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THE LANDSCAPE OF PARKS IN THE MUNICIPALITY OF BAIA MARE FROM AN AESTHETIC-URBAN PERSPECTIVE

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Abstracts

Green spaces have beneficial effects on human ecosystem and maximizing the people human health quality. As a result of urbanization, green spaces were created by fragmentation of natural habitats. A major problem faced by contemporary civilization is environmental degradation and therefore the quality of life. Urban green spaces can be a solution to improving ambient environmental conditions. They are an essential utility category role in the functionality of a localitys being represented by a complex system of architectural elements (the part that is built) and landscape (design of green spaces through the use of vegetation). Urban green spaces as a result of the smaller spread of peri-urban ones require certain landscaping techniques. This study focused on the analysis of existing green areas in Baia Mare in a European context. With a view toward finishing the study we proposed, we drew up an urban and landscape design plan of Baia Mare's extant parks (Mara Central Park, Park of the Monument to the Romanian Soldiers and Queen Mary Park), describing their principal characteristics (functions, landscaping style, extant facilities). Notably, we performed a study that involved monitoring extant vegetation in the parks and classified the vegetation according to categories (deciduous trees, evergreen trees, deciduous bushes, evergreen bushes, hedges, annual flowering plants, aromatic and decorative species). Thus, we were able to determine the extant quantity of plant material and to gauge its uses. Thus, this study offers new instructions for refurbishing the parks analyzed through another process of landscaping.

Key words: *urban green spaces, landscape management, population.*

INTRODUCTION

Green urban infrastructure represents a medium in which human life interacts with natural and artificial elements, (Simonds, 1967) stimulating a feeling of social, intellectual and affective living. However, it has been observed that urban green architecture is situated within optimal parameters only in high-income countries, and that it can function as an indicator of development (Florincescu, 1999). Urban green spaces take advantage of the city's biological (Preda-Godeanu, 2013) and aesthetic potential. Likewise, they influence the population's health by improving air quality, moderating thermal variations and sonic pollution (Cândea, Bran and Cimpoeru, 2006; Ciupa and collab., 2010). Moreover, urban green spaces also influence the interior thermic environment (cooling or warming the interior microclimate) (Wang and collab., 2014). Thus, in keeping with principles of durable development, the characteristics of vegetation in a public space may contribute to reducing inhabitants' stress (Muja, 1994) and, implicitly, ensure quality of life. Urban development follows the creation of structures able to transform an "agglomeration" into a "complex of settlements" partly freed of stress (Rădulescu, 2007). Moreover, cities should be

planned as spaces for durable communities (Antohi, 2012).

In urban areas, green spaces tend toward insularity. Under conditions of reduced biodiversity, linking green spaces and re-establishing links with natural habitats (Vădineanu, 1999) become necessary actions when it comes to preserving species of interest to conservationists. Thus, a heterogeneity of biotope conditions is ensured, as well as, implicitly, more ecological niches as trophic and spatial support.

Green spaces represent land managed within a constructible perimeter or outside it, covered in vegetation, that can be utilized directly (for recreation) or indirectly (through moderating and remodeling) by the human population (Negruțiu, 1980; Baycan - Levent, Vreeker and Nijkamp, 2009).

According to the World Health Organization (WHO), an optimal level of human activity takes place within 50m^2 (at a minimum, 9m^2/inhabitant) of green space/inhabitant within the city and 300,000 m^2 outside the city (Muja, 1994 cited by Constantinescu and Szilagyi, 2002). At the European Union level, green space standards indicate a minimum of 26m^2/inhabitant. In Romania, urban green space does not meet European standards, the average being 18m^2/inhabitant (Chiriac, Humă and Stanciu, 2009). The majority of Romanian cities have recreational spaces below the cumulative area recommended for green space in our country (14.0-32.5m^2/inhabitant) (Cândea, Bran and Cimpoeru, 2006).

In 2011, the north-west region held second place in terms of urban green spaces (3.164 ha), behind Bucharest-Ilfov (4.921 ha), with a growth rate in green spaces of 35.8% (the national average being 9.7%) (www.adrvest.ro). In 2013, Maramures Country had some 342.8 ha of urban green space, which comes to an average of 11.2 m^2/inhabitant (PLAM, 2013). Maximal European norms provide that green space in Baia Mare be extended to 40m^2/inhabitant, or 598 ha by 2015 (Bolea and Chira, 2009). Thus, in order for quality of life to improve in Baia Mare, urban renewal is needed. This would entail adopting complex principles that regard the use of space in harmony with the population's demands, the aestheticization of the environment and the highlighting of the landscape through architecture. Understanding the landscaping and ecological importance of aestheticized landscapes in urban life impelled the undertaking of this study.

