

Investigation of heritage plants representing urban identity and the change in the urbanization process

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Abstract: Historical textures of the cities are unique spaces exhibiting hundreds of years of urban identity and cultural heritage with all their components such as buildings, outdoors and plant materials. Therefore, historical animate materials are as crucial as historical inanimate ones to sustain urban identity. This study aims to reveal the heritage plants representing the urban identity and their temporal change in urbanization as an example of Kahramanmaraş's historical urban texture. The study was carried out in three stages: a) Identifying and mapping traditional public and civil architectures and carrying out spatial investigations on these samples, b) Creating a heritage plants album describing their use, purpose, and composition by identifying the sample areas, c) Determining the temporal changes in the use of the plants representing the urban identity through user researches. According to the findings obtained in the study, *Olea europaea* L. (81.9%) is the most representative plant in the city among the 29 heritage plants examined. In addition, 32 new exotic species have recently been frequently used in the city's green spaces instead of valuable heritage plants representing the city. Compared to the past, while there was no significant change in the purpose of creating a shaded and cool resting place in terms of intended use, the purpose of enhancing the visual quality of the courtyard/garden increased by 15.32% and obtaining products decreased by 29.8%.

Keywords: Heritage Trees, Native Species, Urban Identity, Cultural Sustainability, Historical Urban Area

Kent kimliğini temsil eden miras bitkiler ve bunların kentleşme sürecindeki değişimin incelenmesi

Özet: Kentlerin tarihi dokuları; binaları, dış mekânları ve bitki materyalleri gibi tüm bileşenleri ile yüzlerce yıllık kentsel kimlik ve kültürel mirası sergileyen eşsiz mekânlardır. Bu nedenle, kentsel kimliğin sürdürülmesinde tarihi cansız materyaller kadar tarihi canlı materyaller de önem taşımaktadır. Bu çalışma, kent kimliğini temsil eden miras bitkilerin kentleşme süreci içerisindeki zamansal değişimini Kahramanmaraş'ın tarihi kent dokusu örneğinde ortaya koymayı amaçlamaktadır. Çalışma üç aşamada gerçekleştirilmiştir: a) Geleneksel kamu ve sivil mimarilerin belirlenmesi, haritalanması ve bu örnekler üzerinde mekânsal incelemelerin yapılması, b) Örnek alanlardaki bitkilerin belirlenmesi ve bunların kullanım ve amaçlarının anlatıldığı bir miras bitki albümü oluşturulması, c) Kent kimliğini temsil eden bitkilerin kullanımlarındaki zamansal değişimlerin kullanıcı araştırmaları ile belirlenmesi. Araştırmada elde edilen bulgulara göre *Olea europaea* L. (%81,9) incelenen 29 miras bitki arasında kenti en çok temsil eden bitkidir. Ayrıca 32 yeni egzotik türün, kenti temsil eden değerli miras bitkilerin yerine kentin yeşil alanlarında son zamanlarda sıklıkla kullanılmaya başlandığı gözlenmiştir. Bitkilerin kullanım amaçlarında geçmişe göre gölgeli ve serin bir dinlenme mekânı oluşturma amacıyla önemli bir değişiklik olmazken, avlu/bahçenin görsel kalitesini artırma amacı %15,32 artmış olup ürün elde etme amacı ise %29,8 azalmıştır.

Anahtar kelimeler: Miras bitkiler, Yerli türler, Kent kimliği, Kültürel sürdürülebilirlik, Tarihi kentsel alan

1. Introduction

The concept of identity has been a very controversial issue that many famous researchers have tried to explain from different angles for a long time (Alexander, 1977; Krier, 1988; Lynch, 1960; Rapoport, 1984; Relph, 1976; Rossi, 1982; Schulz, 1979; Violich, 1995). According to the opinions, identity develops depending on the structural environments shaped by social actions such as social, economic, and cultural conditions and spatial knowledge and experiences.

This concept often comes to mind when it is a matter of heritage (Boussaa, 2018). Cultural heritage is accepted as a valuable and irreplaceable resource for each individual's

identity and increases the quality of social life. Moreover, as a blended state of past and present practices, it bridges people's natural and built environments in different periods (Bajec, 2016; Lowenthal and Olwig, 2006). As a result, cultural sustainability is related to the concept of identity and is defined as the continuity of local values, lifestyle, and identity (Alexander et al., 1987; Cara, 2014; Heikkinen et al., 2007).

Sustaining the spatial identity of cities and transferring the spatial culture to future generations is possible by approaching all the components that make up a city as a whole without discrimination (Ujang, 2012). Accordingly, the legibility of spatial identity can be evaluated with elements related to the natural, artificial and social

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✓ **Received** (Geliş tarihi): 01.08.2023, **Accepted** (Kabul tarihi): 23.10.2023



Citation (Atf): Abacıoğlu Gitmiş, E., Altunkasa, M.F., 2023. Investigation of heritage plants representing urban identity and the change in the urbanization process. Turkish Journal of Forestry, 24(4): 436-451.
DOI: [10.18182/tjf.133190](https://doi.org/10.18182/tjf.133190)

environment (Biol, 2007; Ocakçı, 1994; Önem and Kılınçaslan, 2005). At this point, the historical textures of the cities play the most prominent role in developing spatial identity, memory, and belonging, as they are the formations that have placed the most in shared cultural and spatial memories of societies. In the context of all these qualities, historical textures embody the cultural values, lifestyles, and visual elements of the past and carry them to the present (Bajec, 2016; Carrión, 2005; Çelik and Yazgan, 2007; Doratlı and Önal, 2000; Erduran Nemutlu et al. 2013; Koçan, 2011). Therefore, protecting historical urban areas is essential in restoring the identities of cities. In this context, we must adapt historical urban regions to the current conditions. These specificity and intrinsic values can be sustained by studies on preserving historical, cultural, and natural heritage (Carta, 1999).

More systematically, historical textures are the descriptors of urban identity with the following features:

- Provide the legibility of cities,
- Are unique,
- Symbolize the city region and the city in general,
- Make societies feel their history,
- Unveil the old-new relationship,
- Constitute a common language in terms of values and forms they carry,
- Provide cultural continuity,
- Carry memory/emotional/intrinsic values along with their usage value,
- Form the core or centers of the establishment of the cities (Abacıoğlu Gitmiş, 2021; Bozhüyük, 2007; Erduran Nemutlu et al., 2013; Karadayı, 2000).

Urban identity is not only a phenomenon shaped by physical forms but also a set of meanings associated with any urban landscape that has an active ecological reality (Bookchin, 1992; Watson and Bentley, 2007). Green spaces, which symbolize the urban identity by reflecting the city's history, culture, and economy, have privileged importance to the cities (Beck, 1992; Ferris et al., 2001; Loures et al., 2007; Sachs, 1995). Therefore, when the subject is approached in terms of spatial identity and plants, it is crucial to reveal human-space-plant relations. Plantation arrangements in courtyards, gardens, streets, and squares of historical textures have the following characteristics:

- It takes shape with natural and local species,
- It is identified with the urban space,
- It exhibits harmonious integrity with the historical character of the city,
- It is observed that it has a memory, imaginary and semantic value (Abacıoğlu Gitmiş, 2021; Karaşah and Sari, 2018; Lawrence, 2008; Schroeder, 2012; Shimada and Johnston, 2015).

As it could be understood from the literature reviews above, plant materials existing in the historical textures are living identity elements that are accepted as valuable tools in preserving and maintaining the identity of the cities. Since plants embody the relationship between humans and nature by contributing to developing a sense of space, belonging, and identity for societies. It also effectively establishes an emotional and cognitive bond between historical textures and urban residents (Zhao et al., 2020).

In parallel with the expansion of cities, today's residential areas are gaining weight in the direction of new

enhancement areas of cities. As a result, most people residing in the historic urban areas in the old settlement cores move to these new residential areas. This situation paves the way for the disappearance without any protections in spatial qualities, mainly traditional civil architecture (residential architecture), courtyards/gardens, street typologies, and squares as essential components of historic urban areas. On the other hand, it creates remarkable changes and deteriorations in plantation arrangements, which are much more exposed to interventions such as destruction and alteration than inanimate materials. Thus, the need for plants, which are one of the essential components of spatial culture and has an important place in the inhabitant's cultural memory and mental map, is gaining more and more importance.

