

Original article

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## Genetic Diversity of Norway Spruce in Natural Stands Contaminated with Heavy Metals in Varying Degrees in the North-West of Russia

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**Abstract.** The investigation of the relationship between the accumulation of heavy metals by plants and the level of genetic diversity of their populations is relevant for assessing the adaptive potential of forest-forming tree species under the conditions of industrial development and climate change. The study is devoted to assessing the parameters of genetic diversity of Norway spruce in microsatellite loci in natural stands with varying heavy metals contamination.

The objects of research are trial plots in the Leningrad region near the metallurgical enterprise “Orion-Specseplav-Gatchina” LLC (Gatchinskoye forestry) and near highways in the Tosnensky district (Lyubanskoye forestry). Research method – analysis of polymorphism in nuclear EST-SSR loci. Contamination of test plots with heavy metals Mn, Zn, Cu, Fe, Pb, Cr, Ni, Cd was determined by their content in spruce needles. A trend towards a decrease in genetic diversity (number of effective alleles –  $N_e$ , Shannon diversity index –  $I$ , expected heterozygosity –  $H_e$ ) was noted in mature spruces and undergrowth on the most polluted test plots near the metallurgical enterprise. Pairwise comparison of  $F_{ST}$  indices of populations revealed that populations from the Gatchina1 and Gatchina2 sample plots, which are the most contaminated with heavy metals and are closest to the source of pollution in Gatchina, have some degree of apartness from other populations in the Gatchina and Tosnensky districts, located at a distance of 19–38 km from them.

**Key words:** Norway spruce, microsatellites, genetic diversity, population structure, heavy metals.

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