

spruce north-taiga forests preferably concentrate in forest litter horizons. Lower lying mineral horizons decrease in number of bacteria by 5–41 times and in number of fungal spores by 4–6 times. Biomass of microbial communities is structurally dominated by mycelium of microscopic fungi (85.6–93.6 %). Soil microbe communities in green-moss and long-moss spruce forests have similar and in some cases statistically equal parameters as number of bacterial cells and fungal spores, length of fungal mycelium, biomass of bacteria and fungal mycelium. Soil in sphagnum spruce forests differs from soils at the other two key plots by a sharp decrease in number and biomass of bacterial cells and an increase in total number of fungal spores, length of fungal mycelium and fungal biomass. According to the multi-substrate testing results, the most stable and soil quality favorable microbial community develops in organic soil horizons under green-moss spruce forests. Soil bogging in spruce forests lowers functional activity of soil microbiota. Higher moisture content decreases activity of alcohol-assimilating microbiota and increases assimilation of aminoacids. Microbe communities at excessively moistured soils do not practically consume such aminoacids as arginine, asparagine, valine, and serine. Soil microorganisms in green-moss spruce forest are highly diverse (the Shannon index of 4.4–49). It is 3.0–3.8 for boggy spruce forests. Mineral soil horizons for all studied soils have a lower biodiversity index (by 1.1–1.3 time). The  $d$  parameter responsible for stability of soil microbiota and the  $G$  integral index characterizing its well-being evidence a non-stable and unwell status of microbe communities. Only one horizon, i.e. forest litter of gley podzolic soil under green-moss spruce forest, can be considered a well-doing microbial system.

**Key words:** forest soils, microbe biomass, microbe communities, multi-substrate testing, taiga forests.

**UNDERSTANDING OF ECOSYSTEM FUNCTIONING  
AS A PREREQUISITE FOR ECO-COMPATIBLE REFORESTATION  
OF DEGRADED AREAS WITH NATIVE SPECIES – A CASE STUDY  
FROM THE ANDEAN ECUADOR**

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Worldwide reforestation activities on degraded land are still predominantly based on few well known plantation tree species. However, eco-compatible silvicultural concepts for the reforestation of degraded areas in regions with high biodiversity require a deep

understanding of ecosystem functioning and biodiversity. Using a case study from Ecuador we show that the development of silvicultural concepts for reforestation with native species has to go hand in hand with the generation of fundamental ecological knowledge about tree species traits and requirements, the consideration of natural forests as source of forest reproductive material as well as institutional capacity building and training of local experts. We present a conceptual framework based upon results from analyses of biodiversity and phenological patterns in a pristine forest, from nursery experiments and from reforestation trials.

**Key words:** biodiversity, forest reproductive material, natural forest management.

### **DENDROCHRONOLOGICAL ASSESSMENT OF CLIMATIC AND ANTHROPOGENIC INFLUENCES ON URBAN FOREST IN BULGARIA**

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The results of long-term dendrochronological investigation of planted urban forests growth and the impact of climatic and air pollution factors on them in the King Boris' Park, Sofia, are presented. Insufficient aeration of Sofia valley, presence of a number of enterprises, emitting enormous amounts of polluting agents, and increased traffic cause formation of fogs and concentration of toxic gasses, dust, smoke and soot in this area. The dynamics of the annual radial increment of the trees is influenced by the main climatic parameters (air temperature and precipitation) as well as the environmental pollution. Attention was concentrated on assessment of the joint impact of climatic factors and anthropological pollution on pine and oak stands. The results of the climate response models show the difference of the air pollution and natural factors impact on the studied pine and oak stands.

**Key words:** air temperature, oak, pine, polluting agents, precipitation, radial increment.