Up to the present, many studies have been carried out on historical city centers and urban green spaces. These are mostly have focused on preservation based on the building typology of historical city centers; examination of human attitudes towards plants existing in residential gardens, streets, or immediate surroundings; improving health and well-being through the plants in the courtyard/gardens of homeowners (Anderson and Schroeder, 1983; Buhyoff et al., 1984; Flannigan, 2005; Schroeder and Ruffolo, 1996; Sommer et al., 1990; Ulrich and Addoms, 1981).

However, studies on historical urban green spaces and their sustainability in spatial identity and culture are pretty limited. Moreover, as observed from the new plantation arrangements implemented in the historical textures of today's cities, foreign domesticated species are often used instead of natural species. This leads to not matching the formation of images and perceptions in the inhabitants' cultural memory and the mental map to their spatial knowledge and experience. Thereby, the situation can turn into a process that progresses towards the gradual loss of preserved diversity, harmony between the environment and nature, also integrity among all the elements that make up the city which are the characteristics of the sustainable urban landscape (Antrop, 2005; Robinson, 2004).

From all these theoretical points of view, this paper focused on heritage plants as an element of space and spatial identity. To put it more simply, based on human-space-plant relations, the primary purpose of this paper is to reveal the heritage plants representing the urban identity and determine the temporal changes in the urbanization process.

2. Material and methods

The study was carried out in Kahramanmaraş urban protected area (35 ha) (Figure 1 and 2). This area became a settlement core due to the reconstruction activities carried out in Kahramanmaraş Castle and its surroundings by the Dulkadiroğulları Principality in the 14th century (Gökhan and Kaya, 2008). Accordingly, it contains many historical architectures from different periods.

The study is based on identifying heritage plants representing urban identity and assessing the temporal changes in the urbanization process via user research. Therefore, a mixed method approach (MMA) (Creswell, 2014) was applied in the study. With this approach, the study aims to comprehensively understand the research problem by collecting and interpreting quantitative and qualitative data (Creswell, 2014). The method of the study consists of three primary stages.

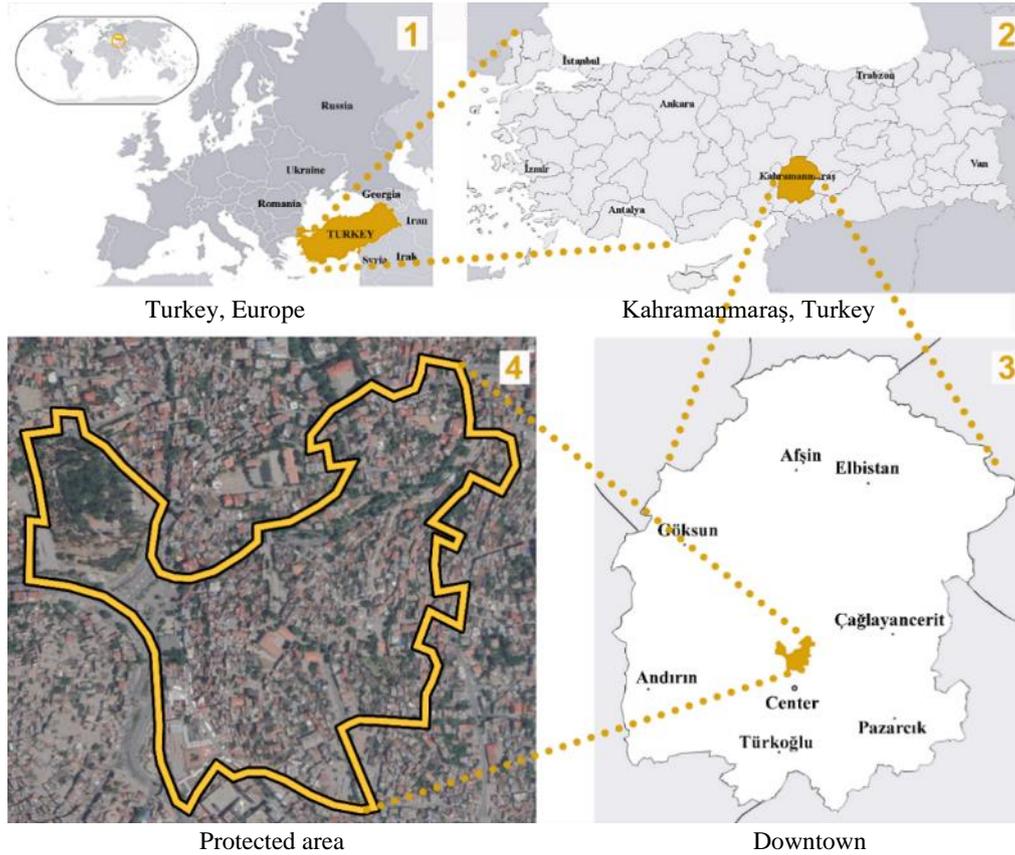


Figure 1. Location of the study area

2.1. Identifying and mapping areas to be examined in the study

Many traditional buildings and architectural elements are in the study area, including open spaces, whose original spatial quality has been preserved or significantly lost. Since it is difficult to examine all of these elements separately and will not yield the results reflected in practice, detailed studies have been carried out on the sample area. Given the above, a total of 35 structures, including 25 traditional civil architectures, one school, one madrasah, five mosques, two caravansaries, one hammam, and one square, were considered to be worth examining as sample areas (Figure 2). The following features were determined in the selection of these places:

- Having one of the elements of the courtyard and garden together with the building in spatial terms,
- Consisting of structural and plant elements of unique character that can represent the spatial identity of the city,
- In general, the various plant materials used outdoors show significant integrity,
- Being able to reveal the spatial culture of the city dweller and its reflection in the space in the context of traditional-current relationships.

2.2. Determination of heritage plants existed in the study area and creation of plant album

On-site investigations were carried out to determine the plant species found in the courtyards or gardens of the sample areas. Thus, each plant existing in the courtyard/gardens was recorded with photographs and their frequency of existence was noted. A comprehensive plant inventory was made and a plant album was created. As a result, 29 heritage plants were identified during the field surveys, including 23 trees, two shrubs, and four climbers. The plants identified are given in Table 1. and Figure 3.

The quality of being a heritage plant was determined according to the frequency of the plants in the courtyard/gardens. User opinions (general user) were used to reveal the potential of the species identified as heritage plants to represent the urban identity. The temporal changes (species and usage purposes) of these heritage plants from past to present were tried to be measured with the user group over 50 years old.

