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ASSESSMENT OF THE CITY VISUAL ENVIRONMENT (ON THE EXAMPLE OF KHOLODNOGIRSK DISTRICT OF KHARKIV)

Due to the rapid development of urban areas, the environment is undergoing significant changes. This also applies to the visual environment. Man deforms the appearance of the natural environment, adjusts to himself, constantly bringing new and new architectural structures and elements. However, solving the problems of urban infrastructure has exacerbated the problems of visual comfort. Therefore, there is a need for a clear assessment of the visual environment.

Purpose. To determine the qualitative characteristics of the video-ecological situation of the Kholodnogirsk administrative district of the city of Kharkiv.

Methods. Field research and assessment of the visual environment of the city district; method of objective assessment by photofixation; quantitative method of assessing the aggressiveness of the visual urban environment**;** method of calculating the index of severity of the lesion and the degree of lesion of White Mistletoe.

Results. The various visual fields of the urban environment, homogeneous and aggressive, were investigated and determined. The smallest indicator of the homogeneity of the visual environment in the Kholodnogirsk district of Kharkiv is observed around the territory of the Yunost Park – 3%, the largest – around the park on the Volonteer Street - 55%. It is determined that the index of aggressiveness of the visual environment varies from 0.66 to the maximum possible 1. The degree of landscaping of the Kholodnogirsk district of the city of Kharkiv is established. The maximum rate of landscaping - 37%, determined in the park on the Volonteer Street and the minimum - 6% on the Pryvokzal′na ploshcha. The results of calculations of the index of severity of damage and the degree of damage to trees of recreational areas of the area by mistletoe (Viscum album L.) showed - severity index – 10.5% and degree of damage – 27.3%, observed in Tivoli Garden, the smallest – in Yunost Park – 3.4% (index of seriousness) and the square of O. I. Meshchaninov Square – 8% (degree of damage to tree species).

Conclusions. In recent years, there has been a significant deterioration in the visual environment in cities where most of the population lives. It was revealed that for the territory of the Kholodnogirsk district of the city of Kharkiv, the highest homogeneity indicators are inherent in locations with old buildings, and aggressiveness is in a new building. This demonstrates the need for a well-equipped recreation areas that can "mask" of visual ground discomfort urbogeosystem. An important component of the comfortable visual environment of the city - landscaping, for the Kholodnogirsk district of Kharkiv, in accordance with the standards, is not sufficient. One of the most important factors in reducing the number of green areas is the invasion of tree species by mistletoe (Viscum album L.) It is necessary to focus the attention of local authorities on videoecological problems requiring a comprehensive solution.

KEYWORDS: videoecology, aggressive visual environment, homogeneous visual environment, factor aggressiveness, mistletoe (Viscum album L.), index of the seriousness of lesions, the degree of damage, urban recreational areas

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ОЦІНКА ВІЗУАЛЬНОГО СЕРЕДОВИЩА МІСТА (НА ПРИКЛАДІ ХОЛОДНОГІРСЬКОГО РАЙОНУ М. ХАРКІВ)

У зв’язку зі стрімким розвитком урбанізовних територій, довкілля зазнає значних видозмін. Це стосується й візуального середовища. Людина деформує зовнішній вигляд природного оточення, підлаштовує під себе, постійно привносячи все нові та нові архітектурні споруди та елементи. Однак, вирішення проблем міської інфраструктури, призвело до загострення проблем візуального комфорту. Тому виникає необхідність в чіткій оцінці стану візуального навколишнього середовища.

Мета. Визначення якісних характеристик відеоекологічної ситуації Холодногірського адміністративного району міста Харкова.

Методи. Польові дослідження та оцінка візуального середовища району міста; метод об'єктивної оцінки за допомогою фотофіксації; кількісний метод оцінки агресивності візуального міського середовища**;** методика розрахунку індексу серйозності ураження та ступіня ураження Омелою білою.

