

Using Indigenous Plant Species Ranging on The Campus Area of Ömer Halisdemir University in Landscape Design Works

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Abstract

Selection of plant material for landscape architecture is highly substantial. Use of species from indigenous vegetation increases chances of success in applications being an economic approach and providing the integrity of the city with its neighborhood. A previous study on flora on the campus of Ömer Halisdemir University has shown that 405 taxa from 74 families and 262 genus exhibited indigenous distribution. In this study, some of the indigenous plant species on the campus were evaluated from ecological, aesthetical and functional points of view of and 15 of them were projected to be eligible to be used in landscape areas. specified species were given below along with their Latin and Turkish names with their biological, ecological characteristics and photographs. Since they naturally range within circumstances of Niğde, their habitats were also studied and samples of landscape designs with these species were presented. The types of landscaping that can be used in the Niğde campus area are respectively: *Butomus umbellatus* L., *Colchicum triphyllum* G. Kunze, *Crocus chrysanthus* Herb., *Cyperus longus* L., *Gladiolus atroviolaceus* Boiss., *Iris orientallis* Mill., *Juncus articulatus* L., *Juncus conglomeratus* L., *Lamium orientale* L., *Phlomis armeniaca* Wild., *Phragmites australis*, *Tulipa humilis* Herb., *Typha angustifolia* L. and *Zygophyllum fabago* L. of species.

Keywords: Campus, Endemic Plant, Landscape Design, Natural Plant, Niğde.

Ömer Halisdemir Üniversitesi Kampüs Alanında Yetişen Doğal Bitki Türlerinin Peyzaj Düzenlemelerinde Kullanım Olanaklarının Araştırılması

Öz

Peyzaj mimarlığı çalışmalarında bitki materyali seçimi oldukça önemlidir. Doğal bitki örtüsüne ait türlerin kullanılması; uygulamaların başarı şansını artırmakta, ekonomik olmakta ve kent ile yakın çevresinin bütünlüğü sağlanmaktadır. Ömer Halisdemir Üniversitesi yerleşkesinde yapılan bir flora çalışmasıyla 74 familya ve 262 cinse ait 405 taksonun doğal yayılış gösterdiği ortaya konulmuştur. Kampüste bulunan bu doğal bitki türleri ekolojik, estetik ve fonksiyonel açıdan değerlendirildiğinde; 15'nin peyzaj alanlarında kullanılmasının uygun olduğu öngörülmektedir. Belirlenen taksonlar Latince ve Türkçe adlarıyla birlikte aşağıda verilmiş olup biyolojik, ekolojik özellikleri ortaya konulmuş ve fotoğraflanmıştır. Niğde koşullarında doğal olarak yetişmeleri nedeniyle habitatları irdelenerek peyzaj için kullanım tasarım örnekleri hazırlanmıştır. Niğde kampüs alanında bulunan ve peyzaj düzenlemesinde kullanılabilen türler: *Butomus umbellatus* L. (Bataklıkgülü), *Colchicum triphyllum* G. Kunze (Öksüzali), *Crocus chrysanthus* (Herb.) Herb. (Sarıçiğdem), *Cyperus longus* L. (Karatopalak), *Gladiolus atroviolaceus* Boiss. (Kıraç süseni), *Iris orientallis* Mill. (Ankara süseni), *Juncus articulatus* L. (Camışotu), *Juncus conglomeratus* L. (Hasırsazı), *Lamium orientale* (Fisch. & C.A.Mey.) E. H. L. Krause (Güzelve), *Phlomis armeniaca* Wild. (Bozşavlak), *Phragmites australis* (Cav.) Trinex Steud. (Kamış), *Tulipa humilis* Herb. (Çoban lâlesi), *Typha angustifolia* L. (Saz) ve *Zygophyllum fabago* L. (İt üzerliği)'dir.

Anahtar Kelimeler: Kampüs, Endemik bitkiler, Peyzaj Mimarlığı, Peyzaj Tasarımı, Doğal bitkiler, Niğde .

