

PHYTODIVERSITY OF ANNUAL FLOWERING AND ORNAMENTAL PLANTS IN THE FLOWERBEDS OF POLTAVA AND ITS CHARACTERISTICS

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In the framework of the study, the phytocoenoses of ornamental flowering plants in the flower beds of Poltava were examined. The aim of the work was to investigate the phytodiversity of annual flowering and ornamental-leaved plants in flower beds of various types in Poltava, as well as to provide a systematic characterization and analysis of species frequency. As a result of the research, it was established that the assortment of ornamental flowering plants in the flower beds comprises 46 species from 44 genera, 21 families, and 14 orders. The class Magnoliopsida is represented by 44 species from 42 genera, 19 families, and 12 orders, while the class Liliopsida includes two species from two genera, two families, and two orders. The primary families constituting the flora of Poltava's flower bed phytodiversity are: Asteraceae (15 species), Amaranthaceae and Brassicaceae (4 species each), Lamiaceae (3 species), and Malvaceae, Papaveraceae, and Plantaginaceae (2 species each). These 32 species make up 71.11% of the total number of species. The remaining 14 families are each represented by a single species.

Key words: phytodiversity, systematic structure of flora, flowerbeds, frequency of occurrence of species.

Connection of the publication with planned research works.

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Introduction.

The flowerbeds in Poltava play a significant role in the greening of the city. Flowering plants, like other ornamental plants, are multifunctional: they release oxygen and absorb carbon dioxide, trap dust and noise, and also cultivate patriotic and aesthetic feelings and influence recreational conditions. Their role is particularly enhanced in residential areas, where they bring people closer to nature. All the city's flowerbeds can be categorized into several groups based on their location: near administrative and industrial buildings, in squares, parks, on the premises of educational and preschool institutions, near private estates, and within their territories. However, the functions they perform are practically independent of their location and are the same for all flowerbeds. The phytodiversity of flowerbeds, in terms of the lifespan of the plants, includes annual, biennial, and perennial species.

The aim of the study.

To study the phytodiversity of annual flowering and ornamental foliage plants in various types of flowerbeds in Poltava, provide a systematic characterization, analyze the origin of the flowering and ornamental foliage plants, and determine the frequency of occurrence of the identified species.

Object and research methods.

The material for this study was based on personal observations of the assortment of flowering and ornamental plants in the flowerbeds of Poltava. Over 60 flowerbeds were surveyed, grouped as follows: flowerbeds in parks, squares, and boulevards; flowerbeds on the premises of educational and

preschool institutions; and flowerbeds on street lawns near residential buildings. Observations were conducted on 17 streets in the city and its central part, as well as in parks: «Peremoha», «Korpusnyi Sad», Kotlyarevsky Park, «Petrovsky», and «Sonyachny». The study was carried out during the summer and autumn of 2023.

The material was collected using the route method. Herbarium collection of samples was not performed; instead, they were photographed. The research focused on annual flowering and ornamental species, as well as perennials that are cultivated as annuals under local conditions.

The names of flowering and ornamental plants are given according to the manuals «Floriculture» [1] and «Flower Bed Design» [2]. We surveyed over 60 flowerbeds in various parts of the city. The origin of the flowering and ornamental foliage plants was determined using literary sources. The frequency of occurrence of cultivated species was assessed using a generally accepted visual scale, where: 1-3 locations – very rare; 4-6 – rare; 7-10 – sporadic; 11-13 – common; more than 13 times – very common.

Research results and their discussion.

Our research established that flowering and ornamental foliage plants in Poltava's flowerbeds are insufficiently covered in informational sources. Our preliminary studies identified 36 species of flowering and ornamental plants from 33 genera and 16 families in Poltava's flowerbeds [3, 4, 5].

The characteristics of the utilization of higher spore-bearing plants in the agro-landscapes of garden and park management have been established: bryophytes [6] and vascular spore-bearing plants [7].