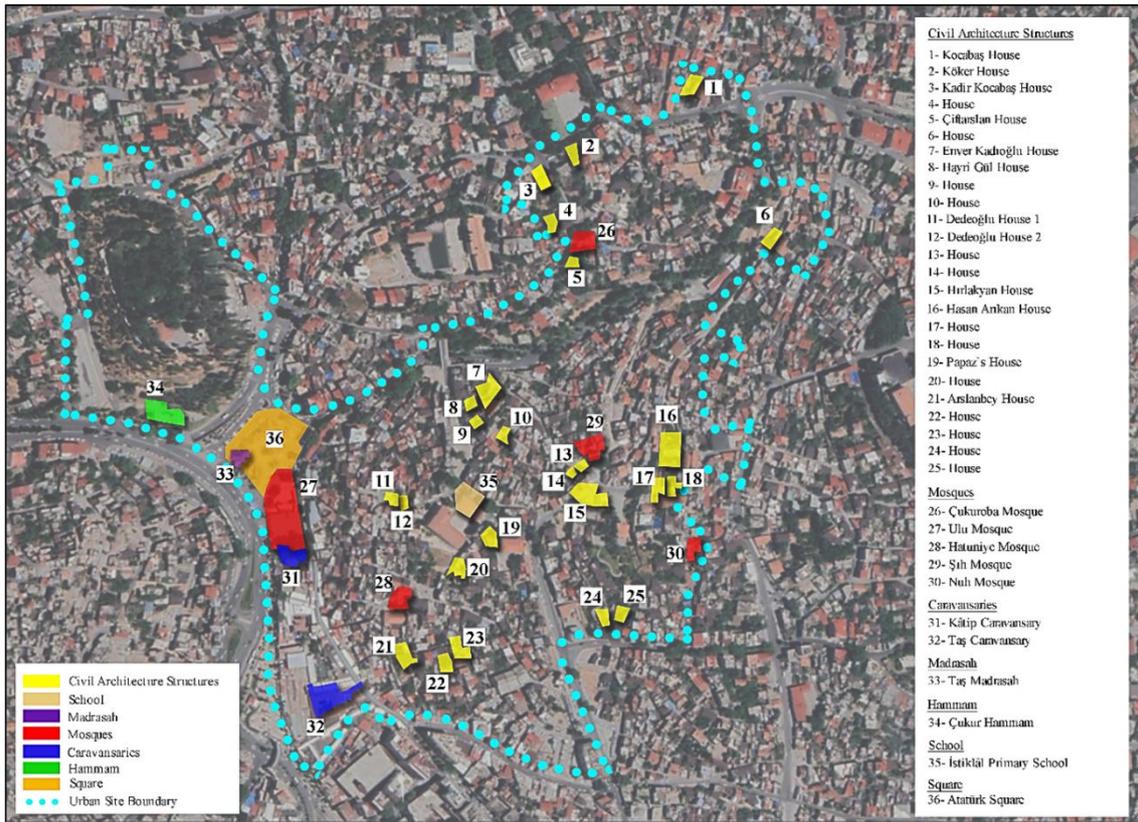
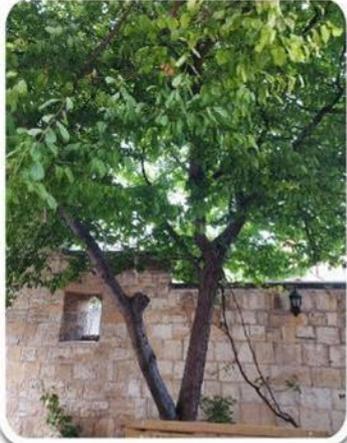


Figure 2. Location map of the traditional civil and public architectures examined in the study

Table 1. Heritage plants existing in courtyards/gardens of traditional civil and public architectures

Tree/Treelet
<i>Acer negundo</i> L.
<i>Ailanthus altissima</i> L.
<i>Amygdalus orientalis</i> Mill.
<i>Cedrus libani</i> A. Rich.
<i>Cercis siliquastrum</i> L.
<i>Citrus aurantium</i> L.
<i>Cupressus sempervirens</i> L. var. <i>horizontalis</i> Mill.
<i>Cupressus sempervirens</i> L. var. <i>pyramidalis</i>
<i>Diospyros kaki</i> L.
<i>Elaeagnus angustifolia</i> L.
<i>Eriobotrya japonica</i>
<i>Ficus carica</i> L.
<i>Fraxinus excelsior</i> L.
<i>Juglans regia</i>
<i>Melia azedarach</i> L.
<i>Morus alba</i> L.
<i>Olea europaea</i> L.
<i>Pinus brutia</i> Ten.
<i>Pinus pinea</i> L.
<i>Platanus orientalis</i> L.
<i>Prunus armeniaca</i> L.
<i>Robinia pseudoacacia</i> L.
<i>Tilia tomentosa</i> Moench.
Shrubs and Climbers
<i>Hedera helix</i> L.
<i>Lonicera japonica</i> L.
<i>Parthenocissus quinquefolia</i>
<i>Punica granatum</i> L.
<i>Rosa</i> sp.
<i>Vitis vinifera</i> L.



1. *Acer negundo* L.

Place used: Streets and parks

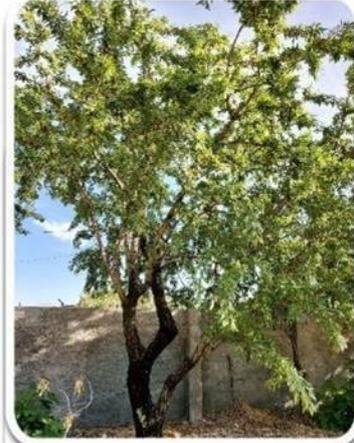
Purpose of usage: Providing shade and coolness, using it as an ornament or decoration element



2. *Ailanthus altissima* L.

Place used: Residential courtyard/gardens

Purpose of usage: No specific purpose, invasive species



3. *Amygdalus orientalis* Mill.

Place used: Residential courtyard/gardens

Purpose of usage: Obtaining products, providing shade and coolness, being contented in terms of growing conditions and wishes



4. *Cedrus libani* A. Rich.

Place used: Residential courtyard/gardens

Purpose of usage: Creating a place where various activities can be carried out alone, using it as an ornament or decoration element



5. *Cercis siliquastrum* L.

Place used: Streets and parks

Purpose of usage: Providing shade and coolness, using it as an ornament or decoration element



6. *Citrus aurantium* L.

Place used: Residential courtyard/gardens

Purpose of usage: Obtaining products, using it as an ornament or decoration element



7. *Cupressus sempervirens* var. *Horizontalis* Mill.

Place used: Residential, mosque and madrasah courtyard/gardens; streets

Purpose of usage: Using it as an ornament or decoration element, being contented in terms of growing conditions and wishes



8. *Cupressus sempervirens* L. var. *Pyramidalis*

Place used: Residential, mosque and madrasah courtyard/gardens; streets

Purpose of usage: Using it as an ornament or decoration element, being contented in terms of growing conditions and wishes



9. *Diospyros kaki* L.

Place used: Residential courtyard/gardens

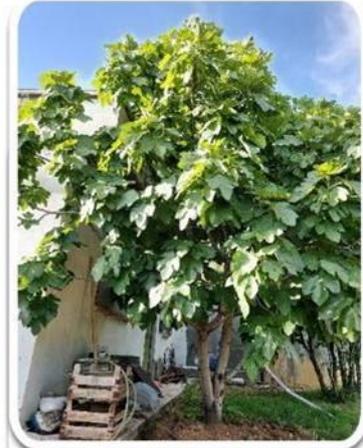
Purpose of usage: Obtaining products, providing shade and coolness, being contented in terms of growing conditions and wishes



10. *Elaeagnus angustifolia* L.
Place used: Residential courtyard/gardens; parks
Purpose of usage: Providing shade and coolness, using it as an ornament or decoration element, being contented in terms of growing conditions



11. *Eriobotrya japonica*
Place used: Residential and mosque courtyard/gardens
Purpose of usage: Obtaining a product, using it as an ornament or decoration element



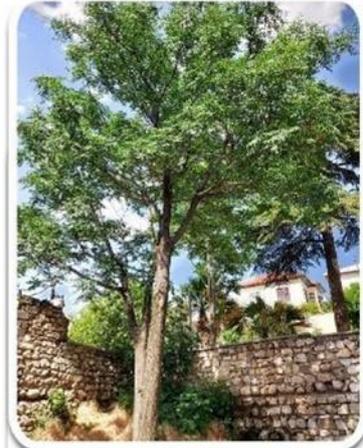
12. *Ficus carica* L.
Place used: Residential and mosque courtyard/gardens
Purpose of usage: Obtaining a product, being contented in terms of growing conditions and wishes



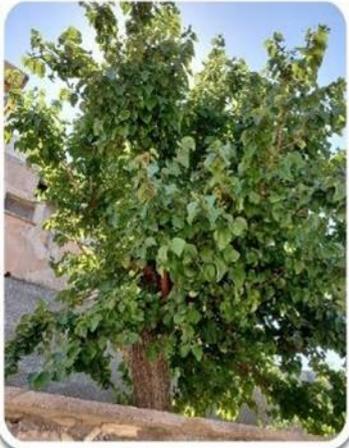
13. *Fraxinus excelsior* L.
Place used: Streets and parks
Purpose of usage: Providing shade and coolness, using it as an ornament or decoration element



14. *Juglans regia*
Place used: Residential courtyard/gardens
Purpose of usage: Obtaining a product, providing shade and coolness, being contented in terms of growing conditions and wishes



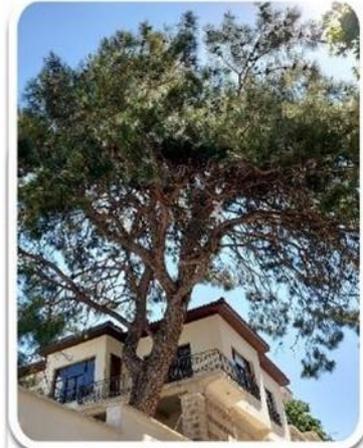
15. *Melia azedarach* L.
Place used: Streets and parks
Purpose of usage: Providing shade and coolness, using it as an ornament or decoration element



16. *Morus alba* L.
Place used: Residential courtyard/gardens
Purpose of usage: Obtaining a product, providing shade and coolness, being contented in terms of growing conditions and wishes



17. *Olea europaea* L.
Place used: Residential courtyard/gardens
Purpose of usage: Obtaining a product, providing shade and coolness, being contented in terms of growing conditions and wishes



18. *Pinus brutia* Ten.
Place used: Residential, mosque and madrasah courtyard/gardens; streets
Purpose of usage: Providing shade and coolness, using it as an ornament or decoration element, being contented in terms of growing conditions and wishes



19. *Pinus pinea* L.

