sciendo
Acta hort regiotec, 26, 2023(2): 168–172
DOI: 10.2478/ahr-2023-0021

Research Article

Application of synanthropic plants in the design of green spaces in Warsaw (Poland)

Filip Kamionowski[1]*, Beata Fornal-Pienak[1], Mária Bihuňová[2]

[1]*Warsaw University of Life Sciences, Institute of Horticultural Sciences, Poland*
[2]*Slovak University of Agriculture in Nitra, Faculty of Horticulture and Landscape Engineering, Institute of Landscape Architecture, Slovak Republic*

Article Details: Received: 2023-05-24 | Accepted: 2023-07-26 | Available online: 2023-11-30

The aim of the study was to summarize the use of synanthropic vegetation in public green areas of selected Polish cities. The study included issues related to phytosociology and landscape architecture. For this purpose, a literature study was performed. Part 1 identified possible ways of using synanthropic vegetation in the design of public green areas, Part 2 showed examples of such areas from Warsaw. The authors suggested species that can help enrich urban lawns, part 3 contains proposition of plant species composition for more natural lawns in city parks, including synanthropic plants typical for Poland (prepared by the authors). The process of gradual introduction of synanthropic vegetation in Poland was summarized and compared to the trends in Western European countries. The urban policy of Warsaw regarding the mowing of lawns and the use of flower meadows was briefly described, which influences the presence of synanthropic species in the urban environment. A watershed moment for the use of synanthropic species in Poland was identified, as well as the authors' predictions for their future use.

Keywords: landscape architecture, cities, urban green spaces, synanthropic flora, ruderal flora

1 Introduction

Synanthropic plants (Greek syn – from; anthropos – human) are plants that accompany human, they appear thanks to anthropopression (too much pressure on the environment, local destruction), as well as after its completion (e.g. as a result of abandoning an object). Their communities are formed near abandoned buildings, fields, natural habitats disturbed by human activities, in extremely unfavorable conditions – by railway tracks and post-mining areas, heaps, landfills (Wysocki & Sikorski, 2014). Synanthropic plants can be native species (apophytes) and alien species (anthropophytes). Synanthropic plants, like all plants, contribute to improving the conditions in the city: they lower the temperature, absorb dust, reduce surface runoff and nuisance noise. They can also be melliferous (supporting pollinating insects living in cities) and have healing properties. Their communities are home to many species of animals and contribute to the increase in biodiversity (Robinson & Lundholm, 2012; Trzaskowska, 2011). The use of synanthropic plants in shaping green areas can bring many measurable benefits that will depend on the land management method and the group to which they can be assigned (ruderal or segetal). Segetal species, as their presence is associated with regularly performed soil cultivation, form unstable communities, dependent on strong human interference. Ruderal species, on the other hand, form more durable communities (a great advantage in the case of urban greenery, which should be resistant to both time and human), which is related to their frequent appearance as a result of succession. In the case of lawns enriched with spontaneous species, the risk of spreading grass diseases is reduced, the amount of oxygen produced increases (Trzaskowska, 2013). Less care expenditure necessary to maintain such greenery (Yang et al., 2023) reduces costs (Kühn, 2006) and burden on the environment. The purely aesthetic function should also be mentioned – their wild appearance is a substitute for nature in a heavily transformed urban environment, although it happens that they do not meet

***Corresponding Author:** Filip Kamionowski, Warsaw University of Life Sciences, Institute of Horticultural Sciences, Department of Environmental Protection and Dendrology, Ul. Nowoursynowska 166, Warsaw, Poland; filipkamionowski@gmail.com

the requirements of residents and designers due to their common occurrence and untidy appearance, associated with neglected areas (Trzaskowska, 2011). However, a change in attitude may be encouraged by both trends and regional policies of local authorities. A trend gaining popularity in Poland, that may support the visibility of synanthropic plants in the city is limiting lawn mowing (Trzaskowska, 2013). In Warsaw, as the official Warsaw site informed (Urząd m.st. Warszawy, 2020), the city has decided to abandon frequent mowing, with the mayor encouraging private entities and cooperatives in communications to limit mowing as well. Indirectly, this is a measure leading to the facilitation of the colonization of grasslands by synanthropic species and, consequently, their greater representation in urban greenery. In addition, the city in 2022 organized campaigns to distribute seeds of meadows containing synanthropic species, so that public awareness is to be raised, and the city's natural and aesthetic qualities are to be enhanced – as official Warsaw site informed (Urząd m.st. Warszawy, 2022). But first of all, in Warsaw's urban green spaces, synanthropic plants are increasingly finding a place as a design element on which this study focuses.

