

ENVIRONMENT PROTECTION

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Abstract. *Principal reasons of chemical pollution caused by the activity of filling stations, namely losses of hydrocarbon material, which takes place at transport operations and exploitation of imperfect equipment, have been analyzed. The primary sources of filling stations negative environmental impacts are shown to be storm waters, which wash off poured out petrochemicals from their territory, while direct environment pollution as a result of emergency overflows of petrochemicals is a rare phenomenon. It is indicated that the negative consequences of filling stations activity spread on atmospheric air, adjoining soils and water objects, including ground and underground water, and it is expressed in contamination of these environment components with petrochemicals and creation of threats for human health.*

Keywords: environment quality; green spaces; urban areas.

1. Introduction

Modern city is an urban ecosystem, the important component of which is green plantations. They are presented with arboreal, shrub and grassy vegetation, which is cultivated in aesthetically pleasant and valuable combinations and creates favorable terms for vital functions in a city ecosystem. These green plantations effectively execute the functions on saturation of urban air with oxygen and exometabolites, removal of dust and chemical pollutants from the environment, reduction of noise, microclimate regulation, and, finally, recreation of population, provided that the town-planning regulations are fulfilled and principles of green plantations rational management are implemented.

2. Literature Analysis

Creation of light, healthy cities-gardens with clean air, people-friendly natural surroundings was the subject of utopians-humanists considerations long ago, as they made the plans of ideal cities.

The principles of healthy cities structure, which would encompass natural environment, were offered by T. Kampanella [18], R. Owen [15], E. Govard [5].

Scientists offered two most effective, in their opinion, systems of urban green plantations: green rings and green spots. In both cases authors aspired

to the equal provision of all city with plantations at minimum radiuses of their availability.

In 1910 German town-planners working on the project of Berlin planning developed the wedge structure of plantations, after which green wedges penetrate to the city center and unite the external green belt.

English architects offered the structure of plantations, where greenery wedges were combined with rings.

This chart includes:

- central park kernel;
- green stripes, which connect residential districts;
- green centers of residential districts;
- green stripes dividing residential district into microregions;
- suburban green zones.

A range of principle charts were developed in the USSR.

Thus, professor N. V. Baranov in the plan of the nearest future city structure places green plantations in the form of prolonged belts of planted trees and shrubs along highways incorporated in the unique system.

Introduction of modern amenities and principles of greenery plantations in the cities were studied by such authors, as Y.P. Bocharov [2], O.K. Kudryavtsev [2], M.N. Bolotov [3], V.A. Rigalov [3], Y.T. Kravchuk [6], L.E. Biriukov [1], I.A. Mykolaivska [12], V.V. Tabolin [17], V.B. Zotov [20], Y.L. Khotuntsev [4].

3. Research purpose

The basic tasks of research are the analysis of green plantations role in the formation of city environment and determination of factors of plant associations' degradation and deterioration of urban environment on the whole. Consequently, the purpose of this work is the generalization of theoretical bases from organization, maintenance and management greenery at municipal territories, study of foreign countries experience in this field, and development of recommendations for the improvement of the existing practice of urban green plantations management.

4. Condition of green plantations at urban territories

Development of urbanization, complication of spatial forms of economic and social activity raises the requirements to the district planning, conservation of valuable natural resources, cultural sights, issues of maintaining the environment in favorable for human life condition [9].

In Ukraine indexes of provision with green plantations of general use per one inhabitant of urban area and level of green plantations well-being on the whole remain similar to those of 1991 and meet city building standards, but in some areas tended to diminish.

The main problem at this stage is not only the retaining of green plantations area, but also support of their state at high-quality level.

During the last years quality of settlements provision with modern amenities gradually declines in Ukraine. The works on plantation of greenery at urban territories and maintenance of the existent green plantations diminishes annually.

Thus, volumes of works on creation of new plantations of all kinds at the territories of settlements in Ukraine in 2000 against 1990 reduced 30 times, and plantations of general use — 9 times. Volumes of works on landscape reconstruction of the existent plantations of all kinds on the whole in Ukraine also diminished 1,5 times by comparison with 1999 [14].

The necessary level of maintenance and care was provided only for 58% green plantations in 2000 on the whole in Ukraine.

