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HANS EM
FACULTY OF FOREST SCIENCES
LANDSCAPE ARCHITECTURE AND
ENVIRONMENTAL ENGINEERING

BOOK OF ABSTRACTS

INTERNATIONAL SCIENTIFIC CONFERENCE

Better forestry,
for better forests,
for a better planet.

15–16TH JUNE 2022. SKOPJE, REPUBLIC OF NORTH MACEDONIA

DEDICATED TO THE 75TH ANNIVERSARY OF THE
HANS EM FACULTY OF FOREST SCIENCES, LANDSCAPE ARCHITECTURE
AND ENVIRONMENTAL ENGINEERING

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Ss. Cyril and Methodius University in Skopje
Hans Em Faculty of Forest Sciences, Landscape Architecture and Environmental Engineering
North Macedonia

75 YEAR ANNIVERSARY

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Urban hedges – an important green element in the system of landscape design

Case study: Settlement of Taftalidze 1 and residential complex 'Sveti Jovan', Skopje, North Macedonia

Viktorija Brndevska Stipanović[1]*, Jasminka Rizovska Atanasovska[1], Vlatko Andonovski[1], Anastazija Dimitrova[1], Jelena Čukanović[2]

[1] Ss. Cyril and Methodius University in Skopje, Hans Em Faculty of Forest Sciences, Landscape Architecture and Environmental Engineering, Skopje, North Macedonia
[2] Department of Fruit growing, Viticulture, Horticulture and Landscape architecture, Faculty of Agriculture, University of Novi Sad, Novi Sad, Serbia

* Corresponding author: vikibrn@gmail.com

Abstract:

Urban hedges as a green element of landscape design are very important due to their aesthetic and functional value. As dense greenery in a small space together with vertical gardens and green roofs, hedges can play a significant role in providing urban areas with efficient green infrastructure.
This research aims to inventory and analyse hedges in terms of species composition, types of hedges according to shaping (formed: low or symbolic, medium-high, high and free-growing) and their condition in terms of decoration and functionality. Their condition is defined in 4 categories: excellent, good, bad and very bad. Two different locations are a part of this research: the settlement of Taftalidze 1 and the residential complex 'Sveti Jovan' in Zlokukjani, both located in the municipality of Karpos, in the city of Skopje, North Macedonia. While the entire territory of the second location is a part of this research, only private houses at the first location are involved.
The presence of hedges around private houses in Taftalidze 1 is 72,9 %. Of a total of 443 private yards, 323 are with hedges. Their species composition is quite rich and it consists of 25 different taxa. Most of them, 285 are formed medium-high. Only low or symbolic formed hedges are not present at all. The most common species is Ligustrum vulgare L. 30 % of all are in very bad condition, 28,2 % in bad, 37,2 % in good and only 4,6 % are in excellent condition.
In the residential complex, 'Sveti Jovan' 21 different taxa are used for creating hedges. The most common species are Hedera helix L. and Pyracantha 'Orange Glow'. There are hedges of all types. Almost all are in excellent condition.
The results show that hedges in the urban landscape design are a commonly used green element. Their type, function and condition depend on many different factors (location, the purpose they are planted for, species composition). All results are a

great base for additional analyses related to the opportunity and impact of hedges in providing certain benefits in support of ecosystem services provision. From the aspect of landscape design, this research can help combine the ecological and social dimensions of urban hedges for analytical and planning purposes.

Keywords: urban hedges; green element; landscape design; private houses; Taftalidze; ‘Sveti Jovan’

URBAN HEDGES – AN IMPORTANT GREEN ELEMENT IN THE SYSTEM OF LANDSCAPE DESIGN

Case study: Settlement of Taftalidze 1 and residential complex ‘Sveti Jovan’, Skopje, North Macedonia

Viktorija Brndevska Stipanović[1*], Jasminka Rizovska Atanasovska[1], Vlatko Andonovski[1], Anastazija Dimitrova[1], Jelena Čukanović[2]

[1] Ss. Cyril and Methodius University in Skopje, Hans Em Faculty of Forest Sciences, Landscape Architecture and Environmental Engineering, Skopje, North Macedonia