2 Material and methods

Literature on synanthropic plant species and the possibilities for their application in green areas was analysed (part 1). Field research was also conducted in Warsaw (capital city of Poland), where the attempts to find green spaces with synanthropic plants were made (part 2). Part 3 presents a proposal for the plant species composition for more natural lawns in urban parks, including synanthropic plants typical for Poland (based on synanthropic plants observed by the authors in urban areas of Warsaw – excluding invasive anthropophytes).

3 Results and discussion

3.1 Part 1. Possibilities of using synanthropic plants in urban greenery

The method of application of synanthropic species should be dependent on many factors, such as: the composition reasons (they can, for example, soften the architectural surroundings), natural conditions, the degree of environmental pollution (salinity, air, water and soil pollution, that can be eliminated by such vegetation), the frequency of use of a given area (Trzaskowska, 2011). They can appear in all types of green areas, in the form of natural communities, in particular in ecological parks and nature parks (created on heavily degraded and transformed areas), as well as in wastelands and brownfields transformed into recreational green areas (Rostański, 2000; Kühn, 2006; Dudzińska-Jarmolińska, 2018; Trzaskowska, 2011). They should not completely replace lawns and typical ornamental plantings (beds, flowerbeds, etc.), especially in historical settings, where they are an important compositional element. Synanthropes can be used to create flower meadows (Tokarska-Guzik 2000) – annual, with segetal species, perennial – ruderal species, filling difficult spaces, currently devoid of functions and unaesthetic (e.g. as a temporary form of development), shaping roadsides and barriers separating green areas from roads, car parks, and other unattractively developed areas. They are also a good plant material for the design of green roofs – the species can be properly selected during the design process. Alternatively, they can be allowed to inhabit the roof in the process of succession, however, it is important to remove seedlings of invasive and unsuitable species, such as trees or large shrubs (Trzaskowska, 2011). They can be used to create grasslands partially replacing lawns (Trzaskowska, 2008). It should be remembered that synanthropic vegetation is not resistant to frequent trampling, which makes it necessary to create separate zones for more intensive use, and design enriched grasslands in places where they were not present previously (Trzaskowska, 2013). Particularly sensitive to trampling are the so-called flower meadows, flowery grasslands. In recent years, they have been gaining popularity in Poland, appearing in parks, roadside greenery and other places, often as part of projects financed from the participatory budgets.

3.2 Part. 2. Selected examples of urban greenery spaces in which synanthropic plants were used in Warsaw, Poland

One of the examples of green spaces, where flower meadows composed of synanthropic species, were used is the square in Warsaw's Chomiczówka, at Bogusławski st. The areas sown with synanthropic plant species were contrasted with the frequently mowed lawn surfaces which, at the same time, constitute a space for relaxation and enable pedestrian communication.

An example of park where the structure has been modified over the years is Roman Kozłowski Park. It was created in the 1970s on the edge of Warsaw's new residential district of Ursynów. In this park there are currently extensive areas of synanthropic grasslands, mowing is reduced. The northern part of the park was created on the site previously used as allotment gardens, the vegetation of which was preserved, creating rest areas located among fruit trees and shrubs, few ornamental plants, as well as synanthropic species, populating the shady spaces between shrubs and former sunny lawns. The history of the object is described on the website of

the Ursynów district office (Urząd Dzielnicy Ursynów m.st. Warszawy, n.d.).

An example of a green space where synanthropic species were used as originally intended is the EKOpark in Ursus (one of Warsaw's districts). Opened in 2019, was awarded the Architecture Prize of the President of Warsaw (for pro-ecological solutions in the design of public space). Authors of the project's first stage are: ABIES – Architektura Krajobrazu, second stage: LS-Project. The facility includes recreational infrastructure, such as a playground, while the environmental value was taken care of by introducing flower meadows (with synanthropic vegetation) and other plantings. Portal Architektura.info (2020) also mentions that visitors can see a small nature trail presenting urban flora and fauna.

