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Investigation of The Existing Use of Campus Plants: The Case of Namık Kemal University (N.K.U.)

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Abstract

The green areas and the effects created by this vegetation are factors that increase the prestige a university and that contribute meaning and identity to the campus. In this study the plant material within the campus was identified, the spatial suitability of these plants were assessed considering their dendrological and ecological characteristics and the problems and solution proposals for these problems were presented. The material is the woody plants in the N.K.U. campus. Around the concept of this study, field surveys, data collection, analysis, synthesis and evaluation were used. The points are given from 1 to 5 to the plants in the research area considering aesthetical and functional features. Their effects on the design were determined based on these scores. When the use of the plants according to the design principles is examined, it is observed that the movement control is considered at most (33.3%) whereas the physical environment control is considered at least (6.8%) in terms of the functional use. When the use of plants in terms of aesthetic quality, the color suitability is considered at most (47.0%) whereas tissue suitability is considered at least (14.5%). The results will constitute an example for the plant use in the subsequent physical progresses of the campus and contribute much to ensure the consistency in terms of planting design

Keywords: Tekirdağ, Namık Kemal University, woody plants, functional use, aesthetic use.

Yerleşke Bitkilerinin Mevcut Kullanımlarının Değerlendirilmesi: Namık Kemal Üniversitesi Örneği (N.K.Ü.)

Öz

Yeşil alanlar ve bu dokunun yarattığı kitlesel etkiler üniversitenin prestijini artıran, yerleşkeye anlam ve kimlik kazandıran unsurlardır. Çalışmada; yerleşkedeki bitki materyali tespit edilmiş, bu bitkilerin dendrolojik ve ekolojik özellikleri dikkate alınarak alandaki uygunlukları değerlendirilmiş, uygulamalarda karşılan sorunlar ve çözüm önerileri ortaya konmuştur. Materyal, Namık Kemal Üniversitesi yerleşkesi içerisinde yer alan odunsu bitkilerdir. Araştırma kapsamında arazi çalışmaları, veri toplama, analiz, sentez ve değerlendirmeden yararlanılmıştır. Alandaki bitkilerin estetik ve fonksiyonel özellikleri dikkate alınarak 1'den 5'e kadar puan verilmiştir. Bu puanlara göre tasarımlardaki etkileri ortaya çıkarılmıştır. Saptanan bitkilerin tasarım ilkeleri yönünden kullanımına bakıldığında; işlevsel kullanım bakımından hareket kontrolünün en fazla (%33.3) olduğu ortaya konulurken, fiziksel çevre kontrolünün en az (%6.8) dikkate alındığı gözlenmiştir. Bitkilerin estetik özellikler bakımından kullanımında ise, renk uygunluğunun en fazla (%47.0) olduğu tespit edilirken, doku uygunluğunun en az (%14.5) düzeyde göz önüne alındığı belirlenmiştir. Sonuçlar, yerleşkenin daha sonraki fiziksel gelişiminde bitki kullanımına da örnek teşkil etmesi ve bitkisel tasarım açısından uyum oluşturulmasında önemli katkı sağlayabilecektir.

Anahtar Kelimeler: Tekirdağ, Namık Kemal Üniversitesi, odunsu bitki, fonksiyonel kullanım, estetik kullanım.

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1. Introduction

The place and importance of plant existence from the point of human and nature relationship, have changed from past to the present day. So far, mankind, a part of nature, continued his existence compatible with nature and so it shall be. The only way of salvation for the mankind who comes to the point of breaking away from nature due to technological advancement, is again the nature. The preservation of nature is only possible by loving and thus, knowing it.

The geomorphologic structure of our country; Turkey, and its quite unique ecological conditions provide a great advantage in terms of plant resources, and this special situation supplies the country the ability to be one of the most important centers of the world in terms of plant resources. Our country is one of the countries with the richest flora in the world, with 11,000 species and subspecies taxa, including about 4,000 endemic species (Kahraman et al. 2012). The floristic richness of our country can be understood better considering the fact that continental flora of Europe has approximately 12,000 species with almost 2,750 endemic plants. Sustainable planning that ensures biodiversity should be conducted during the land use decisions to be made in our country, taking this richness into consideration. This is only possible by creating awareness in society about the importance of plant assets.

