plant 7, 8 – 9.5 flowers. Growth density of generative individuals is 1.6 – 16.6 per m^2, virginal individuals – 6.7 - 34.1 per m^2.

Conclusion. Based on the indices of the occurrence of a primrose high in the studied populations I and II (50 and 100%, respectively) and a high vitality index (4), we can conclude that the populations of primrose are high. The ratio of generative and virginal individuals in both populations shows a good dynamics of their development.

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USE OF INDICATORS OF NITROGEN EXCHANGE OF PULMONARY MOLUSKES FOR MONITORING THE CONDITION OF NATURAL WATERWAYS

G. Tsapko, M. Bartkevich
VSU named after P.M. Masherov, Vitebsk, Belarus

The state of natural ecosystems, including water bodies, is one of the most relevant topics of research. This is due to the need for continuous monitoring of the current environmental situation. The purpose of such research is not only to determine the state of the ecosystem, but also to find the most efficient assessment system with minimal use of resources. In this regard, much attention is paid to the use of living organisms as model test organisms. The most suitable for the analysis of natural reservoirs are pulmonary mollusc coil horny (*Planorbarius corneus*) and the large pond snail (*Lymnaea stagnalis*).

The well-being of the existence of any organisms living in water depends directly on the ecological state of the reservoir. From this it follows that the quality of water will affect all processes of the body, including nitrogen metabolism. Accordingly, studying changes in metabolic rates, one can most effectively track not only changes in the state of the ecosystem, but also predict how these changes will later affect the inhabitants of this system and humans.

The purpose of the research is to study the possibility of using indicators of nitrogen metabolism of pulmonary mollusks to monitor the state of natural water bodies.

Material and methods. The experiment was performed on 216 pulmonary freshwater mollusks of two species: 108 *L. stagnalis* and 108 *P. corneus*. Mollusks

were collected in autumn (September-October) in the reservoirs of four districts of the Vitebsk region (table 1). Each research subgroup contained 9 mollusks.

Table 1 – Places for the selection of mollusks

Shellfish collection area	Collection place	Pond name
Vitebsk district	Vitebsk	r. Vitba
Dubrovensky district	v. Lyady	l. Afanasyevskoe
Ushachsky district	v. Dubrovka	l. Dubrovskoe
Shumilinsky district	a/g Bashni	l. Budovest

Determination of hemolymph indicators was performed by standard biochemical reactions using the reagent kits NTPK Analysis X (total protein, uric acid), Urea-01-Vital (urea). Determination of protein concentration (mg / g of tissue) was performed by the method of Lowry. The content of DNA and RNA (mg / g of tissue) was established according to the method of lober and Rotort [3].

Mathematical processing of the results was carried out using parametric and non-parametric statistics using the statistical software package Microsoft Excel 2010, STATISTICA 12.5.

Findings and their discussion. The content of total protein, nucleic acids in hepatopankeas and the content of total protein, urea, uric acid hemolymph are presented in tables 2, 3.

Table 2 – Total protein content (mg / g), DNA and RNA (mg / g) in hepatopancreas *Planorbarius corneus* and *Lymnaea stagnalis* depending on the habitat ($M \pm m$)

Shellfish collection area (n=9)	Indicator		
	Total protein (mg/g)	DNA (mg/g)	RNA (mg/g)
Planorbarius corneus			
Vitebsk district	256±8,2	1,83±0,10	5,46±0,35
Dubrovensky district	139±8,6[1]	2,00±0,07	6,12±0,15
Ushachsky district	211±9,7	2,94±0,19[1]	7,02±0,42[1]
Shumilinsky district	205±7,5[1]	2,73±0,29[1]	6,79±0,58[1]
Lymnaea stagnalis			
Vitebsk district	323±21,7	2,49±0,03	5,74±0,24
Dubrovensky district	228±7,8[1]	1,43±0,03[1]	6,77±0,25[1]
Ushachsky district	169±9,2[1]	1,93±0,03[1]	7,28±0,44[1]
Shumilinsky district	203±4,3[1]	2,44±0,08	7,46±0,28[1]

Note – [1]$p < 0.05$ compared with mollusks from the Vitba river, Vitebsk district.

In *P. corneus*, in comparison with individuals from the Vitebsk region, the content of DNA and RNA in the Ushach region is increased by 1,6 and 1,3 times, respectively, and in Shumilinsky by 1,5 and 1,2 times, respectively. In *L.*

stagnalis, an increase in the concentration of RNA was observed with a decrease in the DNA content; in the Ushachi region, the DNA decreases 1,3 times, RNA increases 1,3 times; in the Dubrovno region, DNA is reduced by 1,7 times, RNA is increased by 1,2 times compared with the Vitebsk region.

Table 3 – Indicators of protein metabolism in the hemolymph of *Planorbarius corneus* and *Lymnaea stagnalis*, depending on the habitat ($M \pm m$)

Shellfish collection area (n=9)	Indicator		
	Total protein (mg/l)	Urea (mmol/l)	Uric acid (mkmol/l)
Planorbarius corneus			
Vitebsk district	33,31±0,46	6,02±0,06	92,14±2,02
Dubrovensky district	31,24±0,65	6,34±0,06	82,46±2,16[1]
Ushachsky district	35,14±0,60	6,40±0,11	96,36±2,36
Shumilinsky district	36,35±1,62	6,43±0,10	89,06±2,00
Lymnaea stagnalis			
Vitebsk district	15,87±0,25	6,05±0,03	25,46±0,64
Dubrovensky district	14,14±0,17	6,55±0,05[1]	35,31±0,49[1]
Ushachsky district	14,35±0,19	6,45±0,11[1]	28,75±0,57
Shumilinsky district	14,93±0,24	6,65±0,18[1]	30,36±0,76[1]

Note - [1]p <0,05 compared with mollusks from the Vitba river, Vitebsk district

In P. corneus, no statistically significant differences in the content of total protein, urea, and uric acid were observed (table 3). In *L. stagnalis*, the concentration of uric acid in Dubrovno increases by 1.4 times, and by 1.2 times in Shumilino regions compared to the Vitebsk region. The urea concentration of urea in the hemolymph depends on the activity of the mollusks and their diet. Shellfish feed on sedimentary detritus, which is a small organic particles consisting of residues, decomposed animals and plants.

Conclusion. Established significant differences in the content of total protein, nucleic acids in hepatopankeas and the content of total protein, urea, uric acid hemolymph in *Lymnaea stagnalis* and *Planorbarius corneus*. The reason for these differences is the varying degree of anthropogenic load and the ecological state of water bodies. From this it follows that the exchange rates of freshwater pulmonary mollusks, including nitrogen exchange, can be used to monitor the state of natural aquatic ecosystems.

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