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**БИОЛОГИЧЕСКИЕ ОСОБЕННОСТИ ЗЕЛЕННЫХ ГОРОДСКИХ  
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**Аннотация**

Описаны основные проблемы, связанные с зелеными насаждениями в рамках городской среды, а также роль государства в разрешении данного вопроса.

**Ключевые слова:** городская инфраструктура, озеленение, проектирование, биологические особенности.

**BIOLOGICAL FEATURES OF GREEN URBAN SPACES****Elena O. Trunova**

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**ABSTRACT**

This article describes the main problems associated with green spaces within the urban environment, and also highlights the role of the state in resolving this issue.

**Keywords:** urban infrastructure, landscaping, designing, biological features.

The role of modern landscaping cannot be understated. Plants in an urban environment perform a huge number of functions, including decorative and ecological. However, this art always depends on the conditions of a particular landscape and the possibilities of the city. Any landscape construction begins with an assessment of the external environment: the results of geodetic surveys, soil and climatic conditions, the selection of design for urban development, as well as accounting for the resources of the city. The formation and placement of urban gardens and parks (they perform ecological and social functions) in anthropogenic landscapes imply the creation of an integral territory in the form of a single territorial system (Vergunov et al., 1991). The main tool of any green landscaping are plants which can have different biological forms based on the purpose: trees, shrubs, flowers, etc. Depending on the initial idea, it is important to take into account the biological characteristics of plants, since the urban environment differs from the natural one, and to carry out a reasonable selection of planting material accordingly. The purpose of this publication is to characterize and study the biological features of plants in urban conditions for more competent accounting, selection, further care, as well as increasing survival.

Urban ecology differs from natural ecology (by the way, there are few untouched natural territories left). It is an artificially created environment (by mankind), which has a dominant number of elements of the technosphere. The urban environment is always supported by the human community and depends on human activity. It is noted that people adjust the habitat for themselves and thus radically change the landscape and its ecological functions. Types of urban landscapes differ in the degree of development. The first stages are usually rural. There are many natural components in such territories, large areas of fields with herbage and an abundance of woody and shrubby vegetation. The next stages are low-rise urban landscapes. These are the outskirts of cities, where there are also many natural objects, as well as territories occupied by private houses, vacant lots, open soils. The third stage is multi-storey urban landscapes. They are characterized by a high number of man-created objects, vast areas are occupied by asphalt pavement and urban buildings (Vershinin, 2014). Because of this, the city has its own microclimate. Asphalt surfaces and buildings cause the city to overheat by 7-10 degrees Celsius, besides, the urban layout itself forms layers of temperature inversion at an altitude of 100-150 m, where superheated and polluted particles are delayed in windless weather (Nefedov, 2002). The maximum degree of urbanization also marks an increased level of various pollutants (noise, light, heavy metals, dust from the open ground), which also reduces the adaptability of some plant species. It should not be forgotten that recreation also has an impact on the integrity of urban vegetation. Such excessive agglomeration without taking into account and designing green spaces leads to a number of environmental disasters that have irreversible consequences in the long term. And the levelled ecological functions of the landscape adversely affect both nature and people (Gorokhov, 2005). Therefore, the main issue for city managers is to create a high-quality urban environment corresponding to ecological and economic tasks for a comfortable stay of people. After all, urban landscaping can improve the climate in a harsh urban area (disinfection with phytoncides, reduction of wind speed and noise level, humidification of the air) (Tetior, 2013).

The Russian legislative framework implies eco-friendly development in order to preserve the potential of the landscape and reduce damage when planning the territory. Article 2 of the Town-Planning Code of the Russian Federation dated 29.12.2004 N 190-FZ states the need to ensure balanced consideration of various factors (environmental, economic, social, etc.) for the implementation of integrated sustainable development of the territory on the basis of documents and rules on land use in compliance with technological regulations. Also St. 2 of The Civil Code of the Russian Federation states the importance of compliance with the requirements for the protection of environment, which corresponds to the provision of Art. 42 of the Constitution of the Russian Federation. Articles 35 and 36 of the Federal Law "About environment protection" confirm that territorial planning in urban planning should take into account the ecological state of the built-

up landscape, as well as anticipate the consequences of construction in order to prevent a negative impact on environment, and, in addition, keep records of economic costs and waste in architectural and construction activities.

Urban landscaping is inextricably linked with urban planning - both directions are important for creating a comfortable urban environment. When planning and building, it is important to take into account not only the plan and the needs of the development, but also the concept of further exploitation of green spaces. Recreational areas are different components of the urban environment, as a rule, designed for everyday recreation and walks. Depending on the goals, green areas vary. Squares are designed for transit pedestrian movement and everyday walks. Gardens are a recreation area among the trees in the city limits. Boulevards are constructed along streets and rivers, designed for walking, easing the urban load; they are also a transit zone (Denisov, 2006; Rybak, 2016). If the woodlands are adjacent to the forest, then in this case the exploitation has a different character, which is determined by the Forest Code of the Russian Federation (2006). In this case, the main measure for the improvement of the forest community and the safety of recreants is the cutting down of sick or superfluous trees. By order of the Federal Forestry Agency No. 105 dated 09.04.2015, the age of logging was established due to the fact that trees, like any other living organisms, accumulate diseases and pests with age, and subsequently are sources of infections for healthy individuals. In addition, diseased and old stands contribute to the spread of forest fires.

