the Pskov region, many of them need to restore the status of protection, or create new ones. They need protection Kudeversky picturesque landscape – a wonderful place Bezhanitsy hill, a unique landscape of its expressiveness. Here, the picturesque lakes of the lakes alternate with high hills, called "mountains". Among these mountains frontal and Lipnitskaya considered the highest point of the Pskov region. There are picturesque, with quaint twisting contours of the shoreline s Ale lake (up to 40 islands, 25 of peninsulas, 20 bays). Due to its unabashed beauty, all adjacent to this lake district Bezhanitsy colorful hill got the popular name Alyanschina [1; 3]. Another deserving first attention and the object of protection is in Dedovicheskom area. In scenic hilly – basin Sudomskoy terrain elevations abounding lakes (60 lakes) and kamovye hills located Mountain Court. At its foot the river flows and the lake with the same name is stretched, an ancient site is located nearby.

Conclusion. In general, the natural potential of the Pskov Region Protected Areas extraordinarily rich for the development of the network, but to date have not been fully claimed. To attract public attention to the problems of protecting the natural environment of the region, the educational action "International geographical dictation", conducted in Russia since 2015, can be used. The author has developed a special computer program of support for the organization of dictations on the regional markets.

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THE CONTENT OF THE TOTAL PROTEIN IN THE HEMOLIFE OF PULMONARY MOLLYUSCS WELLING IN THE NATURAL WATER

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At present, the level of technogenic load on the hydrosphere continues to be high, which causes an increase in adverse effects on natural water bodies and their flora and fauna. The state of freshwater ecosystems is estimated using many components of benthos, including mollusks. High density of natural populations, lifestyle characteristics (relatively low mobility, feeding mainly sedimentary detritus and periphyton) and ease of

harvesting allow the use of gastropods in the practice of both passive and active biomonitoring.

There is a direct relationship between the activity of the animal and the concentration of oxygen carriers in the internal environment. These differences make it possible to effectively use the widespread types of pulmonary freshwater mollusks as test organisms for assessing the biodiversity of the aquatic fauna of Belarus and bioecological studies by studying the chemical components of the habitat, as well as the structural and physiological characteristics of mollusks as a component of the bioindication of water bodies. An actual study is the exchange of proteins under the influence of various environmental factors. The data will allow solving current and future environmental problems of the state of natural waters through the study of metabolism and its regulation in pulmonary mollusks with different types of oxygen transport [1].

The aim of the study – to determine the concentration of total protein in the hemolymph of pulmonary freshwater mollusks, depending on habitat, season and type of oxygen transport.

Material and methods. The object of the study are pulmonary freshwater mollusks with different types of oxygen transport: copper-containing hemocyanin in pond food and iron-containing hemoglobin in coils. The experiments were performed on 324 pulmonary freshwater mollusks, divided into two groups: 162 specimens of *Lymnaea stagnalis* (pond snail) and 162 specimens of *Planorbarius corneus* (horn reel). Shellfish gathered in spring (april-may), in summer (july) and in autumn (september-october) from reservoirs of six districts of Vitebsk region (table 1). The reservoirs of the selected areas were located at a distance of no more than 30-40 km from the regional center and were reachable by public transport. In each research subgroup, there were 9 mollusks each.

Table 1 – Locations of water, soil and shellfish sampling

Collection area	Place of collection	Pond
Vitebsk district	Vitebsk	river Vitba
Dubrovensky district	village Lyady	lake Vordovye
Beshenkovichi district	village Sokorovo	lakeMaloe
Ushachi district	village Dubrovka	lake Dubrovskoye
Shumilinsky district	Bashni	lake Budovest
Senno district	Senno	lake Senno

Hemolymph was obtained by stimulation of the foot with a slight tingling, which stimulates the reflex of drawing the leg into the shell and the release of the hemolymph from the mantle cavity. Determination of indices in the hemolymph was carried out by standard biochemical reactions using reagent sets of NTPK “Analysis X” (total protein) [2]. The protein content

(mg / g tissue) was determined by the Lowry method. Mathematical processing of the obtained results was carried out by parametric and nonparametric statistics using the package of statistical programs Microsoft Excel 2003, STATISTICA 6.0.

