Investigation of the Recreational / Educational Values of Botanic Gardens; Case of Malaga University Botanic Garden, Spain

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ABSTRACT

In the fast growing and developing urban areas, the quality of green areas is decreasing, while leading the connetion between people and the nature to be lost. For this reason, the term “botanic garden” has gained more importance for endearing the nature to urban dewllers, to introduce plant spcies, while also providing the opportunity to carry out studies in the field of botanic by means of protecting the gene and biological diversity of plants. The botanic gardens provide lost of information on plant species, plant compositions, seaonal changes and breeding environments, while also offering various opportunities in terms of recreational aspects for the users. In this study, the Botanic Garden in the Campus of Malaga University is analyzed, while also examining the recreational opportunities presented by this area to the students, academicians and the visitors in the campus. Additionally, the design criteria of the area, along with the structural elements, living environments of plant materials, their compositions and botanical characteristics have been investigated. In the conclusion part, the contribution that the botanic gardens provide for students, researchers and the visitors in terms of educational and recreational aspects aspects has been set forth. Moreover, it is highlighted that twith the plant species that these areas possess, would the bio-diversity in the world be enhanced.

Keywords: Botanic garden, Recreation, University campus, Malaga

INTRODUCTION:

Ensuring the connection of people with the nature and being recognized as the key element of urban eco-system, the open-green areas contribute into the public health, life quality, landscape, as well as the sustainable development with its environmental quality (Karaşah 2014). Sustainability means adopting practices that balance environmental, economic, and social impacts (Arici 2023). The excessive use of natural resources occasioned by rapid economic growth has damaged the environment and raised many environmental concerns (Panwar et al, 2011). The green areas present a number of tangible and intangible ecosystem services such as recreational opportunities, facilities, elimination of the air pollution, balancing the oxygen and carbondioxyde in the atmosphere, re-ensuring the soil moisture and underground water, flood control, while also improving the quality of wildlife and physical & mental health of people

(Karaşah 2014). Parks, squares, pedestrian areas, zoos, botanic gardens, cemetaries and playground can be shown as examples for urban open green areas (Coşkun Hepcan, Özkan 2005).

Botanic gardens are focused on scientifically recorded living specimens and mostly protected plants that can be studied by biologists from various disciplines including taxonomy, ecology, genetics and conservation (Al Farhan et al. 2008). Botanic gardens have knowledge and skills and run activities that help in our understanding of nature, in conserving species and in informing the public on issues related to climate change (Schulman et al. 2012). Botanical gardens may play a major role in the survival of plants in areas where populations of many plant species are on the verge of extinction and in a world of declining biodiversity, initially as safe havens for endangered plants but increasingly as centers for scientific research and education. Besides the disciplines listed above, education can cover a broad range of topics including plant geography, biodiversity, ethnobotany, horticulture and landscape design (Al Farhan et al. 2008). Botanic gardens draw a wide range of domestic and foreign tourists, as well as frequent local visitors. As both conservation and education are among the priorities of botanic gardens, they are potentially well placed to give conservation awareness to the community, to create attitudes toward conservation, and to promote public support for conservation efforts. (Al Farhan et al. 2008). Public gardens, parks, and botanic gardens reach a large number of domestic and foreign tourists around the world, with Botanic Gardens Conservation International reporting that visits to botanical gardens and arboretums are about 250 million annually. (Connell and Meyer, 2004).

While providing a space for the protection of nature and study area for endangered species through the plants and seeds as a live laboratory, the botanic gardens are also the spaces where the society's awareness is raised on protection, usage and education, as well as providing the opportunity to carry out scientific researches (Muşdal 2019). Additionally, the botanic gardens ensure not only raising the awareness on the protection of plants and habitats, but also enabling the suers to gain various experiences that effect their behaviors and social values (Müminoğlu, Tahta 2018; Willison 1997). According to another definition, the botanic gardens are the established spaces that enable the natural and cultivated plants to be grown in line with their existential purposes, while educating the visitors through introducing these plants, providing information albeit it is limited, providing recreational activities, and carrying out scientific researches on the plant species for various purposes (Ünlü 2016).

