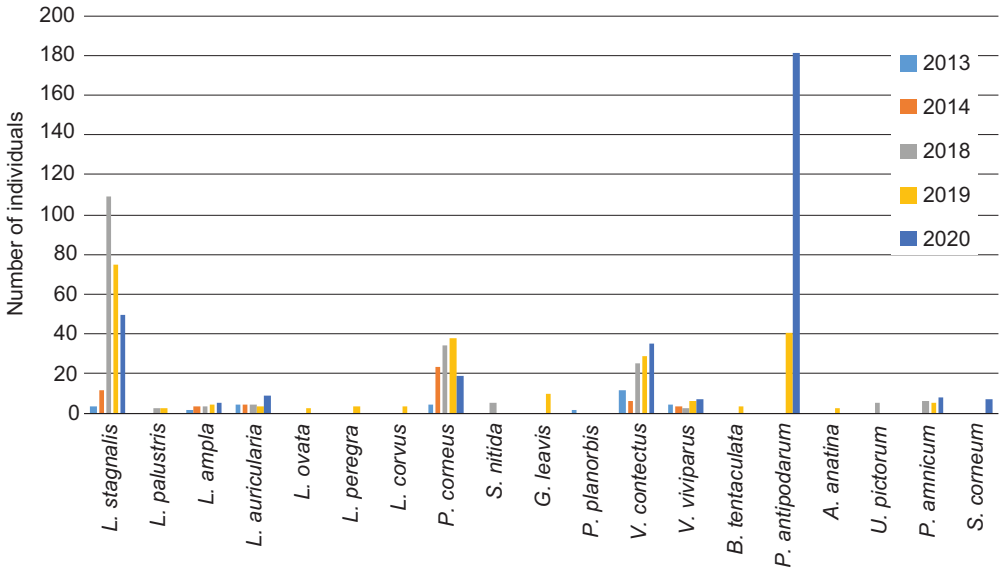

Fig. 1. Quantitative and qualitative composition of mollusc communities in Lake Pisochne

Lake Svityaz is the largest and the deepest of the Shatsk Lake Group with the greatest species diversity of molluscs (**Fig. 2**). In 2013, representatives of nine species of molluscs (*L. stagnalis, L. palustris, L. auricularia, L. ovata, L. truncatula, P. corneus, V. contectus, S. corneum, D. polymorpha*) were observed in the coastal zone of the lake. *D. polymorpha* (19 individuals) was the dominant species that occurred in each experimental site. In 2014, we encountered representatives of 13 species of molluscs (*L. stagnalis, L. palustris, L. ampla, L. auricularia, L. ovata, L. peregra, L. truncatula, L. corvus, P. corneus, V. contectus, V. viviparus, B. tentaculata, D. polymorpha*) among which *L. ovata* (46 individuals), *L. auricularia* (44 individuals), and *B. tentaculata* (44 individuals) were dominant. In the following years, similarly to Lake Pisochne, there was an increase in the species diversity of molluscs. In 2018, there were representatives of 20 species (*L. stagnalis, L. palustris, L. ampla, L. auricularia, L. ovata, L. peregra, L. truncatula, L. corvus, P. corneus, P. planorbis, H. complanatus, G. leavis, V. contectus, V. viviparus, B. tentaculata, O. elegans, U. pictorum, D. polymorpha, S. corneum, P. amnicum*). The most numerous were *D. polymorpha* (90 individuals) and *L. auricularia* (25 individuals). In 2019, representatives of 21 species (*L. stagnalis, L. palustris, L. ampla, L. auricularia, L. ovata, L. peregra, L. truncatula, L. corvus, P. corneus, A. spirorbis, G. leavis, V. contectus, V. viviparus, B. tentaculata, V. piscinalis, P. antipodarum, O. elegans, A. anatina, D. polymorpha, S. corneum, P. amnicum*) were registered. It is noteworthy that a significant number (817 individuals/m^2) of the highly invasive *P. antipodarum* also appeared in Svityaz (Koltun *et al.*, 2020). Due to quarantine restrictions, not all transects were investigated, therefore, in 2020, the species diversity was somewhat lower – 12 species (*L. stagnalis, L. palustris, L. ampla, L. auricularia, L. ovata, L. peregra, L. corvus, P. corneus, V. contectus, P. antipodarum, D. polymorpha, S. corneum*). However, the population of the studied areas by individuals of the dominant species was high – *P. antipodarum* (481 individuals), *L. stagnalis* (257 individuals), *D. polymorpha* (225 individuals), *L. ovata* (179 individuals).

