



Master Plan for Tropical Glasshouse Botanical Garden using Local Culture Resources - Focused on Botanical Garden in Gyeongju Area -

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ABSTRACT

This study is performed to establish the basis of the development of unique tropical botanical garden that will be connected with the identity of the local inheritance resources, 'Silla'. The glasshouse is the traditional 'Silla'; housing and the landscape facilities are tried to imagine 'Silla' kingdom. Combination of the plant exhibition and the cultural inheritance resources can create their own unique theme. The garden divided into five spaces by life cycles of plants and the purpose of appreciation, the palm garden, ornamental foliage garden, flower garden, water lily garden, and tropical fruits garden. The appropriate flowers and trees are selected by their flowering time and the purpose of enjoyment. Especially, *Ficus religiosa* is the symbol plant of buddhism which is the state religion of 'Silla'.

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1. Introduction

1.1. Background & Objectives of the Study

Plants not only provide the necessities of human life, they also contribute rest and health through the beauty they possess. In the past, arboretums and botanical gardens were created for this purpose; however, recent botanical gardens are constructed with the purpose of being a tourism resource as well as for the purpose of rendering various genetic resources into resources through the act of collection, proliferation, conservation, management, and exhibition.

In the case of South Korea, arboretums such as Hongreung arboretum, Gwanak arboretum, and Cheonripo arboretum established in 1922, 1960s, and 1970s, respectively, have been operating for an academic and industrial application as well as being open to the general public and tourists in order to provide a place for resting and fostering of emotions. It is difficult to clearly distinguish between botanical garden and arboretum, but generally a botanical garden refers to place that includes herbs, woody plants, and tropical plants within greenhouse, and large botanical garden may contain an arboretum as a part of the botanical garden facilities. Furthermore, as small scale greenhouses created for research or industrial purposes now gradually become larger, there is a movement to make

greenhouse botanical gardens into a new tourism resource. As a result, the latest greenhouses go beyond the function oriented portal frame type, which is most suited for growing plant life, into various architectural forms, thus, considering the architectural formation of the interior space and the ecological harmony between planted vegetation becomes an important factor in planning the plant life within the greenhouse. In addition, many greenhouse botanical gardens created recently in South Korea are centered on the municipality for the purpose of enhancing the cultural perspective of the local residents and attracting tourist, therefore, it is becoming increasingly more difficult to create a greenhouse that can be differentiated from others due to the nature of the greenhouse.

Related research regarding the formation of a botanical garden for tourism includes plans for botanical garden tourism that is in connection with the accelerating cultural development of Baekje.¹⁾ Entering into the 2000s, research regarding the garden construction planning in accordance with the user or the space has been conducted²⁾, as well as research that provides the basis for a specific model that recognizes the characteristic of the plants by classification groups along with locational characteristics through proposing an eco-design for national aquatic arboretum

1) Huh, S.S., and 4 others, "A Study on the Choice, Arrangement and Operation of Plantation for Development of Tourism Botanical Garden", J. Korean Institute of Landscape Architecture, 1999, 26(4).

2) Kim, S.Y., "Landscape design for Anmyondo Botanical Garden", Ms Thesis, Seoul National University, Seoul, 2000., Jang, O.S., "Analysis and Planning of Kid's Space and Garden-Focused on Domestic Botanical Gardens", MS Thesis, Dankuk University, Cheonan, 2010.

botanical garden that considers the vegetation structures of the natural wetlands.³⁾ There has also been research in relation with the Namhae-gun Agricultural Technology Center that provides a unique planting plan that introduces vegetation such as tropical plants, native plants, and tropical orchards to revive regional characteristics, and a multi-purpose functional space for education, exhibition, and experience to the visitors.⁴⁾ Also, there is a research that points out problems such as exhibiting similar plants without distinction due to not being able to reflect the cultural and landscape characteristics of the region, and suggests a plan focused on maintaining and improving an identity that reflects the landscape and cultural resources of the region for the formation of a distinctive botanical garden.⁵⁾ Recently, greenhouse botanical gardens are being planned and created by many municipalities and ideas for a distinctive greenhouse botanical garden when compared to the existing greenhouse botanical gardens is inevitably very limited. However, designing a greenhouse botanical garden that adopts the cultural characteristics of the region and utilizing the characteristics as the main features in the structure of the botanical garden allow the ability to plan various types of greenhouse botanical gardens and enables the role of being tourist attraction in the future. Therefore, this research paper presents cases that reflected the historical and cultural resources of the region when planning glass greenhouse botanical gardens in order to provide basic information for creating a unique tourism type greenhouse botanical garden in the future.