1. Introduction

Introductio Turkey has a rich biodiversity because of taking place in a important position in terms of plant geography, having differences in topography and climate. The flora of Turkey is richer than all other countries except Russia, compared to European countries and neighboring countries (Başköse et al., 2012). Turkey's natural vegetation, in general, remains under intense pressure due to urbanization in the world. The situation in our country is not different. Areas with many natural species, are becoming dense with urbanization and that causes many species to disappear. Areas with the natural vegetation are left to perish, leaving the area to concrete buildings. The nature is rapidly destroyed. Preservation of nature is ensured by making awareness of biological richness and making plans with an ecological approach (Ekici, 2010). It is known that Turkey is inadequate in taking the necessary measures to conservation of native plants or prevent the destruction of the ecology. Many professions have started various studies to protect natural species. One of these occupational groups is Landscape Architects, who are planning on preserving ecological integrity. Landscape architecture is a science and a profession for ecology-based environmental management, nature and resource conservation. The materials they use are often nature itself and the products of nature. For this reason, the importance of herbal materials, whether in urban or rural areas, is always important. Because of this, plants are indispensable elements for Landscape Architecture studies. The fact that Turkey has different geographical features, increase the diversity of plants used in landscape architecture studies, and also ensure diversity in plant species. The diversity of plant species has also changed the field of use. Some plants are preferred only because of their functional properties, while others are preferred due to

their aesthetic properties. Some plants are used for both functional and aesthetic purposes. However, the uses and the places where they are used are very different from each other (Özer et al., 2009). The university campuses, one of the urban spaces where the plants naturally grow up, have an important place in urban identity with their social and cultural activities as well as education and training activities. The fact that universities are made up of many campuses causes disarrangement and breaks the connection between places. There is a need for a landscape design to establish connections between locations and to increase the availability of common areas for all users. In addition, the planning of open and green spaces in university campuses as a park is important for the quality of life of the students and for the safety of the students. This situation is generally reflected positively in the quality of education and training (Ertekin and Çorbacı, 2010). Urban areas; squares, urban gardens, urban parks, and university campuses are significant potential areas for creating green spaces (Tanrıverdi, 1975, Pamay, 1979). As a matter of fact, a significant part of the first universities were established as campus universities, which are close to almost all the universities established today. Therefore, it has become a necessity to consider landscape planning and design principles in the planning of university campuses. According to Öztürk et al. (2015), The Kastamonu University campus area was selected as a sampling area in order to reduce the effects of ecological imbalance problems and realizing the natural landscape values in the city. It proposed that the species that were detected with both informing and aesthetic features should be assessed, providing sustainability of the species of *Hyacinthella micrantha* (Boiss.) Chouard, which is endemic, *Euphorbia cardiophylla* Boiss.&Heldr., and *Salvia hypargeia* Fisch.&C.A.Mey by protecting them using in-situ and ex-situ methods. There was an

attempt to detect herbaceous species among the natural landscape values in the area. It was further suggested that the species that were detected with both informing and aesthetic features should be assessed, providing sustainability of the species of *Hyacinthella micrantha* (Boiss.) Chouard, which is endemic, *Euphorbia cardiophylla* Boiss.&Heldr., and *Salvia hypargeia* Fisch.&C.A.Mey by protecting them using in-situ and ex-situ methods. Kurdođlu et al. (2013)'s aim is to raise awareness of the use of landscape materials of KTU campus users and their relationships with these materials. As a result of the survey conducted, in order to determine the demand and trends in usage direction; positive-negative relationships between user-plant, user-resource have been examined. Ertekin and Çorbacı (2010) a survey on the Bartın / Karabük University campus, which intend to the academic, social, artistic, cultural and sportive needs of the users in a comfortable form for each term, a landscape project has been prepared and suggestions are proposed. The aim of the study is to protect and sustain natural species. At the same time, it aims to provide scientific research and education and to guide the landscape planning to be done in the region. In short, the plant cover in the campus area of Ömer Halisdemir University has been

evaluated for its use in landscape design. The study attempted to identify species that could be used in landscape design studies from the herbaceous plant species that existed in the campus area. The aim of the study is to ensure the conservation and sustainability of natural plant species.

