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COMMUNICATIONS

FLORA OF MINOR MIRES IN THE MIDDLE TAIGA SUBZONE OF THE REPUBLIC OF KARELIA AND THEIR ROLE I N BIODIVERSITY CONSERVATION

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The surveyed 63 minor mires (1–100 ha) located in four major landscape types in the middle taiga subzone of Karelia were assigned to 11 types of mire massifs of the botanical-geographical classification. Their flora comprises 229 species of vascular plants and 62 moss species. Prevailing in the flora are boreal Eurasian and circumpolar species. Six species listed in the Red Data Book of the Republic of Karelia (2020) were recorded, four of them beingnationally red-listed (2008), too. The spectra of the total vascular plant flora and its core were mapped with respect to Ellenberg's indicator values of 4 ecological factors: light, moisture, soil acidity, soil nitrogen. In relation to light conditions, scioheliophytes and heliophytes prevail in the flora. In relation to moisture factor, over a half of the flora is represented by ultra-hygrophytes and hygrophytes (55%), with a significant contribution of hydro- and hydatophytes (12%). In terms of substrate acidity, moderately acidophilic species account for 29%, acidophilic and extremely acidophilic species – 19%, the species preferring neutral reaction – 24%, and 23% of species are acidity-indifferent. In relation to soil nitrogen factor, oligotrophic species make a prevaling group in the flora (46%), 18% are mesotrophic, 9% are eutrophic, and 10% are indifferent to the factor.

Cluster analysis of the flora composition similarity between different mire types has shown a clear differentiation between the floras of ombrotrophic and mesotrophic sphagnum mires (6 types) and those of mesoeutrophic and eutrophic groundwater-fed herbaceous and herb-moss mires (5 types). The surveyed mires cover total of 915 ha and contain 74% of the mire flora of middle-taiga Karelia. Furthermore, the species associated with ombrotrophic, mesotrophic, and eutrophic open habitats prevailing in mires of this region are represented almost entirely. The account of the flora of forest mires is incomplete, as they have been studied very poorly. Overall, minor mires located in different landscapes of middle-taiga Karelia quite comprehensively represent the diversity of the regional flora and mire types, and are important for the conservation of mire ecosystem biodiversity.

Keywords: vascular plants, mosses, ecological values, mire types, biodiversity conservation

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REFERENCES

Bogdanovskaya-Guienéuf I.D. 1946. O proiskhozhdenii flory boreal'nykh bolot Evrazii [On the origin of the flora of boreal mires of Eurasia]. – In: Materialy po istorii flory i rastitel'nosti SSSR. Moscow; Leningrad. P. 425–468 (In Russ.).

Boch M.S., Smagin V.A. 1993. Flora i rastitel'nost' bolot Severo-Zapada Rossii i printsipy ikh okhrany [Flora and vegetation of the mires of the North-West of Russia and the principles of their protection]. St. Petersburg. 225 p. (In Russ.).

Czerepanov S.K. 1995. Sosudistye rasteniya Rossii i sopredelnykh gosudarstv (Vascular plants of Russia and adjacent states). St. Petersburg. 992 p. (In Russ.).

Ellenberg H. 1974. Zeigerwerte der Gefäßpflanzen Mitteleuropas. – Scripta geobot. 9: 1–97.

Ellenberg H., Leuschner C. 2010. Vegetation Mitteleuropas mit den Alpen. Stuttgart. 1334 p.

Elina G.A., Kuznetsov O.L., Maksimov A.I. 1984. Strukturno-funktsional'naya organizatsiya i dinamika bolotnykh ekosistem Karelii [Structural and functional organization and dynamics of mires ecosystems of Karelia]. Leningrad. 128 p. (In Russ.).

Eurola S., Hicks S., Kaakinen E. 1984. Key to Finnish mire types. – In: European mires. London. P. 11–117.