Результати. Досліджено та визначено різні візуальні поля міського середовища- гомогенні та агресивні. Найменший показник гомогенності візуального навколишнього середовища у Холодногірському районі м. Харкова спостерігається навколо території парку Юність – 3%, найбільший – навколо парку на вул. Волонтерська – 55%. Визначено, що показник агресивності візуального середовища варіюється від 0,66 до максимально можливого 1. Встановлено ступінь озеленення Холодногірського району міста Харків. Максимальний показник озеленення – 37%, визначено на території парку на вул. Волонтерській й мінімальний – 6% на Привокзальній площі. Результати розрахунків індексу серйозності ураження та ступіня ураження дерев рекреаційнихзон району Омелою білою (Viscum album L.) показали – індекс серйозності – 10,5% та ступінь ураження – 27,3%,спостерігаються у саду Тіволі, найменші – на території парку Юність – 3,4% (за індексом серйозності) та у сквері імені О. І Мещанінова – 8% (ступінь ураження деревних порід).

Висновки. За останні роки відбулося суттєве погіршення візуального середовища в містах, де проживає більша кількість населення. Виявлено, що для території Холодногірського району міста Харків найбільші показники гомогенності притаманні локаціям з будинками старої забудови, а агресивності - саме новобудові. Це свідчить про необхідність створення добре облаштованих рекреаційних зон, що здатні «замаскувати» візуальний дискомфорт урбогеосистем. Важливий компонент комфортного візуального середовища міста – озеленення, для Холодногірського району м. Харків, відповідно до стандартів, не є достатнім. Одним з найбільш вагомих факторів зниження кількості зелених насаджень є інвазія деревних порід Омелою білою *(Viscum album L.)*. Необхідно акцентувати увагу місцевих органів влади на відеоекологічних проблемах, що потребують комплексного вирішення.

КЛЮЧОВІ СЛОВА: відеоекологія, агресивне візуальне середовище, гомогенне візуальне середовище, коефіцієнт агресивності, омела біла (viscum album l.), індекс серйозності ураження, ступінь ураження, міська рекреаційна зона

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ОЦЕНКА ВИЗУАЛЬНОЙ СРЕДЫ ГОРОДА (НА ПРИМЕРЕ ХОЛОДНОГОРСКОГО РАЙОНА Г. ХАРЬКОВ)

В связи со стремительным развитием урбанизовних территорий окружающая среда претерпевает значительные видоизменения. Это касается и визуальной среды. Человек деформирует внешний вид природного окружения, постоянно привнося все новые и новые архитектурные сооружения и элементы. Однако, решение проблем городской инфраструктуры привело к обострению проблем визуального комфорта. Поэтому возникает необходимость в четкой оценке состояния визуальной окружающей среды.

Цель. Определение качественных характеристик видеоэкологической ситуации Холодногорского административного района города Харькова.

Методы. Полевые исследования и оценка визуальной среды района города, метод объективной оценки с помощью фотофиксации; количественный метод оценки агрессивности визуальной городской среды; методика расчета индекса серьезности поражения и степень поражения омелы белой.

Результаты. Исследованы и определены различные визуальные поля городской среды- гомогенные и агрессивные. Наименьший показатель гомогенности визуальной окружающей среды в Холодногорском районе Харькова наблюдается вокруг территории парка Юность – 3%, наибольший – вокруг парка на ул. Волонтерская – 55%. Определено, что показатель агрессивности визуальной среды варьируется от 0,66 до максимально возможного 1. Установлена степень озеленения Холодногорского района города Харькова. Максимальный показатель озеленения – 37%, определено на территории парка на ул. Волонтерской и минимальный – 6% на Привокзальной площади. Результаты расчетов индекса серьезности поражения и степень поражения деревьев рекреационных зон района омелой белой (Viscum album L.) показали - индекс серьезности – 10,5% и степень поражения – 27,3%, наблюдаются в саду Тиволи, наименьшие - на территории парка Юность – 3 4% (по индексу серьезности) и в сквере имени А. И. Мещанинова – 8% (степень поражения древесных пород).

Выводы: За последние годы произошло существенное ухудшение визуальной среды в городах, где проживает большая часть населения. Выявлено, что для территории Холодногорского района города Харьков наибольшие показатели гомогенности присущи локациям с домами старой застройки, а агрессивности – именно новостройке. Это свидетельствует о необходимости создания хорошо обустроенных рекреационных зон, способные «замаскировать» визуальный дискомфорт урбогеосистем. Важный компонент комфортной визуальной среды города – озеленение, для Холодногорского района г.Харьков, согласно стандартам, есть недостаточным. Одним из наиболее весомых факторов снижения количества зеленых насаждений является инвазия древесных пород Омелы белой (Viscum album L.). Необходимо акцентировать внимание местных органов власти на видеоэкологических проблемах, требующих комплексного решения.

