

## THE ROLE OF GREEN SPACES IN IMPROVING THE ENVIRONMENTAL CONDITIONS OF CITIES AND TOWNS

**T.A. Parfenyuk**, *Graduate Student*

**K.A. Strakhova**, *Candidate of Philosophy Sciences, Senior Lecturer*

**L.V. Martsinevskaya**, *Candidate of Geographic Sciences, Associate Professor*

**Belgorod State National Research University**

**(Russia, Belgorod)**

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**Abstract.** *The article presents the characteristics and analysis of the main ecological functions of green plantations in creating an optimal urban environment. Special attention is given to landscaping as the main mean of improving health in cities and creating green space, which is of great ecological importance. The impact of urban landscaping on human health is also considered.*

**Keywords:** *green spaces, landscaping, ecological balance, urban environment, city, locality.*

Environmental arrangement of any territory is urged to create favorable conditions for residents and ecosystems, namely, it should contribute to improving the environmental situation; increasing the aesthetic value of territories; creating rational, harmonious and artistically meaningful spatial composition of cities, providing optimal conditions for social functions, and having high aesthetic qualities and expressiveness. Landscaping of the territory plays an important role in the sanitary, fire prevention and artistic aspects.

Green spaces are a mandatory part of the city, which neutralizes and reduces the negative effects of industry and road transport. The functions they perform in an urban environment are very diverse. Conventionally, they can be divided into two main components: aesthetic and environmental.

In the aesthetic aspect, green spaces play a huge role in shaping the architectural and artistic appearance of the city, giving the urban environment individual, unique features. They shade, emphasize, identify the most valuable buildings, structures, monuments, decorate blind walls, fences, old buildings, industrial facilities, etc.

In connection with the strengthening of global urbanization processes, the growth of cities, the increase in the urban population, as well as the rapid development of industry and motor transport, the ecological function of green spaces within urban areas remains particularly important. It is in this context that

the need to include living plants in the "inanimate" nature increases dramatically. By saturating the environment with oxygen, protecting the territory from the effects of winds, trees and shrubs serve as a natural filter and protect the residential areas adjacent to the production from dust, soot, harmful gases and noise. They can be used effectively to defend against direct sunlight. Also they are the most efficient means of combating air pollution, noise, and pathogens.

Below is the detailed analysis of the ecological functions of green spaces in a large city.

### *Wind protection*

Green spaces play a huge role in reducing the speed of wind flows, in changing the direction of wind air masses, act as factors that improve the air of urban areas, protect people from excessive cooling in the winter season and from overheating in the summer. Above the more heated open spaces, the air rises, and the cold air of the green massif mass rushes to replace the risen one. Thus, horizontal air flows arise, that contribute to the ventilation of the territory and the dispersion of harmful impurities, reducing their concentration. Almost the wind speed attenuation to 5% of the original occurs in the depth of the green massif at a distance of about 40 meters from the perimeter of the plantations [1]. This distance depends on the density of tree and shrub stands, species composition, as well as their age.

*Microclimate regulation*

A number of studies conducted back in the 70s illustrated that green spaces can significantly improve the microclimate of cities. One of the most important values of green spaces is that they carry out the process of carbon dioxide utilization. The scale of this process is evidenced by the fact that plants bind about 6-7% of the carbon dioxide contained in the atmosphere in the form of organic substances per year [2].

Due to evaporation and transpiration (this term means the evaporation of excess moisture by the plant through the stomata of leaves or stems), relative air humidity increases in the summer period, as a result of which its temperature decreases. The temperature difference between green spaces and open areas is 4-8°C. This effect is explained by the fact that the walls of houses, asphalt and other artificial surfaces are strongly heated and slowly cool down, maintaining a high ambient temperature for a long time [1].

Trees are slightly heated, as the surface of crowns reflects part of the solar radiation. By reducing the summer heat, green spaces simultaneously increase the relative humidity of the air by about 15-30%. Such air is more suitable for human breathing, and the increase in humidity is perceived as the decrease in air temperature.

*Noise protection*

Urban noise, as well as industrial one, brings tangible harm to human health. It has a depressing effect on the nervous system, lowers the capabilities of the immune system, reducing the body's ability to resist various diseases. Thanks to landscaping, the human body can stand noise without any special consequences. Noise levels exceed these values by dozens of times on busy city streets.

