

BRYOFLORA OF LIMESTONE QUARRIES OF THE CENTRAL RUSSIAN UPLAND

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The aim of this work is to perform a comprehensive analysis of the bryoflora of limestone quarries and assess the role of the latter in the conservation of rare bryophytes. Mosses were collected by the route method in 2014–2020; processing and determination were carried out according to generally accepted bryological methods; samples are stored in the herbarium of the “Galichya Gora” Nature Reserve (VU). 109 species were identified (6 liverworts from 4 families and 103 moss species from 27 families) in the studied bryoflora. The leading families are Pottiaceae, Brachytheciaceae (15 species each), Amblystegiaceae (13), Bryaceae (12 species), Grimmiaceae (7). The number of bryophyte species in the industrial quarries varies from 11 to 63 (Khomyakovskiy quarry, Tula Region); the average species number per object is 26. The share of rare and noteworthy species ranges from zero (Studenovskiy quarry, Lipetsk Region) to 33.3% (Khomyakovskiy quarry), being 20% in most of the quarries. The composition of the moss cover is dominated by species with low and relatively low occurrence and low coverage – 60%. About a third of the species, mainly calciphites, are characterized by higher local occurrence and abundance in quarry-dump landscapes than in natural habitats. In the landscape structure of the quarries, the highest species diversity, namely 75 species, is observed on screes of large boulders or large rubble on steep slopes with the seepage of mineralized underground water; about 30 species occur on accumulative manes and mounds; 25 ones on the banks or drying bottoms of lakes, 20 on vertical walls and ledges. 18 species were found on wood substrates, 30 on clay-limestone soils, 35 on dense limestone surfaces, and about 50 species on large rubble with small deposits of fine-grained earth. The limestone quarries provide habitats of a large number of rare species (about 30% of the species composition), 15 species are listed in the Red Data Books of the regions located on the Central Russian Upland: *Calliargon giganteum*, *Campylium stellatum*, *Encalypta vulgaris*, *Gyroweisia tenuis*, *Hygrohypnum luridum*, *Hylocomium splendens*, *Leucodon sciuroides*, *Ortotrichum anomalum*, *Plagiochila porelloides*, *Rhynchostegium murale*, *Rhytidadelphus triquetrus*, *Schistidium crassipilum*, *S. elongatulum*, *Seligeria calcarea*, *S. pusilla*. The bryoflora of the limestone quarries of the Central Russian Upland can be estimated as very rich. Its composition is characterized by a high level of taxonomic, botanical-geographical, ecological-biological diversity; the limestone quarries are valuable technogenic landscapes, whose biota in the European Russia includes a rare complex of calciphilous bryophytes; it is advisable to organize a conservation regime in the rank of natural monuments or natural parks in a number of the quarries.

Keywords: bryoflora, species diversity, Red Data books, bryophytes, limestone quarries, protected species, ecological and biological characteristics

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