ECOLOGICAL, BIOLOGICAL AND GEOGRAPHICAL STUDY OF THE RATIONAL USE OF THE RESOURCE POTENTIAL AND ENVIRONMENTAL PROTECTION

USING PULMONARY FRESHWATER MOLLUSKS IN SCIENTIFIC RESEARCH WORK OF SCHOOLCHILDREN

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In the past few years, the intensity of human exposure to the environment has greatly increased. In this regard, much attention is now paid to the formation of an ecological culture and responsibility for preserving the environment among students. To obtain the necessary amount of knowledge, one lesson is not enough, therefore, schoolchildren must be involved as much as possible in research work. A significant problem in the organization of students' research work is the selection of accessible research objects, and simple techniques that can be carried out at school. Currently, widespread assessment of the state of natural ecosystems using living organisms (bioindication) [1]. This direction in research will arouse interest among students and does not require a large material base. The objects may be freshwater pulmonary mollusks, which are widely used to assess the state of fresh aquatic ecosystems.

The purpose of the work is to study the possibilities of using freshwater legal mollusks.

Material and methods. Mollusks are a convenient object for research work in the school, due to their accessibility, ease of identification and the availability of literature for the analysis of the data obtained. When studying them, it is possible to carry out both full-scale research work to determine the state of the ecosystem of the reservoir, and just entertaining experiments and observations, to develop skills in working with living objects in students. One of the simplest work that can be done with schoolchildren is to study the glucose content in the tissues of pulmonary freshwater mollusks depending on the season of the year and habitat using standard biochemical kits.

For research, mollusk hemolymph was used. Hemolymph received by means of irritation of the leg with a light, small entomological pin. This stimulates the reflexion of drawing the legs into the rakina, as a result of which a hemolymph from the mantle cavity is isolated externally through the hematal pore.

The determination of uric acid was carried out using sets of reagents NTPK “Analysis X” [3].

Method for determining the concentration of uric acid in hemolymph. Determination of uric acid concentration is carried out by enzymatic method using reagent kits NTPK "Analysis X".

Findings and their discussion. The methodology of the experiment:

1. Prepare a working reagent by mixing reagent 1 (buffer solution) and reagent 2 (enzyme solution) in a ratio of 4: 1.

2. In 3 tubes for the experimental, calibration and blank samples, measure and add 0.02 ml of hemolymph, calibrator and distilled water, respectively, then 1 ml of working reagent is added to each tube.

3. Samples are mixed and incubated for 10 minutes in a thermostat at a temperature of + 37єC.

4. The optical density of the calibration and experimental samples is measured on a spectrophotometer or photocalorimeter at a wavelength of 510 nm against a blank sample.

5. The concentration of uric acid was calculated by the formula:

$C_{оп.} = (E_{оп.}/E_{кал.})\cdot 357$

where, C_{op} – the concentration of uric acid in the studied hemolymph (μmol / l); E_{op} – the optical density of the solution containing the hemolymph under study; E_{kal} – the optical density of the solution containing the calibration solution; 357 is the concentration of uric acid in the calibration solution.

From tables 2-3 it is seen that the concentration of glucose has significant changes depending on the seasons of the year and the habitat. In the coil, the concentration of uric acid in the horny coil is 1,2 times higher in the spring in the Mozyr district, 1,4 times in the Rogachev district, 1.5 times in the Vitebsk and Ushach districts, and 1,8 times in the Dubrovensky and Shumilinsky districts. In the common pond, a similar pattern of change in the content of uric acid in hemolymph is observed. In the spring, Lymnaea stagnalis uric acid level is 1,3 times higher in the Mozyr district, 1,2 times in the Rogachev district, 3 times in the Vitebsk region 2,5 times in the Ushach and Shumilinsky regions, 2,2 times in the Dubrovensky district (tables 1, 2).

Table 2 – Indicators of uric acid concentration in the hemolymph of *Planorbarius corneus* ($M \pm m$)

Clam collection area	Season	
	Spring	Autumn
Vitebsk district	137,99±5,23[1]	92,14±2,02
Dubrovsky district	149,28±1,68[1]	82,46±2,16
Ushachsky district	139,66±4,55[1]	96,36±2,36
Shumilinsky district	157,82±4,52[1]	89,06±2,00
Gomel district	129,36±1,11	121,2±1,97
Mozyr district	148,29±2,77	126,93±3,85
Rogachevsky district	162,57±9,07[1]	115,93±1,71

Note – [1]p <0,05 compared with the autumn period of collection of mollusks.

Table 3 – Indicators of uric acid concentration in hemolymph of *Lymnaea stagnalis* ($M \pm m$)

Clam collection area	Season	
	Spring	Autumn
Vitebsk district	74,47±1,48[1]	25,46±0,64
Dubrovsky district	77,61±1,02[1]	35,31±0,49
Ushachsky district	72,58±1,30[1]	28,75±0,57
Shumilinsky district	74,82±1,34[1]	30,36±0,76
Gomel district	67,01±1,49	60,49±1,23
Mozyr district	78,36±1,47[1]	62,14±1,15
Rogachevsky district	67,28±0,66[1]	58,09±1,07

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

Conclusion. Thus, freshwater pulmonary mollusks can be used as accessible research objects for school students. When carrying out such work, students in practice practice the techniques and principles of working with living objects. This kind of activity contributes to the development of students' interest in studying the ecological state of the environment.

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2. Chirkin, A.A. Lipid exchange / A.A. Chirkin [et al.] // Medical literature. – M., 2003. – 122 p.

DETERMINATION OF THE CONTENT AND STABILITY OF PHENOLIC ACIDS IN THE EXTRACTS FROM THE LEAVES OF HORSERADISH

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As part of the implementation Of the strategy in the field of BioIndustry, the composition of wild plants, one of which is garden horseradish *(Armoracia rusticana)*, is widely studied. This plant is widely known and used for about 700 years. On the territory of the CIS there are 4 species of horseradish, one of them in the territory of the Republic of Belarus *(Armoracia rusticana)* [1–4].

The underground part of horseradish is widely used in folk medicine. The juice of the roots of this plant has pronounced antibacterial properties due to phenolic acids. Freshly prepared extracts from horseradish roots increase the production of hydrochloric acid in the stomach, increase appetite and enhance motility of the gastrointestinal tract [2–5].

When harvesting the roots of the aboveground part of the plant is discarded and widely used, except for cooking, has not yet found. However, complete