[2] University of Novi Sad in Novi Sad, Faculty of Agriculture, Novi Sad, Serbia

INTRODUCTION & METHODOLOGY

- As dense greenery in a small space together with vertical gardens and green roofs, hedges can play a significant role in providing urban areas with efficient green infrastructure. They are probably first used by agricultural people to exclude predatory animals and to control the movement of domesticated animals (Wright *et al.,* 2008). Hedges now have a significant aesthetic role in landscape design and landscape planning (Wright *et al*., 2008) but they are also valuated for their ecological properties (Burel & Baudry, 1995; Marshall & Moonen, 2002). Throughout history, hedges have enjoyed great popularity in geometric parks, especially in the Baroque and Renaissance periods (Pavlovičová *et al.,* 2013). They play an important role in the landscape design of private houses. This tradition has existed for a long time ago all around the world, and it continues today.
- This research aims to inventory and analyse hedges in terms of species composition, the hedge types according to shaping (formed and free-growing) and their condition in terms of decoration and functionality. Formed hedges are processed as low or symbolic, medium-high and high. Their condition is defined in 4 categories: excellent, good, bad and very bad. Which function is more pronounced depends on the plant species, location and the hedge type. Two different locations are a part of this research: the settlement of Taftalidze 1 and the residential complex ‘Sveti Jovan’ in Zlokukjani (Fig.1). While the entire territory of the second location is a part of this research, only private houses at the first location are involved. These two locations are intended for housing in private buildings but have completely different structures and ages. It is the reason why they are chosen to make a comparison in terms of different hedge types, their function and the species composition.

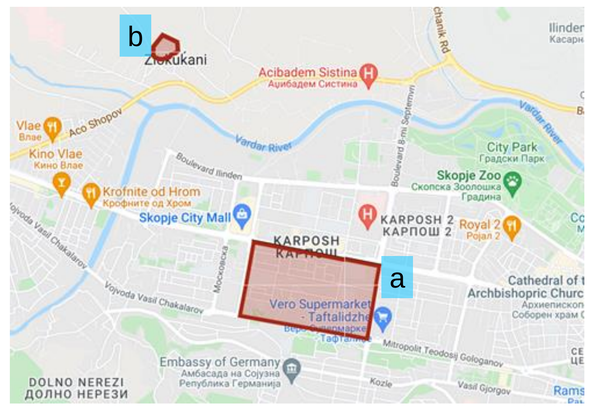

Figure 1. Researched locations: a) Settlement of Taftalidze 1 (area between Blvd. Partizanski odredi, Blvd. 8 Septemvri, St. Mitropolit Teodosij Golaganov and St. Londonska); b) Residential complex ‘Sveti Jovan’ (Zlokukjani). Municipality of Karposh, Skopje, North Macedonia.

RESULTS

Table 1. Characteristics of hedges around private houses in Taftalidze 1

Scientific name	Total number of hedges	Hedge type				Condition			
		Formed			Free-growing				
		low or symbolic	medium-high	high		excellent	good	bad	very bad
Buxus sempervirens L.	1		1					1	
Cotoneaster horizontalis Decne.	3		3			1	2		
× *Cupressocyparis x leylandii* (A.B.Jacks. & Dallim.) Dallim.	11		8	1	2	2	6	2	1
× *Cupressocyparis leylandii* 'Castelwellan Gold'	1		1			1			
× *Cuprocyparis leylandii* 'Silver Dust' (v)	1				1			1	
Cupressus arizonica Greene	7		1	6		1	3	2	1
Cupressus sempervirens L.	1				1				1
Hedera helix L.	39		39				27	6	6
Hedera hibernica (G.Kirchn.) Carrière	4		4				1	2	1
Hedera algeriensis Hibberd	4		4				1	1	2
Hedera helix var. aureovariegata Weston	1		1				1		
Hibiscus syriacus L.	2		2					2	
Jasminum nudiflorum Lindl.	1		1					1	
Ligustrum vulgare L.	211		200	11		3	61	68	79
Lonicera japonica Thunb.	4		4						4
Parthenocissus quinquefolia (L.) Planch.	6		6			1	1	2	2
Photinia × fraseri Dress	4		1	2	1	2		2	
Prunus laurocerasus L.	2		2			1	1		
Pyracantha ‘Orange Glow’	2			2			2		
Rosa floribunda Baker	2		2			1	1		
Rosmarinus officinalis L.	1		1				1		
Thuja occidentalis var. fastigiata H.Jaeger	1		1					1	
Thuja orientalis L.	4		3	1			4		
Thuja occidentalis 'Pyramidalis Aurea'	1				1		1		
Thuja occidentalis 'Smaragd'	9				9	2	7		
Total number	**323**		**285**	**23**	**15**	**15**	**120**	**91**	**97**

[1]Formed low or symbolic hedges – F(LS), with a height to max 0,5 m; Formed medium-high hedges – F(MH), from 0,5 to 2 m; Formed high hedges – F(H), above the height of 2 m.

Figure 2. Part of the hedges around private houses in Taftalidze 1.
a) *Pyracantha* ‘Orange Glow’ - good condition; b) *Hedera helix* L. - good condition;
c) × *Cupressocyparis x leylandii* (A.B.Jacks. & Dallim.) Dallim. - excellent condition;
d) *Thuja occidentalis* 'Smaragd' - Free-growing, excellent condition.