As a result of our original research, we found that the assortment of flowering and ornamental plants in the city's flowerbeds includes 46 species (table) from 44 genera, 21 families, 14 orders, and two classes of the division Angiosperms. The class Magnoliopsida is represented by 44 species from 42 genera, 19 families, and 12 orders. Liliopsida is represented by two species from two genera, two families, and two orders. The

Table – Annual Flowering Cultures in the Studied Flowerbeds of Poltava

№	Family	Genus, Species	Origin cultures	Ornamen- tal value	Frequency of occurrence
1	Ranunculaceae	<i>Delphinium x ajacis</i> L.	Morocco	B.F.	very rarely
2	Papaveraceae	<i>Eschscholzia californica</i> Cham.	North America	B.F.	rarely
3		<i>Papaver rhoeas</i> L.	Europe	B.F.	sporadically
4	Portulacaceae	<i>Portulaca grandiflora</i> L.	Brazil	B.F.	sporadically
5	Amaranthaceae	<i>Althernanthera amoena</i> Voss.	North America	D.L.	sporadically
6		<i>Amaranthus caudatus</i> L.	South America	D.L.	rarely
7		<i>Celosia cristata</i> L.	Mexico	B.F.	rarely
8		<i>Gomphrena haageana</i> L.	Mexico	B.F.	rarely
9	Chenopodiaceae	<i>Bassia scoparia</i> (L.) Coot.	Eurasia	D.L.	rarely
10	Brassicaceae	<i>Brassica oleracea</i> var. <i>acephala</i> DC.	Mediterranean	D.L.	sporadically
11		<i>Lobularia maritima</i> (L.) Desv.	Mediterranean	B.F.	sporadically
12		<i>Lunaria annua</i> L.	Europe	B.F.	rarely
13		<i>Matthiola bicornis</i> (Sibth. et Smith) DC.	Greece	B.F.	sporadically
14	Cleomaceae	<i>Cleome spinosa</i> L.	South America	B.F.	rarely
15	Tropaeolaceae	<i>Tropaeolum majus</i> L.	America	B.F.	sporadically
16	Begoniaceae	<i>Begonia semperflorens</i> Link. et Otto	Brazil	B.F.	often
17	Malvaceae	<i>Malva sylvestris</i> L.	Europe	B.F.	very rarely
18		<i>M. trimestris</i> (L.) Salisb.	Europe	B.F.	rarely
19	Geraniaceae	<i>Pelargonium zonale</i> L.	South Africa	B.F.	often
20	Balsaminaceae	<i>Impatiens balsamina</i> L.	India	B.F.	sporadically
21	Convolvulaceae	<i>Ipomoea purpurea</i>	America	B.F.	often
22	Solanaceae	<i>Petunia hybrida</i> Hord.	South America	B.F.	Very often
23	Plantaginaceae	<i>Antirrhinum majus</i> L.	America	B.F.	Very often
24		<i>Digitalis purpurea</i> L.	Europe	B.F.	very rarely
25	Verbenaceae	<i>Verbena hybrida</i>	A species of hybrid origin	B.F.	often
26	Lamiaceae	<i>Coleus x hybrida</i> Hort.	Tropics of Asia and Africa	D.L.	often
27		<i>Perilla frutescens</i> (L.) Britton	Southeast Asia	D.L.	sporadically
28		<i>Salvia splendens</i> Sellow ex Roemer & J.A. Schultes	Brazil	B.F.	Very often
29	Asteraceae	<i>Ageratum houstonianum</i> Mill.	Mexico	B.F.	Very often
30		<i>Arctotis stoechaedifolia</i> Berg. var. <i>grandis</i> (Nhung.) Less.	Mexico	B.F.	sporadically
31		<i>Calendula officinalis</i> L.	Europe	B.F.	sporadically
32		<i>Callistephus chinensis</i> (L.) Nees	China	B.F.	sporadically
33		<i>Centaurea cyanus</i> (All.) Dost.	Europe	B.F.	rarely
34		<i>Cineraria maritima</i> L.	Mediterranean	D.L.	often
35		<i>Cosmos bipinnatus</i> L.	Mexico	B.F.	rarely
36		<i>Gaillardia pulchella</i> Foug.	Mexico	B.F.	often
37		<i>Gazania tenuifolia</i> Less.	South Africa	B.F.	often
38		<i>Dahlia vareabilis</i> L.	Mexico	B.F.	often
39		<i>Helianthus annuus</i> L.	Mexico	B.F.	sporadically
40		<i>Tagetes erecta</i> L.	Mexico	B.F.	often
41		<i>Tagetes patula</i> L.	Mexico	B.F.	Very often
42		<i>Tagetes tenuifolia</i> Cav.	Mexico	B.F.	sporadically
43		<i>Zinnia elegans</i> Jacq.	Mexico	B.F.	sporadically
44	Campanulaceae	<i>Lobelia erinus</i> L.	South Africa	B.F.	sporadically
45	Comellinaceae	<i>Setcreasea purpurea</i> L.	Mexico	D.L.	often
46	Asparagaceae	<i>Chlorophytum inornatum</i> L.	Mexico	D.L.	sporadically