Place used: Streets and parks

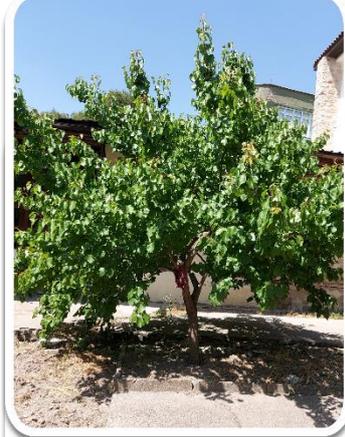
Purpose of usage: Providing shade and coolness, using it as an ornament or decoration element, being contented in terms of growing conditions and wishes



20. *Platanus orientalis* L.

Place used: Streets and parks; mosque courtyard/gardens

Purpose of usage: Providing shade and coolness, creating a place where various activities can be carried out alone, using it as an ornament or decoration element



21. *Prunus armeniaca* L.

Place used: Residential courtyard/gardens

Purpose of usage: Obtaining a product, being contented in terms of growing conditions and wishes



22. *Robinia pseudoacacia* L.

Place used: Streets and parks

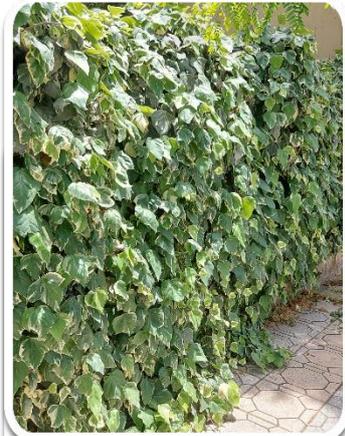
Purpose of usage: Providing shade and coolness, creating a place where various activities can be carried out alone, using it as an ornament or decoration element



23. *Tilia tomentosa* Moench.

Place used: Streets and parks

Purpose of usage: Providing shade and coolness, creating a place where various activities can be carried out alone, using it as an ornament or decoration element



24. *Hedera helix* L.

Place used: Residential courtyard/gardens

Purpose of usage: Providing shade and coolness, using it as an ornament or decoration element



25. *Lonicera japonica* L.

Place used: Residential and mosque courtyard/gardens

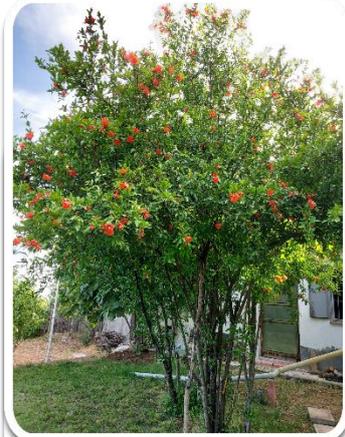
Purpose of usage: Providing shade and coolness, using it as an ornament or decoration element



26. *Parthenocissus quinquefolia*

Place used: Residential and mosque courtyard/gardens

Purpose of usage: Providing shade and coolness, using it as an ornament or decoration element



27. *Punica granatum* L.

Place used: Residential courtyard/gardens

Purpose of usage: Obtaining a product, using it as an ornament or decoration element

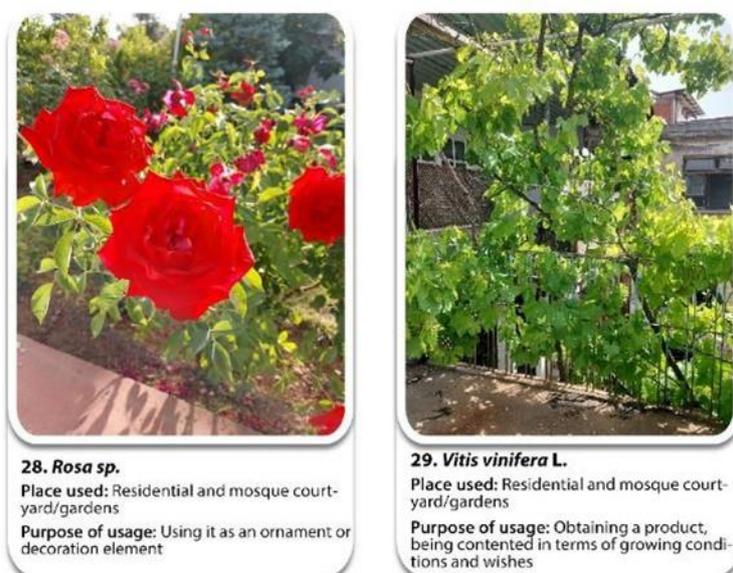


Figure 3. Plant album (Heritage Plants, all photographs were taken in the study areas)

2.3. User research on the relationship between urban identity and plants

User research consists of two main stages: General and above 50-year-old participant surveys. Through general user opinions, it aims to reveal the potential of the species identified as heritage plants to represent the urban identity. The temporal changes (species and usage purposes) of these heritage plants from past to present were tried to be measured with the user group over 50 years old.

The ratios in the Arkin and Colton table given in Pulido (1972) were considered in determining the study's sample size. Accordingly, the general participant survey was carried out with 312 people, the other one was with 151 people, and 463 surveys were applied.

2.3.1. Determination of heritage plants representing urban identity and user interpretations (General user survey)

The general participants at this stage made assessments. In the general user group, no gender, age, or occupation restrictions have been set, except for living in Kahramanmaraş for at least 5 years. Therefore, this group of participants is defined as general. They were asked to assess the 29 heritage plants in the courtyards or gardens of the historical buildings in the study area.

With the user research, it was first tried to determine whether the participants had knowledge about the heritage tree and shrub species examined. For this, the participants were shown the photograph of each plant (Plant album, Figure 3) as well as the leaf samples of each plant so that they could recognize the general forms of the plants. Thus, they were asked whether they knew the presented plants or not. Participants answered "yes" for plants they knew and "no" for plants they did not know. If they knew, they were asked to say the plant's name.

The section that assessed the plant's attributes had an assessment matrix that adjectives can describe from weak to strong. For this purpose, a 22-item scale scored on a Likert

ranking of 5 (very strong) to 1 (very weak) was used, enabling the assessments of the plants presented in the image in terms of each attribute. Thus, users could have expressed their ideas about the plants via this scale. In addition, the studies in which plant surveys were applied previously (Sommer et al., 1990; Schroeder and Ruffolo, 1996; Flannigan, 2005) were utilized to associate the plants with identity in the survey. Finally, data obtained from the surveys were transformed into charts showing the opinions and scores of the participants.

User assessments were analyzed through SPSS software. Some descriptive statistical methods were used in the analysis. Frequency, percentage, arithmetic mean, and standard deviation were used in general user analysis; frequency and percentage were used in above 50 years one. Firstly, frequency values obtained from assessments that were made for each plant's "strong" and "very strong" adjectives by users were calculated in the analysis. Then, the powerfulness levels of the plants were determined according to the sum of these two adjective assessments.