Grishutkin O.G. 2015. Bolota Mordovii: landshaftno-ekologicheskii analiz, flora, posledstviya antropogennogo vozdeistviya [Mires of Mordovia: landscape-ecological analysis, flora, consequences of anthropogenic impact]. Saransk, Pushta. 154 p. (In Russ.).

Hammer R., Harper D.A.T., Ryan P.D. 2001. PAST: Paleontological statistics software package for education and data analysis. – Palaeontol. Electron. 4(1): 1–9.

Ignatov M.S., Afonina O.M., Ignatova E.A. et al. 2006. Checklist of mosses of East Europe and North Asia. –

Arctoa. 15: 1–130.
https://doi.org/10.15298/arctoa.15.02

Ivchenko T.G. 2011. Stepen' izuchennosti i zadachi okhrany raznoobraziya bolotnykh ekosistem Chelyabinskoj oblasti [Level of knowledge and protection of the diversity of the problem of the mire ecosystems of the Chelyabinsk region]. – Vestnik Chelyabinskogo gosudarstvennogo universiteta. Ser. Ekologiya i Prirodopolzovanie. 5: 90–94 (In Russ.).

Ivchenko T.G. 2019. Rastitel'nost' bolot Yuzhno-Ural'skogo regiona (v predelakh Chelyabinskoi oblasti) [Vegetation of mires of the South Urals (within the Chelyabinsk region]: Abstr. ... Diss. Doct. Biol. Sci. St. Petersburg. 53 p. (In Russ.).

Kravchenko A.V. 2007. A compendium of Karelian flora (vascular plants). Petrozavodsk. 403 p. (In Russ.).

Krasnaya kniga Respubliki Kareliya [Red data Book of the Republic of Karelia]. 2020. Belgorod. 448 p. (In Russ.).

Krasnaya kniga Rossiiskoi Federatsii (rasteniya i griby) [Red data book of the Russian Federation (plants and fungi)]. 2008. Moscow. 855 p. (In Russ.).

Kutenkov S.A., Kuznetsov O.L. 2013. Raznoobrazie i dinamika zabolochennykh i bolotnykh lesov Evropeiskogo Severa Rossii [Diversity and dynamics of swamp forests of the European North of Russia]. – In: Raznoobrazie i dinamika lesnykh ekosistem Rossii. Book 2. Moscow. P. 152–204 (In Russ.).

Kuznetsov O.L. 1980. O razvitii aapa bolot severnoy Karelii [On the development of the aapa mires of Northern Karelia]. – In: Mires of the European North of the USSR. Petrozavodsk. P. 92–113 (In Russ.).

Kuznetsov O.L. 2003. Mire vegetation. – In: Biotic diversity of Karelia: conditios of formation, communities and species. Petrozavodsk. P. 50–57.

Kuznetsov O.L. 2006. Flora and vegetation of mires in Karelia. – In: Mire Ecosystems in Northern Europe: Diversity, Dynamics, Carbon Balance, Resources and Conservation: Proceedings of International Symposium. Petrozavodsk. P. 145–159 (In Russ.).

Kuznetsov O.L. 2017. Raznoobrazie tipov bolot taezhnoy zony evropeyskogo severa Rossii [Variety of types of mires in the taiga zone of the European North of Russia]. – In: West Siberian peatlands and the carbon cycle: past and present. Mater. Fifth international Symposium of field. Novosibirsk. P. 26–28 (In Russ.).

Kuznetsov O.L., Maksimov A.I. 2005. Partsial'nye brioflory bolot Karelii [Partial bryoflores of Karelian Mires]. – Trans. of KarRC of RAS. 8: 138–145 (In Russ.).

Kuznetsov O.L., Grabovik S.I. 2010 Monitoring flory i rastitel'nosti bolotnykh ekosistem [Monitoring of flora and vegetation of mires ecosystems]. – In: Monitoring i sokhranenie bioraznoobraziya taezhnykh ekosistem Evropeiskogo Severa Rossii. Petrozavodsk. P. 19–31 (In Russ.).

