

**THE ELECTRONIC DATABASE OF THE FAMILIES
ARISTOLOCHIACEAE, *NYMPHAEACEAE*, *CERATOPHYLLACEAE*
OF THE BELARUSIAN LAKE DISTRICT PRESENTED
IN THE HERBARIUM OF VSU NAMED AFTER P.M. MASHEROV**

Anton Shlyakhtov

VSU named after P.M. Masherov, Vitebsk, Belarus

At present, thanks to the informatization of floristic research, electronic databases are being created, which makes it possible to quickly exchange information on the species diversity of regional floras between various scientific institutions. For this purpose, in the Central Botanical Garden of the National Academy of Sciences of Belarus, a «shell» of the electronic database Microsoft Office Access for herbarium collections of the Republic of Belarus was developed. An accurate analysis of the collection of higher plants in the herbarium fund makes it possible to analyze the territorial distribution, dynamics of collection and number, phytocenotic and ecological-biological features of plants in Belarus.

When studying the flora of the Belarusian lake district, specialists work with herbarium funds, but this can take a lot of time, therefore, to solve this problem, electronic databases are being developed.

The goal is to summarize and systematize data on the diversity of representatives of three families – *Aristolochiaceae*, *Nymphaeaceae* and *Ceratophyllaceae* of the Belarusian lake district, presented in the stock herbarium of the Department of Zoology and Botany of VSU named after P.M. Masherov, with the subsequent entry of the results into the electronic database Microsoft Office Access.

Material and methods. The object of the study was the herbarium specimens of the *Aristolochiaceae*, *Nymphaeaceae* and *Ceratophyllaceae* families of the collection herbarium of the VSU named after P.M. Masherov.

When the Microsoft Office Access program is launched, the window of the electronic database «Herbarium of the VSU named after P.M. Masherov», where you can view the taxonomic composition (families, genera, species, intraspecific names), the number of herbarium sheets of each species, genus, family, as well as the number of sheets by department and class, a list of all collections, a list of labels by families, collection areas samples and composition dynamics.

The database contains the data indicated on the labels of herbarium sheets (plant name in Russian and Latin, family name, habitat, place of collection, date of collection and the names of people who collected and identified the plant).

Each herbarium specimen in the electronic database is assigned its own individual serial number. The field in which the plant names are entered contains a list that includes all representatives of the flora of Belarus.

Findings and their discussion. All information from herbarium specimens by species and genera of representatives of the families *Aristolochiaceae*, *Nymphaeaceae* and *Ceratophyllaceae*, which are presented in the stock herbarium of the VSU named after P.M. Masherov, was analyzed and entered into the electronic database.

According to the Determinant of higher plants of Belarus (1999), 2 species of *Aristolochiaceae* grow in the country – *Asarum europaeum* L. and *Aristolochia clemstitis* L.; 5 species of *Nymphaeaceae* – *Nymphaea alba* L., *Nymphaea candida* J. et C. Presl, *Nymphaea tetragona* Georgi, *Nuphar lutea* (L.) Smith and *Nuphar pumila* (Timm) DC.; There are 2 species of *Ceratophyllaceae* – *Ceratophyllum demersum* L. and *Ceratophyllum submersum* L. [1].

In the Classification List of Higher Vascular Plants for the Belarusian lake district Merzhvinsky L.M. (2000) indicated 1 species from the *Aristolochiaceae* family; 7 species from 2 genera of the *Nymphaeaceae* family and 2 species from the *Ceratophyllaceae* family [2].

In the herbarium of the department, as of 01.10.2020, there are 23 herbarium specimens of *Asarum europaeum* L. from the *Aristolochiaceae* family; 10 herbarium specimens of *Nymphaea alba* L.; 4 samples of *Nymphaea candida* J. et C. Presl; 10 samples of *Nuphar lutea* (L.) Smith; 2 samples of *Nuphar pumila* (Timm) DC. from the *Nymphaeaceae* family, as well as 12 herbarium specimens of *Ceratophyllum demersum* L. from the *Ceratophyllaceae* family.