In the section representing the urban identity, arithmetic means were determined for each plant by calculating the percentage of the frequency value obtained from these assessments for each plant's "strong" and "very strong" adjectives by users to the frequencies of 29 heritage plants.

2.3.2. Revealing the changes of the plants from past to the present in terms of species and intended use (Above 50 years old survey)

Considering that younger individuals may not be able to interpret the study areas, plants, and their changes for a longer period, at this stage, the participants above 50 years old made assessments. First, they assessed the courtyard or gardens of the houses they lived in childhood and present regarding the plants. For this purpose, the plant album (Figure 3) for the 29 heritage plants was presented to the survey participants. Apart from the 29 species, they also expressed their opinions about other plants in the

courtyard/garden of the house they live in today. Finally, the data obtained from the surveys were transformed into charts showing the participants' opinions.

3. Results

3.1. General user research findings

The research was conducted in April 2020-September 2020, and 312 surveys were carried out. However, 28 surveys of inconsistent and protest responses were excluded from the evaluation. Thereby, 312 surveys were taken into consideration.

According to the findings, there was no very high difference between male and female participants (45,2% female, 54,8% male). Furthermore, 65,1% of the participants constitute an active employee group (26-60 years old), and 77,6% have a high school or university degree. In addition, 76,6% of them have lived in Kahramanmaraş for over twenty years (Table 2).

Through the general user research, we examined the potential of the 29 heritage plants in representing the urban identity and their design element effects on individuals. Based on the results obtained from the general user research, assessment findings regarding plants are given in Table 3 - 4.

Table 2. Demographic characteristics of the respondents (general users)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	171	54,8
	Female	141	45,2
Total		312	100,0
Age	18-25 years	53	17,0
	26-35 years	64	20,5
	36-45 years	77	24,7
	46-60 years	62	19,9
	Above 61 years	56	17,9
Total		312	100,0
Education level	Primary	26	8,3
	Secondary	13	4,2
	High School	100	32,1
	Bachelors degree	142	45,5
	Masters degree/Doctorate	31	9,9
Total		312	100,0
Duration of residence in Kahramanmaraş	5-10 years	48	15,4
	11-20 years	25	8,0
	21-30 years	72	23,1
	31-40 years	70	22,4
	41-50 years	53	17,0
	Above 51 years	44	14,1
Total		312	100,0

Table 3. The potential of the heritage plants in representing the urban identity

Plants	Representing the urban identity (%)					
	Common in the city	Native and indigenous	Identified with the city	Compatible with the historical character of the city	Sustainable use from past to the present	Arithmetic Mean
<i>Acer negundo</i> L.	62,2	34,3	13,8	9,9	39,7	32,0
<i>Ailanthus altissima</i> L.	40,7	31,0	27,0	29,5	37,1	33,1
<i>Amygdalus orientalis</i> Mill.	42,6	36,3	31,7	35,6	51,0	39,4
<i>Cedrus libani</i> A. Rich.	55,8	50,0	43,0	51,0	64,5	52,9
<i>Cercis siliquastrum</i> L.	51,6	47,8	9,9	12,2	44,2	33,1
<i>Citrus aurantium</i> L.	15,0	18,9	14,1	16,0	22,4	17,3
<i>Cupressus sempervirens</i> L. var. <i>horizontalis</i> Mill.	72,5	65,3	59,9	62,2	70,2	66,0
<i>Cupressus sempervirens</i> L. var. <i>pyramidalis</i>	74,0	64,4	55,1	68,9	73,7	67,2
<i>Diospyros kaki</i> L.	32,7	28,2	20,8	32,1	33,7	29,5
<i>Elaeagnus angustifolia</i> L.	40,7	35,9	23,8	36,2	52,6	37,8
<i>Eriobotrya japonica</i>	23,7	20,1	17,3	20,5	25,9	21,5
<i>Ficus carica</i> L.	82,4	76,6	69,6	72,5	81,8	76,6
<i>Fraxinus excelsior</i> L.	67,0	27,9	13,8	20,2	40,1	33,8
<i>Hedera helix</i> L.	57,4	40,1	30,7	49,0	58,1	47,1
<i>Juglans regia</i>	71,2	65,8	54,8	63,1	72,5	65,5
<i>Lonicera japonica</i> L.	52,6	42,6	31,1	53,2	59,0	47,7
<i>Melia azedarach</i> L.	37,8	28,5	26,0	27,3	33,0	30,5
<i>Morus alba</i> L.	68,3	67,0	63,1	64,1	68,9	66,3
<i>Olea europaea</i> L.	84,3	83,4	75,3	80,5	86,2	81,9
<i>Parthenocissus quinquefolia</i>	53,2	40,8	33,0	53,2	55,8	47,2
<i>Platanus orientalis</i> L.	71,8	55,8	42,3	44,5	57,7	54,4
<i>Pinus brutia</i> Ten.	76,3	73,7	73,7	72,8	75,6	74,4
<i>Pinus pinea</i> L.	76,3	69,9	60,9	75,0	76,6	71,7
<i>Prunus armeniaca</i> L.	35,9	30,4	25,6	31,8	34,6	31,7
<i>Punica granatum</i> L.	66,3	62,8	54,1	63,8	72,1	63,8
<i>Robinia pseudoacacia</i> L.	75,6	67,0	50,0	39,7	54,2	57,3
<i>Rosa</i> sp.	81,0	71,2	66,4	73,7	78,8	74,2
<i>Tilia tomentosa</i> Moench.	21,4	21,8	18,9	23,0	26,3	22,3
<i>Vitis vinifera</i> L.	82,0	79,8	66,4	78,5	83,4	78,0

It has been determined that *Olea europaea* L. (81,9%) is a plant that represents the urban identity of Kahramanmaraş city the most among the 29 heritage plants. It is followed by *Vitis vinifera* L. (78%) and *Ficus carica* L. (76,6%) (Table 3).

According to the attributes, the highest powerfulness rate is "sustainable use from past to the present" at *Olea europaea* L. (86,2%). On the other hand, the most common plant in Kahramanmaraş is *Olea europaea* L., with the strongest level of 84,3% (Table 3).

Considering the design elements effect of plants on individuals, *Rosa sp.* has the highest powerfulness level of

62%. Here, two other plants are effective after *Rosa sp.*, *Elaeagnus angustifolia* L. (56,2%) and *Olea europaea* L. (54,9%) (Table 4).

The impact of design elements is generally related to the plants' form (55,8%) and flower/fruit (50,2%) arrangements. However, *Rosa sp.* has gained the highest powerfulness levels thanks to its fragrance, flower/fruit, and color elements (Table 4).

The distribution of the respondents according to the level of recognition of plants visually presented to them is given in Figure 4.