2. Material and Methods

In the study, ASTER, Landsat 7-ETM and SPOT satellite images of Niğde city (2016), a method for evaluating the numerical data obtained from field survey works in the framework of campus area were followed (Figure 1). Research material includes the plants that grow naturally in Ömer Halisdemir University campus area. General informations of material are below. Research area includes the campus of Ömer Halisdemir University which is about 3.5km² and Akkaya dam lake and wetlands. Climate features of the research area is hot and arid in summer. At the same time exhibiting favorable conditions of the ecological structure, it facilitates the development of vegetation and increases its diversity. The plants that make up the material of this research are herbaceous and woody plants which are suitable on landscape areas.

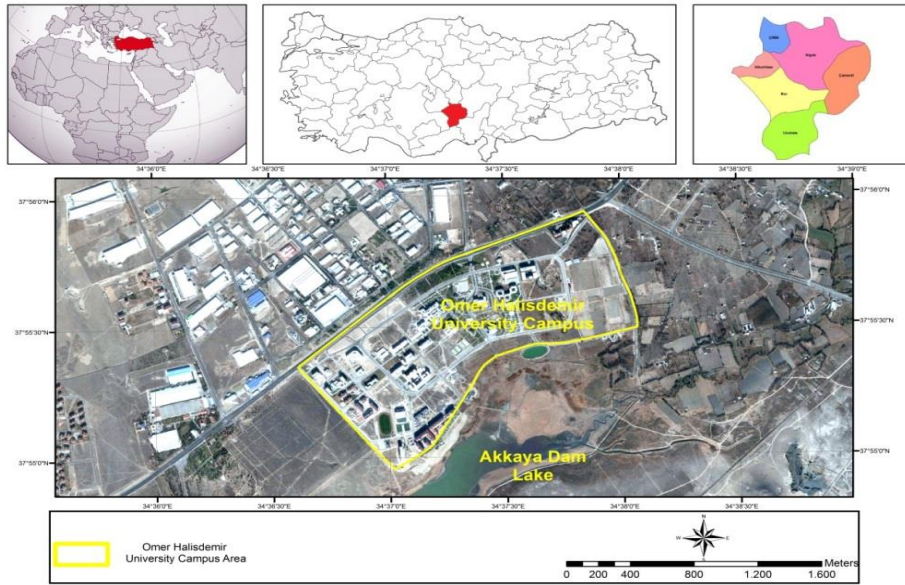


Figure 1. Research Area.

The material of this study is the plant species that are suitable for use in landscape architecture as a result of field study during different vegetation periods between March and November between 2016-2017. Because of the small work area, the field work was done every 15 days. The research method consists of three steps: field study, plant diagnosis, analysis and evaluation. Natural plant species suitable for use in landscape design have been evaluated for their use in design spaces. While determining the uses of plants in urban areas, the ecological (xerophytic, halophytic and hydrophilic), visual (length, shape of growth, form, color, smell, emphasis, fund, mobility) and functional (ground cover, curtain, shading, protection) have been taken into account. These characteristics were determined within the context of observations made in the field and literature researches. The plants identified in the study add enrichment to the urban spaces with its ecological, aesthetic and functional uses. 15 taxa belonging to 12 families, which can be used in landscape arrangements in the direction of the obtained data, have been determined. The use areas of natural plants and calendars related to flowers

are set forth and it is aimed to utilize the characteristics determined in the designs to be done.

3. Research Findings

The soil of the campus area of Niğde Ömer Halisdemir University is slightly alkaline. The problem of salinity in the soil has not been determined. Research area is generally susceptible to erosion. Soils are generally sandy loam textures (Korkanç et al., 2018). Niğde Ömer Halisdemir University's different genus and species have been identified in the campus area especially in the border region of the akkaya dam. In the campus, 15 taxa belonging to 12 families that could be used in landscape planning and design studies were identified. The characteristics of the natural species that can be used as ornamental plants in the landscape in the campus area are given in Table 1. The information about suitable species is given below.