Nowadays, plants come into prominence as one of the most important components for improving the quality of life, rather than being just an urban equipment (Yılmaz and Irmak, 2004). The studies reveal that the plant material contributes significantly to the public health due to its ecological, aesthetic and functional effects on the urban ecosystem. The green areas formed by the plant material influence the improvement of the urban health by providing oxygen and the absorbing the polluted air, saving energy by balancing the temperature, contributing to the water economy by providing water circulation through evapotranspiration and reducing noise (Çelem et al., 1997; Bolund and Hunhammar, 1999). Although these ratios vary due to the plant species, it is determined that the air purification impact of the trees is 70% even though they are defoliated (Bernatzky, 1983). Some studies have shown that stress level of urban public increase in areas with high dense housing, while they get rid of stress very quickly in green areas (Ulrich, 1984). These areas, which contribute to urban ecosystem as well as supply recreation, support biodiversity by providing habitat for wild animals, connect public with nature and retrieve them from the monotony of modern life, and increase the livability of cities (Breuste, 2004; Lau and Yang, 2009).

As well as changing the urban silhouette and life, campuses that constitute an important part of the urban green areas, are small cities where young people meet their basic needs, gain daily experience, establish social communication and where the awareness of nature protection is instilled by increasing the amount of contact with the environment (Gumprecht 2007; Alshuwaikhat and Abubakar, 2008; Yılmaz, 2015; Düzenli et al., 2016). The design of these spaces varies dependent upon the necessities, and many factors that need to be overcome. However, the priority should be planning that meets the recreational needs that helps young people socialize, provides a connection between people and the environment, reduces stress, provides a peaceful environment to the users and encourages usages. As a matter of fact, the studies have determined that the frequency of the use of campus green areas increases the level of perception of the quality of life of young people (McFarland et al., 2008).

When similar researches are examined, it is observed that, mostly the topics related to campus landscape design, determination of natural and ornamental plants on campus are studied (Ünal and Gökçeoğlu 2003, Nugay et al. 2007, Fakir et al. 2009, Altay 2012, Deveci et al. 2012, Yılmaz 2015, Karaşah et al. 2016). Creating or emphasizing the spatial perception and supporting the design in outdoor designs are possible through the use of plants. Therefore, as well as the determination of the plants, the influence of their functional and aesthetic features on landscape design should also be known. The functional features of the plants come up with their contribution to the formation of space and the ecological characteristics of the area. In terms of aesthetic functions; the size, shape, color, and texture characteristics of the plants are utilized. Because, the size of the plant directly affects the use of the area. Visual interestingness is provided based on color and texture. This type of use is very important for plants with attractive autumn colors and flowers. Form is a significant aesthetic criterion in plant design. Its visual power or importance is the key factor in plant composition although it is not as important as dimensions.

Creating healthy and sustainable green spaces depends on making implementations according to the design and planning principles regarding the ecological, aesthetic and functional characteristics of the plants. In this context, this study conducted within the Namık Kemal University campus example, aims to determine

inventory of woody plants which constitute the main component of the open and green areas and to investigate their appropriate usages within the design principles framework.

2. Material ve Method

2.1. Material

The material of the study is the woody plants in the Namık Kemal University Campus. Namık Kemal University was founded in 2006, under the roof of Trakya University, on a 277.8 hectares' land of the Değirmenaltı Campus of the Faculty of Agriculture located in the central district of Tekirdağ province. The climate of area is characterized by Mediterranean type with mild and rainy winters and hot and dry summer. The university has a relatively short history but has developed quite rapidly due to the strong infrastructure of the Faculty of Agriculture established in 1982. There are a total of 34 366 students and 1 535 academic and administrative personnel, including 10 Faculties, 3 Institutes, 3 Colleges, 1 State Conservatory, 11 Vocational Schools, and 11 Research and Application Centers.

2.2. Method

Previous landscape evaluation methods based on field studies, data collection, analysis, synthesis and evaluation have been re-used in this study (Korkut et al., 2010). According to this method, Namık Kemal University campus area is divided into sections based on the land use types (Figure 1). Then, in each section, the areas where the study will be carried out, are determined and numbered for abbreviation (Table 1).

