

UDC 712.414

DOI: 10.31548/forest/1.2023.92

## Hedges in Kyiv's public areas and ways to improve them

Oleksii Lukash\*

Postgraduate Student

Educational and Research Institute of Forestry and Landscape-Park Management  
National University of Life and Environmental Sciences of Ukraine  
03041, 19 Horikhuvatskyi Shliakh Str., Kyiv, Ukraine  
<https://orcid.org/0000-0002-4359-3905>

Vitalina Novyk

Master

Educational and Research Institute of Forestry and Landscape-Park Management  
National University of Life and Environmental Sciences of Ukraine  
03041, 19 Horikhuvatskyi Shliakh Str., Kyiv, Ukraine  
<https://orcid.org/0009-0002-3973-7774>

Anatoliy Kushnir

PhD in Biological Sciences, Associate Professor

Educational and Research Institute of Forestry and Landscape-Park Management  
National University of Life and Environmental Sciences of Ukraine  
03041, 19 Horikhuvatskyi Shliakh Str., Kyiv, Ukraine  
<https://orcid.org/0000-0002-1572-0284>

**Abstract.** Green zones in large cities perform important environmental, urban planning, social and economic functions. Hedgerows in the urban greening system are an integral part of ornamental plantings and perform primarily ecological functions. The research aims to analyse hedges growing in public spaces in Kyiv. To achieve this goal, general scientific methods (observation, measurement, and review of scientific literature on the research topic) were used in theoretical and experimental studies. In total, 65689 square metres of the city's hedges, consisting of more than 306 thousand plants and represented by 31 taxa growing on 217 public facilities and maintained by ten district communal enterprises for the maintenance of green spaces of the Kyivzelenbud communal association, were studied. Species composition, height, planting pattern and quality of hedges were analysed. The results showed that the largest number of hedges was created in the

### **Suggested Citation:**

Lukash, O., Novyk, V., & Kushnir, A. (2023). Hedges in Kyiv's public areas and ways to improve them. *Ukrainian Journal of Forest and Wood Science*, 14(1), 92-104. doi: 10.31548/forest/1.2023.92.

\*Corresponding author



Solomianskyi and Darnytskyi districts of the city, respectively, 17% and 16% of the total. The most common plant species in hedges is the common privet (*Ligustrum vulgare* L.). The surveyed hedges are mainly created according to single-row and double-row planting schemes in approximately equal proportions. By height group, low hedges predominate, accounting for 53.9% of the total, and medium hedges – 33%. The quality condition is mostly good and satisfactory, which indicates compliance with cultivation techniques and timely maintenance. The results of these studies will allow the balance holders of the facilities with hedges to better organise the agrotechnical work on their arrangement and maintenance in a proper decorative state

**Keywords:** hedges; functions of hedges; landscaping element; urban environment; urban landscaping, ecology

## Introduction

Hedgerows as an element of spatial zoning of the territory of settlements are a multifunctional highly decorative tool for solving several problems related to the separation and protection of certain areas from others, masking objects, creating microclimatic conditions in certain areas, engineering protection, directing pedestrian and vehicle traffic, etc.

The research relevance is predefined by the rapid development of Kyiv's buildings, the increase in the number of harmful substances emitted by vehicles and the need to provide scientifically based recommendations for the development and improvement of the existing condition of hedges to increase their decorative appeal and achieve maximum environmental effect in the modern urban environment of the capital of Ukraine.

One of the biggest problems in a modern metropolis is air quality, with pollution being an inevitable result of a large city's life. Following the official portal of the city of Kyiv (Air quality..., 2018), the concentration of hazardous substances has increased rapidly over the past 20 years, namely nitrogen dioxide by 50% and formaldehyde by 200%. The main reason for these changes is the increase in private vehicles in a constantly developing city. K. Yalovy (2021) noted that 85% of emissions in the city

of Kyiv are caused by mobile sources – of transport, of which 70% are accounted for by private vehicles, a similar situation in the cities of the European Union (Ejdys & Lasota, 2022). A study by K.V. Myronchuk & M.P. Kurnytska (2021) predicted that the increase in private vehicles in the capital by 2025 will be 60% of the officially registered 1.2 million cars as of 2021. Around 50% of emissions come from roads with low speeds. Along with air pollution from harmful emissions, the issue of dust concentration arises, with dust concentration in a typical urban environment being 0.1-0.2 mg/m<sup>3</sup>, and in large cities it is at least 0.5 mg/m<sup>3</sup>. Another factor that negatively affects urban residents is noise. It is known that a person can withstand a constant noise level of 20-25 dB without any health consequences. V.P. Kucheriavyi & V.S. Kucheriavyi (2022) argued that the main sources of noise in large cities are also roads that exceed the regulatory noise level.