MATERIALS AND METHODS

In realizing this study, we consulted extant documentation in libraries and at the Ambient Urban Public Space (SPAU) Baia Mare, as well as direct observations in the field.

We prepared an urban plan of extant green spaces in Baia Mare (Figure 1, Table 1) map shows the three city parks: Queen Mary Park (1), Park of the Romanian Soldier's Monument (2) and Mara Central Park (3), green spaces of major interest to the city and to our study due to their complexity and surfaces.

Additionally, direct observations were undertaken in 2009-2010 regarding the structure of decorative species and the landscape method in the three parks (Queen Mary Park (1), Park of the Romanian Soldier's Monument (2) and Mara Central Park (3). The observations lasted for two years (2009-2010), while monitoring took place during the vegetation period.

Starting with the European norms regarding growth and development of urban green spaces in Baia Mare, and based on the results obtained following observations undertaken and data gathered on repeated occasions during 2013-2014, we drafted proposals for landscape management of the green spaces in each park analyzed for improving the quality of the urban environment.

Baia Mare, the capital of Maramures County, is located in northwest Romania, along the 47°39' - 47°48' parallel of northern latitude and along the 23°10' -23°30' meridian of eastern longitude (Tache, 2014).

Table 2 presents a few of the elements regarding climate conditions in Baia Mare.

Table 1. Main characteristics of green spaces analyzed in Baia Mare (original)

Name	*Surface (*ha*)*	*Position:* [1] *GPS coordinates* [2] *Geographic orientation in urban space* [3] *Address*	*Vegetation characteristics*
Queen Mary Park	8	[1]N:47º 66' ' ; E:23º 57' ' [2]N Strada Valea Roş ie	Forest species dominant
Park of the Romanian Soldier's Monument	2.41	[1]N:47º 66' ' ; E:23º 57' ' [2]NE [3]Str. Valea Roş ie	Grass and flower species dominant
Mara Central Park	1.45	[1]N:47º 65' ' ; E:23º 56' ' [2]SV [3]B-dul Unirii	Grass species dominant

