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THE ROLE OF PHYTOINDICATION IN THE ASSESSMENT OF POLLUTION OF URBAN ENVIRONMENT

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Vegetation is an important component of biogeocenosis. Changes in vegetation under the influence of various environmental factors affect the state of biogeocenosis in general and are used as diagnostic features [1].

Carrying out sanitary and hygienic, architectural, economic and other functions, green plantings experience anthropogenic influence [2].

They react to those concentrations of harmful substances that in humans and animals do not leave visible phenomena of poisoning. With their help, it is possible to distinguish the level of air pollution, soil pollution, identify sources of pollution, determine their areas of action, identify polluting ingredients, thereby fulfilling the indicator function [3].

Phytoindication can be achieved by the response of plants that are most sensitive to individual ingredients, or by the accumulation of harmful substances in plants. Therefore among the plants there are: bioindicators with high sensitivity to pollutants and bioindicators-accumulators [3].

In connection with the peculiarities of metabolism, plants are more used to diagnose air pollution and to diagnose soil contamination. To diagnose the levels of total air pollution, it is better to use the first group of bioindicators, since changes and disturbances in them directly reflect the degree of air pollution. Bioindicators-accumulators can be used to diagnose air pollution with a specific pollutant. In this case, it is necessary to determine experimentally at what levels of accumulation of pollutants in the organism are the permissible levels of air pollution [4]. It is known that in the plant body there is a violation of physiological and biochemical processes such as: the intensity of photosynthesis and respiration, the content of pigments, the activity of enzymes, the synthesis of proteins, carbohydrates, and elemental composition of organs. The reproductive process is significantly impaired, the morphostructural parameters of trees change, the growth of trunks in height, the diameter decreases and, as a result, the productivity of the forest stands decreases.

When studying the assimilation apparatus of some species of woody plants under urban conditions, a change in the structure and functioning of certain pigments and plastids as a whole was revealed. Thus, the surface of the chloroplast in trees of urban planting was 1.5 - 2 times less than in the same species in the forest, and the leaf surface unit contained less chlorophyll. The content of carotenoids, on the other hand, is higher

compared to the content of a similar pigment in tree leaves in clean forest habitats [5], experimental data suggest that the drop in the ratio of green pigments to yellow is a symptom of the unsatisfactory state of plants [6].

Under the influence of vehicle emissions in plants growing near the roadway, the frequency of chromosomal aberrations and the amount of lead, zinc, copper, cobalt, arsenic compounds is in excess, causing structural disturbances and subsequent cell destruction [7]. In conditions of anthropogenic environment, assimilation activity is reduced in trees, the content of chlorophyll is reduced, the structure of chloroplasts, acidity of cell sap is changed; under the influence of toxic substances, the content of ascorbic acid, nucleic acids, proteins, fiber decreases, the ability to excrete phytoncides weakens, the activity of enzymes weakens, the water regime of plants is disturbed, the fertility of pollen is reduced [7]. The response to unfavorable conditions is a decrease in the pH of the cytoplasm, leading to the breakdown of many enzymatic reactions, the concentration of phytohormones increases, the content of proline, which under normal conditions is contained in small amounts, increases [7].

In some industrial cities there is a tendency of xerophytization: trees have a rare crown, small leaves, they have changed a growth of shoots, necroses of leaves appear. For many species, the appearance in the industrial zone of a number of features that are commonly regarded as indicators of xeromorphism is characteristic: small-celled mesophyll, a decrease in the size of stomata with an increase in their number per unit area [8].

When examining urban green plantations, the general state of plants is first of all determined, the number of healthy trunks is noted, and the different intensity of chlorosis (premature yellowing of leaves) and necrosis (dead areas of leaves) are also taken into account. With a prolonged and high technogenic influence, chlorosis reaches a maximum degree of severity and passes into necrosis.

Very often, for the purpose of bioindication, various anomalies of plant growth and development are used - deviations from general patterns. Scientists systematized them into three main groups associated with inhibition or stimulation of normal growth (dwarfism and gigantism) or with deformations of stems, leaves, roots, fruits, flowers and inflorescences or may be associated with the appearance of neoplasms [9,10].

The intake of increased amounts of certain elements in plants often causes a number of physiological and morphological changes. They are so characteristic that they can serve as an indicator of environmental pollution (Table 1). Pollution of the environment in large industrial cities has become an environmental factor posing a threat to human genetic health. The issue of detailed and complex monitoring of urban ecosystems becomes urgent. Instrumental methods for determining the chemical composition of the environment are sufficiently developed and are used particularly successfully when working with such components of the biosphere as atmospheric air, water, snow.

Table 1 - Physiological and morphological plant changes caused by the toxicity of metals

Element	Characteristic features
Al	Malformed, misshapen leaves, spotting, short knobby roots
Cr	Yellow leaves with green veins
Co	White stain on leaves
Cu	Dead spots on the tips of the lower leaves; purple stems, malicious leaves with green veins; stunted roots
Mo	Delay in growth, yellow-orange color
Ni	White, Dead spots on the leaves; leafless, unfruitful forms
U	Anomalous number of chromosomes in the nucleus; fruits of unusual shape; leafless, unfruitful forms; assembled in a casting socket
Zn	Chlorinated leaves with green veins; white dwarf forms; dead spots on the tips of leaves; stunted roots
Mn	Chlorinated leaves, affected stems and petioles, cramped and dry areas along the corners, deformation of the leaf plate

When analyzing changes in biological objects, the use of only analytical methods is not enough, since the state of living organisms and entire communities is not always adequate to the level of environmental contamination, moreover, it varies markedly in different taxa. This can only be achieved through biological monitoring. The response of living organisms to changes in the environment, and specifically to change of its chemical composition. The main advantages of biological monitoring in comparison with physical and chemical methods are: 1) lack of requirements for the availability of expensive equipment; 2) the ability to characterize large areas; 3) identification of toxic elements at different levels of plant organization.

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СОВРЕМЕННЫЕ ПРОБЛЕМЫ ИНВАЛИДИЗАЦИИ НАСЕЛЕНИЯ

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В настоящее время в Казахстане основным приоритетом в здравоохранении является значительное усиление профилактической медицины и социальной направленности здравоохранения.

В последние годы неуклонно возрастет внимание к различным аспектам экспертизы и реабилитации как одной из актуальных медико-социальных проблем. Медико-социальная экспертиза определяет состояние трудоспособности и соответствие ее требованиям профессии. В последние годы отмечается рост инвалидности в различных странах. Так, в Новосибирской области Российской Федерации трудовые увечья как причина инвалидности составляет 0,6-0,8 случая на 10 тыс. взрослого населения или 1% первичной инвалидности.

В Казахстане в 2015 году в г. Алматы увеличилась смертность и инвалидность от черепно-мозговых травм среди женщин по сравнению с 1991 годом. В Республике Беларусь черепно-мозговые травмы составляли 236,6 случая на 100