

The result of the experiment is shown in Fig. 1, 2.



Figure 1 – Young tree branches of *Pinus sylvestris* L. infected by *Dothistroma septosporum* (Dorog.) Morelet

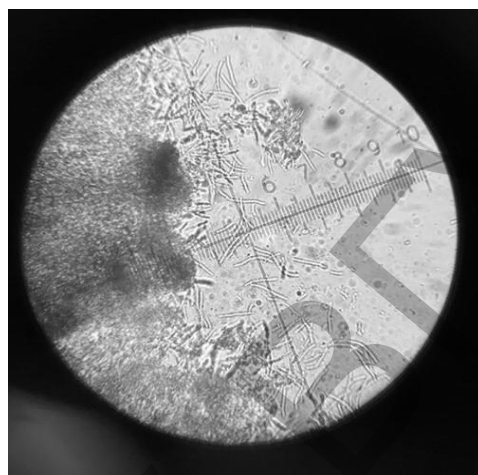


Figure 2 – Conidia of *Dothistroma septosporum* (Dorog.) Morelet

Conclusion. It was found that the dostistromosis is presented in the territory of the northern part of Belarus.

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**ASSESSMENT OF THE CONTENTS OF RESTORED GLUTATHIONE
IN THE HEPATOPANCRAS
OF THE PULMONARY FRESHWATER MOLUSKES
OF THE GOMEL REGION**

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Under the influence of adverse factors in the cell, an excessive amount of reactive oxygen forms is formed, which have a modifying effect on the

macromolecules: DNA, lipids, proteins. Neutralization of reactive oxygen species provides the antioxidant system of the body, which converts reactive oxygen forms into cell-safe forms [1].

Lymnaea stagnalis and *Planorbarius corneus* are two widely distributed types of pulmonary freshwater mollusks living in rivers and lakes of the Republic of Belarus. The high density of natural populations, lifestyle features (relatively low mobility, food mainly sedimentary detritus and periphyton) and ease of collecting individuals allow the use of gastropods in the practice of both passive and active biomonitoring [2].

The goal is to compare the content of reduced glutathione in the tissues of freshwater mollusks living in freshwater bodies, taking into account the season of the year, the type of oxygen transport and the habitat.

Material and methods. The experiment was performed on 162 pulmonary freshwater mollusks of two types: 81 individuals of *Lymnaea stagnalis* (common pond snail) and 81 individuals of *Planorbarius corneus* (horn coil). Mollusks were collected in the fall (September-October) and spring (April-May) in the reservoirs of three districts of the Gomel region manually (table 1). Each research subgroup contained 9 mollusks.

Table 1 – Places for the selection of mollusks

Shellfish collection area	Collection place	Pond name
Gomel district	Gomel	l. Lubenskoe
Mozyr district	v. Krasnaya Gorka	r. Pripyat
Rogachev district	Rogachev	r. Drut

The amount of reduced glutathione was determined by the reaction of interaction of GSH with DTNBK (5,5'-dithio-bis-2-nitrobenzoic acid) with the formation of the yellow-colored anion of 2-nitro-5-thiobenzoate [3].

Mathematical processing of the obtained results was carried out using parametric and non-parametric statistics using the statistical software package Microsoft Excel 2010, STATISTICA 6.0.

Findings and their discussion. The state of the environment has a huge impact on the growth, development and livelihoods of any organism. Especially the environment affects aquatic organisms, since water accumulates various substances, both of natural and anthropogenic origin. In terms of the metabolism of many organisms, it is possible to track the state of the environment in one place or another, to predict anthropogenic effects, the role of biotic and abiotic factors.

According to the study, it was found that the indicators change not only under the influence of the environment, but also cyclically in time depending on the season of the year. Such a distribution of the values of the studied indicators seems to be due to the fact that the spring period is associated with a sharp increase in temperature daytime and lower at night (instability of temperature

conditions), lack of food supply at the beginning of the season, exit from anabiosis of aquatic organisms.

Table 2 – Content of reduced glutathione ($\mu\text{mol} / \text{g}$) in hepatopancreas *Planorbarius corneus* ($M \pm m$)

Shellfish collection area	Season of the year	
	Spring (n = 9)	Autumn (n = 9)
Gomel district	$2,21 \pm 0,05^1$	$1,45 \pm 0,07$
Mozyr district	$2,87 \pm 0,05^1$	$1,89 \pm 0,96$
Rogachev district	$1,77 \pm 0,06^1$	$1,86 \pm 0,05$

Note – $^1p < 0,05$ compared with the autumn collection period of mollusks

Compared with the spring collection period in the hepatopancreas of *Planorbarius corneus*, the content of reduced glutathione in the Gomel and Mozyr regions was reduced by 1.5 times in the autumn period (table 2).

Table 3 – Content of reduced glutathione ($\mu\text{mol} / \text{g}$) in hepatopancreas *Lymnaea stagnalis* ($M \pm m$)

Shellfish collection area	Season of the year	
	Spring (n = 9)	Autumn (n = 9)
Gomel district	$1,84 \pm 0,04^1$	$1,35 \pm 0,02$
Mozyr district	$2,80 \pm 0,05^1$	$1,65 \pm 0,02$
Rogachev district	$1,77 \pm 0,03^1$	$1,37 \pm 0,04$

Note – $^1p < 0,05$ compared with the autumn collection period of mollusks

Compared with the spring collection period in hepatopancreas *Lymnaea stagnalis*, the content of reduced glutathione was reduced by 1.3 times in the autumn in the Rogachev district 1.4 times in the Gomel region, 1.7 times in the Mozyr region (table 3).

There were no statistically significant differences in the content of reduced glutathione in mollusks depending on the type of oxygen transport in all the studied areas of the Gomel region.

It is established that the values of indicators of non-enzymatic antioxidant systems vary depending on the season of the year. As a rule, these changes are as follows: the highest values are recorded in the spring period, the smallest - in the autumn period of the collection of mollusks. This distribution of the values of the studied parameters, apparently, is due to the fact that the spring period is associated with a sharp rise in temperature during the daytime and lower during the night (instability of the temperature regime), insufficient food supply at the beginning of the season, and the release of anabiosis of hydrobionts. In comparison, the autumn period is distinguished by a sufficient food supply, a more stable temperature regime, which is reflected in the metabolism and as a result of the reduced level of stress in animals.

Analyzing the data on the content of reduced glutathione, it was noted that they have similar changes in all the studied areas of the collection of mollusks of the Gomel region: the highest value in the spring period, and the smallest value in the autumn period, which indicates the dependence of the indicators on the season. Based on the results obtained in determining the content of this indicator, it can be concluded that the Gomel region is most susceptible to anthropogenic load, including the effect of increased radioactive background. All this leads to the activation of the chain of non-enzymatic AOC and is confirmed by the reduced content of reduced glutathione, aimed at combating the processes of lipid peroxidation, in mollusks from the Gomel region. Also, these results indicate that the antioxidant system of mollusks of the Gomel region does not cope with the load on the body of hydrobionts from the side of seasonal changes, anthropogenic load, as well as radiation background.

Conclusion. Thus, certain seasonal changes in the dynamics of indicators associated with free radical oxidation can serve as monitoring parameters for the ecological well-being of aquatic habitats of freshwater lung mollusks, since they ultimately correlate with the fundamental indicators of the cellular composition of hydrobiont tissues — the content of nucleic acids.

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