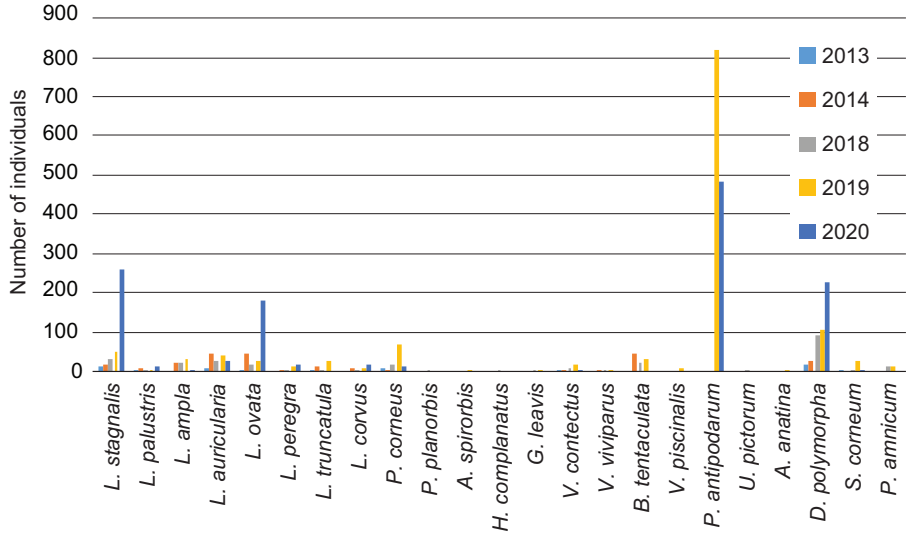

Fig. 2. Quantitative and qualitative composition of mollusc communities in Lake Svityaz

B) Mesotrophic lakes, with low transparency (less than 1.5 m), faintly colored, with a high content of biogenic elements (P = 60–80 μg/L, N = 600–800 μg/L) exposed to high anthropogenic load (Lyutsymer, Krymne). A pronounced coastline and a hard bottom with muddy or muddy and sandy substrates are characteristic of this type of water bodies. These lakes are slightly overgrown; their floristic and cenotic diversity is low, which is caused by a significant level of pollution.

Of all the water bodies under study, Lake Lyutsymer had the largest number of bivalve molluscs of the genera *Unio* and *Anodonta* (**Fig. 3**). In 2013, we observed representatives of 11 species of molluscs (*L. stagnalis, L. palustris, L. ampla, L. auricularia, L. ovata, L. truncatula, A. vortex, V. contectus, U. pictorum, A. cygnea, A. anatina*) in the research transcects. *A. cygnea* dominanted among them (9 individuals). In 2014, 10 species of mollusks (*L. stagnalis, L. ampla, L. auricularia, L. ovata, L. truncatula, B. tentaculata, U. pictorum, U. tumidus, A. cygnea, A. anatina*) were recorded. *A. cygnea* (22 individuals) and *A. anatina* (26 individuals) were the predominant ones. In 2018, a great mollusc species diversity was characteristic of Lake Lyutsymer – we recorded 16 species (*L. stagnalis, L. auricularia, L. truncatula, L. ovata, L. corvus, P. corneus, T. fluviatilis, P. antipodarum, V. piscinalis, O. elegans, U. pictorum, U. tumidus, A. cygnea, A. anatina, S. corneum, P. amnicum*). In the same year, in contrast to Lakes Svityaz and Pisochne, we observed *P. antipodarum*, the number of individuals of which was the largest (2037 individuals). These molluscs were found on the bottom, in sand and silt, on coastal macrophytes, on living and empty shells of bivalves and gastropods, etc. The highest frequency of occurrence of *P. antipodarum* was observed on the unshaded, unvegetated shore of Lake Lyutsymer used for recreational purposes. In 2019, we observed 13 species of molluscs (*L. stagnalis, L. auricularia, L. truncatula, L. ampla, P. corneus, P. antipodarum, B. tentaculata, U. pictorum, U. tumidus, A. cygnea, A. anatina, P. amnicum, S. corneum*), the dominant ones being *P. antipodarum* (305 individuals) and *U. pictorum* (80 individuals). In 2020, nine species of mollusks were observed (*L. stagnalis, L. auricularia, P. corneus, P. antipodarum, V. piscinalis,*