Notes: B.F. – beautifully flowering; D.L. – decoratively leafy.

main families contributing to the floristic diversity are: Asteraceae with 15 species, Amaranthaceae, and Brassicaceae with four species each, Lamiaceae with three species, Malvaceae, Papaveraceae, and Plantaginaceae with two species each. These 32 species constitute 71.11% of the total number of species. The remaining 14 families are each represented by one species.

The richest family is Asteraceae, whose representatives play a significant role in the design of both municipal flowerbeds and private gardens.

The spectrum of leading genera is virtually non-existent, as only the genus *Tagetes* L. includes three species and the genus *Malva* L. includes two. The remaining 42 genera are each represented by a single species.

Among the studied species based on general ornamental characteristics, the plants are divided into two groups: beautifully flowering and decoratively leafy [8, 9, 10]. The first group includes plants grown for their beautiful flowers or inflorescences (37 species, 80.43% of the total number of identified species). Examples of such species are various varieties of *Antirrhinum majus*,

Cleome spinosa, *Petunia hybrida*, *Salvia splendens*, *Verbena hybrida*, and others. The second group includes 9 species (19.56%). These are plants with variegated leaves and stems (*Alternanthera amoena*, *Brassica oleracea* var. *acephala*, *Setcreasea purpurea*, etc.), characterized by pubescent silvery shoots and leaves (*Cineraria maritima*), or striped leaves (*Chlorophytum inornatum*).

Decoratively leafy plants are used to create patterns and backgrounds in flowerbeds. For instance, in the flowerbeds of the Corps Garden, decoratively leafy species like *Cineraria maritima* and *Setcreasea purpurea* are combined with *Petunia hybrida* to form picturesque patterns. In the flowerbeds of the city near the Poltava Academic Regional Ukrainian Music and Drama Theater named after Mykola Gogol, a trident and viburnum were created using *Alternanthera amoena* and *Cineraria maritima*. Thus, such plants are either elements of floral designs or form the background of flowerbeds to create specific compositions.

The analysis of the origin of the surveyed ornamental floral cultures indicates a predominance of species native to Mexico (31.11%), Europe (15.56%), and America (13.33%). Common species from Mexico include *Ageratum houstonianum*, *Gaillardia pulchella*, *Dahlia variabilis*, *Helianthus annuus*, *Zinnia elegans*, and all species of the genus *Tagetes*; from Europe – *Digitalis purpurea*, *Malva sylvestris*, *M. trimestris*, *Papaver rhoeas*, *Calendula officinalis*, *Centaurea cyanus*. Species from North and South America include *Alternanthera*

amoena, *Antirrhinum majus*, *Cleome spinosa*, *Petunia hybrida*, *Tropaeolum majus*, and others.