***Butomus umbellatus* L.**



Figure 2. From *Butomus umbellatus* L. general appearance.

Stem 40-150 cm, 3-15 mm thick at base, usually overtopping leaves. Leaves 3-9 mm broad, slightly twisted, acuminate at apex, almost triangular in transverse section. Umbel (6-)10-30-45)-flowered, longest pedicels to 10 (-12) cm. *FL* 5-9. Lakes, ponds, ditches, swamps, in shallow water, s. L-2300 m. (Anonymus, 2018a)

***Colchicum triphyllum* G. Kunze**



Figure 3. From *Colchicum triphyllum* G. Kunze general appearance.

Leaves 3(-4), syaanthous, linear-lanceolate, erecto-patent and extending 2-4(-9) cm at anthesis. *Fl.* 2-4 (-6). Stony steppe, roadside banks, sandy open slopes near melting snow, 700-2100 m (Anonymous, 2018b).

***Crocus chrysanthus* (Herbert) Herbert**



Figure 4. From *Crocus chrysanthus* (Herbert) Herbert general appearance.

Corm tunic membranous or coriaceous splitting into rings at base, rings entire or toothed. Leaves 3-5(-6), synanthous, 0.5-2.5 mm broad. Prophyll absent. Bracteole present, usually much narrower than bract. Throat of perianth yellow,. *Fl.* 2-4 (-7). Open hillsides in short turf, sparse coniferous woods, scrub, s.l-2200 m. (Selvi et all., Tarihsiz).

Cyperus longus



Figure 5. From *Cyperus longus* general appearance.

Cyperus longus is an evergreen Perennial growing to 1.2 m (4ft) by 2 m (6ft 7in) at a fast rate. It is in leaf 12- an It is in flower from Aug to September. The flowers are hermaphrodite (have both male and female organs) Suitable

for: light (sandy), medium (loamy) and heavy (clay) soils. Suitable pH: acid, neutral and basic (alkaline) soils. It cannot grow in the shade. It prefers moist or wet soil and can grow in water. 1900m. (Anonymous, 2018c)

Gladiolus atroviolaceus Boiss



Figure 6. From *Gladiolus atroviolaceus* Boiss. general appearance.

Stem 30-60 cm. Leaves 3. lamina (2.5-)3.S-S(-8) ram broad, glaucous, with equidistant parallel veins. Spike 4-8 (-11) flowered, dense, secund. Perianth deep violet-purple. Fl. 3-6(-7). Fallow fields, cornfields, disturbed steppe, many calcareous slopes, roadsides, 650-2150 (Anonymous, 2018a).

Hyoscyamus reticulatus



Figure 7. From *Hyoscyamus reticulatus* general appearance (Anonymous, 2019a).

Annual or biennial, glandular-pubescent. Stem erect, 40-60 cm. Basal and lower cauline leaves petiolate, oblong or oblong-lanceolate, pinnatipartite to pinnatisect, lamina 5-15 cm, petiole not more than ½ length of lamina, upper leaves sessile, pinnatipartite, lobate or entire. Calyx 10-20 mm, in fruit 20-30 mm, not constricted at middle, teeth cuspidate, pungent, patent to deflexed. Corolla pale yellowish, soon becoming purplish violet with darker reticulate veins, 20-30 mm, almost campanulate. Stamens included. Anthers yellow. Fl. 4-8. Cereal fields, waste places,

Egypt, SW. Asia. Ir.-Tur. element. (Anonymous, 2019).

Iris orientalis Miller



Figure 8. From *Iris orientalis* Miller general appearance.

Flowers white with a large yellow signal patch in centre of falls; lamina of falls usually shorter than claw, 2.5-3.5(-4) x 1.5-2(-2.6) cm, claw usually unwinged, \pm parallel-sided, 3-4 x 0.5-0.8(-1) cm; ovary with a beak 2-3 cm; capsules 3-4 cm with a beak 2-2.5 cm. FL 5-6. Damp meadows, irrigation channels and marshes, 150-1400 m. (Anonymous, 2018a).