Hedgerows are important elements of landscaping in the modern urban space, especially those along the main transport routes of the city. V.Ya. Zayachuk (2014) noted that they perform important functions, in particular: environmental, urban planning, social and economic. When researching hedges, the ecological function is prioritised. K. Hashad

*et al.* (2023), T. Blanus *et al.* (2019) noted the ability of plants forming hedges to clean the air from pollutants, absorb dust, reduce noise, absorb carbon dioxide, enrich the air with oxygen and, in some cases, the phytoncidal properties of certain plant species, regulate the microclimate, stabilise humidity and temperature, reduce stormwater runoff and the load on the urban sewerage system. H.B. Hladun & H.Yu. Hladun (2013), and O.I. Drebot (2019) found that one hectare of protective green spaces reduces overall air pollution by 10-35%, reduces carbon dioxide concentration by 70%, and provides a 10-15% decrease in temperature in the area adjacent to the carriageway. With the right use of hedges and a reasonable selection of plants, hedges become an integral part of improving the quality of life of metropolitan residents in the context of improving environmental well-being. A.I. Kushnir & O.A. Sukhanova (2022) proved that related functions allow for improving the architectural and planning structure of the city, contribute to the creation of a positive visual perception of the city, increase the cost of housing, create a sense of connection with nature in the centre of an urbanised area, etc. It should be noted that following the provisions of the state building codes (SBR V.2.3-218-007:2012..., 2012), environmental protection must be considered in the design and construction of new roads and highways.

The research aims to examine the existing hedges in public spaces in Kyiv and to develop scientifically based recommendations for the widespread introduction of this type of green space in Kyiv's garden and park facilities.

### Materials and Methods

The study was based on existing hedges arranged in public spaces, on roadsides and at transport interchanges in Kyiv. The green fund of the capital consists of 128 parks with

an area of 3394.02 hectares, 618 squares (456.53 hectares), 31.6 thousand hectares of urban forests in the buffer zone, 49 boulevards (150 hectares), squares and other green spaces (Website of the Kyivzelenbud..., 2022).

A total of 217 sites with hedges were surveyed in 2022. The study used general methods of scientific knowledge: observation, measurement (inventory of green spaces, assessment of the quantitative and qualitative condition of plantings, statistical processing of identified taxa, study of specific conditions of the place of growth with the greatest harmful factors) and theoretical methods: a review of scientific literature on the research topic, the study of the experience of leading European countries. The assessment of the qualitative state of plants in hedges was carried out following the regulatory recommendations of the Instruction on the inventory of green spaces in cities and urban-type settlements of Ukraine (Order of the Ministry..., 2007) according to the following grades *good condition* – plants are normally developed, dry branches are absent, the hedge is dense, there are leaves along the entire length of the shoots, no obvious mechanical damage, no pests or diseases were found; *satisfactory condition* – bushes are normally developed with signs of slow growth, shoots are exposed, leaves are few, there are mechanical damages and damage by pests and pathogens; *unsatisfactory* – plants are weakened, overgrown, significantly bare, especially in the lower part, many dry branches, mechanical damage and damage by pests and diseases, the general appearance is unattractive.

### Results and Discussion

Following the research results, it was found that the total length of hedges in public spaces in ten administrative districts of Kyiv is 65689 linear metres and includes 306257 plant units (Table 1).

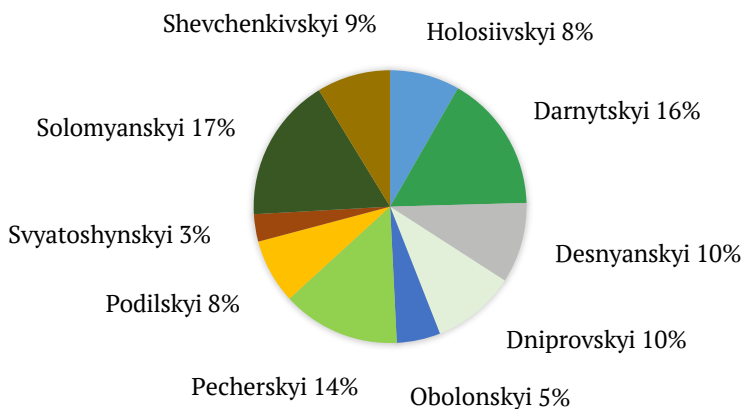
**Table 1.** The total length of hedges in public areas of Kyiv by administrative districts

District name	Number of facilities with hedges	Number of plants in hedges, pcs.	Length of hedges, metres
Holosiivskiyi	22	22311	5440.8
Darnytskyi	27	51476	10698
Desnyanskyi	24	37371	6270
Dniprovskiyi	24	39325	6525
Obolonskyi	31	13578	3396.9
Pecherskyi	3	47615	9189
Podilskyi	14	20467	5032
Svyatoshynskiyi	6	10455	2131
Solomyanskyi	46	43148	11270
Shevchenkivskiyi	20	20511	5736
Total:	217	306257	65688.7

Source: compiled by the authors

In general, planting plants in the form of hedges is used in all administrative districts of the capital, but their ratio is not proportional. This is primarily due to the lack of clear standards and recommendations on the need to use hedges in the city’s greening system. Separate municipal greenery maintenance

enterprises with the status of a legal entities are responsible for the maintenance and development of green spaces in each of the districts, but the decision to install hedges on certain objects is made by different specialists based on their views and considerations (Fig. 1).