U. pictorum, U. tumidus, A. cygnea, A. anatina), with the highest frequency of occurrence in *P. antipodarum* (1412 individuals).

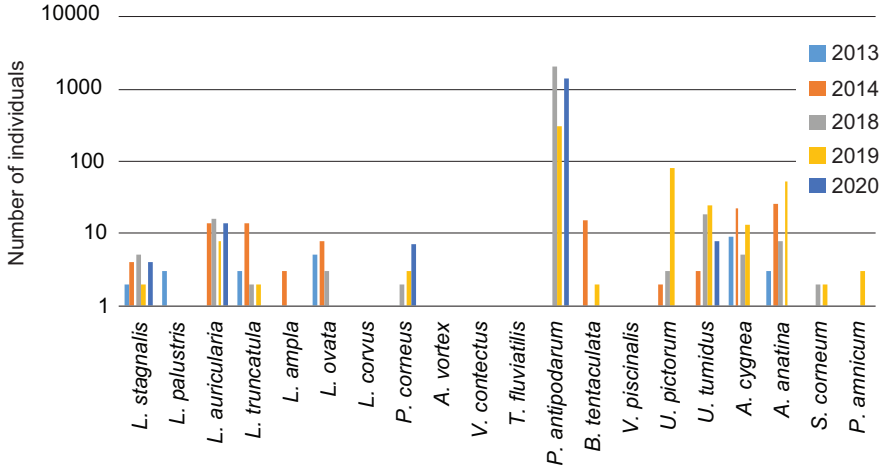

Fig. 3. Quantitative and qualitative composition of mollusc communities in Lake Lyutsymer

During the 2013 study in Lake Krymne, we found 11 species of molluscs (*L. stagnalis, L. auricularia, L. ampla, L. ovata, P. corneus, P. planorbis, V. contectus, V. viviparus, U. pictorum , U. tumidus, A. cygnea*), *L. stagnalis* (10 individuals) and *P. corneus* (11 individuals) being the dominant ones. In 2014, only six species were observed (*L. stagnalis, V. contectus, V. viviparus, U. pictorum, U. tumidus, A. anatina*) with predominant *U. tumidus* (10 individuals). In 2018, species diversity was greater – 10 species of molluscs (*L. stagnalis, L. auricularia, L. ovata, P. corneus, P. planorbis, V. contectus, V. viviparus, U. pictorum, U. tumidus, A. anatina*) with prevailing representatives of *V. contectus* (9 individuals) and *P. corneus* (8 individuals). The following years were marked by a decrease in the number of species. In 2019 there were five species (*L. stagnalis, L. auricularia, G. leavis, U. pictorum, A. anatina*); *U. pictorum* was dominant (6 individuals). In 2020, representatives of only three species (*L. stagnalis, P. corneus, U. pictorum*) were observed, and their quantitative composition was very low (**Fig. 4**).