КЛЮЧЕВЫЕ СЛОВА: видеоэкология, агрессивная визуальная среда, гомогенная визуальная среда, коэффициент агрессивности, омела белая (viscum album l.), индекс серьезности поражения, степень поражения, городская рекреационная зона

Introduction

In modern conditions, the problem of assessing the ecological state of the environment has acquired economic and social significance for Ukraine. Raising the issue of environmental safety, usually means air quality, water pollution, increased noise, vibration, and radiation, but leaves aside no less important socio-environmental factor - the quality of the visible environment. Everything visible environment that surrounds a person is divided into two components: natural and artificial. The natural visible environment fully complies with the norms of the psychophysiological state of man and the physiological norms of vision. The artificial environment is a completely different matter. It differs from the natural and in many cases contradict the laws of human visual perception. The processes of urbanization and industrialization have distanced us from the visual ideal: the artificial environment has ceased to bring aesthetic pleasure and has created a large number of socio-environmental problems.

The interaction of architecture and ecology is often limited, at best, to the use of environmentally friendly materials and energy-saving technologies in construction. In Ukraine, the most pressing problem of the quality of the visual environment has become in the former Soviet times in connection with the increasing pace of general urbanization. The color scheme and structure of urbogeosystems in this period differ sharply from the natural one. The architecture of cities is dominated by uniformity, urban buildings are mostly static and have a large number of planes. Thus, the artificial environment has given rise to another problem of human ecology - the problem of the quality of the visual environment, which is studied by the science of videoecology. This scientific field studies aspects of the visual perception of the environment by man. The author of this scientific field, as well as the term "video ecology" is prof. Filin V. A. [1]. His research shows that a constant visual environment, its saturation with visual elements, can in some way affect the psycho-emotional and physiological state of man. In general, the artificial visual environment can be divided into comfortable and uncomfortable (Fig. 1) [2]. In turn, uncomfortable visual fields are represented by two types: aggressive and homogeneous. It is determined that aggressive visual fields consist of many identical elements, evenly distributed on a surface, and homogeneous are those visible fields in the surrounding space, where either there are no visual details at all, or their number is sharply reduced [1, 2, 3].

Figure 1 presents the classification of types of visual environment of the city. Thus, a comfortable visual environment includes objects that bring visual aesthetic pleasure to a