**Figure 1.** Percentage distribution of the total length of hedges by administrative districts of Kyiv

Source: compiled by the authors

The studied hedges arranged in Kyiv’s garden and park facilities are represented by 30 plant taxa, and the most common species is the common privet (*Ligustrum vulgare* L.). The total

number of plants of this species is 164680 and accounts for 54% of the total number of planted plants (Table 2). According to the authors, the use of common privet to create hedges is

fully justified based on the botanical properties of this plant, as they maximise the ecological function of this type of planting (Kuznetsov *et al.*, 2020; Myronchuk & Henyk, 2021; Ghafari *et al.*, 2020). Quite common plant species for creating hedges in Kyiv are common hornbeam (*Carpinus betulus* L.) 24373 units (8%), Wanguetta's hemlock (*Spiraea x vanhouttei* L.) 22248

pcs. (7%), shiny cotoneaster (*cotoneaster lucidus* Schlecht.) 19397 pcs. (6%), common ninebark (*Physocarpus opulifolius* L.) 14594 pcs. (5%), common box (*Buxus sempervirens* L.) 13999 pcs. (5%), White dogwood (*Cornus alba* L.) 10416 pcs. (3%), the other 24 species account for 12% of the total number of plants used, and the percentage of each species is less than 2%.

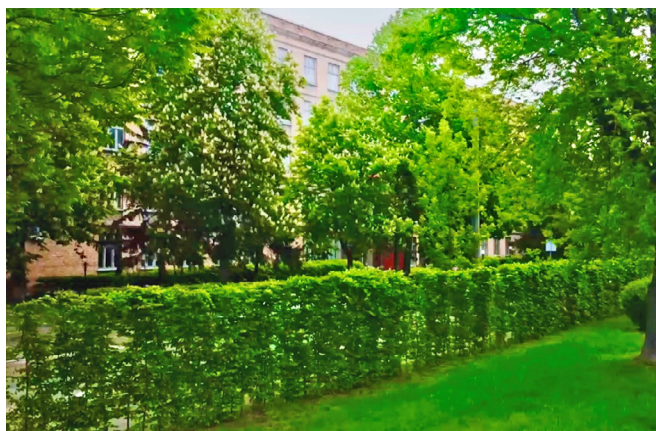
**Table 2.** Taxonomic description of Kyiv hedges

No.	Plant name		Amount	
	English	Latin	pcs.	%
1	Wild privet	<i>Ligustrum vulgare</i> L.	164680	53.77
2	European hornbeam	<i>Carpinus betulus</i> L.	24373	7.96
3	Vanhoutte spirea	<i>Spiraea x vanhouttei</i> L.	22248	7.26
4	shiny cotoneaster	<i>Cotoneaster lucidus</i> Schlecht.	19397	6.33
5	Common ninebark	<i>Physocarpus opulifolius</i> L.	14594	4.77
6	Common box	<i>Buxus sempervirens</i> L.	13999	4.57
7	White dogwood	<i>Cornus alba</i> L.	10416	3.40
8	Japanese meadowsweet	<i>Spiraea japonica</i> L.	5905	1.93
9	Norway maple	<i>Acer platanoides</i> L.	5871	1.92
10	Common snowberry	<i>Symphoricarpos albus</i> L.	4663	1.52
11	Common lilac	<i>Syringa vulgaris</i> L.	3320	1.08
12	Japanese spiraea	<i>Spiraea bumalda</i> L.	2900	0.95
13	Philadelphus coronarius	<i>Philadelphus coronarius</i> L.	3046	1.00
14	Common dogwood	<i>Cornus sanguinea</i> L.	1476	0.48
15	Common barberry	<i>Berberis vulgaris</i> L.	1365	0.45
16	Deutzia scabra	<i>Deutzia scabra</i> L.	1305	0.43
17	Pyracantha angustifolia	<i>Pyracantha angustifolia</i> L.	1168	0.38
18	Ulmus	<i>Ulmus carpinifolia</i> Rupp. ex Shchkw	1116	0.36
19	Arborvitae	<i>Thuja occidentalis</i> L.	1108	0.36
20	European forsythia	<i>Forsythia europaea</i> L.	744	0.24
21	Cornelian cherry	<i>Cornus mas</i> L.	510	0.17
22	Amur maple	<i>Acer ginnala</i> L.	414	0.14
23	Potentilla intermedia	<i>Potentilla intermedia</i> L.	400	0.13
24	Honey locust	<i>Gleditsia triacanthos</i> L.	274	0.09
25	Ginkgo	<i>Ginkgo biloba</i> L.	264	0.09
26	Common hazel	<i>Corylus avellana</i> L.	240	0.08
27	Silver berry	<i>Elaeagnus angustifolia</i> L.	180	0.06
28	Guelder-rose	<i>Viburnum opulus</i> L.	156	0.05
29	Savin juniper	<i>Juniperus sabina</i> L.	75	0.02
30	Mountain currant	<i>Ribes alpinum</i> L.	50	0.02
<b>Total</b>			<b>306257</b>	<b>100.0</b>