The International Botanic Gardens Portection Union is defined as the group of establishments where the botanic gardens and plant collections are protected and exhibited, which possess various certificates for educational and scientific researches (Var and Karaşah, 2010). Dating back to the historical development in hundreds of years, the botanic gardens have globally become the leading establishments in the fields of protection, scientific research, education and recreation. Botanic gardens play more and more crucial roles in terms of ensuring a scientific basis for the protection of plant diversity and sustainable usage. With a public awareness raised on the matter of biodiversity, they have become significant areas for the public (Muşdal 2019). Botanic gardens and arboretums are different from parks. In that, these are arranged not as landscape or playgrounds, or other recreational activities in general, but according to the scientific relations of plant collections. One of the traditional practices in spreading a botanic

garden is to gather the trees and the bushes in a specific part of the garden. Mostly, the trees and bushes are used for improving the landscape effects by means of being spread through herbaceos colletions in their taxonomic groups throughout the garden (Özgenç 2019).

Crane et al. (2009) claim that "work in botanic gardens and arboreta has not been more critical at any other point in history." Society is being increasingly disconnected from both the nature experience and the knowledge of the natural environment. Green plants have become the dominant and most prominent elements of terrestrial ecosystems; however, in high school and university biology courses they are mostly neglected. Bennett (2014) surveyed 1,500 university staff, graduate students, government employees, and NGOs. One of the results was the "The utmost need for botanically qualified experts." More than 90 percent of government workers surveyed reported that their departments lacked the botanical knowledge to fulfill their current management or research needs. They also found that "technical expertise, plant identification ability and general botanical knowledge" were among the skills employers needed. Any and all the subjects appropriately suited for programs of botanical garden education.

Over the past few decades, botanical gardens worldwide have acknowledged the need to take on the task of undertaking a global conservation mission. For the first time jointly, this mission was articulated in The Botanic Gardens Conservation Plan (IUCN-BGCS and WWF 1989), which was widely contributed, reviewed and accepted by botanical gardens around the world (Wyse Jackson and Sutherland, 2000). One of the suggestions presented by IUCN and WWF is on establishing botanic gardens particuarly for countries with enriched tropical flora (IUCN, 1989; Karaşah 2014). The botanic gardens in such countries bridge over the way to maintaining the supporting systems for main ecological process and the life, while also protecting the genetic diversity (Karaşah 2014). It can be clearly seen that the origin of the first gardens base on the close relation between the human health and the plants. In that, the interest of people in the plants started with medical purposes apart from feeding. As a result of this start, it can be agrred that the first botanic gardens have been established by means of gathering useful plants (Muşdal 2019). Examining the history of botanic gardens, it is thought that the origin of them base on the close relation between human health and the plants, and that these medical-oriented gardens were established by Theoprast the philosopher between A.C. 372-287 (Ölçal 2003). Botanics, as a science field, has been developed after people started to analyze plants for medical purposes. The first botanic gardens in the worls have been established to provide materials for students in the faculties of medicine, to collect the plant spcies and to introduce the same (Ünlü 2016).

Botanical gardens with stunning landscapes are ideal places to relax. In addition, there are so many kinds of flowers that bloom almost all year round; people can see various unique, unusual, and uncommon species in gardens. The first true botanical garden was established at the University of Pisa in Italy in 1543, and laid out by Luca Ghini. Soon the Universities of Florence ve Padua followed the precedent set at Pisa and in 1545 built their own theri garden. In around 1566 Rome founded its garden, and in 1567 Bologna. Leiden was established in 1587, and the botanical gardens in Oxford were completed in 1633 (Var, 2013). Taking into account the potential benefits of interacting with nature and the environment in terms of cognitive and a ective growth, we suggest that botanical gardens become a place of regular and scheduled

educational activities. From the point of view of design, the role of exhibition plants in a botanical garden could shift productively from an object-focused design to a visitor-focused approach in which the very nature of the visitor experience turns into the driving force. In this regard, the design of the botanical garden should endeavor to provide a structure for intentionally organizing the experiences of visitors in ways to encourage them on an emotional level and thereby attach personal memories to the visit experience and the physical setting (Blaszak et. al., 2019).