In addition to the aforementioned realizations, there are many areas of Warsaw's public greenery which compositions have been supplemented with flower meadows, composed partially or entirely of synanthropic species, minimizing the areas previously occupied by lawns. These include, among others, meadows in Łazienki Królewskie Park (Łąki Kwietne, n.d.), Bulwary Wiślane, as well as numerous areas along city streets (Zarząd Zieleni m.st. Warszawy, 2018).

Another park in Warsaw – Park Akcji "Burza" is currently under construction, with the landscaping taking advantage of the succession process that has been occurring there for 40 years. The authors of the concept (chosen in competition), on the basis of which the park is being built, are the topoScape and Archigrest studios. The park is being created on a mound raised from the rubble of buildings destroyed during World War II. Walking and historical paths are being created there, as well as the necessary infrastructure. Some of the park's zones will be left to succession, so that the environmental changes can proceed freely and the plant communities that exist there can naturalize (Zarząd Zieleni m.st. Warszawy, 2021). The existing synanthropic communities are used there as a base for further development.

Further example of a park, where existing synanthropic plant communities are planned to be used, is the park in Golędzinów, Warsaw. Next to the existing section surrounding the educational pavilion named "Kamień" are areas of, among other, abandoned allotment gardens, which are planned to be transformed into a park without significant interference with the vegetation. According to the city's assurances, the existing grasslands with synanthropic and meadow species, fruit trees and shrubs, and the remains of ornamental plantings are to be left. The entire complex, in addition to its recreational and educational function, is to serve as a buffer next to the Vistula riparian forests (Zarząd Zieleni m.st. Warszawy, 2022).

3.3 Part. 3. Proposition of plant species composition for more natural lawns in city parks, including synanthropic plants typical for Poland (prepared by the authors)

The propositions are grouped according to their potential use and habitat conditions. Selected species are resistant to harsh urban environment, especially to periodic droughts.

Annually established floral meadows providing an effect mainly with the richness of flowers, possible to use in sunny areas should include species accompanying crops: *Agrostemma githago*, *Anthemis arvensis*, *Avena fatua*, *Bromus secalinus*, *Centaurea cyanus*, *Consolida regalis*, *Lolium agolentum*, *Odonitites verna*, *Papaver rhoeas*, *Rhinanthus serotinus*, *Valerianella dentata*, *Valerianella locusta*, *Vicia sativa*, *Vicia villosa*.

Poor grasslands in sunny areas can be enriched by using: *Achillea millefolium*, *Anchusa officinalis*, *Artemisia apsinthium*, *Cichorium intybus*, *Crepis pulchra*, *Daucus carota*, *Echium vulgare*, *Malva moschata*, *Melilotus alba*, *Melilotus officinalis*, *Oenothera glazioviana*, *Pastinaca sativa*, *Picris hieracioides, Reseda lutea*, *Tragopogon dubius*, *Trifolium pratense*, *Verbascum blattaria*, *Verbascum nigrum*.

In shaded areas, poor grasslands can be enriched with species such as: *Geum urbanum*, *Glechoma hederacea*, *Lamium album*, *Rumex obtusifolius*.

Synanthropic vegetation is increasingly consciously introduced into public green spaces. Among Polish experts, the value of spontaneous plant communities has been recognized by Trzaskowska (2008, 2011, 2013), Jakubowski (2015), Dudzińska-Jarmolińska (2018). They point to the numerous ecosystem services they can provide, contribute to their growing popularity. The numerous benefits of using synanthropic species (environmental, aesthetic, social) are highlighted by the researchers. Recently, there has also been an increase in implementations, in which existing synanthropic vegetation communities are preserved, incorporating them into the structure of parks. This trend is manifested mainly in Western countries, and is gaining popularity in Poland. In Poland itself, this potential is increasingly being recognized, especially when European realizations of green areas in post-industrial areas (where spontaneous vegetation is often used) gained publicity among landscape architects. Examples from Berlin (Germany) should be cited here: Park Südgelende and Park am Gleisdreieck, which are some of the most famous realizations of this type from