**Source:** compiled by the authors

The second most used species as hedges in Kyiv is the common hornbeam, which is very easy to use and can reach a considerable height. By its characteristics, this species allows for the formation of dense hedges, and since this plant is slow growing, the cost of routine maintenance (mowing) is reduced. When creating hedges, it is necessary to choose already formed seedlings of the required size (Myronchuk, 2014; Dudyn, & Levus, 2022). For example, a hedge made of common hornbeam was arranged in 2018 during the overhaul of the park "Defenders of Ukraine" in the Solomianskyi district. The 4.29-hectare park is located between Vynnytska, Ernsta, S. Khoroboho streets and

Povtroflotskoho Avenue (Fig. 2). A 1.8 m high moulded hedge with a total length of 705 metres frames the park along its perimeter, creating a natural screen of protection from high traffic areas. When creating this hedge, 2115 large-sized seedlings were used, which were planted in a two-row planting scheme. It is natural to use the common hornbeam only in 4 districts of Kyiv (Solomianskyi, Sviatoshynskyi, Holosiivskyi and Pecherskyi), as the species is relatively picky about soil fertility. It should be noted that Obolonskyi and left-bank districts of Kyiv have worse soil conditions, as they have mostly sandy, poor soils, and this species is not used there.



**Figure 2.** Hedge in the Park of the Defenders of Ukraine

**Source:** compiled by the authors

As a species widely used as a component of Kyiv's hedges, *Vangutta* hemlock accounts for 7.26% (22248 specimens) of the total number of taxa used in their creation. The species differs from the previously mentioned species in that it does not require systematic formation and is much less demanding on soil fertility and moisture. *Vangutta* tawny has a good decorative effect during flowering (Rohovskyi, 2013; Kushnir *et al.*, 2020;). The most widespread distribution of this species is in the Dnipro district of the

capital, where 9068 plants were found, creating 1447 metres of linear hedges in the Peremoha Park, along A. Malyshko Street, near the Aurora Cinema, in the park at 5 Vershyhora Street, in the park at Berezhniakivska Street, at the transport interchange of Alisher Navoi Street, etc. The height of the *Vangutta* hedges is 0.6-1.0 m.

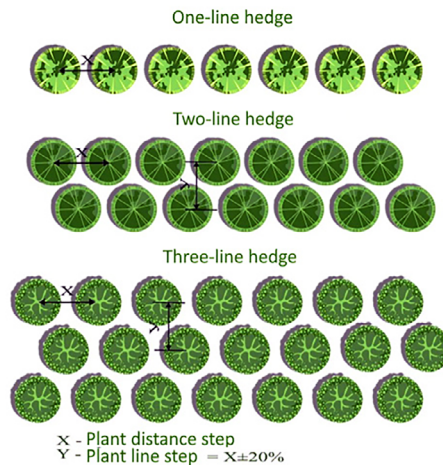
Shiny cotoneaster, common ninebark and white dogwood occupy a significant place in hedges. When studying the plantings in Maksym Shapoval Park in the Solomianskyi district,

a hedge with a combination of decorative forms (cultivars) of the common ninebark by leaf colour (yellow and purple) was found, which has a significant decorative effect.

Common box hedges are quite problematic in terms of maintenance in public areas. To date, 2883 linear metres of hedges have been created from this species. They are arranged mainly in the central districts of the city. The largest number of them was recorded in the Pechersk district on Lesia Ukrainka Boulevard – 1750 linear metres. Undoubtedly, boxwood has

the greatest decorative effect throughout the year, but it requires constant care, including the use of chemical pest control agents, suffers greatly and reproduces relatively slowly after mechanical damage, suffers from animal urine burns, and is often stolen by social unaware layers of the population (Shukel, 2011). Given the above, we do not recommend the use of boxwood in public places.

The main technology of hedges in Kyiv is a single-row and double-row planting scheme (Fig. 3).



**Figure 3.** Hedge scheme

**Source:** compiled by the authors

Mostly, 3 plants per linear metre of single-row hedges are planted and 5 plants per linear metre of double-row hedges (Table 3). In some cases, hedges arranged by a three-row planting scheme were noted, but their number is insignificant and was not considered in the general analysis of field studies.

