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Актуальні проблеми бріології та її перспективи / Матеріали міжнародної наукової конференції, присвяченої 120-річчю від дня народження члена-кореспондента АН УРСР, професора Андрія Созонтовича Лазаренка (25 листопада 2021 р., Львів, Україна). – Львів, 2021. – 116 с.

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У збірнику містяться матеріали міжнародної наукової конференції, присвяченої 120-річчю від дня народження члена-кореспондента АН УРСР, професора Андрія Созонтовича Лазаренка (Львів, 25 листопада 2021 року). Для науковців у галузі бріології, екології, викладачів, студентів і аспірантів природничих і біологічних спеціальностей.

Actual problems of bryology and its perspectives / Proceedings of International Scientific Conference devoted to the 120th anniversary of Corresponding Member of the USSR Academy of Sciences, Professor Andrii Sozontovych Lazarenko (25 November, 2021, Lviv, Ukraine). – Lviv, 2021. – 116 p.

This collection contains the materials of International Scientific Conference devoted to the 120th anniversary of Corresponding Member of the USSR Academy of Sciences, Professor Andrii Sozontovych Lazarenko (Lviv, 25 November, 2021). For scientists in the field of bryology, ecology, teachers and students of natural sciences.

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Фото на обкладинці – *Tortula truncata* (Hedw.) Mitt., дизайн - І.Рабик

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CONTENT

FLORA AND TAXONOMY OF MOSSES

DIGITIZATION OF THE MOSSES COLLECTION OF THE SCIENTIFIC HERBARIUM SYKO (RUSSIA, KOMI REPUBLIC)

An original data entry system has been developed that allows significantly increasing the efficiency of monotonous manual labor when digitizing biological collections. An interface to the database for storing digitized mosses labels has been created. Methods of increasing the productivity of manual labor when digitizing labels are proposed. As a result of the optimization of the digitization process, it was possible to increase labor productivity by at least 2 times compared to the traditional process of digitizing labels of biological collections. Using the proposed methods, 42698 mosses labels (94 %) of the scientific herbarium SYKO of the Institute of Biology of the Komi Scientific Center of the Ural Branch of the Russian Academy of Sciences were digitized. Source codes of the information system, including a description of the database structure (file "labels/models.py "), published for free use in the Zenodo repository (https://zenodo.org/record/3385382#.XW9Wq6VS9hE, https://doi.org/10.5281/zenodo. 3385382). Algorithms for obtaining and processing label images are described. A demonstration of the system's operation in the form of a report at the webinar is available for viewing here: https://youtu.be/IMs6k8PUrN8.

UDC 581.93: 582.32

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ON FLORISTIC GRID MAPPING OF THE BRYOPHYTES IN THE REPUBLIC OF BASHKORTOSTAN (THE SOUTHERN URALS REGION)

The creation of digital maps and databases on flora and vegetation, as well as the use of special GIS programs with automation of the process of botanical data analysis, are examples of the modern methods using in scientific research and protecting the environment and plant diversity in general. A powerful method of botanical data storing and normalization is grid mapping allowed to identify the patterns in species distribution within study area (Prasad et al., 2015; Seregin, 2021).

The history of bryological investigations within the Republic of Bashkortostan (the Southern Urals region) is not very long. The first data about bryophytes collected on this territory were published at the end of 19 century (Shell', 1883). Nevertheless, the bryological research of the last decades allowed to obtain a large amount of bryological data from numerous protected areas and to reveal bryophyte diversity of the main habitats and vegetation types of study area. Similar to many other Russian Regions, the Bashkortostan has a long record of botanical data (herbarium specimens, geobotanical relevйs, scientific reports, BA and PhD thesis, etc.) that are not easily accessible to a broad range of scientists. The project "Electronic Atlas of Bryophytes of the Republic of Bashkortostan" (http://bryophytes-bashkortostan.ru/) is aimed to provide all bryological data from the study area to a wide range of specialists in the online portal.

At present, the authors are developing information and analytical web geoinformation system on bryophytes of the republic. Modern web applications are built on service-oriented architecture, web applications are provided as complex interrelated software for managing data – create, post, edit, computing, displaying and distribute. The basis of geoinformation web application is usually the libraries of spatial data visualization like OpenLayers, LeafletJS, Yandex maps and etc. The web application of "Electronic Atlas of Bryophytes of the Republic of

Bashkortostan" uses the LeafletJS library. This library provides fast creating interactive maps and fast refresh images (Biktashev et al., 2019).