When planning and breaking down the green elements of the urban landscape, it is important to take into account both the general ecological state and the environmental and climatic factors of the territory. Also an important point is a comprehensive assessment of the biometric parameters of green spaces. Such indicators as plant age, wind rose, relief, soil-forming rocks, the level of anthropogenic load will influence the choice of seedlings and further care (Kornienko, Prikhodko, 2018). One of the factors causing the death of urban plants is increased salinization, which occurs due to the treatment of roads for thawing snow. Since these reagents accumulate in the soil layers in the root zone, the plants receive strong doses of chloride, which is why they die. Chlorides, interfering with the metabolism of the plant, have a negative effect on the synthesis of chlorophyll a, thereby reducing the energy potential of the object. It turns out that these substances affect the pigmentation responsible for the photosynthetic role, which is why the plant cannot perform one of its life support functions. Such plants look as if they have received a burn of foliage. Trees with intensive sap movement, such as birch and maple, are particularly affected. These breeds often die near highways (Konovalov, Zarubina, 2017). In addition to chlorides, the reagents contain sodium, potassium and magnesium in an aggressive form for plants (Shevyakova, 2000). Diseases are also one of the causes of the death of green spaces. Excessively intensive anthropogenic load combined with illiterate care can cause epidemics of diseases that lead to the leveling of aesthetic functions, and in the future to death. When planning the placement of planting material, it is necessary to take into account not only local diseases that may be common in a particular territory, but also the sensitivity of certain species to various pathologies. Also, the cause of plant disease may be an excess or lack of nutrients, which is usually manifested by a change in the color and appearance of foliage (Kuzmichev et al., 2004; Treyvas, 2008; Bondarenko, 2009). The death of plants also has its consequences, since it entails the need for new landscaping and planting work, increasing the norms developing gardening organizations and contributing to the waste of the city budget.

Green construction deals with the selection of urban plantings. Depending on the goals and the situation in the urban environment, the priority function of the green zone is chosen. It can be aesthetic, in the case of industrial areas, or architectural and artistic in places of historical value. In case of severe environmental conditions, planning is done within the framework of sanitary-hygienic and microclimatic functions of plantings. In industrial zones, the area of sanitary

protection plantings should occupy at least 60%. In such cases, insulating plantings are used when planting does not allow air flows to disperse through the territory. There is also a filtering type of planting, when air flows are taken into account - they are dispersed and removed from the territory. To implement the urban planning function, green spaces play the role of organizing the territory of the city in the formation of the urban landscape. (Erokhina, 1987; Biryukov, 1978; Lunts, 1974). When landscaping, the current situation on the market is studied - which set of plants there is in specialized nurseries, which of them are able to withstand urban conditions, how much money and labor will be spent on the operation of a certain site. The unpretentiousness of plants will play an important role in maintaining the forest park zone in the necessary condition (Dzhikovich, 2009). Depending on the locality (village/city), their purpose changes (national economic, administrative and cultural-historical). When landscaping settlements are done, architectural monuments must be taken into account. In villages zoning of green areas and urban objects is carried out, or vice versa, they are combined into a single ensemble. The main street or square designated for events is singled out (Dabagyan, 1977). In the urban environment itself, which already had some kind of forest park past, work is carried out depending on the purpose: either conservation or restoration of green spaces within the architectural ensemble must be done. Conservation consists in maximum preservation of what is currently available (light restoration, renewal of planting material, removal of unnecessary elements that make it difficult to operate). Restoration consists in restoring what was in the past, but it is a time-consuming and complex process. This kind of work is carried out depending on the current infrastructure, so it is likely that some elements of the past landscape do not make sense or are impossible/too time-consuming due to developments. It is usually began with collecting the maximum amount of information: photographs, memories, archaeological and geodetic data. Soil expertise is carried out on layers depending on soil horizons, since the soil has a "soil-memory" function and its chemical and visual analysis can restore some details. Archaeological finds can reveal the remains of various architectural forms and their boundaries. Thus, it is possible to reproduce the original appearance of a public green space (Bogovaya, 1972; Gorbachev, 2011; Ilyinskaya, 1993).

In conclusion, it is necessary to note that the selection of plant material, the planning of a green area and the further operation of facilities require a competent approach, as well as the involvement of appropriate specialists. And the role of the state remains far from the last, since urban planning activities cannot be carried out without a legislative framework regulating these issues.

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