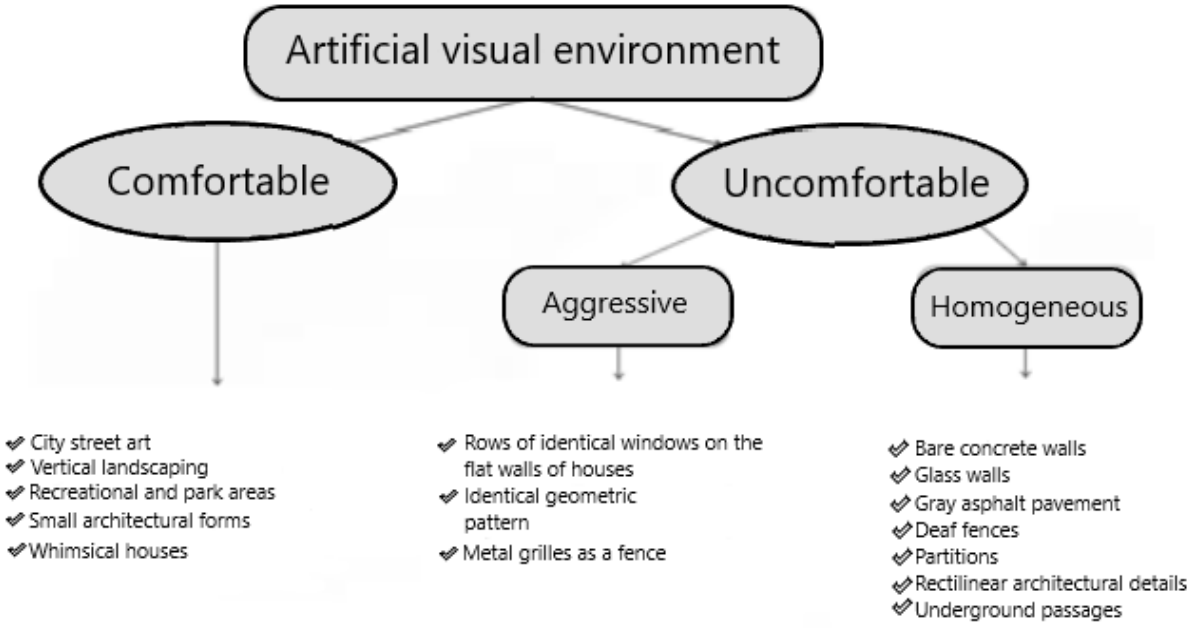

Fig. 1 – Classification of types of artificial visual environment

person, such as planar surfaces with the use of vertical landscaping, colorful graffiti, and architectural details using smooth lines. An uncomfortable visual environment can include objects such as monotonous walls of houses, gray asphalt, and defenses because such objects contain straight lines, monochromatic shades, and gray planes. Metal grilles and rows of identical windows in houses can also have a negative impact on the psycho-emotional and psycho-physiological state of a person. Such objects can be classified as aggressive.

Professor Filin V. A. notes that in recent years there has been a significant deterioration of the visual environment in human habitats [3]. Particularly great changes have taken place in cities, where there are many homogeneous and aggressive visual fields. For example, in the environment of homogeneous fields, the human eye can not fully perceive the surrounding information because in such an environment it has nothing to cling to, that is, the eyes do not work in "economy mode", and this inevitably leads to feelings of discomfort. Also prof. V. A. Filin [2] states: "Adverse environment is one of the factors that lead to changes in eye function, so the number of myopia in cities is usually greater than in villages." In an aggressive visible environment, a person is often in a state of unreasonable resentment. Experts call this disease "Big city syndrome", which is often about is the aggressiveness of society. As a rule, where the visual environment is not more comfortable, there is a tense atmosphere, more cases of criminogenic and immoral behavior. Psychologists who studied the behavior and level of development of children in areas of new development found that children in the neighborhood lag behind in development from their peers who live in the historic part of the city. According to scientists, the very architecture of new buildings with their right angles has a depressing effect on the psyche [1, 2, 3, 4]. These facts are another evidence of the urgency of the problem of video ecology of the city.

The urban environment cannot be successfully studied and modeled without taking into account the attitude to it that exists in the minds of ordinary inhabitants of this environment. According to Kaganov G. Z. [5], their subjective opinions, sympathies, and assessments are no less important environmental factors than purely objective factors – sanitary, geographical, socioeconomic, and others. Explains it interesting socio-ecological phenomenon hypothesis psychologist Heydmetsa M. under which a resident of the city pays special attention to the environment mainly when there is something wrong [6, 7, 8].

Therefore, for the purposes of videoecological assessment it is possible to use sociological methods [9]. They are based on questions about total assessments of quality of life in different areas of the city, their aesthetics, and the quality of the visual environment. However, the methods of sociological sur veys are not devoid of subjectivity, which is explained by sharply individual aesthetic assessments of people's acceptance. In this regard, they can be used only in combination with other research methods.

Ukrainian scientist prof. Fesyuk V. O. [10], considering aspects of the formation and development of large urban systems of northwestern Ukraine, proposed an algorithmic model of constructive-geographical and geoecological analysis of the environment of large cities and an algorithm for implementing the process of optimizing the ecological state of cities. A technique has been developed that allows us to practically assess the level of video-ecological favorableness of the urban environment. Its essence is to calculate the coefficient of videoecological favorability [7, 8]].

Many scientists also consider the urgency of the problem of comfort and ecological safety of the visual environment of the city in their works [5-8, 11-13]. They believe that the problem of visually uncomfortable environment is caused primarily by the following factors: reduction of green areas; lack of purposeful work on the restoration of the facades of existing buildings on the central streets and squares of the city, as a result of which there is an " antiaesthetic effect "; spontaneous location of small architectural forms on sidewalks, unsystematic installation and sometimes aggressive advertising posters and billboards, low lighting of facades of architectural monuments and new compositional and architectural structures [7, 8]. Accordingly, it is important and relevant to determine the video-ecological situation of urban areas.

The purpose is to determine the qualitative characteristics of the video-ecological situation of the Kholodnogirsk administrative district of the city of Kharkiv.