Table 4. The design elements effect of heritage plants on individuals

Plants	Design elements effect (%)						Arithmetic Mean
	Size	Form	Texture	Colour	Flower/fruit	Fragrance	
<i>Acer negundo</i> L.	40,1	56,1	19,9	24,0	12,2	13,8	27,7
<i>Ailanthus altissima</i> L.	42,0	49,4	42,7	58,3	27,9	33,4	42,3
<i>Amygdalus orientalis</i> Mill.	66,0	60,9	46,5	48,4	40,1	21,2	47,2
<i>Cedrus libani</i> A. Rich.	72,8	67,3	55,1	54,4	19,8	45,2	52,4
<i>Cercis siliquastrum</i> L.	36,2	53,5	19,9	62,5	65,4	62,2	49,9
<i>Citrus aurantium</i> L.	19,8	33,0	32,0	49,7	69,2	57,7	43,6
<i>Cupressus sempervirens</i> L. var. <i>horizontalis</i> Mill.	54,2	60,0	42,0	44,3	17,0	26,6	40,7
<i>Cupressus sempervirens</i> L. var. <i>pyramidalis</i>	64,7	73,4	41,7	38,8	14,1	26,9	43,3
<i>Diospyros kaki</i> L.	26,9	27,0	28,2	32,0	46,4	15,1	29,3
<i>Elaeagnus angustifolia</i> L.	46,5	54,1	44,2	66,0	57,4	69,0	56,2
<i>Eriobotrya japonica</i>	20,5	33,4	33,4	35,0	70,2	19,5	35,3
<i>Ficus carica</i> L.	62,8	66,1	42,6	38,8	83,9	17,6	52,0
<i>Fraxinus excelsior</i> L.	46,2	56,7	17,9	18,3	45,8	13,8	33,1
<i>Hedera helix</i> L.	27,3	63,2	25,3	56,7	26,2	11,8	35,1
<i>Juglans regia</i>	71,8	66,6	38,8	39,4	75,0	29,5	53,5
<i>Lonicera japonica</i> L.	18,0	53,2	25,0	46,1	62,9	61,9	44,5
<i>Melia azedarach</i> L.	38,2	40,7	23,7	26,2	32,4	22,5	30,6
<i>Morus alba</i> L.	71,2	60,0	33,1	35,9	69,9	15,7	47,6
<i>Olea europaea</i> L.	37,2	67,0	59,6	65,4	85,3	15,0	54,9
<i>Parthenocissus quinquefolia</i>	21,8	58,0	24,1	52,8	28,6	9,9	32,5
<i>Platanus orientalis</i> L.	58,3	71,2	39,4	43,2	51,9	59,6	53,9
<i>Pinus brutia</i> Ten.	79,5	69,3	41,1	38,5	16,0	12,8	42,9
<i>Pinus pinea</i> L.	78,6	74,7	46,5	39,1	24,3	50,0	52,2
<i>Prunus armeniaca</i> L.	34,0	23,3	24,6	25,7	58,3	16,9	30,5
<i>Punica granatum</i> L.	18,9	51,6	20,9	46,8	76,9	19,5	39,1
<i>Robinia pseudoacacia</i> L.	58,1	63,5	26,6	32,7	58,6	60,5	50,0
<i>Rosa sp.</i>	19,6	62,5	33,3	84,0	85,9	86,5	62,0
<i>Tilia tomentosa</i> Moench.	39,8	38,1	24,3	35,6	45,5	41,7	37,5
<i>Vitis vinifera</i> L.	33,0	64,5	33,0	41,0	89,1	23,7	47,4
Arithmetic Mean	45,0	55,8	34,0	44,1	50,2	33,1	

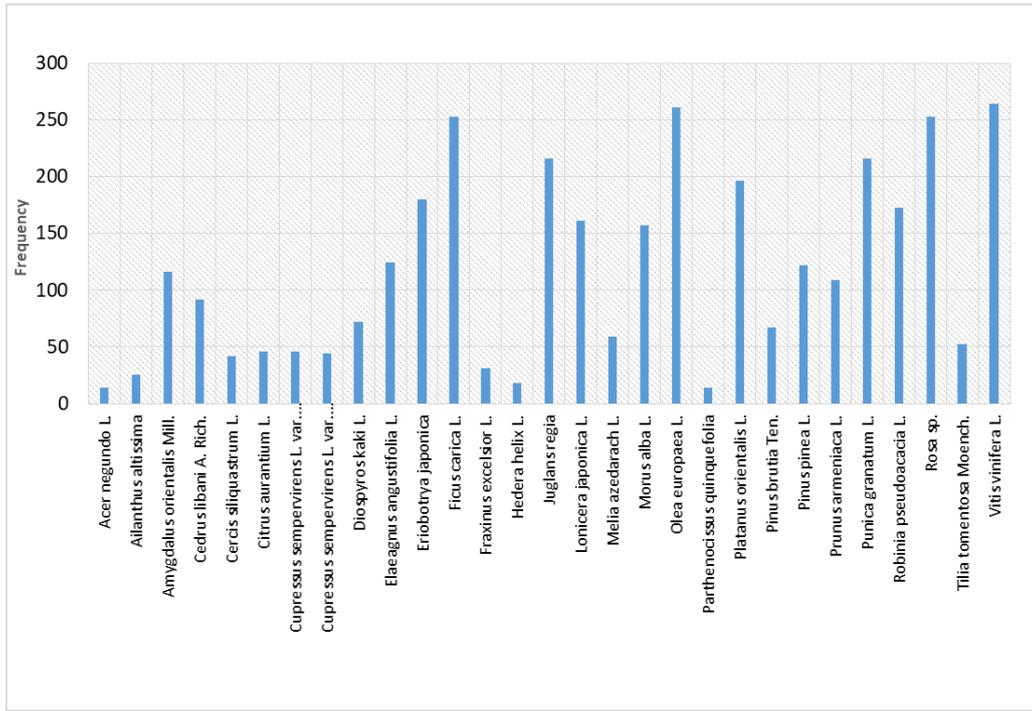


Figure 4. Distribution of respondents according to their recognition of plants

Users recognize *Ficus carica* L., *Olea europaea* L., *Rosa* sp., and *Vitis vinifera* L. more than other species (Figure 4). The powerfulness levels of spatial attributes of the well-known species were also highly found. In other words, recognition and spatial attributes develop parallel to each other.

3.2. Users above 50 research findings

The research was conducted during the same period of general user research, and 151 surveys were carried out. 124 out of 151 participants stated that they had a courtyard or garden belonging to their house and completed the questionnaire. Thereby, assessments were made based on the responses of 124 participants (Table 5).

To determine the species, the intended use of plants and their changes in time, the participants were first asked to assess the plants in the courtyard or garden of their childhood house. Since the participants marked or added more than one option, the number of answers was more than 124. The findings are given in Figure 5.

While 83 (67%) of the participants assessed the intended use of heritage plants in the courtyard or garden of the house they lived in childhood as creating a shady and cool resting place, 70 (56,4%) of them assessed it as enhancing the visual quality of courtyard or garden, and 65 (52,4%) of them did as obtaining the product (Figure 5).

However, the participants did not remember *Acer negundo* L., *Ailanthus altissima* L., *Cercis siliquastrum* L., *Citrus aurantium* L., *Fraxinus excelsior* L., *Melia azedarach* L. ve *Tilia tomentosa* Moench. (a total of seven species) which are among the heritage plants examined in the general participant research in the courtyard or garden of the house where they lived in childhood.

One of the primary purposes of the study is to reveal the current status of the plants that middle-aged and elderly

individuals know about or remember their existence in the courtyards and gardens of their own houses and how their intended uses have changed. In this context, the participants above 50 years old and residing in the same house in the historical texture or moving to another place were asked to assess the current status of the plants used. The findings are given in Figure 6.

Table 5. Demographic characteristics of the respondents (users above 50)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	65	52,4
	Female	59	47,6
Total		124	100,0
Age	50-55 years	34	27,4
	56-60 years	17	13,7
	61-65 years	30	24,2
	66-70 years	24	19,4
	Above 71 years	19	15,3
Total		124	100,0
Education level	Primary	14	11,3
	Secondary	9	7,3
	High School	41	33,1
	Bachelors degree	49	39,5
	Masters degree/Doctorate	11	8,9
Total		124	100,0
Duration of residence in Kahramanmaraş	5-10 years	14	11,3
	11-20 years	4	3,2
	21-30 years	13	10,5
	31-40 years	11	8,9
	41-50 years	23	18,5
	Above 51 years	59	47,6
Total		124	100,0

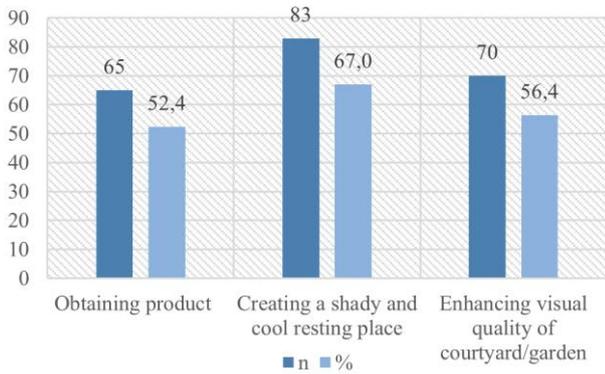


Figure 5. Distribution of the participants' responses above 50 years old with respect to the intended use of the heritage plants in the courtyard/garden of the house they lived in childhood

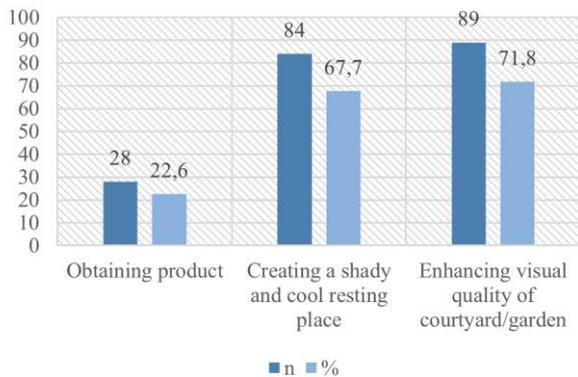


Figure 6. Distribution of the participants' responses above 50 years old with respect to the intended use of the heritage plants in the courtyard/garden of the house they live in today

While 89 (71,8%) of the participants assessed the intended use of the heritage plants in the courtyard or garden of the house they live in today as enhancing the visual quality of the yard or garden, 84 (67,7%) of them assessed it as creating a shady and cool resting place, and 28 (22,6%) of them did as obtaining the product (Figure 6).

