

OLD-GROWTH SPRUCE-FIR FORESTS IN THE PLAIN AREA OF THE KOMI REPUBLIC

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Abstract. Old-growth spruce and spruce-fir forests can be extremely variable in the composition and diversity of their ground layer of vegetation, sometimes with over 10 times difference in diversity between various forests. What is the reason for such a big difference? Here we propose a hypothesis that the ground layer of vegetation is most strongly affected by fire history of boreal forest ecosystems. We estimated composition, structure and diversity of vascular plant and bryophyte species in seven forest types in old-growth forests dominated by either *Picea obovate* or *Picea obovate* together with *Abies sibirica*, which were located in the plains of the Komi Republic. All the study areas were either at elevated or hilly plains with good and moderate drainage, or in valleys of small rivers and streams, away from wets and bogs. We analyzed Landolt's species ecological values, coverage of vegetation layers and deadwoods at different stages of decay, bedrock parameters, and soil charcoals in order to explain differences in the plant species composition and diversity. We showed that there are weak but statistically significant correlations between the coverage of deadwoods at different decay stages and vascular species composition and a positive correlation between the total deadwood coverage and bryophyte species diversity. Among the studied forests, those that are dominated by boreal and nitrophilous tall herbs (located in watersheds and in river valleys respectively), have no fire scars on stems of *Pinus spp.* and almost no charcoal in the soil and demonstrate the highest species diversity. We estimated that these forests have not experienced fires for over 400 years. In contrast, the diversity of vascular plants in the forests dominated by green mosses, dwarf shrubs, small boreal herbs and large ferns was low; we evaluated that the last time when these forests suffered intense multiple fires was at least 150 years ago.

Key words: spruce-fir forests, tall herb forests, vascular plants, bryophytes, deadwood, charcoal, fire.