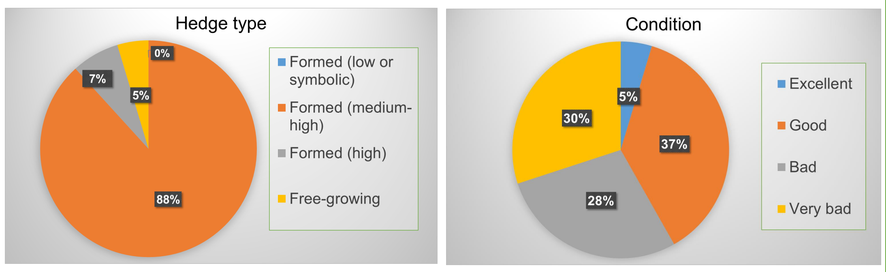

Figure 3. Hedge type and condition - private houses in Taftalidze 1

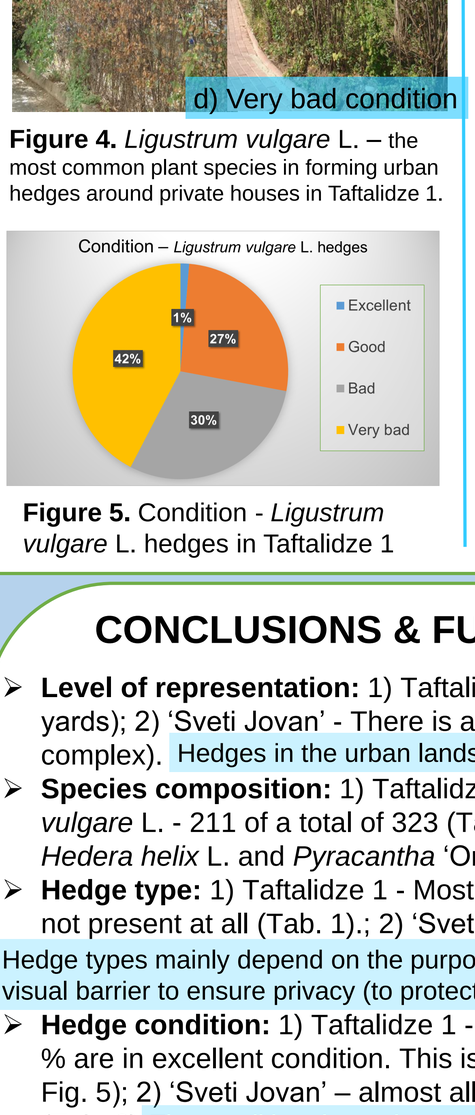

Figure 4. *Ligustrum vulgare* L. – the most common plant species in forming urban hedges around private houses in Taftalidze 1.

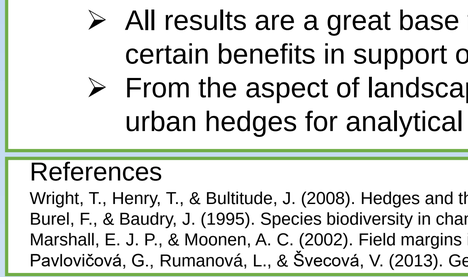

Figure 5. Condition - *Ligustrum vulgare* L. hedges in Taftalidze 1

Table 2. Characteristics of hedges in the residential complex ‘Sveti Jovan’

Scientific name	Level of representation	Hedge type	Condition
Buxus sempervirens L.	M	F(LS), F(MH)	E
Cotoneaster horizontalis Decne.	M	F(LS)	E
× *Cupressocyparis x leylandii* (A.B.Jacks. & Dallim.) Dallim.	M	F(H), FG	E
Cupressus arizonica Greene	L	FG	E
Hedera helix L.	H	F(MH)	E/G
Hedera hibernica (G.Kirchn.) Carrière	L	F(MH)	E
Hedera helix var. aureovariegata Weston	L	F(MH)	E
Juniperus horizontalis 'Blue Chip'	L	F(LS)	E
Juniperus × pfitzeriana 'Old Gold'	M	F(LS)	E
Juniperus × pfitzeriana 'Pfitzeriana Glauca'	L	F(LS)	E
Juniperus sabina 'Tamariscifolia'	M	F(LS)	E
Lonicera nitida E.H. Wilson	M	F(LS)	E/G
Parthenocissus quinquefolia (L.) Planch.	L	F(MH), F(H)	E/G
Photinia × fraseri Dress	M	F(MH), F(H)	E
Pieris japonica subsp. formosa (Wall.) Kitam.	L	F(LS)	E
Pinus mugo subsp. mughus (Scop.) Domin	L	F(LS)	E
Prunus laurocerasus L.	M	F(MH)	E
Pyracantha ‘Orange Glow’	H	F(MH)	E/G
Rosmarinus officinalis L.	L	F(LS)	E
Taxus baccata L.	L	F(MH)	E
Thuja occidentalis 'Smaragd'	M	FG	E

Abbreviations: Level of representation: L - low (present on 1-3 locations on a small area), M - medium (present on 4-7 locations on a small or medium-sized areas), H - high (present on more than 7 medium-sized or big areas); Hedge type: F - formed, FG - free-growing, F(LS) – formed low or symbolic, F(MH) – formed medium-high, F(H) – formed high; Condition: E – excellent, G – good, B – bad, VB – very bad.