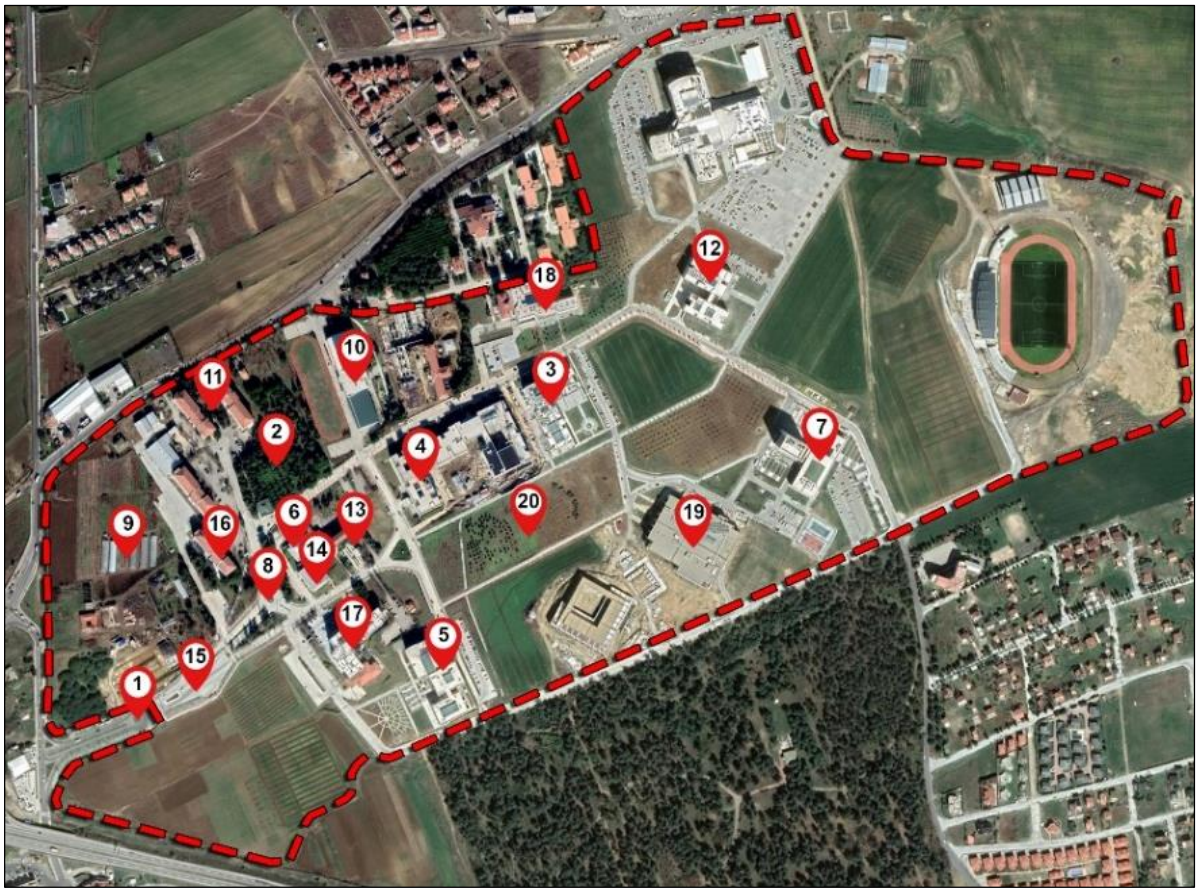

Figure 1. Research areas.

Table 1. Fields included in the study according to field use types at NKU campus and their field numbers.

Area usage types	Research areas
Educational units	Faculty of Arts and Sciences (3), Central Classroom (4), Faculty of Agriculture A Block (17), Faculty of Agriculture B Block (5), Technical Sciences (11), Faculty of Medicine (12), Faculty of Theology (16).
Administrative buildings	Rectorate (7).
Open green areas	Pine field (2), Greenhouse/ Production Area (9), Green belt (20).
Recreational areas	Pyramid Hall (6), Sports Complex (10), July 15th Educational- Culture Center (14), Dining Hall (19).
Housing areas	Hotel (13), Dormitory (18).
Road- refuge planting	Main entrance and surroundings (1), Refuges (8), Roads (15).

