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The mycobiota in solid atmospheric aerosols and surface urban soils of roadside and recreational areas of the metropolis Moscow

Ivanova A.E. [1, 2] ✉, Sidorova T.A. [1], Val`aev D.A. [1], Plotnikova K.A. [1], Prokof`eva T.V. [1], Umarova A.M. [1]

[1] *M.V. Lomonosov Moscow State University, Moscow, 119234, Russia*
[2] *A.N. Severtsov Institute of Ecology and Evolution Russian Academy of Sciences, 119071, Russia*

✉ivanovaane@gmail.com

The dustiness of the air in urban ecosystems is a modern environmental problem determines the health of humans, animals, plants. The contribution of mycobiota to atmospheric dust can be about 70% of organic matter (Science, 2005). Soil and phylloplane are the main suppliers of fungal particles into the air. The aim was to evaluate the content and taxonomic composition of fungi in ground level of aerosols (up to 1,5 m), precipitated dust, also surface urban soil in roadside and recreational park areas of the metropolis Moscow. 8 sites were compared in 2021.

The following sampling methods were used: aspiration, sedimentation, compressor, soil sampling. The following analysis methods were used: fluorescence microscopy to evaluate biomass with Fluorescent Brightener 28; dilution plate technique to isolation of cultivated fungi; species identification by ITS rDNA sequence; Next Generation DNA sequencing techniques (NGS) using the Illumina platform and databases of target sequences of the 18S rDNA gene.

Fungal biomass in aerosols and dust was mainly represented by fungal spores. Up to 50 million spores/g was detected in settling dust, this was 2-3 times more than in surface soil. Up to 10 million spores/m^3 was reached in the air. The number of spores from the PM2.5 fraction predominate – 70-85% in dust and aerosols, up to 95% in urban soil. In the park zone, the share of spores PM2.5 was less than in the roadside. In settling dust and aerosols there was more spores of the PM10 fraction, its weight was 50-70% (up to 95% at a height of 1.5 m) of the total fungal biomass, that more in 2 than in soils. Usually more fungal spores settled on the soil surface in the park, than in the roadside area.

The abundance and diversity of cultivated fungi were higher in aerosols and settling dust in park areas, than in the roadside zone, and higher than in soil. Dark-colored fungi prevailed (abundance (25)55-70%) in aerosols and dust, these were *Alternaria, Phoma, Cladosporium* species. The abundance of *Aspergillus* species and some others increased also. There are many opportunistic and phytopathogenic fungi among these. In soils *Penicillium* and *Trichoderma* dominated. The comparison of cultivated fungal assemblages to the targeted analysis data has been presence.

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