

## Book Review

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**Mosses of the Ural Mountain ecosystems. Alexander P. Dyachenko and Elena A. Dyachenko. UrGPU, Ekaterinburg, Russia. 2016. ISBN: 978-5-7186-0821-2. 648 pages.**

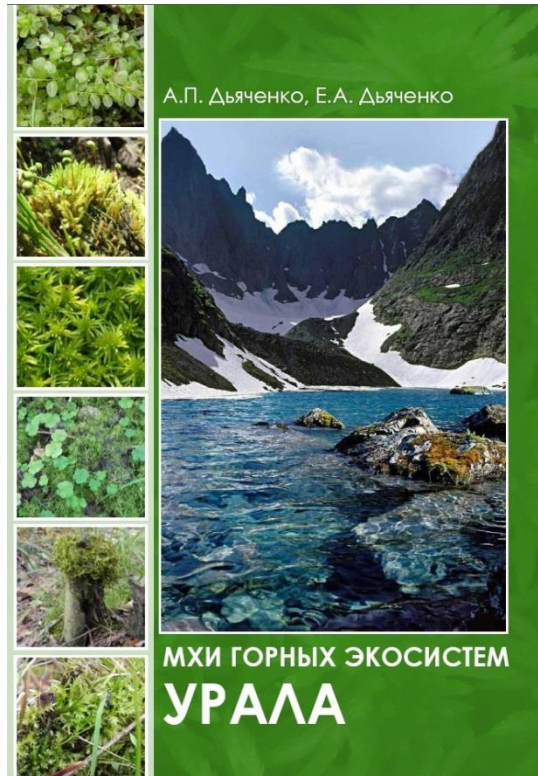
This monograph presents a major taxonomic analysis of the moss flora found in the mountain ecosystems of the Ural Mountains. It catalogues 592 species, 11 varieties and 1 subspecies belonging to 53 families and 173 genera.

The main families represented are, with decreasing numbers of species, Pottiaceae, Grimmiaceae, Bryaceae, Brachytheciaceae, Sphagnaceae, Amblystegiaceae, Dicranaceae, Mniaceae), Polytrichaceae, Rhabdoweisiaceae, Mielihoferiaceae, Plagiotheciaceae, Pylaisiaceae, Splachnaceae, Orthotrichaceae, Calliergonaceae, Encalyptaceae, Ditrichaceae, Fissidentaceae and Bartramiaceae. The fifteen largest families include 445 species, subspecies and varieties, i.e. 73.7 % of

the mosses in the Ural Mountains. Some of the families may include a large number of genera like Pottiaceae with 19 whilst others with a similar number of species can include as few as one genus (e.g. Sphagnaceae). There is a similar variation in the number of species in the genera, e.g. *Bryum* is represented by 37 species while *Bryoerythrophyllum* by only one.

The book also details the differences in the flora of the mountain ecosystems of the five regions of the Urals. In the Polar Urals 371 species, 1 subspecies and 5 varieties have been found while in the Subpolar region, which has the least number of species, only 349 species and 5 varieties have been identified. The richest moss flora is in the Southern Urals with 434 species and 5 varieties, in the Northern Urals have been found 432 species and 6 varieties, and in the Middle Urals 401 species and 7 varieties.

A section of the book deals with rare species found in the Urals and explains a system of classification for them based on the size and distribution of areas in which they are found.



The first group, *Stenodisperse* species, includes 171 taxa which are dispersedly found in small areas and have a low level of tolerance and competitiveness, the second group, *Everydisperse* species, includes 209 species diffusedly found over large areas that have high tolerance and low competitiveness, and the third group known as *Stenoglomerate* species consists of just 7 species found within a small area of the Urals and these are characterized by a combination of low tolerance with relatively high competitiveness which is strongly dependent on environmental factors. A fourth group includes the remaining mosses that are not rare and are distributed widely within the Urals having high tolerance and high competitiveness.

Based on their analysis of moss flora in the Urals the authors had, in an earlier work, devised a system of classification for the geographical analysis of moss flora and they continue to use it in this book. Thus, in different parts of a mountainous country, populations of the same species can have different versions depending on their altitude. Such species are classified as subvexal and in the Urals they number 129 or 21.4% of the moss species. In the book the authors elaborate further on this type of analysis combining geographical region with altitude and its application to the mosses of the Urals.

The book also deals with an analysis of the latitudinal resettlement of mosses in the Ural Mountains. This showed that approximately 40% of the mosses were distributed throughout the Urals and almost 15% grow either in the South Urals or in the Middle and South regions. The remainder are further classified other combinations of regions, namely the northern and central regions, the central and southern regions, and the central regions. The essence of latitudinal changes is the gradual replacement from North to South of cold-tolerant and moisture-tolerant species to heat-tolerant and drought-resistant species.

The authors point out that of the mosses in the mountain ecosystems of the Urals, 83.8% are able to grow on inorganic substrates and 55.6% on organic. This can be interpreted as evidence of the great antiquity of mosses, pointing to the possibility that their ancestors in the process of land development were able to grow on purely inorganic substrates due to the absence or very limited distribution of organic substrates. For this reason, the majority of mosses, apparently, still prefer to grow on inorganic substrates and are less adapted to organic soils, which are secondary to them and less habitable. Interestingly, the biological characteristics of pleurocarpous mosses enable them to grow on organic substrates more successfully than acrocarpous and also on more diverse substrates. Such features of pleurocarpous mosses are indirect evidence of the later evolutionary formation of this group compared with the acrocarpous mosses.

The authors conclude the book with a section on the problems involved in the protection of mosses in the Urals.

This book, which contains 35 drawings, 8 tables, and many other interesting materials can be thoroughly recommended for botanists, geobotanists, ecologists and forestry experts, as well as for teachers and students of those subjects. Although the text is in Russian the Latin classification of the mosses could prove useful for non-Russian scholars.

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