As a result of the research, an almost equal ratio of single-row and double-row hedges in public areas in the context of the city of Kyiv was established (43.7% and 56.3%, respectively), but if we analyse these

indicators within individual administrative districts, we get contradictory results. For example, most hedges in Podilskyi and Pecherskyi districts are created according to a single-row planting scheme, while in Darnytskyi and Obolonskyi districts the situation is the opposite, and in Sviatoshytskyi district single-row planting was not used at all. This indicates the absence of a citywide standard or scientific and practical recommendations in the field of green economy for planting hedges. Given the above, we state that the leading

function of hedges is precisely the environmental one, and therefore standardisation in this area, according to the authors, is timely and necessary (Dworniczak & Reda, 2021; Borowski *et al.*, 2021).

When analysing hedges by height, four groups were identified: borders (up to 0.5 m high), low hedges 0.5-1.0 m high, medium hedges 1.0-2.0 m high, and high hedges above 2.0 m high. The results are shown in Table 4.

**Table 3.** Analysis of the applied hedge planting scheme

District name	overall hedge length			
	one-line		two-line	
	long meter	%	long meter	%
Holosiiivskiyi	2182	40.1	3258.8	59.9
Darnytskyi	1007	9.4	9691	90.6
Desnyanskyi	1669.6	26.6	4600.4	73.4
Dniprovskiyi	2722	41.7	3803	58.3
Obolonskyi	390.2	11.5	3006.66	88.5
Pecherskyi	7853	85.5	1336	14.5
Podilskyi	4823	95.8	209	4.2
Svyatoshynskiyi	0	0.0	2131	100.0
Solomyanskyi	5950.3	52.8	5319.7	47.2
Shevchenkivskiyi	2126.65	37.1	3609.35	62.9
Overall in Kyiv	<b>28723.75</b>	<b>43.7</b>	<b>36964.91</b>	<b>56.3</b>

**Source:** compiled by the authors

**Table 4.** Distribution of hedges by height

District name	Length of hedges, long metres			
	up to 0.5m	0.5-1.0m	1.0-2.0m	over 2.0m
Holosiiivskiyi	0	2238.8	2236	866
Darnytskyi	0	8345.6	2349	0
Desnyanskyi	2011.9	4010.1	188	0
Dniprovskiyi	379	4001	2145	0
Obolonskyi	402.66	2404.23	559.97	0
Pecherskyi	1750	6103	0	1336
Podilskyi	282	3016	1734	0
Svyatoshynskiyi	40	70	2021	0
Solomyanskyi	558	4257.6	5062	862.3
Shevchenkivskiyi	82	941.1	5376.75	0
Overall in Kyiv	5505.56	35387.43	21671.72	3064.3
%	8.4	53.9	33.0	4.7

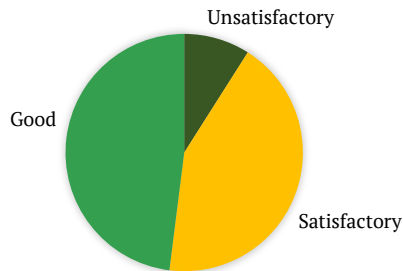
**Source:** compiled by the authors

Thus, most hedges in public areas of Kyiv belong to the group of low hedges (53.9%), the second place with an indicator of 33% is occupied by medium-height hedges, the participation of curbs and high hedges, respectively, is

8.4% and 4.7%. The data obtained quite logically confirm the intention of landscaping specialists regarding the further maintenance and care of these elements of green infrastructure, as most of the surveyed hedges are moulded. In terms

of maintenance, tall hedges are much more expensive to maintain, and curbs mostly do not play an ecological role and are only a decorative element. Based on the recommendations of the Instruction on the Inventory of Plantations

in Cities and Urban Areas of Ukraine (Order of the Ministry..., 2007) their species composition, length in metres, type of planting (single-row and double-row) and assessment of their quality condition were described (Fig. 4).



**Figure 4.** Quality of hedges in public areas of Kyiv

**Source:** compiled by the authors

Most of the inspected hedges at the garden and park facilities of the city of Kyiv are in good condition. The plants in the hedges are well maintained, and they are constantly cared for following the requirements of agricultural practices. Some hedges have minor mechanical damage, some pest damage, and partial exposure of shoots in the lower part and are classified as in satisfactory condition. According to the inspection, only 9% of hedges were classified as unsatisfactory, mostly old plantings that need reconstruction and replacement.