The frequency of occurrence indicator characterizes the degree of spread of certain cultures in the city's flowerbeds. By frequency of occurrence, the most represented group is species that occur «sporadically» (36.96%). Species that occur «often» make up 23.91%, «rarely» – 21.74%. The share of species that occur «very rarely» and «very often» is insignificant, amounting to 6.52% and 10.87%, respectively. Frequently noted species include *Antirrhinum majus*, *Begonia semperflorens*, *Cineraria maritima*, *Verbena hybrida*; very often – *Ageratum houstonianum*, *Petunia hybrida*, *Salvia splendens*, *Tagetes patula*.

Conclusions.

Thus, it has been established that the city's flowerbeds are characterized by a sufficiently rich phytodiversity of ornamental floral cultures, with a predominance of beautifully flowering species. In the future, it is necessary to incorporate more decoratively leafy cultures into their composition, which will contribute to diversifying the floral compositions in the city's flowerbeds.

Prospects for further research.

Promising research directions include studying the species diversity of annual and perennial ornamental flowering plants in the city's flower beds and their interactions with higher spore-bearing plants. The goal is to create biologically sustainable floral compositions within the urban ecosystem of the city.

References

1. Ishchuk LP, Oleshko OH, Cherniak VM, Kozak LA. Kvitnykarstvo. Bila Tserkva; 2014. 292 s. [in Ukrainian].
2. Antonovych YeA, redactor. Dyzain kvitnykiv. Kyiv: Alterpres; 2007. 336 s. [in Ukrainian].
3. Hapon SV, Shevchuk SM, Nahorna SV, Chuvpylo VV, Kuryshko RV. Odnorichni kvitnykovi kultury v ozelenenni m. Poltavy. Materialy Mizhnarodnoi naukovy-praktychnoi internet-konferentsii Aktualni napriamky ta problematyka u tekhnolohiiakh vyroshchuvannya produktsii roslynnytstva; 2023 Lyst 23; Poltava. Poltava: PDAU; 2023. s. 171-173. [in Ukrainian].
4. Pushkar VV, Zhymov AD, Vilhelm-Shvadchak OK. Dyzain kvitnykiv. K.: DAKKIM; 2003. 92 s. [in Ukrainian].
5. National Association of City Transportation Officials. Urban Street Design Guide. Washington: Island Press; 2013. 192 p.
6. New York City Department of Transportation. Street Design Manual. New York: Vanguard Direct; 2013. 264 p.
7. Martin A. Moss magic. Wild Ones Journal. 2016;29(5):6-12.
8. Velcheva LH. Praktykum z kvitnykarstva. Melitopol: Melitopol's'kyi derzhavnyi pedahohichnyi universytet imeni Bohdana Khmel'nyts'koho; 2020. 92 s. [in Ukrainian].
9. Prokopchuk VM. Kvitnykarstvo. Vinnytsia: VNAU; 2016. 126 s. [in Ukrainian].
10. Bondarenko OYu, Nazarchuk YuS. Kvitnykarstvo ta hazony: metod. rekom. dlia praktychnykh robot do dystsypliny dlia studentiv spets. 206 «Sadovo-parkove hospodarstvo». Odesa: Odes. nats.un-t im. I. I. Mechnykova; 2021. 50 s. [in Ukrainian].

ФІТОРІЗНОМАНІТТЯ ОДНОРІЧНИХ КВІТНИКОВО-ДЕКОРАТИВНИХ РОСЛИН КВІТНИКІВ М. ПОЛТАВИ ТА ЙОГО ОСОБЛИВОСТІ

Гапон С. В., Шевчук С. М., Куришко Р. В., Нагорна С. В., Чувпило В. В.