***Juncus conglomerate* L.**



Figure 9. From *Juncus conglomerate* L. general appearance.

Perennial, densely caespitose. Stems 40-100 cm; basal sheaths often dark brown. Stems and leaves with 12-30 strong ridges; pith continuous. Fl. 4-7. Damp places. L.-1600 m. (Snogerup et al., 2002).

Juncus articulatus



Figure 10. From *Juncus articulatus* general appearance

Perennial, caespitose or with creeping rhizome. Stems 5-60 cm, erect or ascending,

with 3-6 leaves. Leaves terete, unitubuiose, perfectly septate. Inflorescence usually broad, of 5-20 heads; heads 5-15 flowered. Fl. 4-8. By streams, wet places, s. 1.-3000 m. (Anonymous, 2018a).

***Lamium orientalis* Fisch. & Mey.**



Figure 11. From *Lamium orientalis* Fisch. & Mey. general appearance.

Stems 7-35 cm, densely to sparingly pubescent. Fl. 4-6. Dry stony hillsides, steppe, fields, vineyards, roadsides, on light soils, 700-1650 m. (Anonymous, 2018a).

***Phlomis armeniaca* Willd**



Figure 12. From *Phlomis armeniaca* Willd general appearance.

Herb to 60 cm, eglandular. Leaves with adpressed or subadpressed indumentum of short stellate hairs, \pm canescent- or whitish-tomentose beneath, basal leaves ovate-oblong to lanceolate and linear-lanceolate, obtuse to subacute, cuneate, tapering towards base, indistinctly crenulate to crenulate-serrate, 2-10 x 0.8-2 cm, petiole to 7 cm. Corolla yellow, 25-35 mm, Nutlets glabrous. Fl. 6-8. Pine woods, steppe, dry limestone rocks, corn and fallow fields, 800-2350 m. (Anonymous, 2018d).

Phragmites australis



Figure 13. From *Phragmites australis* general appearance.

Common reed are located in wetlands from the Arundinoideae subfamily; is a long, hollow plant species that grows on the edge of a lake or river. The end of summer blooms. The flowers usually open in the form of bunch or spica. It opens 40-60 cm of gray-green feathered flowers. The land where moist is abundant and well-drained also grows strong. It is also used for curtaining as a hedge plant since it forms a very frequent texture. A wind-resistant plant (Anonymous, 2012).

Tulipa humilis Herbert



Figure 14. From *Tulipa humilis* Herbert general appearance.

Tunics brittle, pale brown with a ring of hairs around basal plate and ad-pressed hairs at neck. Leaves 2-4(5), 6-20 x 0.5-2 cm, glaucous. Flower usually solitary, infundibular, mauve-or lilac-pink to pink-purple with yellow, blue or purple blotch. Fl 4-6. Rocky limestone, shaly and igneous slopes and scree, mountain steppe, open *Abies - Juniperus excelsa* forest, near melting snow-patches, 1150-3400 m. (Anonymous, 2018a).

Typha angustifolia L



Figure 15. From *Typha angustifolia* L general appearance.

Stem robust, to 2 m. Leaf blades 4-8(-10) mm broad. Female spike 13-37 cm, 1.3-2 cm diam. when ripe, dark cinnamon brown; scales filiform, equalling hairs, with an ovate-spathulate, dark brown apex. FL 6-10. Lakes, ditches, swamps, wet places, s.l.-1930 m.(Anonymous, 2018e.)

Erect, glabrous, branched, perennial herbs, 20-60 cm. Leaves petiolate, often with a rudimentary rachis projecting beyond the leaflets. Petals equalling or slightly exceeding the sepals, white or white and orange. Fl. 5-6. Waste places, steppe, 50-1000 m. (Anonymous, 2018a).

***Zygophyllum fabago* L**



Figure 16. From *Zygophyllum fabago* L general appearance.