The planting practices that have been carried out since the foundation of the campus to the present day have been determined by land work taking advantage of the plan notes. In planting applications; the plant taxa planted in the campus and their dendrological characteristics (tree, shrub, climber; coniferous, broad leafed, evergreen, deciduous; height, form; properties of leaf, flower, fruit; colour of bark) and the functional and aesthetic uses according to plant design principles are taken into consideration. In terms of functional use; visual control (light control, confidence ensuring, curtaining, emphasizing), motion control (directing circulation), physical environment control (control of climate, noise, air pollution, erosion) and space creation features and in terms of aesthetic use; the size, shape, color and tissue suitability of plants have been evaluated. The points are given from 1 to 5 to the plants in the research area considering these features. Their effects on the design were determined based on these scores. Plants with a score of 3 and above were considered as having these functional and aesthetic characteristic.

Symonds and Chelimsky (1958), Symonds and Merwin (1963), Baytop (1984), Davis (1965-1985), Yaltırık (1993) Brickell (1996), Ansin and Terzioğlu (1998) and Yücel (2005) were used to gather information about plant material. In the stages of synthesis and evaluation, which involve the use of plants for plant design purposes, Korkut (2004), Korkut et al. (2010), Yılmaz and Irmak (2012) were used. In these research; dendrological characteristics of some plants, application areas and characteristic features were identied in terms of plant design.

Our study the plant material within the campus has been identified, the spatial suitability of these plants have been assessed considering their dendrological and ecological characteristics and the problems and solution proposals for this problems have been presented.

3.Result and Discussion

During the foundation years of the Faculty of Agriculture, planting studies were carried around block A and B and throughout the circulation area providing access to these buildings from main entrance of the campus. In these studies, street trees creating alley effect and around the buildings, plant material with aesthetic and visual value are used. During the 1990s, two separate areas of 1,000 m² were allocated for afforestation practices. Needle- leaved tree saplings, as 25- year- old trees, predominantly Pinus pinea L. planted in these areas during those years, are remarkable as they constitute the most important forestation areas of the university campus today with their mass effect. However, along those years, since a master plan for the development of the campus was not prepared, the afforestation work could not be done following a definite plan and the open and green areas could not be handled under a systematic concept. In general, these studies consisted of individual tree plantings with instantaneous decisions. For this reason, a healthy, integrated afforestation work could not be done in the campus area and a green space system could not be created.

During the establishment of the Namık Kemal University campus, a master plan of university campus was prepared and this plan was approved by State Planning Organization and put into action. After the establishment of the Parks Gardens Unit affiliated to the Rectorate, the plantation work was accelerated. Within the scope of landscape applications, 3,954 trees and 17,920 shrubs, a total of 21,874 woody plants were planted in the university campus, especially starting from 2009 (Anonymous, 2017). Many needle- leaved and broad- leaved saplings were planted along the green corridor with a width of 400 meters and a length of 90 meters, which is located among the building blocks, during the planting work started in 2015. On the other hand, planting design works are continued around the buildings completed and opened to service.

In the research, woody plants which constitute the main component of the open and green areas of Namık Kemal University campus were determined, their usage conditions were revealed, and they were evaluated in terms of planting design principles. In this context, a total of 119 woody plant taxa were identified, 90 of which were broad- leaved and 29 of which were coniferous. 98 of the plants are only species, 4 have subspecies, 2 have varieties, and 15 have also cultivars. One of the identified species, Abies nordmanniana ssp. bornmuelleriana, is an endemic species that is significant in terms of nature protection and continuation of biodiversity. The plant material in the campus is mostly composed of exotic plants. Only 36.5% of the plants are natural and are found limited within the area (Table 2). This creates some problems in terms of the adaptation of plants to the field.

