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Vegetation indicators of transformation in the urban forest ecosystems of "Kuzminki-Lyublino" Park

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Forest ecosystems in the city are at the same time a component of its natural environment and part of urban developmental planning. It imposes upon urban forests a large functional load, both environmental (formation of environment, air purification, noise pollution reducing, etc.) and social (recreational, educational) which defines the special attitude to their management and study. It is not a simple task to preserve maximum accessibility to the forest ecosystems of the large metropolises with a minimum of change.
The urban forest vegetates in naturally formed soil, it has all the elements of a morphological structure (canopy layers), represented by natural species of the zonal vegetation. Sometimes it is impossible for a specialist to distinguish between an urban forest and a rural one. However, the urban forests are changing, being under the threat of various negative influences of the city, of which pollution is arguably the most significant. This article presents some indicators of structural changes to the plant communities, which is a response of forest ecosystems to an anthropogenic impact. It is shown that the indicators of the transformation of natural ecosystems in the city can be a reduction of the projective cover of moss layer, until its complete absence (in the pine forest), increasing the role of Acer negundo (adventive species) in the undergrowth, high variability of floristic indicators of the ground herbaceous vegetation, and a change in the spatial arrangement of adventive species.
The assessment of the impact of the urban environment on the state of vegetation in the "Kuzminki-Lyublino" Natural-Historical Park was conducted in two key areas least affected by anthropogenic impacts under different plant communities represented by complex pine and birch forests and in similar forest types in the Prioksko-Terrasny Biosphere Reserve. The selection of pine forests as a model is due to the fact that, according to some scientists, pine (Pinus Sylvestris L.), a very ductile and widespread species, is a sensitive indicator of anthropogenic burden, responding to the impact of defoliation and needles discoloration, and survives even at fairly high levels of pollution.
The vegetation cover is one of the most dynamic components of the ecosystem and under the conditions of urban existence it is subject to transformation. The indicators of the transformation of natural ecosystems in the city can be a reduction of the projective cover of moss layer, until its complete absence (in the pine forest), increasing the role of Acer negundo (adventive species) in the undergrowth, high variability of floristic indicators of the ground herbaceous vegetation, and a change in the spatial arrangement of adventive species.
The further study of plant communities with a view to identifying indicators of transformation in urban environmental conditions will help for the early detection of reversible changes in the ecosystems of urban forests and the development of rational urban forest care technologies.