Radiation portal monitor systems are the means of continuous radiation monitoring. They are designed to detect sources of gamma and neutron radiation. Usage of such systems is the effective means of securing potentially dangerous facilities and increasing speed and quality of inspections at customs.

In addition to detection elements and processing units, radiation portal monitor systems generally include also specialized software. This software allows to optimize the operation and management of such systems, in particular it allows to control system remotely, supervise it and automate processes of radiation situation data acquisition, analysis and reporting.

Usage of specialized software as the part of radiation portal monitor system the increases efficiency of the work of customs authorities in field of radiation control. It allows to receive timely information on the radiation status at control points, capture a photo or video image of alarming objects, automates the process of creating reports on the effectiveness of control over the illicit trafficking of nuclear and radioactive materials. This ensures an early warning about the possibility of radioactive contamination or terrorist act.

This study defines concept and describes the process of automating the management of the portal radiation monitors system by developing and implementing specialized software.

BIOINDICATION WITH THE USE OF TRIFOLIUM REPENS L.

Yu. Eshmanskaya, O. Lozinskaya

Belarusian State University, ISEI BSU,
Minsk, Republic of Belarus
Yeushmanskaya@mail.ru

Bioindication methods are important in carrying out environmental monitoring as a result they have recently received widespread acceptance and prevalence. No matter how modern the equipment for controlling contamination and detecting harmful impurities in the environment is, it cannot be compared with a complex "live device" that reacts to various changes, reflecting the impact of the entire complex of factors, including complex compounds of various ingredients.

The aim of the work is to assess the ecological state of the districts of Minsk, Nesvizh and Volma, characterized by the most developed industry, and the main recreational zones located in them, by the method of analysis of genetic polymorphism in populations of white creeping clover according to the variety of the "gray" pattern on the leaves.

Keywords: bioindication, bioindicators, creeping white clover (Trifolium repens L.), polymorphism

Collection of material was carried out in summer, in July. In total, 25 test sites were examined. During the research, the industrial part of the city of Minsk, the city of Nesvizh and the ecological park "Volma" of the Dzerzhinsky district was covered. The collection points were at a considerable distance from each other. Observations of the change in the pattern on the leaves of the meadow clover were carried out by counting forms with different patterns and without it on trial plots. In addition, the frequency of occurrence of detected phenes (in %) was calculated. All the hairdryers we detected were checked with known forms in the literature [3], and when new forms were found they were recorded into a table.

As a result the following conclusions were drawn:

The pasture populations of the Dzerzhinsky and Nesvizh regions were investigated, where 5–7 genotypes with different leaf patterns were identified. In addition to the age of the population, the level of pollution of the growth medium is of great importance here. In this respect, Dzerzhinsky and Nesvizhsky belong to ecologically cleaner regions. On the contrary, the tendency of polymorphism increase is typical for Minsk and its territories, contaminated with exhaust gases of roads, emissions of petrochemical enterprises, 10–12 genotypes were detected. In Nesvizh, anomalous forms of clover have been found, but in general the *vv* genotype is 34,95 %, which indicates a rather favorable habitat for this plant. In the city of Minsk, the frequency of occurrence of the genotype *vv* is 34.3 %, rare genotypes are also found: V^PV^P – 0,2 % and V^BV^B – 0,1 %. There is a wide variety of genotypes on the territory of Minsk. At the total count, the share of unchanged leaves in the sample was about 30 % and varied at some points from 11 to 53 %. The total share of the changed phenotypes was about 71 %, and varied from 47 to 89 %.

The analysis of the conducted studies showed that the pattern on the clover leaf is sensitive and the number of phenotypes increases with an increase in the anthropogenic load. In Minsk, there are clear signs of a load of mutations caused by the impact of anthropogenic factors, in comparison with the points selected in Nesvizh and Volma.

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NEUTRON-PHYSICAL AND THERMOPHYSICAL CALCULATIONS OF WWER-1200. SOFTWARE COMPLEX CASCADE

A. Ezerski

Belarusian State University, ISEI BSU,
Minsk, Republic of Belarus
Alex447712136@gmail.com

The WWER-1200 reactor facility is considered, which is the logical continuation and development of the family of water-water power reactors (WWER) in the direction of increasing the generated electricity from one unit. Neutron-physical calculations (NPC) are carried out for a given reactor facility, both at the design stage and during operation.

Keywords: neutron-physical calculations, core, reactor.

The main task of the NPC for nuclear reactors is to justify their structure, type and design of the reactor installation as a whole, and to determine the set of neutron-physical characteristics that meet the current requirements for safety of nuclear power plants at all stages of the life cycle.

By purpose and target, the neutron-physical calculations can be attributed to the following main areas:

o neutron-physical calculations necessary to justify design and engineering solutions at the design stage of the reactor installation;

o calculation analysis of the behavior of neutron-physical parameters of the core, which is necessary for the technical justification of nuclear safety of operation of the reactor installation in all normal modes, including design accidents;

o calculation justification of measures to improve the safety of operation of the reactor installation and the introduction of new elements of the core;

o neutron-physical calculations necessary to support the current operation of the reactor facility in normal modes.

When designing WWER and predicting their characteristics during operation, the software complex CASCADE is applied, which includes the following main programs;

1) the program BIPR-7A is designed to perform a large-scale three-dimensional calculation the core of the WWER;

2) the program PERMAK-A is designed to perform small-scale small-groups two-dimensional diffusion calculations;

3) the program PIR-A is designed to process operational data, restore three-dimensional fields of energy release and compare the results of measurements with the calculation;

4) the program PROPOK-A provides the interactive mode solution of the task of optimizing the overload of the WWER reactor for a given nomenclature of cassettes loaded into the core;

5) the program HIPI-A is a system of information storage and retrieval, provides interaction of programs included in the complex.

Based on the information presented a general conclusion can be drawn that the significance and importance of neutron-physical calculations of WWER is difficult to overestimate. This is confirmed by the general nomenclature and the volume of neutron-physical calculations for all types of WWER: starting from the design NPC of the preliminary design of the reactor and ending with operational NPC during the reactor operation.

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