The majority of the plant material of the campus consists of species in green tones such as *Acer negundo*, *Cupressus macrocarpa* "Goldcrest", *Juniperus chinensis* L., *Pinus brutia* Ten., *Pinus pinaster* Ait., *Pinus nigra* Arnold, *Pinus pinea* L., *Platanus orientalis* L. and *Tilia argentea* Desf. ex DC. However, taxa such as *Cercis siliquastrum* L., *Malus floribunda*, *Malus* × *purpurea, Prunus cerasifera, Prunus serrulata* and *Tamarix smyrnensis* that herald the coming of spring and *Acer campestre* L., *Betula pendula* Roth and *Fraxinus excelsior* L. that provide autumn coloring, accompanying the color composition.

When the use of the identified woody plants according to design principles is examined, it is observed that the movement control is considered at most (33.3%) whereas the physical environment control is considered at least (6.8%) in terms of functional use. *Cupressus macrocarpa* "Goldcrest", *Pittosporum tobira*, *Platanus orientalis* L. and *Prunus cerasifera* are the most commonly used taxa in terms of movement and orientation within the field. When the use of plants is examined in terms of their aesthetic properties, it is determined that the color suitability is considered at most (47.0%) and whereas the tissue suitability is considered at least (14.5%). However, for the design properties, differences in terms of color, texture, size, and form provide better perception of spaces. Especially at the transition points, the creation of this contrast effect leads to convenient perception.

It has been determined that the *Cercis siliquastrum, Cupressus macrocarpa* cv. "Goldcrest", *Pittosporum tobira* and *Platanus orientalis* L. taxa were used in the vast majority of the campus area. These plants are mostly used for the visual control, motion control, and space creation (Figure 2). The topiary examples of *Cupressus macrocarpa* cv. "Goldcrest" are located at the building entrances especially for visual emphasis. It has been determined that these are most frequently found at the entrances of the Faculty of Agriculture A- Block and Student Dormitories. Other topiary plant examples at the building entrances are Cupressocyparis leylandii and Cupressus arizonica (Figure 3). The excessive use of these plants at the Faculty of Arts and Sciences entrance has neutralized the emphasizing characteristic.

Figure 2. An example of plant design used for motion control

Figure 3. Some topiary examples used at the entrances of the building to emphasize the entrance

Table 2. Plant species identified in the campus and their current use.

TAXON NAME	ORIGIN	APPLICATION AREA	FUNCTIONAL USE				AESTHETICAL USE			
			Visual control	Motion control	Physical environment control	Creating space	Size property	Form property	Colour property	Texture property
Abelia × grandiflora	E	10	10							
Abies nordmanniana ssp. *bornmuelleriana*	D	6	6							
Acer campestre	D	16							16	16
Acer ginnala	E	7					7		7	7
Acer negundo	E	15, 16		15, 16		15, 16			15, 16	
Acer negundo "Variegatum"	E	13, 16		16		13, 16	13		13, 16	
Acer platanoides	D	16, 20		16			16		16	
Acer pseudoplatanus	D	16		16			16			
Acer tataricum	E	3, 9						3, 9		9
Aesculus hippocastanum	E	9, 16				9, 16	9, 16	9, 16	9, 16	9
Ailanthus altissima	D	10, 16			10, 16					
Albizia julibrissin	E	7								7
Amelanchier rotundifolia subsp. *rotundifolia*	E	9							9	
Artemisia arborescens	E	10, 16							10, 16	10, 16
Baccharis halimifolia	E	9					9			
Berberis thunbergii "Atropurpurea"	E	3, 4, 6	3, 4, 6	4, 6				3, 4, 6	3, 4, 6	
Betula pendula	D	4, 6, 17, 20	6	4, 6, 17			6, 17	4, 6, 17	4, 6, 17, 20	4, 6, 17
Betula pendula "Youngii"	E	16						16		
Buxus microphylla	E	1, 3	1	3		3		1, 3		1, 3
Buxus sempervirens	D	10, 12	10	10		10				
Catalpa bignonioides	E	16	16						16	
Cedrus atlantica	E	4, 19						19	4, 19	
Cedrus deodora	E	20						20		
Cedrus libani	D	9, 16, 20	9, 16	9, 16			16			

Abbreviation: E: Exotic plant, D: Natural plant.

Table 2. Plant species identified in the campus and their current use (continue).