Methodics

Determination of the videoecological situation in the administrative district of the city took place using field and in-house research methods. Field surveys and assessment of the visual environment were performed using methods of objective assessment of photo and video capture. When processing field materials, the method of quantitative assessment of the aggressiveness of the visual urban environment was used. It is determined that the indicator of a comfortable video-ecological situation is the landscaping of recreational areas and the city in general. Assessment of the quality of green areas in recreational areas in the area was performed using the method of calculating the index of severity of damage and the degree of damage to wood species by mistletoe (Viscum album L.).

Research results and their discussion

The Kholodnogirsk administrative district of the city of Kharkiv was selected for research and a video-ecological assessment of the territory was performed. The choice of this territory is due to social demand, which is aimed at creating comfortable conditions for human life. Such conditions can be created due, first of all, to recreational zones within the city. Therefore, it is important to determine the quality of the visual environment of the recreational areas and adjacent areas.

The study was conducted in three stages. As already mentioned, there are two types of visual fields: aggressive and homogeneous. That is why at the first stage of research by the method of objective assessment with the help of photo and video fixation the assessment of the homogeneity of the visual environment was carried out. By themselves, recreational areas are comfortable for the psychophysiological state of man, homogeneity is created by the visible fields around, it is mainly planes created by residential buildings. Therefore, it was advisable to choose a space within a radius of 500 meters around the areas set aside for recreation. The following areas were selected for research: areas around the park on the Volonteer Street, Yunost Park, O. I. Meshchaninov Square, Pryvokzal′na ploshcha, Tivoli Garden, and the park around the monument to the firemen.

With the help of visual research and the method of photo fixation, the total number of buildings in the study areas and the number of buildings that create planes of homogeneous visual fields were determined. Yes, in the area around the park on the street. It was found that about 55% of the surrounding visual space is characterized by monotony, monochromaticity, lack of objects to distinguish the human eye, and so on. These are, as a rule, end vertical walls of high-rise buildings, walls of some objects of social infrastructure (schools, kindergartens, etc.). Around most other recreational areas within a radius of 500 m there is 17-50% of visual space, which can be described as homogeneous, because it is mainly multi-story residential complexes of the 60-70s of the last century. The lowest level of visual field homogeneity was observed around the Yunost Park area and accounted for about 3% of the total number of visual areas created by certain objects. This rather low figure can be explained by the location of the park because it is located on the outskirts of the city, so the surrounding streets are built up mostly one-story houses of the private sector or not built at all.

The results of the first stage of the study showed that the homogeneity of the visual environment of the Kholodnogirsk district of Kharkiv has high rates in residential areas, where people spend most of their lives. Such areas should be arranged with the help of greenery, small architectural forms, and graffiti. After all, only in this way it is possible to create a comfortable visual environment [13].

In the second stage of the study, an aggressive visual environment was identified because, in contrast to homogeneous visual fields, aggressive ones can be more clearly characterized and quantified. For this purpose, the method of quantitative assessment of the aggressiveness of the visual environment, proposed by Golubnichy A. A. [11], was used. The main principle of the technique is based on the differentiation of the plane of the visible field into cells. It is further possible to calculate the coefficient of aggression (K_{agr}) as the ratio of the number of aggressive cells (with the presence of identical objects) to their total number. Initially, objects for assessing the aggressiveness of the visual environment and viewpoints (ie, stationary points in space from which the researcher observes a specific object) were selected for photo-fixation in the study area. The research was conducted at the

following sites: Plastychnyi lane,198, Illinska str., 65, Volonteer str. 1a, new building on the Sloviansk str., Pryvokzal′na ploshcha, 2. The viewpoints are chosen according to the places of mass presence of people. Photo fixation was performed for each object at the same height - the average height of the human eye.

Subsequently, the number of grid cells was determined horizontally

$$N_h = \alpha / \varphi,$$

and vertically (1)

$$N_v = \beta / \varphi,$$

where: α is the angle of view of the investigated plane horizontally – for vertical or inclined surfaces or width – for horizontal surfaces, in degrees;

β – the angle of view of the studied plane vertically – for vertical and inclined surfaces or along the length – for horizontal surfaces, in degrees; φ is the angular size of the area of clear vision, in degrees. This approach was chosen in accordance with the research results of prof. Filin V. A. [1, 2].

The obtained photographic materials provided an opportunity to determine the coefficient of aggression. In this case, it depends on the number of cells with more than two visually similar objects and the total number of cells in the grid. This is determined by the formula [11]

$$K_{agr} = N_{agr} / \Sigma N, \quad (2)$$

where: N_{agr} – the number of cells in which more than two visually similar objects;

ΣN ($N_h + N_v$) – the total number of cells in the grid.

