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Effect of *Vaccinium vitis-idaea* L. and moisture on mountain-meadow soils

Rida Sabirova, Michael Makarov, and Maxim Kadulin

Department of Soil Science, Lomonosov Moscow State University, Moscow, Russian Federation (r.sabirova96@gmail.com)

Against the climate change there has been an overgrowing of phytocenoses of alpine lichen heath and arctic tundra with dwarf shrubs and shrubs over the past 40 years. Dwarf shrubs roots of *Vaccinium vitis-idaea* L. forms symbiosis with ericoid mycorrhiza, which may lead to change of soil properties. Mycorrhizal fungi regulate nitrogen, phosphorus and carbon cycles by secretion of active enzymes which depolymerize and mineralize soil organic matter and increase available of mineral nutrition elements for vegetation and microorganisms.

Moreover, in the previous research it was found that moisture was greater under shrubs than under alpine lichen heath. It is known that moisture plays key role in microbial processes in the soil, affect on enzyme activity, nitrification, mineralization and so on. Therefore, the objective of this research is to evaluate the influence of both dwarf shrubs and moisture on the soil characteristics.

Research area is located around 2750 m a.s.l. in the alpine heath of Teberda Nature Reserve, North Caucasus, Karachay-Cherkess Republic where 3 areas with different moisture (15, 21 and 27%) were chosen. In each area samples of mountain-meadow soil were collected from under dwarf shrubs and alpine lichen heath without dwarf shrubs (control) during 10 days of the second part of July and then frozen until laboratory analysis. Firstly, there were analyzed chemical (soil pH, mineral P, organic N, C, inorganic N) and biological (C and N of microbial biomass, basal respiration, mineralization, nitrification and activity of glucosidase, phosphatase, chitinase and leucinaminopeptidase) properties of the soil samples. Furthermore, it was made statistical analysis in Statistica 8.0 program.

It was found that increase in moisture is accompanied by increase in concentrations of inorganic forms of nitrogen, C and N of microbial biomass, basal respiration and nitrification activity in heath without shrubs, which indicates a growth of microbiota activity. However concentrations of labile organic carbon and nitrogen, and enzymatic activity decrease at the same conditions. Such changes indicate a shift from a community of heath with herbal vegetation to communities dominated by ericoid mycorrhizal plants.

The investigation also revealed that soil acidity is significantly higher under *V. vitis-idaea* L., however, there is a noticeable decrease in nitrification activity, inorganic nitrogen concentrations, which indicates minor dependence of the dwarf shrubs on mineral compounds in nitrogen

nutrition.

Thus, both the presence of *V. vitis-idaea* L. and various moisture have a significant effect on the soil characteristics. Moreover, the moisture under control plays an essential role, while under the dwarf shrubs many soil properties remain unchanged, therefore, *V. vitis-idaea* L. creates a microclimate in the soil among roots where moisture has no effect.