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**CONTENTS OF LIPID EXCHANGE INDICATORS IN PULMONARY  
MOLUSKS DWELLING IN THE NATURAL RESERVOIRS  
OF THE VITEBSK AND GOMEL REGIONS**

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Adverse environmental factors have a negative impact on all levels of biological organization: from molecular genetic to biogeocenotic. Therefore, an objective assessment of their consequences for organisms is possible only on the basis of an integral approach, which allows assessing changes in biosystems of different levels [1].

*Lymnaea stagnalis* and *Planorbarius corneus* are widespread types of pulmonary mollusks living in freshwater bodies of Eurasia, including Belarus. Pond crow and cornea are easily cultivated, representatives are not difficult to identify and therefore often serve as objects of environmental, physiological and biochemical studies [2].

The purpose of our research is to study the possibility of using indicators of pulmonary mollusc lipid metabolism for monitoring the state of natural water bodies.

**Material and methods.** The experiment was performed on 378 pulmonary freshwater mollusks of two kinds: 189 individuals of *Lymnaea stagnalis* (common pond snail) and 189 individuals of *Planorbarius corneus* (horn coil). Mollusks were collected in autumn (September-October) in the reservoirs of four districts of the Vitebsk region and three districts of the Gomel 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
Gomel district	Gomel	l. Lubenskoe
Mozyr district	v. Krasnaya Gorka	r. Pripyat
Rogachev district	Rogachev	r. Drut

Determination of triacylglycerols (TG), total cholesterol (total cholesterol), HDL cholesterol (HDL cholesterol) in the hemolymph was performed by standard biochemical reactions using the Analysis X reagent kits [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 TG, OHS and HDL cholesterol in the hemolymph are presented in table 2.

Table 2 – Content of total cholesterol (mmol / l), high density lipoprotein cholesterol (mmol / l), triacylglycerols (mmol / l) in the *hemolymph* *Planorbarius corneus* and *Lymnaea stagnalis* depending on the habitat ( $M \pm m$ )

Shellfish collection area	Indicator		
	Total cholesterol (mmol / l)	High density lipoprotein cholesterol (mmol / l)	Triacylglycerols (mmol / l)
<i>Lymnaea stagnalis</i>			
Vitebsk district	0,418±0,020	0,056±0,013	0,298±0,008
Dubrovensky district	0,504±0,018 <sup>1</sup>	0,086±0,008 <sup>1</sup>	0,404±0,006 <sup>1</sup>
Ushachsky district	0,560±0,015 <sup>1</sup>	0,070±0,008 <sup>1</sup>	0,354±0,008 <sup>1</sup>
Shumilinsky district	0,494±0,011	0,065±0,009	0,347±0,008 <sup>1</sup>
Gomel district	0,410±0,02	0,074±0,011 <sup>1</sup>	0,290±0,01
Mozyr district	0,480± 0,01	0,078± 0,014 <sup>1</sup>	0,340± 0,02 <sup>1</sup>
Rogachev district	0,550± 0,01 <sup>1</sup>	0,081± 0,021 <sup>1</sup>	0,360± 0,01 <sup>1</sup>
<i>Planorbarius corneus</i>			
Vitebsk district	0,316±0,022	0,119±0,006	0,192±0,008
Dubrovensky district	0,281±0,012 <sup>1</sup>	0,058±0,003 <sup>1</sup>	0,324±0,006 <sup>1</sup>
Ushachsky district	0,368±0,014 <sup>1</sup>	0,072±0,007 <sup>1</sup>	0,232±0,011 <sup>1</sup>
Shumilinsky district	0,328±0,011	0,073±0,006 <sup>1</sup>	0,226±0,011
Gomel district	0,310±0,02	0,14±0,01 <sup>1</sup>	0,230±0,02
Mozyr district	0,340± 0,01 <sup>1</sup>	0,10± 0,003 <sup>1</sup>	0,240± 0,01
Rogachev district	0,370± 0,02 <sup>1</sup>	0,11± 0,004 <sup>1</sup>	0,310± 0,03 <sup>1</sup>

<sup>1</sup> p < 0,05 compared with mollusks from p. Vitba Vitebsk district

It is noted that *Lymnaea stagnalis* has cholesterol levels, HDL cholesterol and TG is the lowest in the Vitebsk region (table 2). Compared with individuals collected in the flowing water of the Vitba river, the content of the indicators

was increased by 1.2, 1.5 and 1.4 times in the Dubrovensky district, and 1.3, 1.3 and 1.2 times in the Ushachsky district, respectively. At *Planorbarius corneus*, there were other patterns of changes in the indicators, as in the Dubrovensky district, the content of total cholesterol decreased by 1.2 times, HDL cholesterol levels by 2.1 times, and the TG increased by 1.7 times, and in Ushachi district, the content of total cholesterol was 1.2 times, TG 1.2 times, HDL cholesterol decreases by 1.7 times compared with the Vitebsk region.

In *Lymnaea stagnalis*, the content of cholesterol, HDL cholesterol and TG is the lowest in the Gomel region (table 2). Compared with individuals collected in Lake Lubenskoye, the content of total cholesterol and thyroid is increased by 1.2 times in the Mozyr district, and by 1.3 and 1.2 times in the Rogachev district, respectively. At *Planorbarius corneus*, the changes in the indicators had other patterns, as in the Rogachev district the content of total cholesterol increased by 1.2 times, TG by 1.3 times, and HDL cholesterol decreased by 1.3 times, and in the Mozyr district, the content of TG increased by 1.3 times, HDL cholesterol decreases by 1.4 times compared with the Gomel region.

**Conclusion.** Differences in total cholesterol, high-density lipoprotein cholesterol and triglycerides were found in *Lymnaea stagnalis* and *Planorbarius corneus*, depending on the habitat and type of oxygen transport.

Thus, anthropogenic changes in the indices of carbohydrate and lipid exchanges can serve as monitoring parameters for the ecological well-being of aquatic habitats of pulmonary freshwater mollusks.

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## JUNIPERUS STROBILES SEASONAL CHANGES

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In our days representatives of the *Cupressaceae* Bartl family especially the *Juniperus* genus *Sabina* subgenus are widely used in the green buildings. The biology of these introduced subgenus has not been studied yet. It is known that the strobiles laid in the year preceding the pollination. Usually the strobiles' laying phenological phase is visualized with difficulty. That is why the study of the strobiles initial stages' ontogeny is interesting and important.