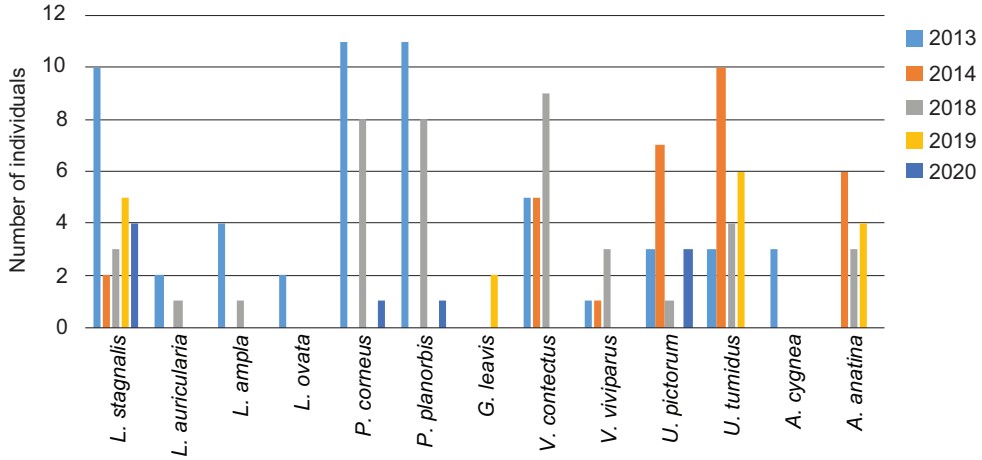

Fig. 4. Quantitative and qualitative composition of mollusc communities in Lake Krymne

2. Large and small non-stratified shallow (up to 3 m) lakes.

This group included mesotrophic lakes with low transparency (less than 1.5 m), with a high content of biogenic elements (P = 50–70 μg/L, N = 900–1100 μg/L), exposed to a high anthropogenic load (Lakes Ostrivyanske and Somynets). In lakes of this type, the coastline is not always well pronounced. Often, part of the coastal strip is easily accessible, while the other part undergoes bog formation processes. The bottom is not solid due to the deposition of a significant amount of detritus, the substrate is muddy or peaty. Such lakes are largely overgrown with macrophytes, but the floristic and coenotic diversity is lower than in the lakes of the first group due to the lack of coenoses with mesotrophic species.

During the study of the malacofauna of Lake Somynets in 2013, representatives of five species of molluscs (*L. stagnalis, L. auricularia, L. ovata, P. corneus, V. contectus*) were found, among which prevailed *V. contectus* (7 individuals) and *L. stagnalis* (6 individuals). In 2014, a significant density of mollusks was observed in the studied transects; representatives of nine species of molluscs (*L. stagnalis, L. palustris, L. ampla, L. auricularia, L. ovata, P. corneus, V. contectus, V. viviparus, B tentaculata*) were recorded. The dominant species were *L. stagnalis* (36 individuals) and *L. ovata* (57 individuals). In subsequent years, an increase in species diversity was observed – in 2018 there were 10 species (*L. stagnalis, L. ampla, L. auricularia, L. ovata, L. corvus, P. corneus, P. planorbis, V. contectus, B. tentaculata, A. anatina*), with the dominant *L. stagnalis* (20 individuals). In 2019, 11 species (*L. stagnalis, L. auricularia, L. ovata, L. peregra, L. corvus, P. corneus , V. contectus, V. viviparus, B. tentaculata, U. tumidus, A. anatina*) were detected, dominated by *L. stagnalis* (148 individuals). In 2020, there were 15 species (*L. stagnalis, L. auricularia, L. ampla, L. ovata, L. peregra, L. truncatula, P. corneus, H. complanatus, V. contectus, V. viviparus, B. tentaculata, V. piscinalis, U. pictorum, S. corneum, P. amnicum*), with the dominant *L. ovata* (80 individuals), *L. truncatula* (65 individuals), *V. piscinalis* (54 individuals), and *L. auricularia* (47 individuals) (**Fig. 5**).