The research results on the species composition and structure of hedges in the urban environment are currently insufficiently covered in the works of Ukrainian and foreign scientists. For example, in the green areas of Chernivtsi, the most used species are boxwood, white boxwood, common privet, and medium-sized meadowsweet (Myronchuk & Henyk, 2021). In another study, researcher K.V. Myronchuk (2014) analysed the patterns of creation and condition of hedges in rural and urban areas of Bukovyna and found that in cities, curbs, single-row hedges consisting of one species

predominate, and in non-urban areas, taller hedges, mostly combined, are prevalent, usually using common hornbeam, white privet, and evergreen boxwood. Similar in species composition to the hedges in Chernivtsi are the hedges in Mukachevo, where evergreen boxwood, white pigweed, and common privet are mostly used for this type of planting (Dudyn, & Levus, 2022). Similarly, to the green areas of public use in Kyiv, the study by A.A. Dzyba & A.V. Baikovska (2015) found that similar plantations in Kharkiv are characterised by the predominance of privet. The most common in the public areas of this city are formed single-row hedges of deciduous woody plant species, while borders and living walls are less common. As in the above cities, the hedges of Lutsk are characterised by the predominance of medium-height hedges created using such plants as black cotoneaster, Vangutta hemlock, common privet, white privet, and viburnum (Shukel, 2011).

The results of several studies on the creation and maintenance of hedges in European cities have revealed both differences and similarities concerning hedges in Ukrainian cities.

For example, S.V. Rohovskyi (2013) points out the frequent use of *Pyracantha charlatanica* in the creation of hedges, which is not typical for the Ukrainian cities under study. At the same time, the formation of hedges in the cities of Vienna, Budapest, Krakow, and Prague is similar, with the use of evergreen boxwood, common privet, cotoneaster brilliant, hornbeam, white snowberry, Wangutt's hemlock, and Thunberg's barberry. The dominant plants that create hedges in the city of Swidnik (Poland) are shiny irga, common privet and plum alder (Muras & Frazik-Adamczyk, 2002; Lubiarsz & Kulesza, 2012). The studies of C. Farrell *et al.* (2022) revealed an ecological approach to the selection of an assortment of plants, including hedges, for use in Australian urban landscapes. It is worth noting that the analysed studies on the peculiarities of creating and maintaining hedges in European cities note their highly decorative state and unsurpassed appearance, which is achieved through regular professional care. To improve and develop hedges in Ukrainian cities, the main components are to increase the level of agrotechnical measures, reconstruction, rejuvenation, and replacement of old hedges, as well as a reasonable approach to the choice of planting material, which is proposed by domestic scientists in the above studies.

## Conclusions

Based on the research conducted on the condition of hedges in the system of landscaping public spaces in Kyiv, the following conclusions can be drawn:

1. Hedgerows account for a significant proportion of the city's garden and park facilities. Their length is 65689 linear metres, and the number of plants is more than 306 thousand.
2. The hedges are in good and satisfactory condition, which indicates that they are systematically maintained by the specialists of the district greenery maintenance companies.

3. The studied hedges are represented by 30 plant taxa. The most widespread species is the common privet (*Ligustrum vulgare* L.), which accounts for 54% of the total number of planted plants. Other common plant species are common hornbeam (*Carpinus betulus* L.) – 8%, Wangutta's hemlock (*Spiraea x vanhouttei* L.) – 7%, shiny cotoneaster (*cotoneaster lucidus* Schlecht.) – 6%, common ninebark (*Physocarpus opulifolius* L.) – 5%, common box (*Buxus sempervirens* L.) – 5%, White dogwood (*Cornus alba* L.) – 3%, and the remaining 24 species account for only 12%.

4. To improve the condition of hedges, it is necessary to develop a targeted programme for the development of this type of planting as part of the capital's environmental development plan.

5. Hedgerows are important in the urban greening system, and therefore we recommend their wider use, especially in places directly adjacent to recreation areas to transport routes, along pedestrian sidewalks, on boulevards and transport interchanges.

6. The selection of planting material for hedges should be scientifically based, considering the main objectives and economic factors for their further maintenance.

The authors believe that the use of hedges in garden and park facilities is one of the most promising ways to develop urban green infrastructure in Ukrainian settlements. They allow for solving global issues of improving the ecological state, improving the comfort of the inhabitants of the urban environment, and enhancing the aesthetic perception of cities in general. The prospect of further research is to study the state of hedges in other Ukrainian cities.

## Conflict of Interest

The authors declare no conflict of interest.

## Acknowledgements

None.

