

were brought. In 1982, the collection includes 200 species and varieties of woody plants, in 1984 – 216, of which 44 species and varieties of mountain ash.

Stage VI. The period of the garden reconstruction (from 1985 to the present). In 1985, they began to carry out the reconstruction of the garden on a household basis, at the expense of income from the sale of planting material.

A new master plan was developed and a complete redevelopment of the territory was carried out. For several years, sanitary felling has been carried out in the garden: thinning of the arboretum has been done, old fruit trees have been demolished. All low-value and weedy tree species that interfered with the normal development of especially valuable introduced species were removed.

The garden is located in the city center in a very picturesque place on the slopes of the river Vitba with different expositions, therefore, the concept of building a botanical garden as a landscape park of a landscape type was adopted. 10 hectares have been allocated for the landscape park on the slopes of the right and left banks of the river Vitba. in 1990 – 97 sanitary and landscape felling was made. By the 2000s, the territory of the garden was reduced to 3 hectares, which created its own problems for the development of a collection of woody plants. But, nevertheless, as of 2021, the collection of the garden has 380 species and varieties of woody plants of different life forms.

Conclusion. Thus, we can state the complex history of the development of the collection of woody plants on the territory of the Botanical Garden of Vitebsk State University named after P.M. Masherov. There were some ups (stage II of the school garden, stage III of the post-war restoration of the garden, stage V of the period of restoration of the botanical garden, stage VI of the period of reconstruction of the garden). But there were also periods associated with the destruction of a greater or lesser part of the collection (the period of occupation by the Nazi invaders and stage IV of the agrobiological station).

1. Vysotsky, Yu.I. Botanical Garden of Vitebsk State University named after P.M. Masherov / Yu.I. Vysotsky, I.M. Morozov, V.L. Volkov. – Vitebsk: UO "VSU im. P.M. Masherov", 2004. – 40 p.
2. Report on the work of the Regional School Botanical Garden for 1949, sheet 10 (Vitebsk State Regional Archives, f. 2797, op. 1, d. 133)

THE CURRENT STATE OF THE MERCURY-CONTAINING WASTE MANAGEMENT SYSTEM IN THE REPUBLIC OF BELARUS

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Keywords: mercury-containing waste, waste management, hazardous waste, demercurization, collection of mercury-containing waste.

Mercury-containing waste belongs to the first hazard class, since mercury is a super-toxicant that poses a danger to human health and the natural environ-

ment. Due to the increase in volumes and irrational handling of these wastes, soil, atmospheric air, as well as surface and groundwater are polluted.

The purpose of the work is to assess the current state of the mercury-containing waste management system in the Republic of Belarus and the possibilities for its improvement.

Materials and methods. The main document regulating the collection of hazardous waste in the Republic of Belarus is the Law "On Waste Management" [1], according to which the mechanism of extended producer responsibility is fixed, namely: legal entities are obliged to ensure the collection of waste, their separation by type, monitor the impact of mercury-containing waste on the environment and the human body, as well as take appropriate measures to reduce the consequences of this impact.

The formation of mercury-containing waste occurs both in production and in all spheres of human activity. To date, metallic mercury is not used in technological processes in the Republic of Belarus, respectively, both household and industrial consumption use products containing mercury. These include: mercury waste and its compounds, mercury lamps and thermometers, fluorescent tubes, medical waste, ignitrons and batteries containing mercury.

In the Republic of Belarus there is a system of accounting for production waste and their management, which regulates the management of mercury-containing waste, namely: collection and separation of waste according to the Classifier of the Republic of Belarus, inventory of production waste, accounting for waste generation and disposal, as well as their storage, burial, transportation and neutralization [2]. In addition, when handling mercury-containing waste, there is a special procedure according to which mercury consumers are required to develop instructions on the procedure for accounting, storage, collection of mercury-containing waste, to inventory devices containing mercury and keep records of mercury used for technological and repair and maintenance needs, as well as organize the collection of mercury and mercury-containing waste.

Findings and their discussion. In the structure of mercury-containing waste, most of it is waste of the I-th hazard class, the most common of which are spent fluorescent lamps. These wastes are generated at enterprises in all regions of Belarus and their collection is organized in all regions of the country.

Until 2009, in the Republic of Belarus, there was no system for collecting mercury-containing goods that had lost their consumer properties. Accordingly, there was no data on the formation of mercury-containing waste from the municipal sector. Therefore, the assessment of the volume of mercury-containing waste was carried out on the basis of data on the import of mercury-containing lamps and their disposal in industrial organizations [3].

Since 2014, the Republic of Belarus has been developing a system for collecting hazardous waste, including batteries and mercury-containing waste, as well as waste electrical and electronic equipment from the population.

In 2015, with the participation of the State Enterprise "Operator of Secondary Material Resources", containers were manufactured for the collection of hazardous

waste, which allow the quick and undamaged removal of mercury-containing waste. In the country, waste of electrical and electronic equipment, mercury-containing gas-discharge lamps, batteries in retail outlets and housing and communal services organizations are collected centrally from individuals [5].

In 2020, 2824.9 thousand pieces of spent gas-discharge mercury-containing lamps, as well as 1.5 tons of mercury thermometers were collected and sent for neutralization in the Republic of Belarus [4].

After demercurization, wastes of mercury and its compounds are formed. These wastes are transferred to the organizations of the GO "Belvtormet", which carry out temporary storage and export of secondary metal mercury outside the country. Neutralization of mercury lamps and fluorescent tubes is also carried out at existing neutralization facilities: CJSC "Ecology-121", JSC "Grodno Himvolokno", JSC "Svetlogorsk Himvolokno" and "ARRIVAL". It is worth noting that the technologies used at these facilities for the neutralization of mercury-containing waste, such as thermal and thermal vacuum treatment, do not allow the neutralization of energy-saving lamps. In addition, the disadvantage of the thermal method of neutralization is that it does not allow the release of mercury as a secondary raw material and therefore the resulting mercury concentrate is shipped to the landfill of toxic industrial waste, despite the pulp must be further processed in order to release secondary mercury.

An important problem for the introduction of new technologies is the extremely low level of collection of mercury-containing lamps, which is primarily due to the lack of economic interest of the population and insufficient awareness of the risks when handling mercury-containing waste.

Conclusion. Thus, we see that today in the Republic of Belarus the system of safe management of mercury-containing waste requires optimization. In this regard, the most important measures to improve the system of hazardous waste management are: expansion of mercury-containing waste collection points, taking into account the convenient location for the population, provision of conditions for safe temporary storage of these wastes at reception points, as well as the definition of a unified procedure for their disposal at disposal facilities and storage facilities. Thanks to the implementation of these directions, it will be possible to conduct an assessment of the management of mercury-containing waste throughout the country, as well as to take timely measures to manage mercury pollution.

1. Law of the Republic of Belarus on Waste Management No. 271-Z of July 20, 2007
2. Classifier of waste generated in the Republic of Belarus. Approved by Resolution No. 85 of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus dated November 8, 2007.
3. Zubritskiy, V.S., Kulbeda, N.A. Treatment of mercury-containing waste. The situation in the Republic of Belarus. Foreign experience. Environmental safety requirements. Edited by V.V. Khodin // Minsk, Bel SIC "Ecology". 2010– - 56 p.
4. Lavrova N. - All aspects of the activity of the testing laboratory. Practical guide. 2021
5. Resolution of the Council of Ministers of the Republic of Belarus No. 1124 dated 02.12.2014 "On approval of the list of goods that have lost their consumer properties and Packaging waste collected from Individuals, which must be provided by organizations engaged in retail trade".