As a result of the study, the coefficient of aggressiveness of the visual environment for each of the objects was determined. Approximation of indicators to 1 indicates an increase in aggression. For the plane created by the house on the lane. Plastychnyi, 198, this ratio is 0.68. Given the almost complete absence of landscaping around, this is a small indicator, which was positively affected mainly by the alternation of architectural details. As a result of visual assessment of the next visual field - a plane created by a multi-story building on the street. Illinska, 65, the coefficient is set at 0.86. Regarding the plane created by the house on the Volonteer Street 1a, the coefficient of aggression is 0.8. These houses and the planes they create are located directly around the recreational area, the landscaping of which can be considered satisfactory. However, due to the significant number of identical small elements and their close relationship in the visible field, the rate of aggression increases significantly. The maximum coefficient – 1, characteristic of a plane set buildings on the street Slovyansk. Such a high value is due to the uniform placement of the same architectural details over the entire plane of the visible field. The lowest coefficient – 0.66 has a visible field created by the facade of the post office building (Pryvokzal′na ploshcha, 2). The large size of architectural details and sufficient landscaping, which "hides" the same details, reduce aggression.

The results of the study showed that most of the visual environment of the recreational areas of the Kholodnogirsk district of Kharkiv meet high levels of aggression, and therefore do not provide positive visual needs of the population. The fact that the highest coefficient of aggression is inherent in the areas with new buildings, indicates the emergence of problems at the design stage of architectural structures. Given this, it should be noted that now it is necessary to focus considerable attention on specialists responsible for urban development on the video-environmental aspects in order to optimize them [9].

But there is another factor that affects the quality of the visual environment - is landscaping. Greenery is able to hide aggressive and homogeneous fields, changing the environment to a more visually comfortable for the psychophysiological state of man. Therefore, at the *third stage of the* research, an assessment of landscaping of the Kholodnogirsk administrative district of Kharkiv was performed.

The research was conducted by measuring the area occupied by greenery and the total area of the park or recreational area. The indicator of landscaping of the territory (%) was calculated (Table 1).

Thus, the degree of the landscaping of the park on the Volonteer Street is 37% of the total area, and the area that is classified as recreational - Pryvokzal′na ploshcha - is landscaped by only 6%. Other recreational areas are landscaped by 30-36%. It is determined that landscaping of recreational areas does not reach even 50%, which should meet the standards [14] and is not sufficient. Thus, even recreational areas are not able to provide the Kholodnogirsk district with sufficient indicators of landscaping, not to mention landscaping of residential buildings.

Table 1

The results of research on the assessment of landscaping Kholodnogirsk administrative district of Kharkiv

№	Name of park / recreational area	Total area, m^2	Area of greenery, m^2	Landscaping rate, %
1	Pryvokzal′na ploshcha	141 600	8,000	6
2	O. I. Meshchaninov Square	194 800	58 400	30
3	Yunost Park	451 900	143 900	32
4	Tivoli Garden	85 200	30 700	36
5	Volonteer Street Park	108 600	40 550	37

Based on the results led the study should be noted that the planting area Kholodnogirsk area is not sufficient and needs much the optimization updates green space in the park areas, new planting areas, and, consequently substantial investment [14]. Such measures will include not only the creation of new facilities that will be able to solve the visual video-ecological problems of the city, the improvement of microclimatic conditions, partially solve the problems of exposure to polluted air and others. Also, thanks to the solution of the problem of landscaping, it is possible to talk about the greening of all elements of the infrastructure of the district and the city as a whole. For example, it is more appropriate to use vertical landscaping. Unfortunately, currently, the use of this type of landscaping is not typical for recreational areas and adjacent areas of the Kholodnogirsk district of Kharkiv, and this, above all, has a negative impact on the video-ecological situation. Another means of greening the urban space with the help of greenery is the creation of plant corridors. These objects create a favorable microclimate due to greenery and have a positive effect on the psycho-physiological state of the population. However, it should be noted that solving the problem of landscaping requires a comprehensive approach. Not only landscape designers but also ecologists, scientists, economists, local governments, and local authorities should be involved.