Table 1. Natural species that can be used as ornamental plants in the landscape in the campus area.

Plant type	Family	Blooming (month)	Habitat	Endemic	Form	Use in the landscape
<i>Butomus umbellatus</i> L.	<i>Butomaceae</i>	5-9	lakes, ponds, reeds, shallow waters	Not endemic	Sparse branching spreader	Moist areas, lakes and water sides
<i>Colchicum triphyllum</i> G. Kunze	<i>Iridaceae</i>	2-4	stoned stones, road sides, melt snowy slopes	Not endemic	Sparse branching spreader	Refuge and rock gardens

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<i>Crocus chrysanthus</i> (Herbert)	<i>Iridaceae</i>	2-4	hill sides, scattered coniferous forests	Not endemic	Sparse branching spreader	For exhibition and demonstration purposes, in flower parter
<i>Cyperus longus</i> L.	<i>Cyperaceae</i>	5-9	River waters, marsh river beds, marine waters	Not endemic	Branched and creeping	At the edges of the pool
<i>Gladiolus atroviolaceus</i> Boiss.	<i>Liliaceae</i>	3-6	Crops and cereal fields, destructed steep slopes, stoned calcareous slopes, roads	Not endemic	Sparse branching spreader	Flower parter
<i>Iris orientallis</i> Miller	<i>Iridaceae</i>	5-6	wet meadows, drainage channels and marshes	Not endemic	Sparse branching spreader	On the edge of the pool, in the flower parter
<i>Juncus articulatus</i> L.	<i>Juncaceae</i>	4-8	stream edges, wet places	Not endemic	Branched and creeping	Water edges
<i>Juncus conglomeratus</i> L.	<i>Juncaceae</i>	4-7	moist places	Not endemic	Sparse branching spreader	Water edges
<i>Lamium orientale</i> Fischer & C.A. Meyer	<i>Lamiaceae</i>	4-9	Shaded, limestone and volcanic rocks, slips, pebbles, walls, ruins, river	Not endemic	sparse	Flower parter
<i>Hyoscyamus reticulatus</i>	<i>Solanaceae</i>	2-4	Stony or rocky places, cereal fields, roadsides, waste areas	Not endemic	Stem branched, densely leafy, sticky and densely pubescent	Flower parter
<i>Phragmites australis</i> (Cav.) Trinex Steudel	<i>Poaceae</i> (<i>Gramineae</i>)	8-10	lakes, rivers, pits, marshes, channel canals, sea breezes	Not endemic	Branched and creeping	In rock gardens, on water edges
<i>Phlomis armeniaca</i> Wild	<i>Lamiaceae</i> (<i>labiatae</i>)	6-8	<i>Pine woods, steppe, dry limestone rocks, corn and fallow fields</i>	endemik	Branched	Rock gardens, flower parties

<i>Tulipa humilis</i> Herbert	<i>Liliaceae</i>	4-6	calcareous rocks, hilly and volcanic slopes and pebbles, mountain	Not endemic	Sparse branching spreader	Flower parcels, in refuges
<i>Typha angustifolia</i> L	<i>Typhaceae</i>	6-10	lakes, reeds, wet places	Not endemic	Sparse branching spreader	Natural and artificial water edges
<i>Zygophyllum fabago</i> L.	<i>Zygophyllaceae</i>	5-6	barren places	Not endemic	Branched	In refugees, poor soil conditions

