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EFFECT OF ATMOSPHERIC AIR POLLUTION ON GREEN ECOSYSTEMS

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Abstract. This article presents methods of atmospheric air pollution and their mechanisms of action.

Keywords. Heavy substances, polycyclic aromatic hydrocarbons, ecology, environmental pollution, toxic gases, production.

Currently, a number of scientific studies are being conducted in leading scientific centers of the world to determine the level of air pollution, prevent the spread of harmful gases into the environment, and improve the territory. In this regard, the development of scientific foundations for the selection and recommendation of ornamental tree species, the preservation of the ecologically optimal state of the human environment is one of the urgent tasks of today.

When industrial or other substances are released into the atmosphere, their concentration changes, and in certain areas, their accumulation in the soil and vegetation cover is observed. Research in this direction was first conducted by (Mc.Laughlin S.B.) [3] in the 80s of the last century. During this period, in Europe and America, as well as in the countries of the Commonwealth of Independent States, the main air pollutant was sulfur dioxide. The first joint scientific project of Soviet and American scientists in the 1980s, dedicated to the impact of forest ecosystems and pollutants, also shows how problematic the impact of pollutants on trees during this period was[1]. To date, research in this area is being conducted on a large scale and specific to each region.

By the end of the last century, acid rain, one of the main threats to the tree ecosystem, had appeared. Although the emergence of acid rain was observed even in the Middle Ages, the scale of anthropogenic changes today and the increasing concentration of industrial and household waste in the atmosphere have led to an increase in the intensity of acid rain [2].

Research methods. Based on the results of the conducted research, with the increase in pollutants in the atmosphere, the tree ecosystem in the world's forest zone has lost its viability by 45% [2]. Today, the method of comparison and classification based on changes in tree morphology has been applied worldwide in the study of tree changes [3]. The purpose of this research work is to study the relationship between the accumulation of pollutants in trees under conditions of increased concentration of pollutants in the atmosphere of the city of Andijan.

The result of the scientific work. The method of studying the accumulation of pollutants in the leaves of different types of trees with atmospheric concentrations of these substances in the studied territory consists of analysis by modeling simple statistical relationships. For this purpose, the determined concentration of harmful substances in the atmosphere was determined by analyzing samples taken from tree leaves at the same time. Under such conditions, it is impossible to determine the intensity of accumulation. The reason is that the accumulation of harmful substances in the atmosphere on tree leaves occurs at a certain time interval. The results of the experiments show that in the experiments conducted in the city of Andijan, the

distribution of pollutants in the atmosphere on Navoi Park, Cholpon, Navoi Shah, Babur Shah, and Amir Temur Streets is very slow[4].

Especially in the summer months, wind speed and low air humidity contribute to the accumulation of pollutants in the lower layers of the atmosphere up to 10 meters, where humans breathe. High concentrations of CO2 are seasonal, increasing mainly in summer and autumn. Dust remains the same throughout the year. It was established that the cleanest area of the city's atmosphere is the A. Navoi Park, and the amount of CO2 in this area was 0.25 mg/m3, and dust particles up to 0.05 mg/m3. Pollutants in the atmosphere act on living organisms in the form of biochemical agents, leading to disruptions in the ultramicroscopic structure of the cell. This leads to physiological processes and plant metabolism and causes a decrease in its productivity, growth rate, and life expectancy. Depending on the genetic characteristics of trees in an ecosystem, the impact of various types and levels of pollutants on them can vary. The stress level of atmospheric substances on trees develops in two ways: quantity over a limited period of time or accumulation over a long period of time. The atmosphere is practically an unlimited air phase, and the physical and chemical processes in it are important for the existence of living organisms. The presence and concentration of anthropogenic harmful substances in the air has a secondary, primarily harmful effect on humans themselves. This effect manifests itself in trees in latent, regular, and irreversible forms. Low concentrations, in turn, do not quickly manifest in plants and disrupt physiological processes. In the form of regular action, it negatively affects the chlorophilization process, and in the irreversible form, the concentration of substances in the atmosphere causes the tree trunk to dry up due to the inability of the trunk to absorb water with the process of mesophilization or unusual leaf shedding. According to the research results, trees cannot have a harmful effect on the tree ecosystem if the limit of their resistance to such substances does not exceed the level of their adaptive properties. Such a concentration limit in 1984 was expressed in the following indicators. The maximum NO2 content in the atmosphere is 0.04 mg per cubic meter of air, averaging 0.02 mg per day; the maximum for lead is 0.01 mg, averaging 0.002 mg per day, the maximum for SO2 is 3.0 mg, the maximum for formaldehyde is 1.0 mg per day, the maximum for formaldehyde is 0.02 mg, averaging 0.003 mg per day.According to the results of regression-correlative modeling, a strong correlation was revealed between the concentration of harmful substances in the atmosphere and the amount of cumulation occurring in tree leaves. Such a connection was especially pronounced in the juniper tree. In particular, the bond density between sulfur dioxide and the accumulation of this substance in the leaves of the selected trees was: 0.88 in the juniper tree; 0.78 in the oak tree; 0.75 in the false chestnut tree; and 0.93 in the paulownia tree.[2]

The peculiarity of sulfur dioxide transformation is that it oxidizes in the atmosphere and undergoes strong cumilation in trees, from sulfate to its other compounds. Its oxidation occurs practically in two ways: firstly, it undergoes a photochemical homogeneous reaction in gaseous space with strong oxidizing agents (hydroxyl process); secondly, it is heterogeneous, i.e., absorption into water vapor in clouds, fog, and other types of precipitation.

Conclusion: The accumulation of lead from heavy metals in tree leaves leads to the development of two types of harmful processes. Firstly, it has a harmful chemical effect, disrupting the chlorophyll process, and secondly, it accumulates in the leaves and participates in the thermal burning process. According to the modeling results, the strength of the relationship between the concentration in the atmosphere and the accumulation in tree leaves is weak. It

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even showed that there is an inverse relationship in the cumulation process in the leaves of the false chestnut tree.[2]

The relationship between atmospheric nitrogen dioxide and leaf accumulation in trees showed that juniper, oak, and paulownia trees have a strong and direct relationship, while false chestnut trees have a weak relationship. The maximum concentration of nitrogen dioxide in the atmosphere up to 0.04 mg/m3 is important for the nitrogen saturation of trees.

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