TAXON NAME	ORIGIN	APPLICATION AREA	FUNCTIONAL USE				AESTHETICAL USE			
			Visual control	Motion control	Physical environment control	Creating space	Size property	Form property	Colour property	Texture property
Celtis australis	D	9, 12	9						9	
Cercis siliquastrum	D	3, 4, 6, 9, 13, 20	4, 9, 13			4, 13	6		3, 4, 6, 9, 12, 13	
Chamaecyparis lawsoniana	E	16						16		
Chamaeraps excelsa	E	6						6		
Cornus sanguinea	D	9							9	
Cortaderia selloana	E	7, 8								
Cotoneaster lacteus	E	6			6				6	
Crataegus crus-galli	E	9	9						9	
xCupressocyparis leylandii	E	9, 10, 13, 20		9, 10, 13			9	9, 10, 13		
Cupressus arizonica	E	3, 12, 20		3, 12					3	
Cupressus arizonica "Glauca"	E	9							9	
Cupressus macrocarpa	E	9		9						
Cupressus macrocarpa "Goldcrest"	E	4, 6, 10, 12, 13, 17, 18	17, 18	4, 6, 10, 12, 13, 17		4, 10, 12, 13, 17	4, 10	4, 6, 10, 12, 13, 17, 18	4, 6, 10, 12, 13, 17, 18	4, 6, 10, 12, 13, 17, 18
Cupresus sempervirens	D	13				13		13		
Cupressus sempervirens var. *pyramidalis*	D	8	8							
Elaeagnus angustifolia	D	5, 16, 20	16	5					5, 16, 20	
Euonymus japonicus "Aureus "	E	3, 6, 18	6	3, 6, 18		6			3, 6, 18	6
Fagus sylvatica "Purpurea"	E	11							11	
Fraxinus excelsior	D	16, 20		16		16	16	16		16, 20
Ginkgo biloba	E	19			19					

Abbreviation: E: Exotic plant, D: Natural plant.

Table 2. Plant species identified in the campus and their current use (continue).

TAXON NAME	ORIGIN	APPLICATION AREA	FUNCTIONAL USE				AESTHETICAL USE			
			Visual control	Motion control	Physical environment control	Creating space	Size property	Form property	Colour property	Texture property
Gleditsia triacanthos	E	9			9					
Hibiscus syriacus	E	6		6			6	6	6	
Juniperus chinensis	E	4, 15, 18	4, 15, 18	4, 15						
Juniperus oxycedrus ssp. *oxycedrus*	D	9			9					
Koelreuteria paniculata	E	16						16		
Laburnum vulgare	D	20					20			
Lagerstroemia indica	E	6		6				6	6	
Laurus nobilis	D	3, 11	3					11		
Lavandula angustifolia	D	10		10					10	
Ligustrum japonicum	E	9				9				
Ligustrum vulgare	D	6		6						
Liquidambar orientalis	D	12							12	
Magnolia grandiflora	E	5, 7	5, 7			5	7			
Malus domestica	E	9			9					
Malus floribunda	E	7, 18		18		7			7, 18	
Malus × *purpurea*	E	5		5			5	5	5	
Melia azedarach	E	9							9	
Morus alba	D	14			14					
Morus alba "Pendula"	D	14, 20	14, 20							
Nandina domestica	E	3, 6							3, 6	
Nerium oleander	D	16		16					16	
Olea europea	D	3, 19	3					3, 19		
Parrotia persica	E	3		3						
Paulownia tomentosa	E	16				16				
Philadelphus coronarius	E	6	6	6						
Photinia glabra	E	3, 18		3, 18		3, 18			3, 18	
Picea abies	E	18		18						
Picea pungens	E	9	9						9	

Abbreviation: E: Exotic plant, D: Natural plant.

Table 2. Plant species identified in the campus and their current use (continue).