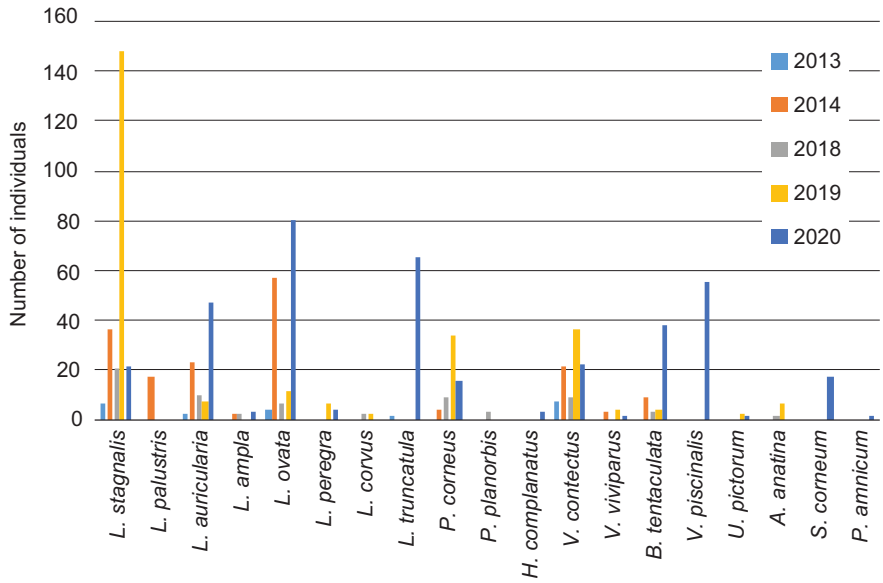

Fig. 5. Quantitative and qualitative composition of mollusc communities in Lake Somynets

The investigation of Lake Ostrivyanske revealed an increase in the species composition over the period of study (**Fig. 6**).

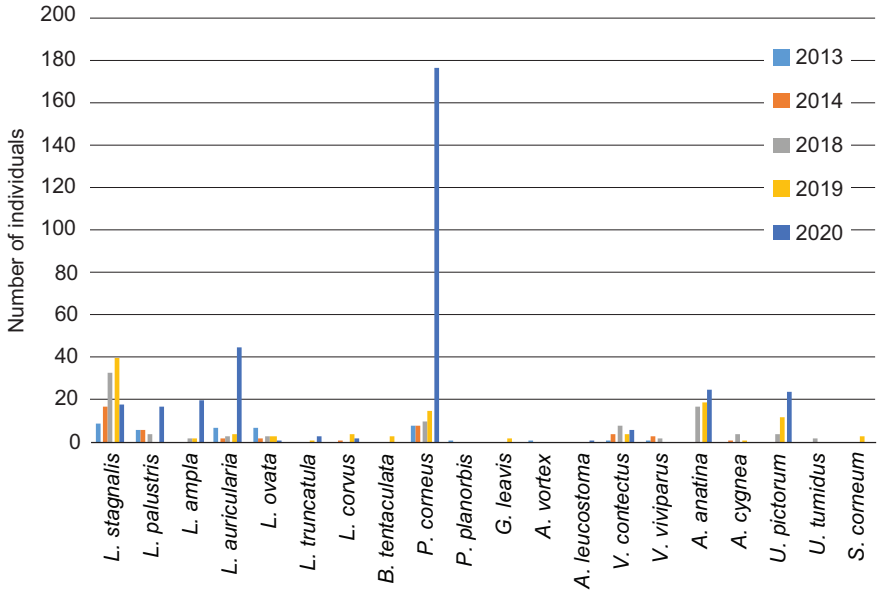

Fig. 6. Quantitative and qualitative composition of mollusc communities in Lake Ostrivyanske

In 2013, there were nine species (*L. stagnalis, L. palustris, L. auricularia, L. ovata, P. corneus, P. planorbis, A. vortex, V. contectus, V. viviparus*) dominated by *L. stagnalis* (9 individuals). The following year, the same number of species was recorded, but the qualitative composition was slightly different (*L. stagnalis, L. palustris, L. auricularia, L. ovata, L. corvus, P. corneus, V. contectus, V. viviparus, A. cygnea*), also dominated by *L. stagnalis* (17 individuals). In 2018, we observed representatives of 12 species of mollusks (*L. stagnalis, L. palustris, L. ampla, L. auricularia, L. ovata, P. corneus, V. contectus, V. viviparus, U. pictorum, U. tumidus, A. cygnea, A. anatina*) with prevailing *L. stagnalis* (33 individuals). In 2019, 15 species were detected (*L. stagnalis, L. palustris, L. ampla, L. auricularia, L. ovata, L. truncatula, L. corvus, B. tentaculata, P. corneus, G. leavis, V. contectus, A. anatina, A. cygnea, U. pictorum, S. corneum*); *L. stagnalis* (40 individuals) and *A. anatina* (19 individuals) being the dominant ones. In 2020, we encountered representatives of 12 species of molluscs (*L. stagnalis, L. palustris, L. ampla, L. auricularia, L. ovata, L. truncatula, L. corvus, P. corneus, A. leucostoma, V. contectus, A. anatina, U. pictorum*), and in contrast to the previous years, *P. corneus* dominated (177 individuals).