In modern urban areas, a significant part of the wood species used in urban landscaping is negatively affected by various factors. Atmospheric pollution, surface runoff pollution, pests, and parasitic plants - all this leads to the mass death of urban flora. It was found that for the Kholodnogirsk district of Kharkiv the main problem of landscaping is the defeat of tree species by mistletoe (Viscum album L.). Mistletoe (Viscum album L.) is a dioecious semi-parasitic shrub with yellowish-evergreen leathery leaves that grows in the crowns of many species. Mistletoe is called semi-parasitic because its leaves are capable of photosynthesis, from the host plants take only water and minerals. As a rule, mistletoe spreads in its natural environment with the help of winter herbivorous birds - thrushes and waxwing, which feed on its fruits. Another way of spreading it is that spores are transferred with the help of contaminated tree pruning equipment and this promotes vegetative propagation of mistletoe. Studies have shown that maple trees (Acer Platanoides) and linden trees (Tiliacordata) are most susceptible to infection by this semi-parasitic plant.

It is known that mistletoe (Viscum album L.) belongs to the category of active invasive plants. This is due to particularly favorable conditions for the development of populations of this plant semi-parasite in areas where plantations are usually the weakest compared to natural due to increased anthropogenic pressure. Such areas are recreational areas of the city. Greenery here is not only the "lungs" of the city but also a means to create a comfortable visual environment. Therefore, maintaining these plants in good condition is an extremely important and urgent task. The research was conducted in the above-mentioned recreational zones of the Kholodnogirsk district of the city of Kharkiv: Yunost Park, O. I. Meshchaninov Square, the park on Volonteer Street, the park around the around the monument to the firemen and the Tivoli Garden.

The results of field studies of park areas made it possible to perform calculations of the severity index (SI) and the degree of damage to trees by the semi-parasite plant Mistletoe white (Viscum album L.).

Thus, first the severity index (SI) of tree species was calculated according to the formula [15]

$$SI = [\{ (P \times Q) \} / (M \times N)] \times 100 \% , (3)$$

where: P – severity score,

Q – number of infected plant shaving the same grade;

M – total number of observed plants,

N – maximum number on the rating scale.

A visual inspection of woody plants within recreational areas was conducted. The basis of the above formula is to assess the severity of damage to trees (P). To find it, we used the appropriate scale (Table 2), where the number of points depends on the number of bushes of White Mistletoe (Viscum album L.), parasitizing on a tree plant.

According to the scale, an assessment of the severity of the lesion was provided for each active plant in the recreational areas. For example, the fragment shows the results obtained during the study of tree species in the O. I. Meshchaninov Square (Table 3).

Table 2

Scale of the severity of plant damage by Viscum album L [15]

Score	Description
0	No incidence (no mistletoe)
1	1-5 per plant
2	6-10 per plant
3	11-15 per plant
4	16-20 per plant
5	>20 per plant

Table 3

Estimation of severity of defeat of wood breeds by White mistletoe (*Viscum album L.)* in O. I. Meshchaninov Square (fragment)

№	Wood species	Number of bushes (*Viscum album)*	Severity index
1	Norway maple *(Acerplatanoides)*	14	3
2	Norway maple *(Acerplatanoides)*	9	2
3	Norway maple *(Acerplatanoides)*	4	1
4	Norway maple *(Acerplatanoides)*	2	1
5	Small-leaved linden*(Tiliacordata)*	1	1
6	Norway maple *(Acerplatanoides)*	9	2
7	Norway maple *(Acerplatanoides)*	7	2
8	Norway maple *(Acerplatanoides)*	3	1
9	Norway maple *(Acerplatanoides)*	2	1

Based on the determination of the severity assessment, the lesion severity index (SI) was calculated. Therefore, for the territory of Yunost Park this index is 3.4%. For the O. I. Meshchaninov Square - 4.1%. The area of the park around the the monument to the firemen has a severity index of 7.2%, the highest figure is 10.5% in the Tivoli Garden.

Subsequent studies calculated the degree by white mistletoe infestation. For this purpose, the total number of trees in the study area and the number of woody plants affected by White Mistletoe (Viscum album L.) were determined. The highest value is typical for the Tivoli Garden - 27.3%. The trees of the park on Volonteer Street were also significantly affected - 24%, in the park around the monument to the firemen - 14.4% and in the Yunost Park - 12.5%. The lowest figure - 8% was recorded in the O. I. Meshchaninov Square.