1.2. Research Methods and Range

In order to effectively plan for a greenhouse that introduces the cultural characteristics of the region, the research was conducted in the following order: first, analysis of the existing greenhouse botanical garden, second, analysis of the target area, and finally, botanical garden planning.

In regard to analyzing the status of existing greenhouse, the greenhouses selected as the subjects of this study were among the botanical gardens visited by the investigator that perform the function of participatory viewing by the local residents or tourists, rather than simply being a research facility. Specific analysis such as the name and location of the botanical garden, the size of the greenhouse, the number of plant species kept, the composition of the theme, and operational outliers were the main

factors of the investigation.

The standards for analyzing the target area were cultural resources that can reflect cultural materials into the botanical garden plan and analyzing the physical environment of the corresponding area by considering the impact of region when the greenhouse botanical garden was created. Also, cultural material suitable for the creation of a botanical garden obtained by analyzing the humanistic characteristics of the target area and excavating the elements of the local culture that differentiates the area from other regions. On the basis of humanistic characterization analysis regarding the target area and the derived cultural material, a facility that can satisfy the cultural materials of the region and the selection process of various species for a distinctive tourism greenhouse that continuously attracts visitors and can be set apart from the existing botanical garden was planned.

2. ANALYSIS

2.1. Analysis of the Existing Glasshouse

The types of botanical gardens range from national, public, private, and school operated in accordance with the main body of the operation, and Table 1 indicates the investigative results regarding the current status of greenhouse botanical gardens over 900m² in size that has the combined purpose of research and tourism located within South Korea. The greenhouse botanical garden of Seoul Grand Park, South Korea established in 1985 is the third largest single greenhouse facility in Asia and exhibits various plant life such as foliage plants and cactuses, and is one of the main components of plant life related facilities within Seoul Grand Park along with the theme gardens. Yeomiji botanical garden established in 1989 is listed on the Guinness Book of World Records as the largest greenhouse in Asia, and is the first botanical garden in South Korea to include tropical plants for display and viewing. As a major tourist destination of Jeju Island located within the Jungmun tourism complex, many tourists visit the Yeomiji botanical garden to this day. In addition, places such as the Citrus Museum in Seogwipo, Jeju Island has the characteristic of only collecting citrus fruits from around the world, and the insect botanical garden in Seoul Forest, South Korea is a multipurpose greenhouse with the features of being able to observe insect species along with foliage and tropical plants. The greenhouse botanical garden within Hanbat arboretum located in Daejeon, South Korea has introduced a tropical rainforest mangrove colony of the within the greenhouse to order to create a change in the planting plan from to the existing tropical greenhouse through the introduction of the new

3) Cho, D.G., and 2 others. "Proposal of Ecological Design of Aquatic Garden in Korea National Arboretum Considering Natural Wetland Vegetation Structure" J. Korean Soc. People Plants Environ., 2011, 14(6).

4) Choi, K.O., and 4 others. "Design for the Tropical Plant Gardens of Agricultural Techniques Center of Namhae-Gun", J. Korea Society for Plants People and Environment, 2005, 8(2).

5) Park, E.Y. and B.R. Yoo. "Master Plan for Jeju Sanghyo Botanical Garden using Local Landscape Resources", J. Korean Society of Rural Planning, 2009, 15(4).

Table 1. List of tropical botanical garden (The area of glasshouse is over 900m²)

Name (established year)	Province	Area (m ²)	Major theme (Number of species)	Remarks
Citrus Museum World Citrus Garden	(2003) Jeju Seogwipo	2,471	The world citrus from Korea, Europe, Asia, America etc. (over 143 species)	Citrus theme botanical garden
Citrus Museum Sub-tropical Botanical Garden	(2008) Jeju Seogwipo	1,650	Sub-tropical garden (over 297 species)	
Daeheon Hanbat Arboretum Tropical Garden	(2011) Daejeon Seogu	1,600	Mnagrove garden, palm garden, tropical flower garden, rainforest garden (over 198 species)	Mangrove theme botanical garden
Seoul Grandpark Botanical Garden	(1985) Gyeonggi Gwacheon	2,825	Foliage plant garden, fern garden, cactus garden, orchid garden (over 1,260 species)	The third largest botanic garden in Asia
Parks of Seoul Insect Garden	(2005) Seoul Sungdong	1,331	Foliage plant garden, tropical plant garden (over 231 species)	Insects observation
Botanic Garden Yeomiji	(1989) Jeju Seogwipo	12,543	Flower garden, aquatic garden, cactus garden, jungle garden, tropical fruits garden (over 1,800 species)	The largest Botanic garden in Asia
Ontrepieum	(2011) Gyeongsangbuk Andong	1,518	Tropical fruit garden, cactus garden, rainforest garden, herb garden (over 240 species)	Consign management
University of Ulsan Botanical Garden	(2001) Ulsan Nambu	992	Sub-tropical flower and fruit garden, foliage plant garden, water plant garden, palm garden, cactus garden (over 295 species)	Located in the Ulsan univeristy