Within the framework of the project each site visitor can select the active button "Search for finds by territory", choose a certain area by highlighting the cells of the 10 * 11 km grid with the left mouse button and use the active button "Request". After then a list of all species records found within the selected area can be seen on the screen. This list includes brief data on the information source, collector's name, geographical coordinates of the collection site, a brief description of the location and habitat. At the bottom of the screen, site visitors can select the button "Export localities" and upload a CSV file provided more detailed information species full Latin names, ID, altitude, remarks, etc.).

To see information for each species, site visitors can to select the button "Search" and choose the species from the lists of Marchantiophyta or Bryophyta included all species which ever have been reported from the territory of Bashkortostan. Each species page presents a literature source containing information about the first species finding in the republic, data on ecology and conservation status of this species within the study area, etc. For instance, the "Ecology" section contains the description and photo of typical habitats, the number of this species findings within different types of EUNIS habitats, etc.

Currently, 403 mosses and 94 liverwort species are known for the Republic of Bashkortostan. Mosses belong to 59 families, among which the leading ones are Pottiaceae Schimp. (38 species), Grimmiaceae Arn. (34), Mniaceae Schwдgr. (31), Sphagnaceae Dumort. (30) Brachytheciaceae Schimp. (29), Amblystegiaceae G. Roth (28), Bryaceae Schwдgr. (21), Dicranaceae Schimp. (17), Polytrichaceae Schwдgr. (13), Orthotrichaceae Arn. (12). 22

families (37% of the total number of families) are represented by 1 species.

Liverworts belong to 29 families, among which the leading ones are Anastrophyllaceae L. Sцderstr., De Roo & Hedd. (11 species), Scapaniaceae Mig (9), Lophoziaceae Cavers (8), Cephaloziaceae Mig. (7), Jungermanniaceae Rchb. (7) Ricciaceae Rchb. (7), Lophocoleaceae Vanden Berghen (4), Aneuraceae H. Klinggr. (4), Calypogeiaceae Arnell (4). 13 families of liverworts (45%) are represented by 1 species.

23 mosses (*Oxyrrhynchium speciosum* (Brid.) Warnst., *Pyramidula tetragona* (Brid.) Brid., *Acaulon triquetrum* (Spruce) Müll.Hal., *Bartramia ithyphylla* Brid., *Drepanocladus capillifolius* R. humnst.) Warnst., Ruthe and others) and 6 liverworts (*Mannia gracilis* (F. Weber) DB Schill et DG Long, *Reboulia hemisphaerica* (L.) Raddi, *Riccia glauca* L., etc.) are known by old specimens found 60-100 years ago.

According to grid mapping, bryophyte species were found in 299 grid cells (sized 10 * 11 km) out of 1332, covering the territory of the Republic of Bashkortostan (143600 km2). It means that only about 23% of the republic territory has been more or less bryologically investigated.

More than 1000 bryophyte specimens were collected only in 2 grid cells (within the territories of the Iremel Nature Park and the Ufa Plateau), more than 700 specimens – in 4 grid cells (in the Iremel Nature Park and the South Urals State Nature Reserve), more than 500 specimens – in 29 grid cells, and more than 200 specimens – in 23grid cells. The proportion of cells in which up to 10 finds were made is approximately 25% of the total number of surveyed cells. The grid mapping allowed to identify of the grid cells with high concentration of rare and endangered species. These data were used in the preparation of the next edition of the regional Red Data book.

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CONTRIBUTION OF A.S. LAZARENKO TO THE MOSS FLORA OF THE SOVIET FAR EAST

Andrey Sozontovich Lazarenko made a great impact to the study of the moss flora of Soviet Far East. He collected bryophytes in Primorsky Territory in 1930, 1933 and 1935, published the "Brief manual of leafy mosses of the Far East" (Lazarenko, 1938) and compiled the first detailed checklist of this area (Lazarenko, 1940, 1941a, 1941b, 1946). Most of his identifications remain valid, some were later questioned and re-identified; however, among the latter there are a number of cases when re-identifications were incorrect, whereas original identification of Lazarenko turned out to be correct. A very confusing taxonomy of the genus *Glyphomitrium* is one of such examples. Lazarenko (1933) was the first who reported this genus for the Soviet Union, under the name *G. humillimum* (Mitt.) Card. Later Abramova & Abramov (1955) revised Russian specimens and referred them to *G. warburgii* (Broth.) Card. Subsequent publications used one of these two