Botanic Gardens are recognized as the Living Laboratories. While a botanical library and herbarium may form the basis of botanical education, a garden must complement them. The eminent ecologist Frederick Clements (1911) stated, "Without adequate greenhouses as well as gardens, starting botany can not be properly taught." He further claimed for replacing manuals and seminars with hands-on plant experiences. Botanical gardens are not a replacement for studying in natural environments, but should be regarded as complementary, and they bring the latter many benefits. Among the advantages of botanical gardens are: (Bennett, 2014)

Convenience and accessibility: University / garden collaborations allow students and faculty to easily visit collections, particularly when gardens are on or near the campus. Training time is minimal, and every hour of traveling to a field site means 1 hour less study time. In addition, the gardens are built to make the collections of plants easy to access.

Diversity: Many natural areas are rich in species, particularly those closer to the tropics but few are equal to the density of the garden species. For most natural systems the vegetation is dominated by a few species. There is a higher equanimity in gardens, where fewer individuals of one species per area equate to more total species.

Global perspective: Students will appreciate Chusquea from Chile, Eupatorium from Europe and Juniperus from Japan in a temperate North American garden. Visitors can encounter Brassavola of Brazil, Cola of Cameroon, or Veitchia of Vanuatu in a tropical garden. The equivalent of circumnavigating a global climate belt may be a few hours of strolling through a garden. Climate-controlled glasshouses may expand the tour to include much more of the diversity around the world. Most forward-thinking gardens now often contain locally grown plants.

Repeat visits: Students should return to a garden for further research and examination, due to their convenient locations and accessibility. Learning plants becomes much easier when their names and roots are imprinted on a metal seal. Serious students come back to the garden long after their final degree was recorded.

Aesthetics: The beauty of the learning environment is an understated part of education. One way to improve learning is by developing a physical atmosphere that facilitates learning and promotes it. In a botanical garden, teaching about plants makes sense owing in part to the accessibility of living material. Moreover, the garden area is more than a source of content for pedagogy. What the gardens is also a respite from the usual learning atmosphere that can promote focus, reduce distractions and motivate students.

Outdoor learning: Outdoor learning is best accomplished while outdoors. Most people have limited knowledge of the common organisms, especially the plants surrounding them. Students learn about living organisms more effectively as they meet certain species in the field components in courses allow students to bring what they have learned into the classroom. In addition, college-level field courses can increase academic interest and attention in environment-focused humanities courses including environmental history, philosophy, and literacy.

MATERIAL AND METHOD:

This study was carried out at the Botanic Garden of Malaga University campus in November 2019. The main material of the study comprises of the landscape design principles, along with the structural and plant materials used in the Botanic Garden of Malaga University.

The methodology of the study comprises of the phases of literature research, onsite observation, photography, collecting data from the institution and analysis of the data collected. The following phases were completed within the scope of the study:

- Field – Research study
- Categorization of the plant groups in every set,
- Identification of the plant species in every category,
- Technical drawing of the settlement layout on Autocad 2018,
- Marking the parquets with different colors in line with the list of plants and processing the same on the settlement layout,
- Presenting the names, familias and life forms of the native and non-native plants in the areas as attached to the study.

Figure 1. Case Area, Malaga University (Earthpro, 2021)

In accordance with the data obtained, the contribution of the botanic gardens in the University for students/academicians and the environments have been analyzed, thus developing suggestions accordingly.