Thus, as a result of the study, it was found that the greatest damage from White Mistletoe (Viscum album L.) affected the tree vegetation of the Tivoli Garden and the park of the park on Volonteer Street. These recreation areas are located directly next to residential buildings, where there are virtually no measures to ensure plant health. The least damage by this semi-parasitic plant is characteristic of O. I. Meshchaninov Square and Yunost Park. This is explained by the fact that in these areas there is an alternation of species composition of vegetation and the presence of tree species resistant to damage (so 12% of the trees in the O. I. Meshchaninov Square are birches). Another factor in reducing the infestation of plants with White Mistletoe is the sanitary pruning of trees, in particular in the O. I. Meshchaninov Square and Yunost Park.

The conducted research allowed to develop recommendations for creating a comfortable visual environment for recreational areas and adjacent areas [16]. To prevent the appearance of aggressive and homogeneous visual fields, you can use the following:

- It is important to improve landscaping work in the city: increase the number of greenery, maintain plant health. For example, several methods can be used to control white mistletoe. This is primarily the treatment of mistletoe-infected tree species (Viscum album L.). Also, in accordance with paragraph 11.5 of the "Rules for the maintenance of greenery in the settlements of Ukraine", approved by the order of the Ministry of Construction, Architecture, and Housing of Ukraine №105 from 10.04.2006, to control mistletoe mechanical method is used - pruning mistletoe bushes that do not bear fruit, 5-7 cm, and with fruiting - at least 15-20 cm below the place of its attachment to the branches. In the case of damage to the crown of trees by white mistletoe by more than 60%, they must be removed [17, 18, 19]. It is also important to constantly replace remote affected trees with invulnerable species such as conifers, nuts, or birches.

- Use vertical landscaping on the walls of buildings where there are no architectural accents (Fig. 2);

- Use advertising posters to optimize an aggressive visual environment;

- Increase the number of small architectural forms as objects of a comfortable visual environment.

- Create modern wall paintings. Mural painting has drawings on large planes. These include wall paintings, murals, ancient cave paintings. Such works were created in the city of Kharkiv: the portrait of Lyudmila Gurchenko, lane Gurchenko, 7 (Fig. 3), portrait of actress Natalya Fateeva on the street. Primerskii 22A (Fig. 4), the mural at "Strelka" on the street Kontorskiy, etc [12].

- Apply whimsical architectural elements of various shapes;

- Use the modern urban landscape element and Street Art (Fig. 5).

Finally, it should be noted that videoecological issues should be addressed by involving municipal authorities and utilities, such as Kharkivblagoustriy, administrative (Kharkiv Regional Department of Forestry and Hunting) and production resources, involving modern scientific developments and using design fantasies to improve the urban environment. After all, it is very important to take into account a comprehensive approach to create a comfortable visual environment in the city of Kharkiv.

Fig. 2 – Building of NUPh, Kharkiv

Fig. 3 – Portrait of Lyudmila Gurchenko [20]

Fig. 4 – Portrait of actress Natalia Fateeva [21]

Fig. 5 – Graffiti Salvador Dali, Kharkiv

Conclusions

A study of the quality of the video-ecological situation within urban geosystems has shown that in recent years there has been a significant deterioration of the visual environment in human habitats. This problem is related to the spread of the artificial environment, which has arisen due to the processes of urbanization and industrialization. Particularly great changes have taken place in cities, where there are many homogeneous and aggressive visual fields. It is established that these changes negatively affect the psycho-emotional and psycho-physiological state of a person. It was found that the highest indicators of homogeneity are inherent in areas with old buildings, and aggression - it is the new building. The highest coefficient of aggressiveness of the visual environment (K_{agr} = 1) is presented in the surrounding planes surrounding the park near the monument to the Fireman.

It is determined that an important indicator of a comfortable video-ecological situation is the landscaping of the city. Thus, in the territory of Kholodnogirsk district it was noted that landscaping is less than 50%, which according to the standards is not sufficient. As a result of the study, it was found that for the Kholodnogirsk district of Kharkiv one of the most important factors in reducing the amount of landscaping is the invasion of tree species by mistletoe (Viscum album L.). It is established that on the territory of the Kholodnogirsk administrative district of the city of Kharkiv it is extremely necessary to carry out a number of measures that would create comfortable conditions for permanent stay and relaxation of the population. Given the above, it should be noted that considerable attention should be paid to the video-environmental problems of modern cities.

Conflict of interests

The authors declare that there is no conflict of interests regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been completely observed by the authors.

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