One of these plants, "*Phlomis armeniaca*" is an endemic species. Plant species identified in the research area are generally species that are effective with flowers. The most sought-after feature of plants used for aesthetic purposes is flower beauty. The plant, which is also influenced by its intense flowers, is used for the creation of aesthetic plant designs and the use of landscape architectural works. The plant is particularly suitable for use in parks and in intensive groups. Solitary use should be assessed especially in domestic gardens. Some of them are composed of flowers and forms and effective species. In landscaping these species are preferred because they create depth and decorative appearance. Creating depth and decorative appearance can be achieved by plant branching that creates decorative appearance with leaves, form, flowers and fruits. The orange, red colored, bunch-shaped fruit is the main element of the decorative features. They also create emphasis and focus effects with their colorful structure (Özer et al., 2009). The plants identified in the study add diversity in ecological, aesthetic and functional aspects in the campus area or urban areas of Niğde province. *Colchicum triphyllum*, *Tulipa humilis*, *Gladiolus atroviolaceus* *Butomus umbellatus*, *Iris orientallis*, *Typha angustifolia*, *Phragmites australis*, *Cyperus longus* L. *Longus*, *Juncus conglomeratus*, *Juncus articulatus*, *Crocus chrysanthus*, *Phlomis arniaca*, *Species that can be used on the roadside*, *Gladiolus*

atroviolaceus, *Colchicum triphyllum*, *Barley places*, *Zygophyllum fabago*, *Peganum harmala* are some the species that can be used in different garden types as well as rock gardens and as material in landscape studies.

4. Results

Campus areas in recent years can be called protected areas. In urban areas, restoration works are increasing due to the increase in urban population. Natural areas in and around the city are also damaged. The changes in environmental conditions human-altered sites provide specific niches, which are often colonised by exotic species rather than by native species. Many exotic species in temperate zones originating from warmer areas easily adapt to disturbed urban conditions. These species, which are imported to an area due to anthropogenic activities, sometimes cover the area more frequently than native plants (Osma, et al. 2010). In Urban areas, natural plant species are threatened with extinction. In the campus areas, it can be considered as a place where less construction is done compared to urban areas. For this reason, one of the areas where natural plant species are protected is campus areas. The use of natural flora elements in landscape planning allows urban people to be aware of and benefit from natural assets. Thus contributing to the protection of nature by providing better understanding. Plant species

naturally found in campus areas can be used economically and contributing to the sustainability of natural plant species.

As a result, it was determined that 15 plant taxon were suitable for the purpose of the study. The species detected in the campus before the beginning of the study, particularly endemic (*Phlomis armeniaca* Wild) or Least concern (*Butomus umbellatus*, *Cyperus longus* L., *Juncus articulatus* L., *J. Conglomeratus* L., *Typha angustifolia* L.) should be reproduced by being cultured. These species should be evaluated in the design or planning works with certain aesthetic and functional qualities. The use of these plant species have an importance for landscape architecture studies in terms of the protection of plant species and the establishment of applications similar to natural structures with low maintenance and installation costs (Deniz and Şirin, 2005). Natural plant species have many benefits such as easy and good adaptation to environmental conditions, fewer maintenance demands compared to foreign origin plants, more durability and being shelter and food source for wildlife (Barış, 2002). Significant point of the study is providing sustainability of natural landscape areas.

- The campus landscaping project should create a good city campus which is well associated with the environment at the upper scale. At the subscale it should use and develop the own potential.
- The newly planned university campus should strengthen plant image of the city which covers the environment of the city and accept it. Also it should brought to the fore the native herbaceous species.
- Furthermore, increasing the plant knowledge of persons who study, lecture, and work in various scientific branches should be considered as a fact that would bring environmental sensitivity.

- A large part of the budget should be allocated for landscaping in the campus area, resulting in a wide-open green outdoor area for plants.

It will be possible to provide sustainability through planting works to support and protect natural areas but only in this manner (Öztürk and Bilgili, 2015). As a result, the use of natural plant species in landscape planning and design for conservation and sustainability, which is necessary for the adaptation of plants to exotic nature, is also important in terms of conservation of species.