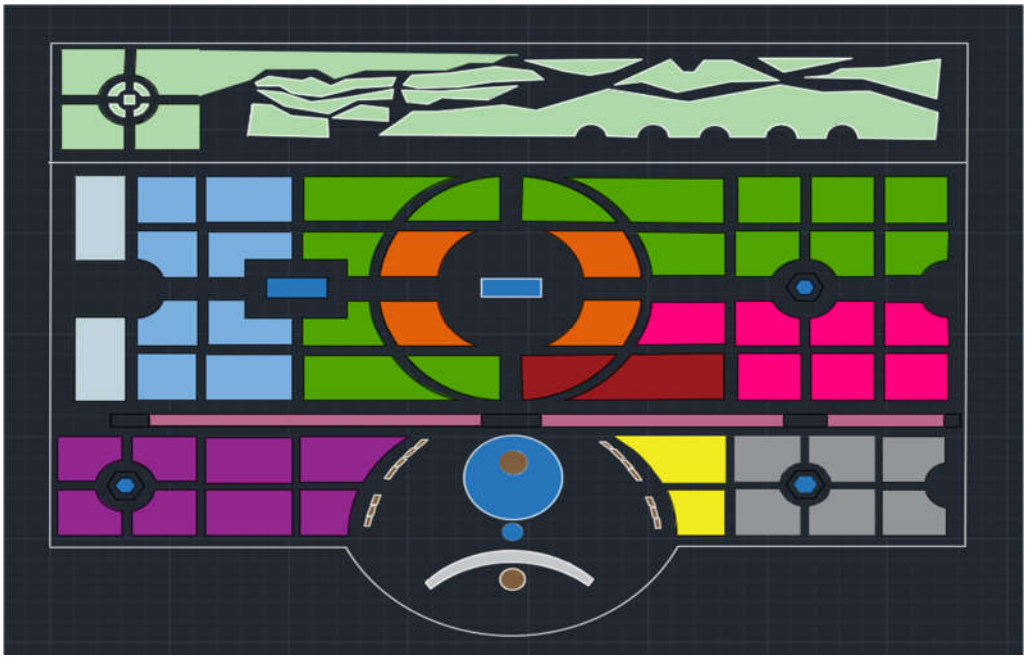


Figure 2. Structural and Plantal settlement layout in the study area (Original, 2021)

DISCUSSION

History of the Botanic Garden in Malaga University - Spain

According to information gathered from the Botanical garden's education office and official web page of garden; in the historical process the botanic gardens in Europe have been used as the centers of medicinal plants in particular, in line with educational and experimental purposes. Today, on the other hand, the botanic gardens used as research centers in university campuses aims at protecting the natural heritage that is rare, under threat of extinction and endangered.

- 1973 - The historical resources both in written and visual form mention the botanic Garden in Madrid, Calle de la Victoria, with many native and non-native plants gathered.
- 1876 - Malagueña Science Association, under the chair of Dr. Domingo de Orueta, suggested the establishment of a Botanic Climatization Garden in the small garden of the Military Hospital and in Victoria Church.
- 1940 - Dr. Laza Palacios suggested the purchasing of a suitable land for establishing a Climatization and Trial Garden under the supervision of Finca de la Concepción “University Institution” on behalf of the High Commission of Scientific Researches.
- 1971 - Prof. Gallego Morel, as the Chancellor of Malaga University, re-proposed the item for the agenda from 1940.
- 1975 - The City Council of Malaga decided to establish a Botanic Institute in the garden of Cultural Foundation.
- 1981 –The field-research studies were kicked-off in order to establish a botanic garden within the borders of Malaga University Campus.
- 1997 - The construction works of the Botanic Garden of Malaga Universite started on a land of 1.5-hectare located between Teatinos campus and the Faculty of Science & Literature.

The formal opening of the Botanic Garden was held on 22nd June 2015 with the attendance of Dear Adelaida de la Calle Martín, as the Chancellor of the University.

Functionality Features of Botanic Garden of Malaga University

Gardens specializing in primarily displaying rose genus plants and varieties are called rose gardens. Since ancient times the different species of this genus have been used as a sign of beauty and fragrance, so it has a long tradition of symbolism and significance (for the Greeks and Romans this genus symbolized their love goddesses; Aphrodite and Venus).

The University of Malaga's Botanical Garden has activities and workshops that target various educational levels. These activities are tailored to each level and complement the basic

knowledge, which students obtain on the school agenda, while at the same time promoting and awakening the students ' interest in the wonderful world of plants.

Besides workshops and programs for the different educational levels, the Botanical Garden has practical lessons for small groups who want to know more about the world of plants. The Botanical Garden currently concentrates on the following groups:

- Active participation centers
- Special education center
- Associations
- Neighbor communities
- Foundations
- Private collectives

Landscape Design Properties of the Garden

The layout-planning scheme of the 1.5-hectare area, assigned for the establishment of a botanic garden, bases on the designing principles of Islamıc gardens. Comprising of 3 sets, the garden has fruit trees in the first two sets, along with the aromatic, wintergreen and deciduous plants on a systematical order. On the third set, collections where the cactus from Iber Peninsula, along with the biological diversity, stone paving and thermo Mediterranean ecosystems stand out can be seen.