CONCLUSIONS

Overall, the studies conducted during 2013–2020 revealed the presence of representatives of 29 species of freshwater molluscs that belong to the classes of Gastropoda and Bivalvia in the Shatsk Lake Group.

The highest frequency of occurrence was characteristic of representatives of the Lymnaeidae family that populated all the water bodies under study in high density every year (see **Table**). The unique species found only in one lake during one year were

Qualitative composition of malacofauna in some lakes of the Shatsk National Nature Park

Species \ Year	2013						2014						2018						2019						2020					
	P	Sv	L	K	O	S	P	Sv	L	K	O	S	P	Sv	L	K	O	S	P	Sv	L	K	O	S	P	Sv	L	K	O	S
Lymnaea stagnalis (Linnaeus, 1758)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Lymnaea palustris (O. F. Müller, 1774)		+	+		+			+			+	+	+	+			+		+	+			+			+			+	
Lymnaea ampla (Hartmann, 1821)	+		+	+			+	+	+			+	+	+			+	+	+	+	+		+		+	+			+	+
Lymnaea auricularia (Linnaeus, 1758)	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		+	+
Lymnaea ovata (Draparnaud, 1805)		+	+	+	+	+		+	+		+	+		+	+	+	+	+	+	+			+	+		+			+	+
Lymnaea peregra (O. F. Müller, 1774)								+						+					+	+				+		+				+
Lymnaea truncatula (O. F. Müller, 1774)		+	+					+	+					+	+					+	+		+						+	+
Lymnaea corvus (Gmelin, 1791)								+			+			+	+			+	+	+			+	+		+			+	
Theodoxus fluviatilis (Linnaeus, 1758)															+															
Planorbarius corneus (Linnaeus, 1758)	+	+		+	+	+	+	+			+	+	+	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+	+
Planorbis planorbis (Linnaeus, 1758)	+			+	+									+		+		+												
Segmentina nitida (O. F. Müller, 1774)													+																	
Gyraulus leavis (Alder, 1838)														+					+	+		+	+							
Anisus spirorbis (Linnaeus, 1758)																				+										
Anisus leucostoma (Millet, 1813)																													+	
Anisus vortex (Linnaeus, 1758)			+		+																									
Hippeutis complanatus (Linnaeus, 1758)														+																+
Viviparus contectus (Millet, 1813)	+	+	+	+	+	+	+	+		+	+	+	+	+		+	+	+	+	+			+	+	+	+			+	+
Viviparus viviparus (Linnaeus, 1758)	+			+	+		+	+		+	+	+	+	+		+	+		+	+				+	+					+
Bithynia tentaculata (Linnaeus, 1758)								+	+			+		+				+	+	+	+		+	+						+
Valvata piscinalis (O. F. Müller, 1774)															+					+							+			+
Potamopyrgus antipodarum (Gray, 1843)															+				+	+	+				+	+	+			
Dreissena polymorpha (Pallas, 1771)		+						+						+						+						+				
Unio pictorum (Linnaeus, 1758)			+	+					+	+			+	+	+	+	+				+	+	+				+	+	+	+
Unio tumidus (Philipson, 1788)				+					+	+					+	+	+				+			+						
Anodonta cygnea (Linnaeus, 1758)			+	+					+		+				+		+			+	+		+				+			
Anodonta anatina (Linnaeus, 1758)			+						+	+					+	+	+	+	+		+	+	+	+			+		+	
Sphaerium corneum (Linnaeus, 1758)		+												+	+					+	+		+		+	+				+
Pisidium amnicum (O. F. Müller, 1774)													+	+	+				+	+	+				+					+
29																														

Comments: P – Lake Pisochne; **Sv** – Lake Svityaz; **L** – Lake Lyutsymer; **K** – Lake Krymne; **O** – Lake Ostrivyanske; **S** – Lake Somynets

T. fluviatilis (Lake Lytsimer, 2018), *S. nitida* (Lake Pisochne, 2018), *A. spirorbis* (Lake Svityaz, 2019) *A. leucostoma* (Lake Ostrivyanske, 2020). The highest mollusc species diversity was observed in Lake Svityaz (23 species), and the lowest – in Lake Krymne (13 species).