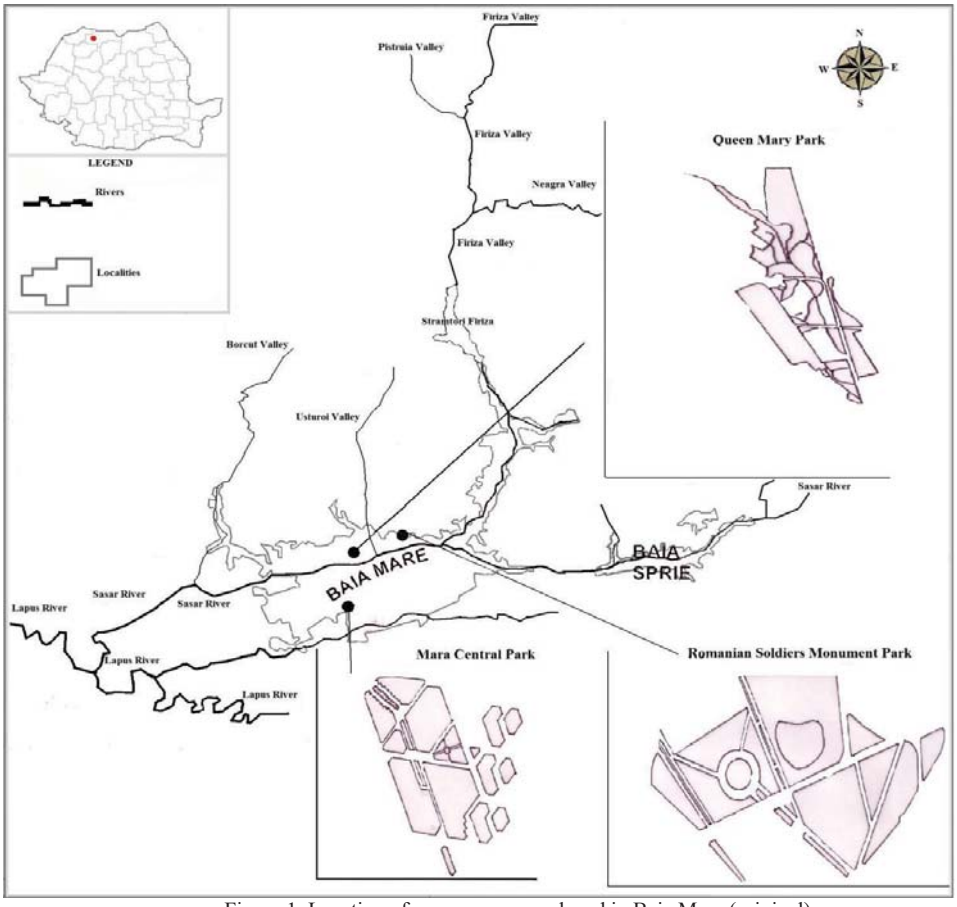

Figure 1. Location of green spaces analyzed in Baia Mare (original)

Table 2. Elements of climate conditions in Baia Mare

Analyzed elements	Caracteristics
Altitude	➢ 235 m
Microclimate and topoclimate	➢ hills and low plateaus, city situated in sub-mountainous depression
Ecological sector	➢ oak forests
Atmospheric pollution	➢ atmosphere polluted with sulfur and nitrogen oxides, heavy metals, dust
Annual precipitation	➢ 976 mm
Average annual temperature	➢ 9.4° C

RESULTS AND DISCUSSIONS

The administrative surface of Baia Mare covers 23,363.81 ha, of which 3,170 ha are agricultural land, 18,599 ha are forested land and 1,804 ha are construction sites or used for other purposes.

The built-up area comes to 3,563.58 ha, of which the total green space is 141 ha or 3.95% (Table 3) (Statement PUG, 2012). The amount of green space per inhabitant is 15.34 m^2, under the national average of 18/m^2 (Chiriac, Humă and Stanciu, 2009) and far below the optimal level of 50 m^2/inhabitant recommended by WHO. The most extensive green spaces are Queen Mary Park, the Park of the Romanian Soldier's Monument and Mara Central Park.

The main activities in Baia Mare that represent the main criterion of marking the land use zones and implicitly the types of landscape are (after PUG, 2012): dwellings of all types, industrial and storage activity, public institutions and services, communication and transport links, services, green spaces, government equipment, communal agriculture, special use, other (built-up areas, forests, water, unproductive land) (Table 3).

Table 3. Land use in built-up area of Baia Mare (Memoriu PUG, 2012)

Functional zones	Sub-functional zones	Extant	
		ha	%
Dwellings and associated circulation arteries		**1,208.97**	**33.93**
Industrial units and deposits		**296.09**	**8.31**
Public institutions and services		**531.39**	**14.91**
Communication and transport routes	**Road transport**	**362.31**	**10.17**
Green spaces, leisure, sport areas	**Roads, parks**	**23.16**	**0.65**
	Leisure/sport areas	**92.42**	**2.59**
	Specialized	**11.06**	**0.31**
	Other green spaces	**14.36**	**0.40**
	Total	**141**	**3.95**
Forests		**49.82**	**1.40**
Lands with special destination		**20.95**	**0.59**
Technical and government buildings		**97.72**	**2.74**
Communal agriculture, cemeteries		**40.03**	**1.12**
Other areas (unusable land, waterways)		**815.30**	**22.88**
Total		**3,563.58**	**100.00**

Information about the structure of decorative species, the type of management and the main functions of the parks in Baia Mare are synthesized in Table 4 and Table 5.

Given the objective of expanding green spaces in Baia Mare, in the context of European norms, we recommend that when landscaping is performed, that decorative species be selected according to the following criteria:

- adaptability of ornamental vegetation to the pedoclimatic conditions of Baia Mare;
- fulfillment of ecological conditions for attracting pollinating insects;

Table 4. Characteristics of certain parks in Baia Mare (adapted from Radu, 1984)
- classification based on categories of vegetation: trees, shrubs and bushes potential species