Results and their discusion. The content of total protein in the hemolymph of pulmonary freshwater mollusks depends on the season of the year. It was found that the maximum content of this indicator is fixed in the spring period, the lowest values are in the summer period of shellfish gathering (Tables 2, 3).

Table 2 – Total protein content (mg / g) in the haemolymph of *Planorbarius corneus (M±m)*

Collection Area	Season of the year		
	Spring (n=9)	Summer (n=9)	Autumn (n=9)
Vitebsk district	37,04±0,52[1]	24,15±0,32	33,31±0,46[1]
Dubrovensky district	33,40±0,63[1]	25,02±0,44	31,24±0,65[1]
Beshenkovichi district	33,17±1,08[1]	25,81±0,61	32,63±1,01[1]
Ushach district	35,36±0,95[1]	23,55±0,83	35,14±0,60[1]
Shumilinsky district	39,34±0,61[1]	26,67±0,66	36,35±1,62[1]
Senno district	36,62±1,70[1]	23,72±0,45	31,38±0,57[1]

Note – [1]p <0.05 compared with the summer period of shellfish gathering; [2]p <0.05 compared to the autumn period of shellfish collection

In comparison with the summer collection period, the horny coil has an increased total protein content in the spring period by 1.5 times in the Vitebsk, Ushach, Shumilin and Senno districts. The same patterns are preserved when comparing the summer and autumn periods. Compared with the summer collection period, the common pond snake found an increased total protein content in the spring period by 1.3 times in Vitebsk, Dubrovno, Beshenkovichi, Ushachi and Senno districts.

Table 3 – Total protein content (mg / g) in the hematolymph of *Lymnaea stagnalis (M ± m))*

Collection Area	Season of the year		
	Spring (n=9)	Summer (n=9)	Autumn (n=9)
Vitebsk district	14,03±0,22[1]	11,35±0,16	15,87±0,25[1]
Dubrovensky district	13,14±0,33[1]	10,05±0,18	14,14±0,17[1]
Beshenkovichi district	13,58±0,12[1]	10,72±0,27	14,62±0,22[1]
Ushach district	13,59±0,11[1]	9,95±0,65	14,35±0,19[1]
Shumilinsky district	14,48±0,28[1]	11,80±0,30	14,93±0,24[1]
Senno district	14,54±0,17[1]	10,24±0,15	15,16±0,21[1]

Note – [1]p <0.05 compared with the summer period of shellfish gathering; [2]p <0.05 compared to the autumn period of shellfish collection

Содержание общего белка в гемолимфе *Lymnaea stagnalis* и *Planorbarius corneus* имеет общую закономерность у двух видов: концентрация белка снижается в летний период времени и повышается весной и осенью, что связано с активацией обмена веществ в благоприятный для жизнедеятельности, менее стрессовый летний период времени.

The total protein content in the hemolymph of Lymnaea stagnalis and Planorbarius corneus has a common pattern in two species: protein concentration decreases in summer and increases in spring and autumn, which is associated with the activation of metabolism in a life-favorable, less stressful summer period of time.

Conclusion. The content of total protein in the hemolymph of pulmonary freshwater mollusks was reduced in summer and increased in spring and autumn. These changes are associated with a change in the composition of the food base, physical and physiological activity of organisms and the external influence of environmental factors. Based on the data obtained, an algorithm for establishing the ecological state of water can be created by analyzing simple and accessible methods for studying the total protein in three parameters: the season, habitat and type of oxygen transport using two model organisms, *Lymnaea stagnalis* and *Planorbarius corneus*.

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