Compared to the past, while there was no significant change in the purpose of creating a shaded and cool resting place in terms of intended use, the purpose of enhancing the visual quality of the courtyard/garden increased by 15,32%, and obtaining products decreased by 29,8% (Figure 5 and 6).

Participants also stated that other plants exist in the courtyard, garden, or green areas belonging to the houses they live in today besides the heritage plants. The number of the mentioned ones was 32. The participants also assessed these species in terms of their intended use. The findings are presented in Table 6.

The prominent plants used to obtain the product are *Lavandula angustifolia* Mill. (7,3%), *Rosmarinus officinalis* L. (7,3%) and *Laurus nobilis* L. (5,6%) (Table 6).

Robinia pseudoacacia 'umbraculifera' is the most used plant with 36,3% to create a shady and cool resting place. It was followed by *Cupressus macrocarpa* Hartw. (22,6%), *Lagerstroemia indica* L. (20,5%), *Ligustrum japonicum* Thunb. (16,9%), *Berberis thunbergii* DC., *Paulownia tomentosa* Thunb. (12,1%), *Washingtonia filifera* Wendl. (11,3%), *Albizia julibrissin* Durazz., *Prunus cerasifera* 'pissardii' (10,5%), *Cupressocyparis leylandii* M. L. Green. and *Thuja orientalis* (9,7%) (Table 6).

Euonymus fortunei 'aurea' (60%) is the most used plant to enhance the visual quality of the garden or courtyard. It is followed by *Euonymus japonica* 'aurea' (58%), *Pyracantha coccinea* Roem. (57,3%), *Cupressus macrocarpa* Hartw. (50,8%), *Lagerstroemia indica* L. (46%), *Robinia pseudoacacia* 'umbraculifera' (41,9%), *Nerium oleander* L. (39,5%), *Cupressus arizonica* 'glauca' Greene (35,4%) and *Rosmarinus officinalis* L. (30,7%) (Table 6).

Table 6. The plants existing in the courtyard/garden of the house in which users above 50 years old live today (except for heritage plants)

The plants used in courtyard/garden of house we live in present	Obtaining product		Creating a shady and cool resting place		Increasing visual quality of courtyard/garden	
	n	%	n	%	n	%
Tree/Treelet						
<i>Albizia julibrissin</i> Durazz.	0	0,0	13	10,5	13	10,5
<i>Cupressocyparis leylandii</i> M. L. Green.	0	0,0	12	9,7	24	19,4
<i>Cupressus arizonica</i> 'glauca' Greene.	0	0,0	10	8,1	44	35,4
<i>Cupressus macrocarpa</i> Hartw.	0	0,0	28	22,6	63	50,8
<i>Lagerstroemia indica</i> L.	0	0,0	25	20,5	57	46,0
<i>Ligustrum japonicum</i> Thunb.	0	0,0	21	16,9	26	21,0
<i>Magnolia grandiflora</i> L.	0	0,0	5	4,0	8	6,4
<i>Paulownia tomentosa</i> Thunb.	0	0,0	15	12,1	12	9,7
<i>Populus alba</i> L.	0	0,0	0	0,0	4	3,2
<i>Prunus cerasifera</i> 'pisardii'	0	0,0	13	10,5	24	19,4
<i>Prunus serrulata</i> Lindl.	0	0,0	1	0,8	1	0,8
<i>Robinia neomexicana</i> Gray.	0	0,0	3	2,4	4	3,2
<i>Robinia pseudoacacia</i> 'umbraculifera'	0	0,0	45	36,3	52	41,9
<i>Salix babylonica</i> L.	0	0,0	10	8,1	16	12,9
<i>Thuja orientalis</i>	0	0,0	12	9,7	22	17,7
<i>Washingtonia filifera</i> Wendl.	0	0,0	14	11,3	21	16,9
Shrubs and Climbers						
<i>Berberis thunbergii</i> DC.	0	0,0	15	12,1	17	13,7
<i>Buxus microphylla</i> 'japonica' Rehd.	0	0,0	2	1,6	23	18,5
<i>Campsis radicans</i> Seem.	0	0,0	0	0,0	14	11,3
<i>Cortaderia selloana</i> Schult.	0	0,0	0	0,0	11	8,9
<i>Cotoneaster horizontalis</i> Decne.	0	0,0	0	0,0	5	4,0
<i>Euonymus japonica</i> 'aurea'	0	0,0	4	3,2	72	58,0
<i>Euonymus fortunei</i> 'aurea'	0	0,0	0	0,0	74	60,0
<i>Jasminum officinale</i> L.	0	0,0	8	6,4	13	10,5
<i>Juniperus horizontalis</i> Mnch.	0	0,0	3	2,4	18	14,5
<i>Laurus nobilis</i> L.	7	5,6	2	1,6	10	8,1
<i>Lavandula angustifolia</i> Mill.	9	7,3	0	0,0	36	29,0
<i>Nerium oleander</i> L.	0	0,0	10	8,1	49	39,5
<i>Photinia x fraseri</i>	0	0,0	2	1,6	28	22,6
<i>Pyracantha coccinea</i> Roem.	0	0,0	4	3,2	71	57,3
<i>Rosmarinus officinalis</i> L.	9	7,3	2	1,6	38	30,7
<i>Viburnum tinus</i> L.	0	0,0	3	2,4	11	8,9

4. Discussion

Many studies investigating urban identity or its elements, for example, (Anderson and Schroeder, 1983; Buhyoff et al., 1984; Flannigan, 2005; Schroeder and Ruffolo, 1996; Sommer et al., 1990; Ulrich and Addoms, 1981), tackled user research as one of the fundamental methods based on individual perception. Evaluation data are based on single-user research in these studies. However, our study differs from the mentioned ones because it was conducted based on two different user types of research. The purpose is to determine the relationships between plants and the perception of urban identity and to measure their changes over time.

4.1. Participants' details

There was no very high difference between male and female participants in the general user and users above 50 years old surveys. However, the high proportion of respondents under the age of 45 in the general user survey indicates that respondents are predominantly young.

4.2. Heritage plants-urban identity relations in the context of general user research

Schroeder et al. (2006), suggested that research might be worth pursuing by categorically specifying the composition of urban trees, which vary depending on cultural and climatic lines, to examine the possible role of culture in tree attitudes. In line with this view, in the study, each plant species existing in the historical texture was examined separately, and the cultural dimension associated with the urban identity was determined.

Among the heritage plants in the study, it has been determined that;

- *Olea europaea* L. (81,9%) is the plant that represents the urban identity of Kahramanmaraş city the most among the 29 heritage plants.
- *Rosa sp.* (62%), being in the first place, *Elaeagnus angustifolia* L. (56,2%) and *Olea europaea* L. (54,9%) create the most effective feelings on individuals.

These three plants, as native, valuable and veteran species in the region, have always preserved their importance as living elements of public and private outdoor spaces, where people have been involved in many activities

for hundreds of years. Moreover, the olive has taken an important place in human memory and spatial culture as abundance, justice, health, pride, victory, prosperity, wisdom, reason, purification, and rebirth from ancient times to the present. On the other hand, the rose has gained value in Islam's religion with its holiness but has generally become a symbol of love, beauty, silence and secrecy (Keykubat, 2014; Özçelik, 2019). In this context, it can be considered natural to attribute the same importance to these three species, which have an important place in the cultural memory of the Anatolian people in Kahramanmaraş. Undoubtedly, it would be a correct approach to consider other species with high attributes related to urban identity as elements that occupy a place in the cultural and spatial memory of the people.