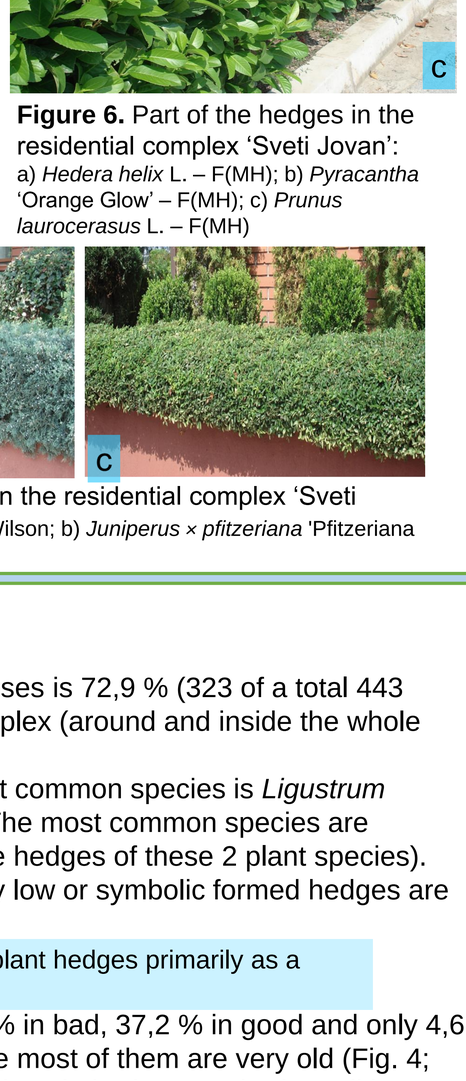

Figure 6. Part of the hedges in the residential complex ‘Sveti Jovan’:
a) *Hedera helix* L. – F(MH); b) *Pyracantha* ‘Orange Glow’ – F(MH); c) *Prunus laurocerasus* L. – F(MH)

Figure 7. Part of the formed low or symbolic hedges in the residential complex ‘Sveti Jovan’, all in excellent condition. a) *Lonicera nitida* E.H. Wilson; b) *Juniperus × pfitzeriana* 'Pfitzeriana Glauca‘ and c) *Cotoneaster horizontalis* Decne.

CONCLUSIONS & FUTURE PERSPECTIVES

- **Level of representation:** 1) Taftalidze 1 - The presence of hedges around private houses is 72,9 % (323 of a total 443 yards); 2) ‘Sveti Jovan’ - There is a huge representation of hedges throughout the complex (around and inside the whole complex). Hedges in the urban landscape design are a commonly used green element.
- **Species composition:** 1) Taftalidze 1 - Consists of 25 different taxa (Tab.1). The most common species is *Ligustrum vulgare* L. - 211 of a total of 323 (Tab. 1); 2) ‘Sveti Jovan’ - 21 different taxa (Tab. 2). The most common species are *Hedera helix* L. and *Pyracantha* ‘Orange Glow’ (the entire complex is enclosed with the hedges of these 2 plant species).
- **Hedge type:** 1) Taftalidze 1 - Most (285 of 323) are medium-high formed hedges. Only low or symbolic formed hedges are not present at all (Tab. 1).; 2) ‘Sveti Jovan’ - There are hedges of all types (Tab. 2).

Hedge types mainly depend on the purpose they are planted for. Around private houses, people plant hedges primarily as a visual barrier to ensure privacy (to protect themselves from unwanted views).

- **Hedge condition:** 1) Taftalidze 1 - 30 % of all hedges are in very bad condition, 28,2 % in bad, 37,2 % in good and only 4,6 % are in excellent condition. This is due to the large presence of Ligustrum hedges, the most of them are very old (Fig. 4; Fig. 5); 2) ‘Sveti Jovan’ – almost all are excellent, some are good, and there are no hedges in bad or very bad condition (Tab. 2). The condition depends on many different factors (the age of the settlement and the economic and social status of the owners as basic factors, which further determine others such as species composition, the age of the hedge, maintenance etc.)
- All results are a great base for additional analyses related to the opportunity and impact of hedges in providing certain benefits in support of ecosystem services provision.
- From the aspect of landscape design, this research can help combine the ecological and social dimensions of urban hedges for analytical and planning purposes.

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