Decorative totality / Characteristics	Queen Mary Park (1)	Park of the Romanian Soldier's Monument (2)	Mara Central Par (3)
Functions	Recreation/Playground	Cultural/Recreation	Transit/Recreation/Playground
Landscaping style	Natural	Mixed (landscaping and geometric)	Mixed (landscaping and geometric)
Vegetation appearance	Kept up	Needs upkeep	Need landscaping
Abies alba	solitary	N/A	N/A
Chamaecyparis lawsoniana	solitary	N/A	solitary
Larix decidua	solitary	N/A	N/A
Phellodendron amurense	solitary	N/A	N/A
Picea abies	solitary	N/A	solitary
Pinus nigra	N/A	solitary	solitary
Pinus strobus	solitary	N/A	N/A
Pinus sylvestris	solitary	N/A	N/A
Pseudotsuga menzienii	solitary	N/A	N/A
Tsuga canadensis	solitary	N/A	N/A
Acer globosa	N/A	solitary	solitary
Acer negundo	N/A	solitary	solitary
Acer platanoides	N/A	N/A	solitary
Acer pseudoplatanus	solitary	N/A	N/A
Betula pendula	N/A	N/A	solitary
Carpinus betulus	N/A	solitary	solitary
Castanea sativa	solitary	N/A	N/A
Catalpa speciosa	solitary	N/A	N/A
Elaeagnus angustifolia	N/A	N/A	solitary
Fraxinus excelsior	N/A	solitary	solitary
Juglans regia	solitary	solitary	solitary
Magnolia kobus	solitary	solitary	solitary
Malus sylvestris	N/A	solitary	solitary
Prunus cerasifera pissardi	N/A	solitary	solitary
Quercus petraea	solitary	N/A	N/A
Quercus robur	N/A	plant associations	solitary
Robinia pseudocacia	N/A	solitar	solitary
Salix babylonica	N/A	N/A	solitary
Salix matsudana "tortuosa"	N/A	N/A	solitary
Sorbus aucuparia	N/A	solitary	solitary
Tilia cordata	solitary	N/A	solitary
Ulmus minor	N/A	N/A	solitary

Legend: N/A- missing species

- size, position and use of landscaping points of interest created through diversity of vegetation, play of water and light effect;
- introducing non-allergenic double-flowered plants;
- assuring a year-round plant decor;
- diversifying vegetation so that it includes both deciduous and evergreen trees and bushes, as well as perennial and annual species;
- selecting ornamental species based on type of decor (decorative through shape, flowers and leaves, or arrangement on twigs of fruits).

Table 5. Characteristics of certain parks in Baia Mare (adapted from Radu, 1984)
- classification according to categories of vegetation: bush species, annual flowering species and aromatic species

Decorative totality / Characteristics	Queen Mary Park (1)	Park of the Romanian Soldier's Monument (2)	Mara Central Park (3)
Functions	Recreation/Playground	Cultural/Recreation	Transit/Recreation/Playground
Landscaping style	Natural	Mixed (landscaping and geometric)	Mixed (landscaping and geometric)
Vegetation appearance	Kept up	Needs upkeep	Need landscaping
Juniperus horizontalis	N/A	plant associations	plant associations
Thuja sp.	solitary	N/A	N/A
Thuja columnaris	N/A	solitary	solitary
Thuja orientalis	N/A	N/A	solitary
Amorpha fruticosa	N/A	N/A	plant associations
Berberis thunbergii	N/A	N/A	hedges
Berberis vulgaris	N/A	N/A	hedges
Buxus sempervirens	N/A	alignment	hedges
Chaenemeles japonica	N/A	plant associations	plant associations
Cotoneaster dammeri	N/A	growth in pots	N/A
Cotoneaster horizontalis	N/A	alignment	hedges
Euonymus fortunei	N/A	plant associations	plant associations
Forsitia intermedia	N/A	plant associations	alignment
Hibiscus syriacus	N/A	N/A	solitary
Ligustrum vulgare	N/A	alignment	Hedges
Phyladelphus coronarius	N/A	plant associations	plant associations
Rosa sp.	N/A	solitary/ plant associations	solitary/ plant associations
Sambucus nigra	N/A	solitar	solitary
Spiraea vanhouttei	N/A	plant associations	plant associations
Symphoricarpus sp.	N/A	plant associations	plant associations
Viburnum carlesii	N/A	solitary	solitary/ plant associations
Hedera helix	N/A	Narrow band	N/A
Begonia semperflorens	plant associations	plant associations	Narrow band
Canna indica	N/A	N/A	Narrow band
Dhalia sp.	N/A	N/A	Narrow band
Gazania splendens	plant associations	N/A	Narrow band
Iresine lindenii	N/A	plant associations	N/A
Lavandula angustifolia	N/A	plant associations	N/A
Rosmarinus officinalis	N/A	plant associations	N/A
Thymus vulgaris	N/A	plant associations	N/A
Viola tricolor	plant associations	N/A	Narrow band
Zinnia elegans	N/A	N/A	Narrow band

Legend: N/A- missing species

Following an analysis undertaken in Queen Mary Park (Figure 2), the Park of the Romanian Soldier's Monument (Figure 3) and Mara Central Park (Figure 4) we determined the landscaping values of each park as it currently exists as well as proposals for improving quality of life in Baia Mare through landscaping techniques (Table 6.).