5. References

- Anonymous, 2012. T.C. Su Kenarı ve Su İçi Süs Bitkileri Yetiştiriciliği 622B00182. Milli Eğitim Bakanlığı. Tarım Teknolojileri,
- Anonymous, 2018a. <https://turkiyebitkileri.com>
- Anonymous, 2018b. <http://www.illinoiswildflowers.info>
- Anonymous, 2018c. Plants For A Future (<https://www.pfaf.org/user/AboutUs.aspx>)
- Anonymous, 2018d. <https://www.turkiyebitkileri.com/tr/foto%C4%9Fraf-galerisi>
- Anonymous, 2018e. Lesser Bulrush. <http://www.luontoportti.com/suomi/en>
- Anonymous, 2019. <https://www.turkiyebitkileri.com/tr/foto%C4%9Fraf-galerisi/view-album>
- Anonymous, 2019a. Dogalhayat.org
- Barış, M.E. 2002. Yeşil alan uygulamalarında doğal bitki örtüsünden yeterince yararlanılmıyormuyuz? II. Ulusal Süs Bitkileri Kongresi. S: 91-95, Antalya.

- Deniz, B., Şirin, U. 2005). Samson Dağı Doğal Bitki Örtüsünün Otsu Karakterdeki Bazı Örneklerinden Peyzaj Mimarlığı Uygulamalarında Yararlanma Olanaklarının İrdelenmesi. ADÜ Ziraat Fakültesi Dergisi 2005; 2(2) : 5 - 12
- Ekici B. 2010. Bartın Kenti Ve Yakın Çevresinde Yetişen Bazı Doğal Bitkilerin Kentsel Mekânlarda Kullanım Olanakları Süleyman Demirel Üniversitesi Orman Fakültesi Dergisi Seri: A, Sayı: 2.ISSN: 1302-7085, Sayfa: 110-126
- Ertekin, M., Çorbacı, Ö.L. (2010). Üniversite Kampüslerinde Peyzaj Tasarımı (Karabük Üniversitesi Peyzaj Projesi Örneği). Kastamonu Üni., Orman Fak. Dergisi, 2010, 10 (1): 55-67 Kastamonu Univ., Journal of Forestry Faculty
- Korkanç, S., Aksoy, E., Altınköse, S. 2018. Niğde Akkaya Barajı Havzasında Arazi Kullanımı/Arazi Örtüsü Değişiminin Bazı Toprak Özellikleri Üzerine Etkileri. Ömer Halisdemir Üniversitesi Mühendislik Bilimleri Dergisi, Cilt 7, Sayı 1, (2018), 34-45
- Kurdoğlu, B.,Ç., Işık, Ö.B., Bayramoğlu, E. 2013. Doğal-Yapay Peyzaj Materyalleri ve Kullanıcı İlişkisi: KTÜ Kanuni Yerleşkesi Örneği. Kastamonu Üni., Orman Fakültesi Dergisi, 2013, 13 (1): 164-174.
- Osma, E., Özyiğit, İ., Altay, V.A., Serin. 2010. Urban vascular flora and ecological characteristics of Kadıköy district, Istanbul,Turkey. Maejo Int. J. Sci. Technol. 2010, 4(01), 64-87.
- Özer, S., Atabeyoğlu, Ö., Zengin, M. 2009. *Prunus spinosa* L. (Çakal Eriği)'nin Peyzaj Mimarlığı Çalışma Sahasında Kullanım Olanakları. GOÜ. Zir. Fak. Der., 2009, 26(2), 1-7.
- Öztürk, S., Bilgili,B. 2015. The Use of Natural Plant Species of Kastamonu University Campus in Landscape. Kastamonu Üni., Orman Fakültesi Dergisi, 2015, 15 (1): 175-182
- Pamay, B., 1979. Park-Bahçe ve Peyzaj Mimarisi. İstanbul Üni. Orm. Fak., Yay. No : 264, 89-120, İstanbul.
- Selvi, S., Satıl, F. Tarihsiz. Balıkesir'de Yetişen *Crocus* L. (Iridaceae) Türlerinin Morfolojik Özellikleri ve Tehlike Kategorileri. (dergipark.ulakbim.gov.tr)
- Snogerup, S., Zika, P.f., Kirschner, J. 2002. Taxonomic and nomenclatural notes on *Juncus*. Preslia, Praha, 74: 247–266, 2002
- Tanrıverdi, F. 1975. Peyzaj Mimarisi. Atatürk Üni. Zir. Fak., Yay. No : 196, 369 s., Erzurum.