In modern large cities, up to 60% of the population lives in conditions of acoustic discomfort. Increased noise causes hearing impairment, the development of a specific disease of auditory neuritis, the consequence of which can be deafness. Non-specific effects of noise are manifested in disorders of the nervous and cardiovascular systems (increased blood pressure, irritability, apathy, etc.).

To protect the urban environment from noise, specially formed strips of green spaces are used. Tree and shrub planting creates the effect of absorption, dispersion or reflection of noise. Noise-reducing plantations are designed to lessen the noise generated by various sources. Landscaping strips should consist of very dense tree plantings with closing crowns [3]. Noise-proof belts are designed in dense lines, without gaps. To do this, shrubs are planted between the tree trunks. The width of the tree belt area should be at least 10-15 meters, the optimum value - 25 meters. The required landing height is 5-7 meters. A belt of several rows of trees with a gap between them equal to the height of the planting is more effective. Nevertheless, the greatest effect in this case is given by a belt with different landing heights: at the source of noise - lower, and then higher.

*Sanitary and hygienic role of green spaces*

Relatively recently, the phytoncidal properties of a number of plants have been discovered, these are: bird cherry, lilac, cherry laurel, as well as a number of other tree species, among which there are both deciduous and coniferous plants.

Fir bark phytoncides kill diphtheria bacterium. The juice of Antonov apples, preparations of poplar leaves and some other plants kill dysentery bacterium. Phytoncides of bird cherry and cherry laurel in laboratory conditions kill flies, mosquitoes and ticks in 10-12 seconds.

A juniper plantation on an area of 1 hectare releases 30 kilograms of volatile substances with bactericidal properties into the air, sufficient to sterilize the air of a small city or one micro district of a large settlement or agglomeration. Due to the effects of phytoncides, 1 cubic meter of air in the forest contains only 200-300 bacteria, in the air of large cities they are 200-250 times more [4].

About 72% of dust particles and fine impurities suspended in the air, up to 60% of sulfur dioxide settle on trees, shrubs and grass. Green spaces absorb carbon dioxide, while releasing oxygen, thereby providing a person with substances necessary for life.

*Health-improving function of green spaces*

Landscaped areas have emotional and mental impacts on a person. It has been scien-

tifically proven that the natural landscape actively contributes to the recuperation, resumption of the mobile balance between the body and the environment, which is disturbed due to illness, fatigue and insufficient staying outdoors.

According to the color theory, the calming effect of nature consists in the formation of two colors in it – green and blue. The peculiar soft forest lighting, richness of colors, aroma of flowers, rustle of leaves, and singing of birds are also important.

The reduction of pain syndrome was studied due to visual contact with landscaping. In addition, some researchers note the normalization of blood pressure and strengthening of immunity, increased motor activity and interest in life in general, decrease in the number of exacerbations of chronic diseases, including diabetes, and increase in life expectancy.

After the transfer of research to the urban environment, not only the improvement in

residents' health was noted, but also the decrease in the crime rate in disadvantaged areas after their landscaping and beautification.

Thus, one of the ways to improve the urban environment is landscaping. Green spaces absorb dust and toxic gases. They are involved in the formation of soil humus, which ensures its fertility. The formation of atmospheric air gas composition is directly dependent on flora. Plants enrich air with oxygen, phytoncides and light ions that are useful for human health, and absorb carbon dioxide. Green plants soften climate. They absorb solar energy and create carbohydrates and other organic substances from the minerals of soil and water during photosynthesis.

Plants not only perform their biological and ecological function, but their diversity and colorfulness always please humans. Many plant species are curative materials, and parts of medicines.

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### РОЛЬ ЗЕЛЕННЫХ НАСАЖДЕНИЙ В УЛУЧШЕНИИ ЭКОЛОГИЧЕСКИХ УСЛОВИЙ ГОРОДОВ И НАСЕЛЕННЫХ ПУНКТОВ

**Т.А. Парфенюк**, магистрант

**К.А. Страхова**, канд. филос. наук, старший преподаватель

**Л.В. Марциневская**, канд. геогр. наук, доцент

**Белгородский государственный национальный исследовательский университет (Россия, г. Белгород)**

***Аннотация.** В статье представлена характеристика и анализ основных экологических функций зеленых насаждений в создании оптимальной городской среды, рассмотрено влияние озеленения городской территории на здоровье человека. Необходимо понимать, что озеленение является основным средством оздоровления в городах и создания зеленого пространства, оказывающее важное экологическое значение.*

***Ключевые слова:** зеленые насаждения, озеленение, экологическое равновесие, городская среда, город, населенный пункт.*