## References

- [1] Air quality research is being conducted in Kyiv. (2018). Retrived from [https://kyivcity.gov.ua/news/u\\_kiyevi\\_provoditsya\\_doslidzhennya\\_yakosti\\_atmosfernogo\\_povitrya/](https://kyivcity.gov.ua/news/u_kiyevi_provoditsya_doslidzhennya_yakosti_atmosfernogo_povitrya/).
- [2] Blanus, T., Garratt, M., Cathcart-James, M., Hunt, L., & Cameron R.W.F. (2019). Urban hedges: A review of plant species and cultivars for ecosystem service delivery in north-west Europe. *Urban Forestry & Urban Greening*, 44, article number 126391. doi: [10.1016/j.ufug.2019.126391](https://doi.org/10.1016/j.ufug.2019.126391).
- [3] Borowski, J., Czarny, P., Krynicki, M., Motas, M., Stolarczyk, J., Wodzicki, R., Tyszko-Chmielowiec, P., & Witkoś-Gnach, K. (2021). *Standard cięcia i pielęgnacji drzew*. Wrocław: Fundacja EkoRozwoju.
- [4] Drebot, O.I. (2019). The influence of forest strips on the ecological condition of road transport lands. *Balanced Natue Using*, 4, 26-34. doi: [0.33730/2310-4678.4.2019](https://doi.org/0.33730/2310-4678.4.2019).
- [5] Dudyn, R.B., & Levus, T.M. (2022). Ecological and biological bases of hedge formation in Mukachevo city. *International Scientific Journal "Grail of Science"*, 17, 196-199. doi: [10.36074/grail-of-science.22.07.2022.034](https://doi.org/10.36074/grail-of-science.22.07.2022.034).
- [6] Dworniczak, Ł., & Reda, P. (2021). *Standard ochrony drzew i innych form zieleni w procesie inwestycyjnym*. Wrocław: Fundacja EkoRozwoju.
- [7] Dzyba, A.A., & Baikovska A.V. (2015). [The current state of hedges in public spaces in Kharkiv](#). *Scientific Bulletin of the National University of Life and Environmental Sciences of Ukraine*, 229, 141-147.
- [8] Ejdyś, S., & Lasota, F. (2022). Protection of the environment in terms of functioning of urban transport. Literature review. *Rocznik Ochrona Srodowiska*, 24, 481-492. doi: [10.54740/ros.2022.034](https://doi.org/10.54740/ros.2022.034).
- [9] Farrell, C., Livesley, S.J., Arndt, S.K., Beaumont, L., Burley, H., Ellsworth, D., Esperon-Rodriguez, M., Fletcher, T.D., Gallagher, R., Ossola, A., Power, S.A., Marchin, R., Rayner, J.P., Rymer, P.D., Staas, L., Szota, C., Williams, N.S.G., & Leishman, M. (2022). Can we integrate ecological approaches to improve plant selection for green infrastructure? *Urban Forestry & Urban Greening*, 76, article number 127732. doi: [10.1016/j.ufug.2022.127732](https://doi.org/10.1016/j.ufug.2022.127732).
- [10] Ghafari, S., Kaviani, B., Sedaghatthoor, S., & Allahyari, M.S. (2020). Ecological potentials of trees, shrubs and hedge species for urban green spaces by multi criteria decision making. *Urban Forestry & Urban Greening*, 55, article number 126824. doi: [10.1016/j.ufug.2020.126824](https://doi.org/10.1016/j.ufug.2020.126824).
- [11] Hashad, K., Yang, B., Gallagher, J., Baldauf, R., Deshmukh, P., & Zhang, K.M. (2023). Impact of roadside conifers vegetation growth on air pollution mitigation. *Landscape and Urban Planning*, 229, article number 104594. doi: [10.1016/j.landurbplan.2022.104594](https://doi.org/10.1016/j.landurbplan.2022.104594).
- [12] Hladun, H.B., & Hladun, H.Yu. (2013). [Protection of highways by forest plantations of the linear type and their projected volumes](#). *Forestry and Agroforestry*, 123, 103-113.
- [13] Kucheriavyi, V.P., & Kucheriavyi, V.S. (2021). *Landscaping of populated areas*. Lviv: "Novyi Svit-2000".
- [14] Kushnir, A.I., & Sukhanova, O.A. (2022). *Agrotechnics of plants in landscape construction* (Part I. Coniferous trees). Kyiv: IEYamchynskyi.
- [15] Kushnir, A.I., Pushkar, V.V., Sukhanova, O.A., & Vakulyk, I.I. (2021). *Encyclopedic dictionary-reference book of landscaper*. Kyiv: CP "COMPRINT".