One of the most substantial sources of negative impacts on green plantations at urban areas is motor transport. Influence of motor transport shows up in form:

- direct elimination of greenery as a result of parking on lawns;
- damage of greenery resulted from transport emissions into the atmospheric air;
- creation of unfavorable conditions for plants growth due to compression of soil at passages on randomly created roads.

The low general and ecological culture of population results in the considerable damage of green plantations by pedestrians. This is especially the case for young trees, bushes and grassy cultures. But the old fruit and berry plantations are also considerably damaged in certain periods of vegetation (during flowering and fruit ripening).

Sanitary activities conducted in cities to support normal aesthetically beautiful look of green plantations are doubtful in results and consequences. It includes, foremost, periodic radical scrap of trees, which is considered the method of their rejuvenation.

Considerable inconveniences are thus created for citizens because of almost complete absence of greenery and shade in summer. In addition, botanists consider such cutting to be harmful for trees, as they can not recover sometimes, fall ill and even perish. Such cutting must be transformed in the annual partial cutting of some branches of trees.

The important problem of urban green plantations is the activity of construction companies, which often violate environmental legislation in the course of their work, destroying green objects. Unfortunately, law enforcement authorities remain indifferent to the ecological problems of city. Quite often appeals the habitants of city to the organs of internal affairs concerning illegal elimination of green plantations remain without any reaction from their side.

5. The environmental approaches to green plantations management

Environmental approach to the improvement of the city environment is based on hygienic criteria or on standards of population provision with the areas of different functional purpose.

Thus, data of the American researches, urbanized territories (including transport and other technical communications), agricultural lands and open-space must correlate as 1:1:1, and the "ecological" standard of area per one citizen is 3 hectares [19].

World Health Organization recommends the standard of 50 m² of urban and 300 m² suburban green plantations [13].

The average level of city territory greening must make up about 50%, according to the recommendations of hygienists [11]. But it is often an impossible task to provide this level under the conditions of extremely dense building.

Existing standards do not take into account many factors, in particular considerable difference in the saturation degree of all levels of plant associations, including most efficient form of urbanized environment optimization, which are park and forest-park plantations.

Vegetative groups of any degree of anthropogenic transformation and different economic exploitation could be used as elements of phytorestitution:

- sylvanocenosis (forest-park and park zones);
- frurocenosis (shrub thickets and belts);
- stripocenosis (peripheral plantations at parks);
- public gardens, gardens, and wayside stripes);
- pologocenosis (farm gardens and small private plantations);
- pratocenosis (lawns, multi-grass edges of forests);
- agroocenosis (flower-gardens, vegetable gardens);
- rudocenosis (groups of weed species), which are incorporated under the single term “green plantations”, but considerably differ in efficiency of environment optimization [7, 8, 10, 16].

Optimization of green areas use needs complex study of their territory, assessment of natural resource potential and possible changes, substantiation of efficient directions of their use with the least losses both for nature and for humans.

The complete solution of these tasks is possible within the framework of geological approach, which enables complex detection and analysis of structural and functional properties of green zone geosystems as objects of nature exploitation.

The green areas of cities are treated as part of urban landscapes, natural geosystems of which are intensively transformed by humans.

Depending on the hierarchical level and degree of anthropogenic transformation of geosystems green areas are divided on:

- natural-anthropogenic geosystems, which appeared as a result of moderate, mainly recreational use of natural geosystems of urban landscapes (park, forest-park zones and others, that belong to macrolevel);

- anthropogenic geosystems, natural plant-soil cover of which has undergone considerable changes (agrarian lands, garden-park areas);

- elements of technogenic geosystems, namely: microlevel green elements of complex urban green areas.

6. Methods of improving green plantations condition in Kyiv

Basic tasks of Kyiv development is provision of stable balanced development of city as the capital of Ukraine. Sustainable development of Kyiv is economically, socially and ecologically balanced decision making in relation to the planned results of city functioning in prospect.

The main tasks of city environment protection and improvement includes microclimate regulation, protection of air, water resources and soil, protection of buildings from noise, vibration and similar harmful impacts, restoration of damaged territories.

All these tasks are directly connected with normal functioning of urban green areas.

Planning means of the established tasks fulfillment are:

- rational territory zoning;
- tracing highways, organization of building;
- maintenance and plantation of greenery.

Maximum possible cover of urban territories with green plantations belongs to the most important environmental activities.