Table 6. Proposals for landscaping of green spaces in Baia Mare (original)

Location	Current use	Landscaping proposals
Queen Mary Park	● represents a recreation area for adults and seniors; ● a network of pedestrian paths equipped with wooden benches, surrounded by deciduous and evergreen species, both trees and bushes; ● play areas, specially cared for and carefully marked, exist.	• redoing the play area; • using extant vegetation to create special effects at night. These are obtained through artificial illumination of ornamental plants in various chromatic shades; • enclosing the recreation benches located on the main alleys in coverings of cast iron decorated with liana species and climbing roses.
Park of the Romanian Soldier's Monument	● serves as a meeting point between various educational centers and areas near the sports center; ● connects the new and old centers of Baia Mare.	• landscaping geared toward a younger population (14-20 years); • creating landscape effects through lianas, bushes and flowering plants; • including rocks with an alpine type landscaping; • introducing water play that will have a cooling effect on sunny summer days.
Mara Central Park	● has a functional purpose, serving as a connecting node between the main commercial, administrative and educational centers.	• Surrounding with curtains of decorative vegetation that is soundproofing, resistant and non-allergenic; • landscaping an area set aside for walking and activities of the 0-3 age group; • landscaping a play space for the 4-8 age group; • setting aside a miniature garden with traditional, representative Maramures elements.

Figure 2. Alley with Small-leaved Lime in Queen Mary Park, Baia Mare, Maramures

Figure 3. Arrangement with annual flowering and aromatic species, in the Park of the Romanian Soldier's Monument, Baia Mare, Maramures

Figure 4. Bush species arrangement in Mara Park, Baia Mare, Maramures

CONCLUSIONS

Information presented in this study is a novelty of being so far reported in other publications.

After the assessment were established the most important characteristics of public parks from the city of Baia Mare (Maramures County), located in the north-west part of Romanian country. It was also drafted a first classification of vegetation in species categories arbustoide and bushes, annual flower and aromatic species; it was described the current destination of each park and there have been made new proposals for landscaping to improve the space for the three municipal parks in modern European context.

When applying these proposals for landscape management, the daily needs of the population of Baia Mare will be met; green spaces will be beautified in three locations: Queen Mary Park (1), the Park of the Romanian Soldier's Monument (2) and Mara Central Park (3) and the quality of the urban environment and the population's life will be improved.

Comparing the recorded data (Table 4) to the 3 parks in Baia Mare found that the park with the highest number of species of solitary willing shrubs were recorded in Mara Central park (21 species) followed by Queen Mary Park (16 species) and only 12 species Park of the Romanian Soldier's Monument (arranged solitary and in associations with 2-4 species);

For the shrubbery and flower decoration the most representative parks are Park of the Romanian Soldier's Monument for the diversity of plant arrangement (Table 5) such as:

- plant associations between deciduous and softwood species (*Juniperus horizontalis Amorpha fruticosa Chaenemeles japonica, Phyladelphus coronarius* and others) exist in 2 parks (Mara Central Park and Park of the Romanian Soldier's Monument);
- hedges with *Berberis sp. Buxus sempervirens Ligustrum vulgare* exist only in Mara Central Park;
- solitary plant species there are planted in all 3 parks (Figure 4);
- alignment with trees, shrubs and bushes potential species in 2 parks (Mara Central Park and Park of the Romanian Soldier's Monument);
- flowers it was organised in narrow band association in the Mara Central Park (*Zinnia elegans*, *Canna indica, Gazania splendens, Dhalia sp*) or simple plant association (*Begonia semperflorens, Gazania splendens, Viola tricolor*) in the Park of the Romanian Soldier's Monument;
- medicinal plant species was used only in Park of the Romanian Soldier's Monument organised in plant association with 4 species: *Iresine lindenii, Lavandula angustifolia, Rosmarinus officinalis, Thymus vulgaris*.

The landscaping solutions for the parks analyzed will ensure the reorganization of extant plant groups, the improvement in appearance of the green spaces studied and the creation of points of interest around certain themes. Moreover, they will permit the realization of landscaping solutions and the grouping of vegetation around traditional themes.

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