Figure 3. Construction Phase of the Botanic Garden of Malaga University (Offical Wesite of Botanic Garden, 2022)

A large pergola is placed in the center of the second set in a manner covering the whole pool. This element has been dedicated to “Ebu Muhammed Abdullah bin Ahmed bin el-Baytar” who was reognized as one of the most important botanists and pharmacologists of the Medieval History in Iber Peninsula, while his name is given to this pergola.

Figure 4. “The Pergola Dedicated To Ebu Muhammed Abdullah bin Ahmed bin el-Baytar (Original, 2019)

Since the Islamic gardens are generally built in hot and arid climate regions, the main theme of these gardens have come forth as the water and shadow elements. The most crucial element of these gardens is the usage of water. Channels that intersect each other through vertical lines comprise the geometrical garden design. The basis of the botanic garden plan in Malaga Univeristy comes from the Chahar Bagh planning scheme used in the Islamic gardens. There is a rectangular fountain pool under the Ahmed bin el-Baytar pergola at the center of the garden, and liveliness has been brought into the garden by means of connecting the channels and the water to the other sections. The main channel has been shaped in accordance with the land slope, while the secondary channels have been designed by means of being connected to various pools in parallel and in vertical stand to the slope. However, it can be clearly seen that major differences can be spotted on the design. The channels enabling the circulation of the water in the garden are not shaped as pool-looking streams, and the channels are covered with grids. With fences around the parquets made of plant materials, the formal planning scheme has been enabled to become more apparent.

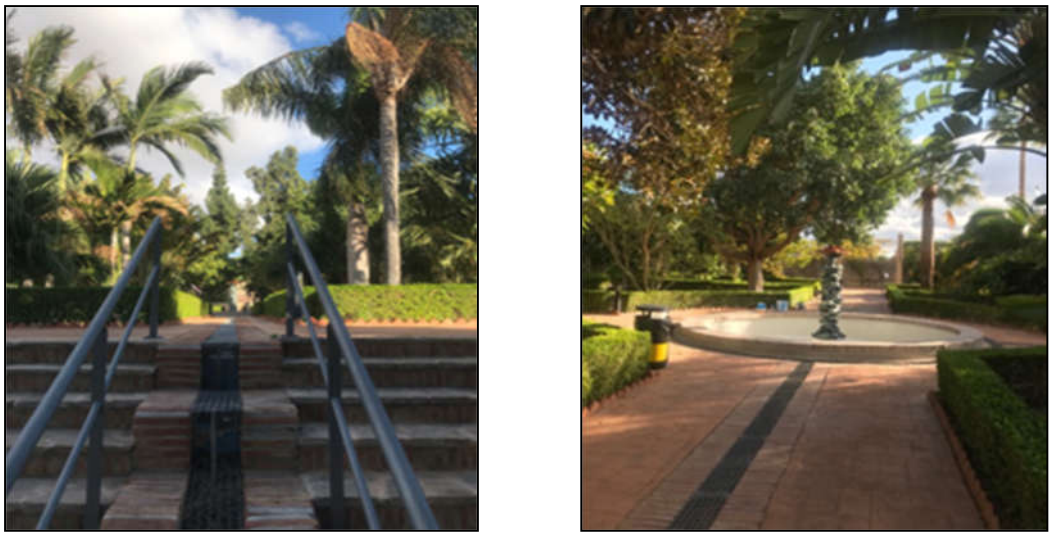


Figure 5. Water elements used in the second set garden (Original, 2019)

Notwithstanding that the basis of the garden plan seems to be in harmony with the Islamic garden plan, the Bonsai tree within the round-shaped parter in the entrance of the garden, along with two nested round-formed Water-lily pool Pal Parquet which have been designed with a modern perspective in the first set completely differ from the characteristics of Islamic garden design. However, there is also a fountain pool design made of marble, which can be usually seen in the Islamic garden designs (see. Fig. 6).

Figure 6. Entrance of Botanic Garden (Original, 2019)

Examining the second set of the garden in terms of landscape design principles, it can be understood that the basis of the design has been laid on a formal planning scheme; however, various differences can be spotted on the other sets. The completely third set in particular comprises of informal parquets, while the only plant species included in the design are cactus and succulent. Comprising of approximately 100 different cactus species, this area is one of the most attention-grabbing parts of the garden in terms of both design aspects and the diversity of plant species used.