TAXON NAME	ORIGIN	APPLICATION AREA	FUNCTIONAL USE				AESTHETICAL USE			
			Visual control	Motion control	Physical environment control	Creating space	Size property	Form property	Colour property	Texture property
Picea pungens "Glauca"	E	3		3				3	3	
Pinus brutia	D	2, 6, 10				2, 6, 10	2, 6, 10			
Pinus pinaster	E	2, 10				10	2, 10			
Pinus nigra	D	2, 6, 12			2	2, 6				
Pinus pinea	D	2, 9, 10, 15, 20			2	2	2, 9, 10, 15			
Pinus sylvestris	D	2			2				2	
Pittosporum tobira	E	3, 13, 14, 16, 18	13, 14, 17			13, 14, 17, 18	13	13, 16, 18		
Platanus occidentalis	E	15				15				
Platanus orientalis	D	3, 4, 7, 12, 15, 16, 20		3, 7, 12, 15		3, 4, 7, 12, 16				
Platycladus orientalis	E	9, 10	9, 10							
Platycladus orientalis "Aurea"	E	3, 20		3		20		9	3, 9	3, 9
Platycladus orientalis "Aurea Nana"	E	10	10	10		10		10	10	10
Platycladus orientalis "Pyramidalis"	E	6		6						
Populus nigra subsp. *nigra*	D	9			9					
Prunus avium	D	12							12	
Prunus cerasifera	E	6, 12, 15, 16	16	6, 12, 15, 16		12, 15, 16	6, 15, 16	15, 16	6, 12, 15, 16	6, 15, 16
Prunus cerasifera "Atropurpurea"	E	9, 20							9, 20	
Prunus x domestica	D	10, 16							10, 16	
Prunus padus	E	3							3	
Prunus persica	E	14, 18					14, 18			
Prunus serrulata	E	12							12	

Abbreviation: E: Exotic plant, D: Natural plant.

Table 2. Plant species identified in the campus and their current use (continue).

TAXON NAME	ORIGIN	APPLICATION AREA	FUNCTIONAL USE				AESTHETICAL USE			
			Visual control	Motion control	Physical environment control	Creating space	Size property	Form property	Colour property	Texture property
Pseudotsuga menziesii var. *viridis*	E	16					16			
Punica granatum	D	14								
Pyracantha coccinea	D	3, 14, 18		3, 14, 18		3, 18			3, 14, 18	
Pyrus communis	D	9							9	
Pyrus elaeagnifolia	D	9						9		
Robinia kelseyi	E	20					20			
Robinia pseudoacacia	E	3, 10, 13				13	3, 10, 13			
Robinia pseudoacacia "Umbraculifera"	E	4, 5, 17	4	5, 17	5	4	4, 5, 17	4, 5, 17	4, 5, 17	4, 5, 17
Robinia x slavinii	E	19							19	
Salix babylonica	E	11	11					11		
Santolina chamaecyparissus	E	4							4	
Sophora japonica "Pendula"	E	3						3		
Spiraea x vanhouttei	E	16						16	16	
Styphnolobium japonicum	E	9	9							
Symphoricarpos albus	E	6								11
Symphoricarpos orbiculatus	E	6			6					
Syringa vulgaris	E	9							9	
Taxus baccata	D	8			8					
Tamarix smyrnensis	D	9			9					
Tilia cordata	D	18		18				18	18	
Tilia argentea	D	7, 9, 15, 20		15		7, 9, 15	7	7, 15	9, 15	7
Viburnum tinus	E	4		4			4	4	4	
Vitis vinifera	D	15			15					
Yucca gloriosa	E	6, 16, 18	v							

Abbreviation: E: Exotic plant, D: Natural plant.

The road trees forming the space by creating alley effect have a wide coverage in the planting activities within the campus. These trees consist of *Fraxinus excelsior, Malus × purpurea, Platanus orientalis* L., *Tilia argentea* and *Robinia pseudoacacia* "Umbraculifera" taxa. In the parking lots, *Paulownia tomentosa, Platanus orientalis* L. and *Robinia pseudoacacia* "Umbraculifera" taxa were used more (Figure 4)

Figure 4. *Robinia pseudoacacia* "Umbraculifera" and *Paulownia tomentosa* samples used in parking lots

4. Conclusions

Green areas in university campuses contribute to the urban spaces due to their plant potential and species diversity. Besides, it has other impacts such as meeting recreation needs, establishing relations between people and the environment, ensuring the integrity between the structures, creating reserve areas to meet the physical development of the campus and making aesthetic contributions to the area (Karakaş, 1999; Ertekin and Çorbacı 2010). For this reason, necessary care should be given to the planting applications to be conducted within the campus and design studies should be done by taking advantage of the effects of plants such as creating space, orientation, screening, emphasizing, completing structural elements and controlling the physical environment.