Western Europe. Both parks, built on post-railroad land, are characterized by architectural minimalism. The first of the aforementioned examples, designed by the Odious group, operates mainly with vegetation colonizing the area in the process of succession, was described in Landezine (Atelier Loidl, 2011). The second one, designed by Atelier Loidl (2011), uses floral meadows, diversifying the entire area and contrasting with the harsh elements of the post-industrial infrastructure, it was also described in Landezine (Atelier Loidl, 2011). Both were built in a similar period (2008–2009 Park Südgelende and 2013 Park am Gleisdreieck). Almost a decade after their openings, the previously described green spaces in Poland, using similar plant material, were realized. The trend for the use of synanthropic plants, however, is still current in the West – in 2022 meadows consisting of, among other, synanthropic species, were introduced around the Tower of London, creating the Superbloom project (Historic Royal Palaces, n.d.). This is an interesting example because of the interference with the historical qualities of the architectural complex, one of the most important of the country's history.

As shown by unique examples, in Poland spontaneous vegetation is slowly ceasing to be the domain and an exclusive interest of specialists. It is becoming an inspiration, a very valuable material, and the main (or one of the most important) theme of green areas. However, it is more common to supplement already existing green areas with additional small-scale elements, such as: floral grasslands, also called floral meadows. In the capital of Poland, they are introduced in various places, including: Management of Urban Green Areas (Zarząd Zieleni m.warszawy, 2022). The examples cited confirmed the conclusions from the analysed literature – in green areas in Poland, synanthropic species are used mainly for establishing flower meadows, enriching lawns, and as a temporary arrangement before the establishment of the final plant cover.

It is worth noting that the slow pace of introduction of synanthropic plants into public green spaces may be associated with the perception of them as "weeds", and the areas overgrown with them are neglected, standing in opposition to the polished historic green areas. Such voices, both from residents and planners, have clearly shaped the public debate, as mentioned by, among others, Trzaskowska (2011), Jakubowski (2015). It is possible that society's general disregard for the topic limits the creation of green spaces with synanthropic vegetation. This is also one possible reason why these species are so rarely mentioned, even though they are extremely widespread in urban environments. In recent years, due to the increase in ecological awareness and the growing attachment of residents to the substitute for nature represented by synanthropes in urban environments, these voices have become silent, especially among landscape architects. In the coming years, we expect the use of spontaneous plants to increase as the ideas and arguments for their use become more popular in Poland.

4 Conclusions

The trend of using synanthropic vegetation in green areas is becoming increasingly popular in Poland, as shown by the examples cited in the article. The emergence of landscaping facilities using spontaneous vegetation was preceded by scientific research popularizing knowledge about them, including the benefits they provide (environmental, aesthetic, social). Realizations using synanthropic species in Poland were preceded by similar realizations in Western European countries. In Warsaw, synanthropic species are most often used in the form of newly established flower meadows, enriched lawns, patches of vegetation left to succession processes. They accompany not only green areas, but also, for example, streets, residential areas. The city of Warsaw actively supports the process of using species in public green spaces and private areas by organizing information and promotional campaigns.

References

Architektura. Info. (2020, December 17). *EKOpark z Nagrodą Prezydenta Warszawy*. https://architektura.info/architektura_zrownowazona/miasta_zrownowazone/ekopark_z_nagroda_prezydenta_warszawy

Atelier Loidl. (2011, September 15). *Park am Gleisdreieck*. Landezine. https://landezine.com/landscape-architecture-berlin-01

Dudzińska-Jarmolińska, A. (2018). Rekultywacja i rewitalizacja jako sposoby przekształcania terenów poprzemysłowych na tereny parkowo-rekreacyjne. *Prace Komisji Krajobraz Kulturowego,* 39 (1), 117–132. https://doi.org//10.30450/201807

Gruen Berlin. (2013, February 1). *Schöneberger Südgelände Park*. Landezine. https://landezine.com/schoneberger-sudgelande-park-by-odious/

Historic Royal Palaces. (n.d.). *Superbloom*. Retrieved May 16, 2023, from https://www.hrp.org.uk/tower-of-london/superbloom/

Jakubowski, K. (2015). "Piękno nieoczywiste". Rola miejskich nieużytków w kształtowaniu nowej kategorii parków miejskich. *Space & FORM | przestrzeń i FORMA,* 24(2), 145–162.