Nymphaea alba L. and *Nuphar pumila* (Timm) DC. are the species listed in the Red Book of the Republic of Belarus [3].

The electronic database allows for various types of analysis, for example, it is easy to establish the distribution of the studied species in the administrative districts of the Vitebsk region. Herbarium was collected in the following areas: Vitebsk, Shumilino, Glubokoe, Gorodok areas – the *Aristolochiaceae* family; Rossony, Gorodok, Dokshitsy, Beshenkovichy, Senno, Vitebsk, Shumilino, Ushachy districts – the *Nymphaeaceae* family; Shumilino, Ushachy, Gorodok, Beshenkovichy, Vitebsk, Verkhnedvinsk districts – *Ceratophyllaceae* family.

In the stock herbarium there are also collections from other regions of Belarus (Grodno region of Grodno district; Mogilev region of Mogilev district).

Conclusion. Herbarium of the Department of Zoology and Botany of VSU named after P.M. Masherov is a unique botanical collection that is widely used both at the university itself for educational and scientific purposes, and in other institutions in the Republic of Belarus. The herbarium collection makes it possible to judge the flora and its dynamics of a particular region from the moment the collection was created to the present. The electronic database greatly facilitates the work of florists in obtaining data on the places of growth, occurrence, phytocenotic confinement, the number of plant species, which is

very important for the preparation of new editions of the Flora of Belarus and the Red Book of the Republic of Belarus.

The herbarium fund is annually replenished with new samples, therefore it is very important to enter data on new samples into the electronic database.

The study showed that the *Aristolochiaceae*, *Nymphaeaceae* and *Ceratophyllaceae* families were studied in more detail in the following districts of the Vitebsk region: Vitebsk, Beshenkovichi, Verkhnedvinsk, Gorodok, Dokshitsy, Rossony, Senno, Ushachy and Shumilino districts. According to these data, it can be concluded that out of 21 regions, only 9 have been studied in detail, and in the rest of the regions it is necessary to carry out field collections, as a result of which new habitats of the studied species from the presented botanical families will be identified. As a result, the electronic database will be replenished, which will make it possible to more fully judge the diversity of the flora of the Belarusian lake district.

1. Determinant to higher plants of Belarus. / Ed. V.I. Parfenov. – Minsk: Design PRO, 1999. – 472 p.

2. Merzhvinsky L.M. Flora of the Belarusian lake district: Classification list of higher vascular plants. – Vitebsk: VSU named after P. M. Masherov, 2000. – 60 p.

3. Red Book of the Republic of Belarus. Plants: rare and endangered species of wild plants / Ch. editorial board: I. M. Kachanovsky (head), M. E. Nikoforov, V. I. Parfenov [and others] – 4th ed. – Minsk.: Belarus. Encyclopedia name after P. Brovka, 2015. – 448 p.

THE PROBLEM OF THE EFFICIENCY OF AGROECOTOURISM IN BELARUS

Kiryl Shumsky

BNTU, Minsk, Belarus

The tourist market is one of the most dynamically growing in the whole world. The Republic of Belarus is not an exception. One of the trends in the world and in our republic is the development of agroecotourism. There are several explanations to it. One of them is, certainly, the popularity of the whole industry as a desired service and as a job place. Another is growing popularity of environmental-friendly attitude to our nature and special interest to folklore and local history. This year one more reason has become clearly seen and it is the pandemic COVID-19. The lockdown in a lot of countries has frozen the tourist market. The first direction, the tourist agencies have been allowed to work in, is inner tourism. The sector of agroecotourism is preferable as it usually means that some group of people who are related by birth or friends can live rather separately in clean natural environment. So, nowadays agroecotourism is a very dramatically developing sector of inner tourism and it is worth studying as a profitable industry for countryside.