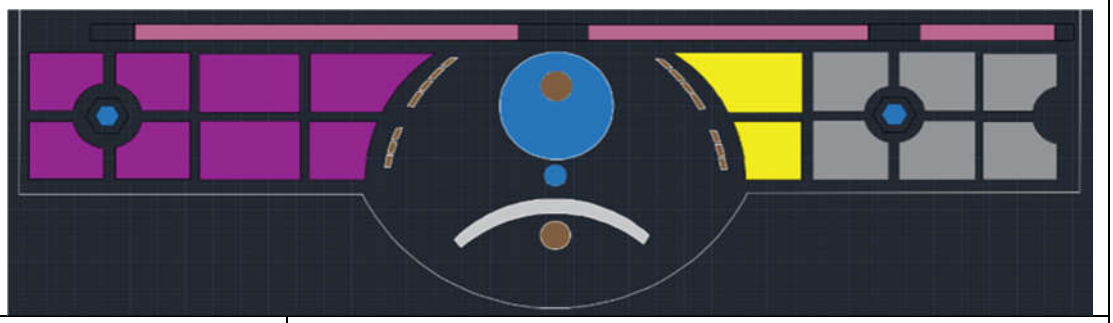
Classifications are made by various environments and ecoles for the plant species, albeit with minor differences. The plant spcies are planted to the parquets in the Malaga Botanic garden, which are planned as groups (Order). According to this classification, the botanic gardens hosts 442 plant spcies from 82 family which come from Rosidea, Dicotyledonae, Cycadynae,

Coniferae/Pinophyta, Rosids, Asterids, Magnoliids, Commelinids, Monocots, Caryophyllales species groups.

The Plant Materials in the First Set Garden

Covering an area of approximately 5.000,00 square meters, the first set garden has various plant species in different parts of the parquets. Based on a settlement layout, a list of plant species has been constituted by means of marking the plant classes with specific colors for each parquets.

Table 1. The First Set Plan in Malaga Botanic Garden (Prepared by the authors, 2021)

First Set Garden		
	Plant Groups	**Plant Species**
	Rosidae	Along the first set of the botanic garden, roses with variety of multiple flowers have been used for enabling direction. These species are as follows. Bu türler Rosa hybrida Hort. 'Cosmos', Rosa hybrida Hort. 'Jubile du Prince de Mónaco, Rosa hybrida Hort. 'Marcel Pagnol', Rosa hybrida Hort. 'Philippe Noiret', Rosa hybrida Hort. 'Prestige de Lion', Rosal híbrido del té 'Michalangelo', Rosal miniatura ´Baby Baccara´, Rosales floribunda, Rosales floribunda 'Arlequín', Rosales floribunda 'Astronomia', Rosales floribunda 'Boteror.
	Dicotyledonae	A plant group that belongs to the Angiospermae taxon, with flowering plants. Many similar plant species can be seen in this group. The related taxons are as follows. Hypericum patulum Thumb., Brachychiton x roseus J.P., Hibiscus tiliaceus L., Hibiscus elatus Swartz., Tilia oliveri Szysz., Pseudobombax ellipticum (HBK.) Dugand, Brachychiton bidwillii Hook., Brachychiton discolor F. Muell, Dombeya natalensis Sond., etc.
	Cycadynae	Plant species with palmate leaves can be seen in this group. Some of the species are as follows: Cycas revoluta Thunb, Encephalartos ferox Bertol., Dioon edule Lindl., Dioon