Резюме. Досліджувалися квітничково-декоративні рослини на квітниках м. Полтави. Метою роботи є вивчення фіторізноманіття однорічних квітничково-декоративних та декоративно-листяних культур на квітниках різного типу м. Полтави та його систематична характеристика, аналіз частоти трапляння видів та походження. Для обстеження було взято понад 60 квітників різного типу в різних районах міста.

У результаті оригінальних досліджень встановлено, що асортимент квітничково-декоративних та декоративно-листяних рослин на квітниках міста Полтави налічує 46 видів з 44 родів, 21 родини, 14 порядків. Клас Magnoliopsida репрезентований 44 видами 42 родами, 19 родинами, 12 порядками; Liliopsida – двома видами, двома родами, двома родинами, двома порядками. Основу флори фіторізноманіття квітників м. Полтави становлять родини: Asteraceae – 15 видів, Amaranthaceae, Brassicaceae – 4 видами кожна, Lamiaceae – трьома видами, Malvaceae, Papaveraceae, Plantaginaceae – двома видами кожна. Це 32 види, що становить 71, 11% від загальної кількості видів. Решта 14 родин репрезентована кожна одним видом.

У спектрі провідних родів тільки рід *Tagetes* L. налічує три види та рід *Malva* L. – два. Решта 42 роди представлені одним видом кожний.

За характером декоративності в досліджуваному фіторізноманітті виділено дві групи рослин: красиво-квітучі види (37 видів, 80,43% від загальної кількості виявлених видів) та декоративно-листяні (9 видів, 19,56%).

За частотою трапляння найбільш представленою є група видів, що трапляються «спорадично» (36, 96%). Види які зустрічаються «часто» становлять 23, 91%, «зрідка» – 21,74%. Частка видів які відмічені «дуже рідко» та «дуже часто» незначна і становить відповідно 6,52%, 10,87%.

Ключові слова: фіторізноманіття, систематична структура флори, квітники, частота трапляння видів.

PHYTODIVERSITY OF ANNUAL FLOWERING AND ORNAMENTAL PLANTS IN THE FLOWERBEDS OF POLTAVA AND ITS CHARACTERISTICS

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Abstract. The study focused on ornamental-flowering plants in the flowerbeds of Poltava. The aim of the work is to examine the phytodiversity of annual ornamental-flowering and decoratively leafy cultures in various types of flowerbeds in Poltava and to provide a systematic characterization, as well as analyze the frequency of occurrence and origin of the species. Over 60 different types of flowerbeds in various districts of the city were surveyed.

As a result of original research, it was established that the assortment of ornamental-flowering and decoratively leafy plants in the flowerbeds of Poltava includes 46 species from 44 genera, 21 families, and 14 orders. The class Magnoliopsida is represented by 44 species from 42 genera, 19 families, and 12 orders; Liliopsida is represented by two species, two genera, two families, and two orders. The main flora of the phytodiversity of Poltava's flowerbeds consists of the families: Asteraceae – 15 species, Amaranthaceae, Brassicaceae – 4 species each, Lamiaceae – 3 species, Malvaceae, Papaveraceae, Plantaginaceae – 2 species each. These comprise 32 species, accounting for 71.11% of the total number of species. The remaining 14 families are each represented by a single species.

In the spectrum of leading genera, only the genus *Tagetes* L. includes three species and the genus *Malva* L. includes two. The remaining 42 genera are each represented by one species.

Based on the nature of ornamental value, the studied phytodiversity is divided into two groups: beautifully flowering species (37 species, 80.43% of the total number of identified species) and decoratively leafy species (9 species, 19.56%).

By frequency of occurrence, the most represented group is species that occur "sporadically" (36.96%). Species that occur "often" account for 23.91%, "rarely" – 21.74%. The share of species noted as "very rarely" and "very often" is insignificant, amounting to 6.52% and 10.87%, respectively.

Key words: phytodiversity, systematic structure of flora, flowerbeds, frequency of occurrence of species.

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Conflict of interest:

The Authors declare no conflict of interest.

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