Kühn, N. (2006). Intentions for the unintentional spontaneous vegetation as the basis for innovative planting design in urban areas. *Journal of Landscape Architecture,* 1(2), 46–53. https://doi.org/10.1080/18626033.2006.9723372

Łąki Kwietne. (n.d.). *Łazienki Królewskie*. Retrieved May 16, 2023, from https://lakikwietne.pl/laka-kwietna-lazienki-krolewskie/

Robinson, S. L., & Lundholm, J. T. (2012). Ecosystem services provided by urban spontaneous vegetation. *Urban Ecosystems,* 15, 545–557. https://doi.org//10.1007/s11252-012-0225-8

Rostański, A. (2000). Rekultywacja i zagospodarowanie nieużytków poprzemysłowych – rozwiązania alternatywne. *Inżynieria Ekologiczna,* 1, 81–86.

Tokarska-Guzik, B. (2000). Przyrodnicze zagospodarowanie nieużytków miejsko-przemysłowych na przykładzie centrów górniczych Europy. *Inżynieria Ekologiczna,* 1, 72–80.

Trzaskowska, E. (2008). Wykorzystanie zbiorowisk synantropijnych jako miejsc spontanicznego wypoczynku w miastach. *Nauka Przyroda Technologie,* 2, 4.

Trzaskowska, E. (2011). Zbiorowiska synantropijne: niedoceniony potencjał współczesnych miast. *Acta Scientiarum Polonorum*, 10(3), 55–66.

Trzaskowska, E. (2013). Ochrona różnorodności biologicznej w kształtowaniu terenów zieleni na przykładzie trawników. *Acta Sci. Pol., Administratio Locorum,* 12(2), 101–110.

Urząd Dzielnicy Ursynów m.st. Warszawy. (n.d.). *Park im. Romana Kozłowskiego*. Retrieved May 16, 2023, from https://ursynow.um.warszawa.pl/-/park-im-romana-kozlowskiego

Urząd m.st. Warszawy. (2020, August 11). *Apel o ograniczenie koszenia i nieużywanie dmuchaw*. https://um.warszawa.pl/waw/strategia/-/apel-o-ograniczenie-koszenia-i-nieuzywanie-dmuchaw

Urząd m.st. Warszawy. (2022, April 26). *Wysiej warszawską łąkę w swoim domu*. https://um.warszawa.pl/-/wysiej-warszawska-lake-w-swoim-domu

Wysocki, C., & Sikorski, P. (2014). *Fitosocjologia Stosowana w ochronie i kształtowaniu krajobrazu*. Wydawnictwo SGGW.

Yang, Y., Yu, Q., Fu, D., Hou, Y., Chen, Y., Guo, T., Chen, H., Yan, H., Shao, F., & Zhang, Y. (2023). Diversity of Spontaneous Plants in Eco-Parks and Its Relationship with Environmental Characteristics of Parks. *Forests,* 14 (946). https://doi.org/10.3390/f14050946

Zarząd Zieleni m.st. Warszawy. (2018, May 8). *Warszawiacy zasieją łąki kwietne*. https://zzw.waw.pl/2018/05/08/warszawiacy-zasieja-laki-kwietne/

Zarząd Zieleni m.st. Warszawy. (2021, June 24). *Nowy park pod Kopcem Powstania Warszawskiego – tam, gdzie historia przenika się z naturą*. https://zzw.waw.pl/2021/06/24/nowy-park-pod-kopcem-powstania-warszawskiego-tam-gdzie-historia-przenika-sie-z-natura/

Zarząd Zieleni m.st. Warszawy. (2022, June 15). *Tworzymy Park Naturalny Golędzinów*. https://zzw.waw.pl/2022/06/15/tworzymy-park-naturalny-goledzinow/

Zarząd Zieleni m.st. Warszawy. (2022, July 8). https://zzw.waw.pl/2022/07/08/drugie-koszenie-trawnikow-przyulicznych