- 
- [16] Kuznetsov, S.I., Kushnir, A.I., Levon, F.M., Pushkar, V.V., Sukhanova, O.A., Kuznetsova, M.S., & Honcharenko, B.V. (2020). *Assortment of trees, shrubs and vines for landscape construction in Ukraine*. Kyiv: CP "COMPRINT".
- [17] Lubiarcz, M., & Kulesza, P. (2012). *Znaczenie przyrodnicze i krajobrazowe zywoplotow przy ciagach komunikacyjnych w Swidniku (Woj. Lubelskie)*. *Teka Komisji Architektury, Urbanistyki i Studiow Krajobrazowych*, VIII/2, 50-60.
- [18] Muras, P., & Frazik-Adamczyk, M. (2002). *Zywoploty*. Krakow: Plantpress.
- [19] Myronchuk, K.V. (2014). *Comparative characteristics of models of hedge creation and formation in rural and urban areas (on the example of Chernivtsi region)*. *Scientific Bulletin of the National Forestry University of Ukraine*, 24.8, 78-82.
- [20] Myronchuk, K.V., & Henyk, Ya.V. (2021). Composition, ecological structure and decorative effect of hedges in the urban environment of Chernivtsi. *Scientific Bulletin of the National Forestry University of Ukraine*, 31(5), 47-53. doi: 10.36930/40310507.
- [21] Myronchuk, K.V., & Kurnytska, M.P. (2021). Dust protection function of hedges on the example of urban ecosystems of the Chernivtsi region. *Scientific Bulletin of the National Forestry University of Ukraine*, 31(4), 48-53. doi: 10.36930/40310407.
- [22] Official Website of the Kyivzelenbud Municipal Association. (n.d.). Retrived from <http://kyivzelenbud.com/about/strategiya-rozvytku>.
- [23] Order of the Ministry of Construction, Architecture and Housing and Communal Services of Ukraine No. 8 "On Approval of Amendments to the Instruction on Technical Inventory of Green Spaces in Cities and Urban-Type Settlements of Ukraine". (2007, January). Retrived from <https://zakon.rada.gov.ua/laws/show/z0082-07#Text>.
- [24] Rohovskyi, S.V. (2013). *Experience in maintaining green spaces in European cities and its use in Ukraine*. *Scientific Bulletin of the National University of Life and Environmental Sciences of Ukraine*, 187(1), 126-134.
- [25] SBR V.2.3-218-007:2012. (2012). *Environmental requirements for highways*. Designing. Kyiv: State Highway Agency of Ukraine (Ukravtodor).
- [26] Shukel, I.V. (2011). *Hedges in Lutsk city and methods of their improvement*. *Scientific Bulletin of the National Forestry University of Ukraine*, 21.16, 331-335.
- [27] Yalovyi, K. (2021). *Caution: The air! 12 facts about what Kyiv residents breathe*. Retrived from <http://kyivzelenbud.com/about/strategiya-rozvytku>.
- [28] Zayachuk, V.Ya. (2014). *Dendrology*. Lviv: SPOLOM.

## Живоплоти в місцях загального користування міста Києва та шляхи їх вдосконалення

**Олексій Олегович Лукаш**

Аспірант

Навчально-науковий інститут лісового і садово-паркового господарства  
Національний університет біоресурсів і природокористування України  
03041, вул. Горіхуватський шлях, 19, м. Київ, Україна  
<https://orcid.org/0000-0002-4359-3905>

**Віталіна Олексіївна Новик**

Магістр

Навчально-науковий інститут лісового і садово-паркового господарства  
Національний університет біоресурсів і природокористування України  
03041, вул. Горіхуватський шлях, 19, м. Київ, Україна  
<https://orcid.org/0009-0002-3973-7774>

**Анатолій Іванович Кушнір**

Кандидат біологічних наук, доцент

Навчально-науковий інститут лісового і садово-паркового господарства  
Національний університет біоресурсів і природокористування України  
03041, вул. Горіхуватський шлях, 19, м. Київ, Україна  
<https://orcid.org/0000-0002-1572-0284>

**Анотація.** Зелені насадження урбанізованого середовища великих міст виконують важливі екологічні, містобудівельні, соціальні та економічні функції. Живоплоти в системі озеленення мегаполісу є невід'ємною частиною декоративних насаджень та виконують насамперед екологічні функції. Метою роботи було провести аналіз живих огорож, що зростають в насадженнях загального користування міста Києва. Для досягнення поставленої мети під час теоретичних, експериментальних досліджень використовувалися загальнонаукові методи (спостереження, вимірювання, огляд наукової літератури по темі дослідження). Загалом досліджено 65689 м.п. живих огорож міста, що складаються з понад 306 тис. рослин та представлені 31 таксонами, які зростають на 217 об'єктах загального користування і знаходяться на обслуговуванні десяти районних комунальних підприємств по утриманню зелених насаджень комунального об'єднання «Київзеленбуд». Проаналізовано видовий склад, висоту, схему посадки та якісний стан живих огорож. За результатами встановлено, що найбільша кількість живих огорож створено у Солом'янському та Дарницькому районах міста, відповідно, 17 % і 16 % від загальної кількості. Самим розповсюдженим видом рослин у складі живоплотів є бирючина звичайна (*Ligustrum vulgare* L.). Обстежені живі огорожі створені переважно за однорядною та дворядною схемами посадки приблизно у рівних співвідношеннях. За групою висот переважають низькі живоплоти, кількість яких становить 53,9 % від загальної, середніх за висотою – 33 %. Якісний стан переважно добрий та задовільний, що свідчить про дотримання агротехніки вирощування та своєчасності догляду. Результати цих досліджень на практиці дозволять підприємствам-балансоутримувачам об'єктів із зростаючими ними живоплотами краще організувати проведення агротехнічних робіт щодо їх влаштування і утримання в належному декоративному стані

**Ключові слова:** живі огорожі; функції живих огорож; елемент озеленення; урбанізоване середовище; міське озеленення; екологія