Kuznetsov O.L., Kutenkov S.A. 2012. Bolota zapovednika "Kivach", ikh raznoobrazie, genezis i dinamika [Mires of the Kivach Nature Reserve, their diversity, genesis and dynamics]. – In: Prirodnyye protsessy i yavleniya v unikal'nykh usloviyakh srednetayezhnogo zapovednika: Mater. nauchno-prakt. konf., posvyashchyonnoy 80-letiyu FGBU "Gosudarstvennyy prirodnyy zapovednik "Kivach". Petrozavodsk. P. 58–64 (In Russ.).

Kuznetsov O., Tokarev P., Kutenkov S., Antipin V. and Lindholm T. 2014. Mires of the Zaonezhye Peninsula. – In: Biogeography, landscapes, ecosystems and species of Zaonezhye Peninsula, in Lake Onega, Russian Karelia. Helsinki. P. 131–146.

Kuznetsov O.L., Maksimov A.I., Boychuk M.A., Kutenkov S.A. 2018. Bryoflora of Mire Biotopes in North European Russia, Its Diversity and Ecological Characteristics. – In: Mosses: Ecology, Life Cycle and Significance. P. 59–87.

Lindholm T., Heikkilä R., Kuznetsov O. 2019. Finnish botanists in the mires of Olonets region in Russian Karelia during the Second World War. – Mires Peat. 24(12): 1–18. https://doi.org/10.19189/MaP.2018.OMB.390

Lounamaa J. 1961. Untersuchungen uber die eutrophen Moore des Tulemajarvi-Gebietes in sudwestlichen Ostkarelien, KASSR. – Ann. Bot. Soc. "Vanamo". 32(3): 1–63.

Lukashov A.D. 2003. Geomorphological characteristics. – In: Biotic diversity of Karelia: conditios of formation, communities and species. Petrozavodsk. P. 12–17.

Mironov V.L., Kuznetsov O.L., Maksimov A.I., Antipin V.K., Heikkilä R., Lindholm T., Kutenkov S.A. 2017. On the Flora of the Ypäyssuo Hydrological (Mire) Nature Reserve, Karelia (Russia). – Trans. of KarRC of RAS. 1: 18–31 (In Russ.).
https://doi.org/10.17076/bg348

Razvedka torfjanykh mestorozhdeniy [Exploration of peat deposits]. 1953. Moscow. 705 p. (In Russ.).

Volkova E.M. 2018. Bolota Srednerusskoi vozvyshennosti: genesis, strukturno-funkcional'nye osobennosti I prirodoohrannoe znachenie [Mires of Middle-Russian Upland: genesis, structural and functional features, environmental significance]: Abstr. ... Diss. Doct. Biol. Sci. St.Peterburg. 46 p. (In Russ.).

Yurkovskaya T.K. 1992. Geografiya i kartografiya rastitelnosti bolot Evropeyskoy Rossii i sopredelnykh territoriy [Geography and cartography of vegetation in mires of European Russia and adjacent territories]. St. Petersburg. 256 p. (In Russ.).

Yurtsev B.A., Kamelin R.V. 1987. Programs of floristic researches of different degree of detail. – In: Theoretical and methodical problems in comparative floristics. Materials of the II workshop on comparative floristics. Leningrad. P. 219–241 (In Russ.).

Zatsarinnaya D.V. 2015. Ekologicheskie osobennosti i rastitel'nost' karstovykh bolot zony shirokolistvennykh lesov (na primere Tul'skoi oblasti): [Ecological features and vegetation of karst mires of deciduous forest zone (on the example of Tula region)] Diss. ... Kand. Biol. Sci. Moscow. 173 p. (In Russ.).

Zeliankevich N.A., Grummo D.G., Sozinov O.V., Galanina O.V. 2016. Flora and Vegetation of the Raised Bogs of Belarus. Minsk. 244 p. (In Russ.).