The long-term studies of the dynamics of the malacofauna revealed an increase in anthropogenic load on the studied water bodies, particularly Lakes Svityaz and Pisochne. If measures are not taken to divert the effluents discharged into the lakes by the local sanatoriums and private households, we can expect irreversible processes in the aquatic ecosystem, namely the eutrophication of water („blooming") and a significant decrease in water quality.

Besides, the spread of the highly invasive New Zealand snail *Potamopyrgus antipodarum* to new reservoirs on the territory of Shatsk Lake Group – Svityaz (2019–2020), Pisochne (2019–2020), Lyutsymer (2018–2020) has been detected. The causes and consequences of such changes in the ecosystem require more detailed and long-term research.

COMPLIANCE WITH ETHICAL STANDARDS

Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Human Rights: This article does not contain any studies with human subjects performed by any of the authors.

Animal studies: All international, national and institutional guidelines for the care and use of laboratory animals were followed.

AUTHOR CONTRIBUTIONS

Conceptualization, [I.K.; I.Kh.]; methodology, [I.K.]; validation [I.Kh.]; formal analysis, [I.K.; I.Kh.]; investigation, [I.K.; I.Kh.]; resources [I.K.; I.Kh.]; data curation, [I.K.]; writing – original draft preparation [I.K.]; writing – review and editing, [I.Kh.]; visualization, [I.K.; I.Kh.]; supervision, [I.K.; I.Kh.].

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РІЗНОМАНІТНІСТЬ УГРУПОВАНЬ МОЛЮСКІВ У ДЕЯКИХ ВОДНИХ БІОТОПАХ ШАЦЬКОГО ПООЗЕР'Я

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Вступ. У публікації висвітлено результати власних досліджень угруповань прісноводних молюсків у деяких водних біотопах Шацького поозер'я. Шацький національний природний парк за фізико-географічним районуванням належить до Волинського Полісся. Естетична привабливість, прозора вода, чисте піщане дно озер, соснові ліси тощо з кожним роком приваблюють дедалі більше відвідувачів до парку. Рекреаційне значення Шацького національного природного парку в літній період посідає вагоме місце в Україні. Такий антропогенний вплив у результаті пришвидшує інтенсивність евтрофування озер, заростання макрофітами берегів. І, як наслідок, збільшення щільності макробентосу, зокрема, малакофауни водойми.

Матеріали та методи. Дослідження проводили у літній період протягом 2013–2014 рр. і 2018–2020 рр. на деяких водоймах Шацького національного природного парку, які відрізняються за ступенем трофності: оз. Світязь, Пісочне, Люцимер, Кримне, Острів'янське й Соминець.

Результати. Прісноводні молюски є зручним об'єктом для досліджень забруднення водойм, оскільки слугують хорошими індикаторами якості середовища існування. Озера Світязь і Пісочне належать до слабомезотрофних водойм, які активно використовуються з рекреаційною метою. Для озера Світязь характерне найвище видове багатство молюсків (23 види) зі всіх досліджуваних водних об'єктів. Озера Люцимер і Кримне – мезотрофні, які перебувають під сильним антропогенним впливом. Найбільша численність двостулкових молюсків родів *Unio* і *Anodonta* характерна для оз. Люцимир. А у оз. Кримне спостерігали найнижче видове багатство малакофауни (13 видів). Озера Острів'янсьне і Соминець – мезотрофні неглибокі водойми. Для цих озер характерне значне збільшення видового складу молюсків протягом дослідного періоду.

Висновки. Протягом досліджень якісного і кількісного складу малакофауни ми спостерігали збільшення чисельності й видового різноманіття молюсків. Також встановлено розселення інвазивного новозеландського равлика *Potamopyrgus antipodarum* у нові водойми на теренах Шацького поозер'я.

Ключові слова: прісноводні молюски, Шацький національний природний парк, трофність, антропогенне навантаження

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