In this study, for the evaluation of the woody plants of Namık Kemal University Campus, a total of 117 plant taxa were identified, 88 of which were broad- leaved and 29 of which were needle-leaved. The majority of these plants (63.5%) are exotic and there are some problems in the area in terms of ecological conditions. The plants with the most intense adaptation problem are Chamaerops excelsa and Magnolia grandiflora. In addition to this, it has been observed that the dendrological characteristics of plants have not been taken into consideration so much in some areas of the campus. However, the identification, emphasizing and strengthening of circulation of spaces are closely associated with to the color- texture- form properties of the plants.

As road tree, plants like *Malus × purpurea, Tilia argentea, Robinia pseudoacacia* "Umbraculifera", *Platanus orientalis* L. and *Acer negundo* were mostly used in the campus in order to guide the circulation by means of movement control. In these areas it has been observed that there is not much attention paid to the "size conformity" which is effective in defining the space and setting the area to human scale. Especially, it is observed that *Malus × purpurea* was weak in terms of shading and could not provide the alignment, determining the axis due to its inability to make a wide crown. However, the roadside planting composed of species in front of the Faculty of Agriculture, is a very good example in terms of the movement control. It is suggested to increase the use of natural plants along the pedestrian ways in the campus such as *Betula pendula, Fraxinus excelsior, Platanus orientalis* L. and *Tilia argentea* which create a sense of shading and space, and provide a higher visual dependent upon their autumn colors and to make hierarchical changes in the plant species used along the roads with different width and volume. Additionally, pavements and pedestrian ways should be separated from the roads by erecting green barriers and the trees planted along this zone should be selected amongst the species that increase traffic safety and provide shaded spaces in terms of size.

The other plants that do not have proper usage in terms of size in the research area and attract the most attention are *Euonymus japonicus* "Aureus", *Photinia glabra* and *Pittosporum tobira*. Frequent planting was carried out without considering their adaptation and final dimensions, which posed the risk of drying. Therefore, living spaces have narrowed as the plants have grown.

In the entrance of the building there are plants that topiary art was applied for emphasizing purposes. Nevertheless, the use of plants with intense color effect, such as *Cercis siliquastrum, Lagerstroemia indica, Malus × purpurea, Photinia glabra, Prunus cerasifera* and *Syringa vulgaris*, which are suitable to be used for

emphasis, will bring vitality to the design and eliminate the monotony. In addition, considering the situation of the plants throughout the year, the landscape will be kept colorful along the four seasons and the continuity of use will be ensured. In addition to these, applications should be made considering the form and dimensions that the plants will gain in the future. In some areas, it has been observed that this rule was ignored and therefore the plants have climbed over the border.

Trees should protect vehicles from the harmful effects of the climate. However, in the parking lots of the campus, plant designs are insufficient and technically unsuitable. These kinds of hard construction surfaces must be concealed with planting designs. It was observed that the tall trees in front of the Faculty of Theology masked these appearances, formed a background to the buildings and softened sharp surfaces.

As a result of the research, it was observed that the indigenous plant species were limited within the campus. However, the fact that the plant material is selected from the natural species will be an appropriate decision in terms of adaptation. Since the people have spoiled natural environments around their urban spaces, natural plants will not only contribute to the cease the people's longing for nature and familiarize them with nature, but also will be an appropriate use in terms of ecology. By correct-selection of plant species, landscape characters that are effective in each season will be revealed, thus, the changes in the landscape character will lead to a change in the environmental perception.

With this study, the woody plant inventory of the campus was created and it was aimed to create a model that will be effective in creating the unity in terms of plant design in the campus and to constitute an example of plant usage for future physical development of the area. As a result of the research, it will be useful to prepare plates in which the names of the campus plants in Latin and Turkish and brief information about them are written. Thus, by creating awareness about the areas exhibiting plant specimens in the campus, people will be given the chance to learn species, and this will also contribute to the formation of environmental awareness and nature conservation consciousness through the love of nature

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