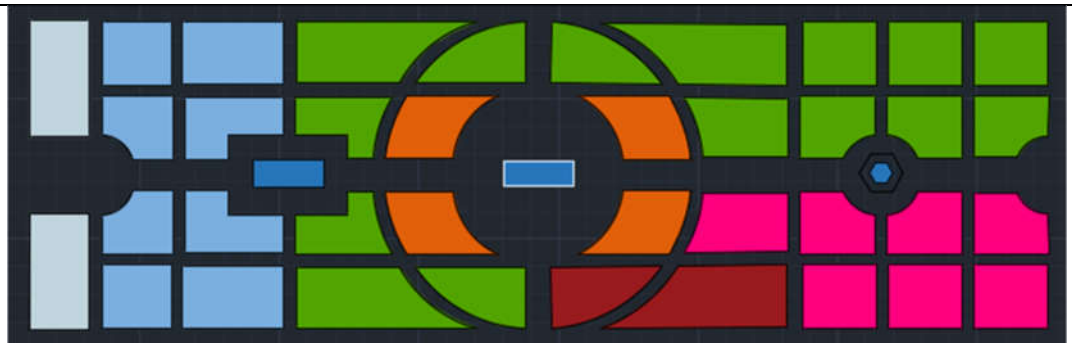
		spinulosum Dyer, Dioon rzedowskii De Luca. A., Zamia vazquezii D.W. Stev.
	Coniferae/Pinophyta	In this group, cone-bearing Gymnosperm plant species can be seen. These species are as follows. Abies pinsapo Boiss , Cephalotaxus harringtonia K. Koch 'fastigiata', Pinus pinea L., Araucaria heterophylla (Salisb.) Franco, Taxus baccata L., Chamaecyparis lawsoniana (Murr.) Parl., Araucaria angustifolia (Bertol.) Kuntze, Pinus canariensis Sm.
	Pool	There are polygonal pools in two symmetrical positions and circular pools in two different sizes.

Figure 7: Plant samples included in the lots (Original, 2019)

The Plant Materials in The Second Set Garden

Covering an area of approximately 6.000,00 square meters, the second set garden has various plant species in different parts of the parquets. Based on a settlement layout, a list of plant species (Figure 9) has been constituted by means of marking the plant classes with specific colors for each parquets.

Table 3. The Second Set Plan in Malaga Botanic Garden (Prepared by the authors, 2021)

The Second Set Garden Plan	

The Plant Materials in the Third Set Garden

	Plant Groups	Plant Species
	Rosids	The plant species are as follows: Quercus robur L., Quercus suber L., Quercus faginea Lam., Quercus canariensis Willd., Ficus lyrata Warb., Casuarina equisetifolia L., Maytenus senegalensis (Lam.) Exell, Ficus carica L., Bauhinia variegata L., Malvaviscus penduliflorus DC., Rhaphiolepis umbellata (Thunb.) Makino, Raphiolepis x delacourii André, Photinia serrulata Lindl., Cotoneaster horizontalis Decne., Elaeagnus × ebbingei Boom. 'Variegata', Melia azedarach L., Buxus balearica Lam., Cottinus coggygria (Scop.).
	Asterids	The plant species in this group are as follows: Plumeria Alba L., Symphoricarpos albus (L.) S.F. Blake, Eranthemum puchellum Andrews, Buddleja officinalis Maxim., Iochroma cyaneum (Lindl.) M. L. Green, Osmanthus heterophyllus (G.Don) P.S. Green, Tithonia diversifolia (Hemsl.) A. Gray, Symphoricarpos racemosus Michx, Westringia fruticosa (Willd) Druce, Spathodea campanulata P. Beauv, Tecoma stans (L.) HBK, Plectranthus amboinicus (Lour.) Spreng., Russelia equisetiformis Scheltdl & Cham., Tabebuia impetiginosa (Mart. ex DC.) Standl.
	Magnoliids	Some of the species in this group are as follows: Magnolia grandiflora L., Berberis thunbergii DC, Annona cherimola Mill., Mahonia aquifolium (Pursh) Nutt. 'Atropurpurea', Nandina domestica Thunb., Cocculus laurifolius A. DC., Cinnamomun camphora (L.).
	Commelinids	Some of the species in this group are as follows: Chambeyronia macrocarpa (Brongn.) Vieill. et Becc., Sabal mauritiiformis (H. Karst.) Griseb. et H. Wendl., Latania lontaroides (Gaertn.) H.E.Moore, Dypsis decaryi (Jum.) Beentje & J. Dransf., Alpinia zerumbet (Pers.) Burtt et Sm., Canna x generalis L. H. Bailey, Chambeyronia macrocarpa (Brongn.) Vieill. et Becc., Washingtonia robusta H. Wendl.
	Monocots	Dracaena marginata Lam., Aloe vera (L.) Burm. f., Yucca elephantipes Regel, Aloe saponaria (Ait.) Haw., Aeonium arboreum Webb & Berthel., Agave filifera Salm-Dyck, Dasylirion serratifolium (Karw. ex Schult. f.) Zucc., Agave ferox C.Koch, Hesperaloe parviflora (Torr.) Coult., Aloe x spinosissima A. Berger, Aloe brevifolia Mill., Gasteria carinata (Mill.) Duvall, Aloe ferox Mill., Clivia nobilis Lindl., Furcraea selloa K. Koch, Agapanthus africanus (L.) Hoffmanns.