Important pre-condition of this is the creation of scientifically substantiated system of internal green plantations and organization of suburban green zones.

Thus, green plantations must be maximally close to the place of people residence to provide maximum positive environmental effect.

For the complex solution of the above mentioned problems of urban green plantations it is necessary:

- to introduce ecological policy at municipal level to form ecological awareness of citizens;
- to develop and implement the concept of maintenance and expansion of urban green plantations;
- to change principles and procedures of greenery construction and maintenance, providing scientific organization of relevant authorities work and high executive discipline;
- to provide citizens with right not to pay 20% value-added tax rate for the implementation public works on green plantations maintenance in cities;

- to organize participation of citizens of various age groups to works on green plantations maintenance, and budget money saved this way could be used for conduction of other works related to green plantations;
- to provide Kyiv park authorities with skilled managers;
- to strengthen the responsibility for violation of legislation and crimes in relation to green plantations of Kyiv city;
- to develop and implement the state monitoring system of urban green plantations.

7. Conclusions

So, in the course of the research the role of green plantations for urban territories and in particular for Kyiv was established.

To give green plantations possibility to fulfill their useful functions, it is necessary to implement city-planning rules and principles of green economy management.

Green plantations development is time-consuming and technologically difficult process.

Plantation of trees and bushes carried out usually, when plants are young and as a result are very vulnerable.

Complications of planting technology is related to the fact, that the basic building material is a plant, a living organism, which constantly changes in time, sharply reacts to unfavorable conditions of the environment.

Green plantations, especially in cities, undergo serious influence, caused by humans: pollution of air, soils, water depresses growth and complicates the existence of trees and bushes; sometimes it even leads to their deaths.

From the other side, humans often consciously destroy green plantations, for example, while preparing area for constructional site.

Children destroy plants in playing and amusing oneself.

The maximum possible cover of city territories with green plantations belongs to the major ecological targets of city development.

One of the most important tasks of city environment improvement is optimization of management and care over green zones of cities based on geoecological approach, which enables complex assessment of geosystems condition and definition of methods of their improvement, not limiting the use of these areas for recreational and other needs.

The analysis of the green plantations management system in Kyiv has showed the basic problems in this field and defined main parameters of green plantations quality.

It has been suggested to develop the inventory digital map of Kyiv based on the available and additional information to be acquired specially for this purpose.

The presence of such map will give the possibility to optimize work of authorities, which co-ordinate the work on maintenance and development of urban green plantations.

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М. М. Радомська¹, С. О. Кумейко², Х. В. Штельма³ Підвищення якості навколишнього середовища за рахунок оздоровлення зелених насаджень

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Розглянуто важливий компонент урбоєкосистеми — зелені насадження на міських територіях. Досліджено основні негативні чинники, що впливають на кількість та якість зелених насаджень. Установлено, що однією з головних передумов оздоровлення міського середовища є оптимізація використання зелених зон, що потребує їх комплексного вивчення, оцінки природно-ресурсного потенціалу та можливих його змін. Обґрунтовано шляхи раціонального використання біологічних ресурсів міст. Показано, що реалізація запропонованих заходів у рамках геоєкологічного підходу дасть змогу комплексно виявити структурні та функціональні властивості геосистем зелених зон як об'єктів природокористування і розробити заходи для їх оздоровлення.

Ключові слова: зелені насадження; урбанізовані території; якість навколишнього середовища.

М. М. Радомская¹, С. О. Кумейко², Х. В. Штельма³ Повышение качества окружающей среды за счет оздоровления зеленых насаждений

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Рассмотрен важный компонент урбоэкоосистемы — зеленые насаждения на городских территориях. Исследованы основные негативные факторы, влияющие на количество и качество зеленых насаждений. Установлено, что одной из главных предпосылок оздоровления городской среды является оптимизация использования зеленых зон, что требует их комплексного изучения, оценки природно-ресурсного потенциала и возможных его изменений. Обоснованы пути рационального использования биологических ресурсов городов. Показано, что реализация предлагаемых мер в рамках геоэкологического подхода позволит комплексно выявить структурные и функциональные свойства геосистем зеленых зон как объектов природопользования и разработать меры по их оздоровлению.

Ключевые слова: зеленые насаждения; качество окружающей среды; урбанизированные территории.

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