Doygun and Ok, (2006) unveiled that the most common species in Kahramanmaraş is *Platanus orientalis* L. (Plane Tree). Apart from this, they stated that the other most common species in the city is *Olea europea* L. In addition, they attributed a special meaning to *Olea europaea* L. and highlighted that this plant is the most frequently encountered species as preserved individuals today in parks and house gardens due to the city's development towards the olive groves. Therefore, existing olive trees in these areas and re-planting them can be an advantage. Although this seems to be an action that validates the continuity of using *Olea europaea* L. from past to present, these lands gradually transform into a built environment, especially in the city's west, by developing against the vegetation. The situation threatens the existence of these species in the town. Similar to the results of our study, Doygun (2009) recorded that Olive groves in Kahramanmaraş suffered a loss of area due to the urban sprawl. This phenomenon has gained speed recently as urbanization has increased.

Merdoğlu Bilaloğlu (2004) found that the courtyards and gardens of traditional houses in Kahramanmaraş are represented by *Diospyros kaki* L., *Ficus carica* L., *Juglans regia*, *Morus alba* L. and *Pinus brutia* Ten. The plants identified in her study and ours show parallelism to a great extent. However, we determined that 29 heritage plants (Table 1) belonged or adapted to the region for many years in the courtyards or gardens of traditional public and civil architectures of Kahramanmaraş, including five plants identified by Merdoğlu Bilaloğlu (2004).

Many users attribute meaning to the plants by considering the size, shape, colour, flower, and fruit elements. Such a determination is inevitable when it is accepted that form, size, and colour elements shape the mental map in the physiological process of perception. On the other hand, in the cognitive process of perception, spatial knowledge, observations, and experiences gain detail and clarity to form the mental map.

It has turned out that flower and fragrance elements have a more significant meaning than other elements in the plants preferred as ornamental or decoration items in terms of intended use. As a result similar to this, in Flannigan's study (2005), among the benefits provided by plants, expressions such as "pleasing to the eye", "enhances the look of garden and home", "autumn colour and "bring nature closer" were evaluated with high scores. The tree's colour of leaves and flowers comes to the fore, as well as the form and size in making up these contributions and feelings. Moreover, the fact that the characteristics of the plant, such as shape and size, texture, branching, flower density, colour, and fruits

are significantly different from other species, can ease recognition of the plants and take place in the mental map. This finding is in line with the statement by Austin (2002) that there is an increase in awareness of plants due to the purpose of obtaining products such as fruit and timber. At the same time, the fact that a species can get a product supports the perception of abundance and fertility, as well as attributes such as flowers and fruits making up this perception. Since plants whose fruits, flowers, and leaves can be used as nutrients (such as olives, roses, and vines) increase the level of the powerfulness of their use with their functional and aesthetic contributions as well as these features.

It has been observed that there is a directly proportional relationship between more consistent and realistic users' evaluations and the recognition of the plants. The more users recognize a species accurately, the more consistent their assessment of that plant has become. For example, there were significant differences between the evaluation level of *Ailanthus altissima*, which is less well-known, and the evaluation level of *Ficus carica* L. and *Olea europaea* L., which are well known. In parallel with this, it has been observed that as the plant's recognition level increases, the plant attributes' powerfulness level also increases. In other words, recognition and spatial attribute develop parallel to each other.

4.3. Changes of plant material in the city over time in the context of the research of users above 50 years old

It has been observed that the intended use of plants and species selection has changed over time. This change is more evident in the exteriors of the houses. The aim of obtaining product, which dominates especially in the historical texture and traditional residential courtyards and gardens throughout the city, has remained in the background in today's houses and visual quality or aesthetic concern has come to the fore. Based on this thought, the regulation of mostly newly built homes in the city as multi-story housing groups with common outdoor spaces might be.

It has become crucial to enhance the visual landscape quality in shared outdoor spaces and to create a shady and cool resting place where residents can engage in various activities. Therefore, the prominence of visual quality and the acceptance of the planting approach, which can be considered a fashion in local governments and among the public, can be counted as the main factors in the increase of exotic plant diversity. Furthermore, in this approach, it can be accepted that the companies engaged in producing and trading ornamental plants create a directed demand with demonstrations they offer to the market. On the other hand, fruit-bearing species may not be preferred very much due to the reasons such as the difficulty of sharing the product, the more cultural processes for fruit yield and its higher cost and the pollution caused by the falling of uncollected products to the ground.

It has been determined that the plants used to obtain the product are *Lavandula angustifolia* Mill., *Rosmarinus officinalis* L. and *Laurus nobilis* L. Besides being intensively used as ornamental plants, these three species also have significant economic value. They are used in various industrial branches due to the oil obtained from their leaves and flowers. For this reason, they are grown in fields and gardens, sometimes as a single or a second crop.

It has also turned out that users give more space to use shrubs in the courtyard or garden of the house they live in today. This approach can depend on some reasons: The idea of adding visual diversity to the exterior, gradually decreasing the garden area which is out of hard surfaces (car park, terrace, etc.), the fact that cultural processes can be done easier and less expensive than the trees; and they do not create an obstacle for the visual objects around the house.

5. Conclusions

This study focused on determining the relations between the heritage plants existing in the courtyards/gardens of traditional public and civil architectures in a city and the urban identity as well as the changes from past to the present in terms of the species and intended use. For this purpose, a pilot study was conducted to shed light on the future conservations and management of other cities' landscapes in the example of Kahramanmaraş's historical open and green spaces.

The plants and urban identity concept has been handled in many ways, and the changes urban development process have been examined. Although this research could seem as a regional study since it is based on local and native plant species, but the method used as an empirical-based presents the applicable qualifications for broader international landscape management. It also provides suggestions for the sustainability and conservation actions of other cities of similar character in human-space-environmental integrations.

In the study, 29 heritage plants, including tree and shrub species, were identified in the outdoor areas in the historical texture. Besides this, 32 exotic new species were identified in new residential areas and public spaces throughout the city. Most of them are the plants that entered and adapted to our country and the region many years ago. They are also used frequently in landscape arrangements in the region's cities and throughout the country instead of natural and heritage species. Compared to the past, while there was no significant change in the purpose of creating a shaded and cool resting place in terms of intended use, the purpose of enhancing the visual quality of the courtyard/garden increased by 15.32%, and obtaining products decreased by 29.8%.

The overall results showed that there has been a remarkable change in the selection and intended use of plants depending on the time in Kahramanmaraş's open spaces and green areas in historical texture. The plants used in these areas gradually move away from cultural sustainability regarding species selection and intended use.

Some suggestion remarks are presented below:

- In the example of Kahramanmaraş City, concentrating on planting the species such as *Amygdalus orientalis* Mill., *Cedrus libani* A. Rich., *Cercis siliquastrum* L., *Ficus carica* L., *Juglans regia*, *Morus alba* L., *Olea europaea* L., *Platanus orientalis* L., *Pinus brutia* Ten. and *Rosa sp.*, which are regarded as native, veteran and heritage plants of the city, will provide benefit in terms of sustainabilities of city's identity and culture.
- No matter where in the world, plantings made from native and veteran species require fewer maintenance costs

because they are already the region's indigenous plants. Thereby, they will provide convenience in terms of landscape management and planning in the cities.

- As an example of Kahramanmaraş City, *Olea europaea* L. is one of the most common and representative species in open-green spaces and settlement areas. Therefore as the most representative species, Olives and their groves should be protected regarding the sustainability of the urban identity.
- The achievement of restoration in historical places depends on considering the outdoors of the buildings, the streets, the squares, and all their living and non-living elements. Therefore, architects, interior architects, landscape architects, and urban planners specializing in restoration actions must work together.

Acknowledgement

This paper is based on the first author's Ph.D. thesis under the second author's supervision. The first author would like to thank the thesis committee for their generous support and valuable comments on the study.

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