	Pool	There are two rectangular and one polygon shaped pools of different sizes in the area.

Covering an area of approximately 2.000,00 square meters, cactus (Caryophyllales) species can be seen the third on an informal order and under a manner allocated to the parquets.

Table 4. The Third Set Plan in Malaga Botanic Garden

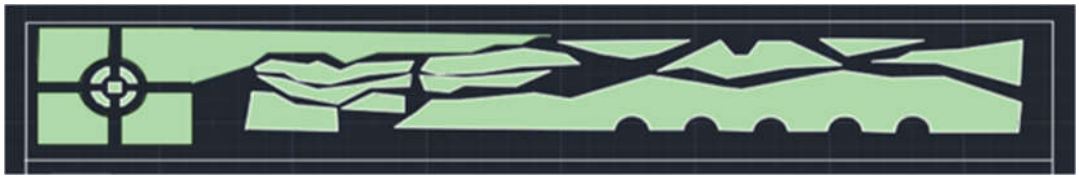
The Third Set Garden Plan		
	Plant Groups	**Plant Species**
	Caryophyllales	Some of the non-native plant species in this area are as follows. Opuntia tomentosa Salm-Dyck, Echinocactus grusonii Hildm., Pachycereus pringlei (S. Watson) Britt. & Rose, Neobuxbaumia polylopha (DC.) Backeb., Polaskia chichipe (Gosselin) Backeb., Opuntia rufida Engelm, Ferocactus stainesii var. pilosus (Galeotti) Backbg., Opuntia leucotricha D.C., Stenocereus griseus (Haw.) Buxb., Pachycereus marginatus (DC.) Britt. & Rose, Carnegia gigantea (Engelm.) Britt. & Rose, Ferocactus stainesii (Hooker) Britton & Rose, Tephrocactus aoracanthus Lem., Cleistocactus sp. Lem., Cereus peruvianus var. monstruosus Engelm. & Bigelow, Echinopsis sp. Zucc., Aloe juvenna Brandham et S. Carter, Opuntia subulata (Muehlenpf.) Engelm.
		

Figure 8: Plant samples included in the lots (Original, 2019)

CONCLUSION AND SUGGESTIONS:

The botanic gardens are of crucial significance in terms of engraining the love of plants to people. For a long period of time, the four-square motive has been recognized to have a meaning that evokes the religious expression of the garden of eden. Additionally, it is thought to be the four corner – four continents – of the world, which are Asia, Europe, America and Africa. Botanical gardens are often designed with biological deliberations in mind, such as the need to preserve biodiversity. As in other community acts, functionality is also an important concern. In contrast, the need to connect with human values, such as tolerance, care or justice, and the facility to provoke interaction, reflection and discussion are often sidelined.

Malaga botanical garden is located in the university campus. In addition to serving students and university staff, recreational visits from outside also make the area special. The Botanic Gardens are of vital importance in terms of contribution into the protection and enhancing the plantal diversity across the globe. Within this context, there are 442 plant taxones from 81 families are placed in the Botanic Garden of Malaga, which is an enriched garden in terms of plantal diversity. When the plant diversity in the garden is examined; It is seen that the most dense plant family is the tree and shrub species belonging to the Malvaceae family. The second most dense plant family is the cactus species, which is the Cactaceae family. However, the area, which has a rich plant diversity, is home to many genera and species. This situation offers diversity to the people visiting the botanic park. Botanic gardens are very important fields of science and nature in terms of people getting to know plants and observing different plant species. In addition, it is a very valuable type of green space in terms of the positive psychological effects of reaching the green area and spending time in the green area.

Botanical Gardens offer the opportunity to build ecologically functional landscapes on a large scale as well as educate individuals, professionals and organizations on sustainable green infrastructure. In addition, since they are used as education and research facilities, they significantly affect the direction and speed of urban green space design and planning.

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