aquatic plant colony group. As mentioned above, up to now the majority of greenhouse botanical gardens in South Korea have differentiated themselves with other glass greenhouse botanical garden through size or type of species and factors such as harmony with the location of the garden or characteristics related to locality have nearly never been reflected in the formation of a botanical garden.

2.2. Analysis of the Target Area

1) Analysis of the Target Area

The target area of the botanical garden is the Gyeongju area, which is known for the highest distribution of historical and cultural resources in South Korea. In particular, the Bomun Lake Resort (tourist complex) in Gyeongju, which is the where the East Palace botanical garden is located at, is a tourism district in Gyeongju and attracts many tourists visiting Gyeongju area due to attractions such as the Shilla Millennium Park, Gyeongju World Culture Expo Park, Gyeongju World, and California Beach located around the Bomun Lake. The area provides entertaining things to see and do, as well as being a suitable location for creating a greenhouse botanical garden that utilizes tourism resources.

2) Humanistic Environment Analysis

The East Palace botanical garden is located at the entrance of the Bomun district in Gyeongju providing easy accessibility, and various attractions such as tourism facilities, amusement facilities, and cultural facilities are in the surrounding area, as well as being adjacent to the five districts of the “Gyeongju Historic Areas” designated as world heritage sites in December 2000 (Fig. 1).



Fig 1. Location of Gyeongju East Palace Garden

The east palace of the “East Palace Garden”, which is the name of the botanical garden, is originally the secondary palace site of the Silla palace located west of the Anap pond. The prince used the place as a residence and banquets were held at the location when receiving important guests. The “East Palace Garden” was chosen as a modern reproduction, which is enacted through storytelling, of a historic content based on records that indicate a large pond was dug in the site during the 14 year of King Munmu along with the making of the Samsinsan and the 12 hills, and beautiful flowers and trees were planted as well as the raising of rare birds and animals in the area.

3) Derivation of the Local Culture

There are many artifacts and buildings of Silla based on Buddhist culture that have been preserved in the Gyeongju area, and the culture is systematically becoming a tourism resources. Major cultural attractions of Gyeongju include the Gyeongju Hyanggyo, Cheomseongdae Observatory, Daereungwon Tomb,

Bunhwangsa Temple, Ohreung, Poseokjeong Pavilion, Royal Tomb of King Muyeol, Yangdong Village, Anap Pond, Gwaereung, Bulguksa Temple, Mogwol Literary House, Seokgulam Grotto, and the Gameunsa Temple Site; among which features that can harmonize with the plans of the botanical garden such as the Cheonmado of Daereungwon Tomb, Poseokjeong Pavilion, Anap Pond, and lotus pattern, which is the symbol of Buddhist culture in Gyeongju, were selected as subject matter that can be reflected into the facilities within the botanical garden. The Cheonmado of the Daereungwon Tomb is an element that matches the botanical garden in material because it is drawn on the surface of the saddle flap made with a rectangular Birch bark, and both the Poseokjeong Pavilion and Anap Pond have water as their theme which can reflect the concept of rest making it appropriate with the basic purpose of the greenhouse botanical garden, and the lotus pattern was selected because it was suitable as a pattern for various facilities within the botanical garden.

3. BOTANIC GARDEN PLANNING

3.1. Architecture and Civil Engineering

The existing greenhouses are designed to maximize the interior light and secure a wide space through function-oriented features such as even-span type, half-span type, three quarter type, arched type, and venlo type, however, in reflection of the historic characteristics of Gyeongju, the form of the existing Hanok (traditional Korean-style house) was borrow as much as possible when planning the form of East Palace botanical garden. For this purpose, decorated glass was placed in the location of the Hanok pillars to appear similar to pillars when viewed from the outside, the roof-ends were stylized in the way as the roof-ends extracted from Hwangnyongsa Temple in order to represent the form of the Hanok as well as the symbolism of Gyeongju as much as possible through the roof. The building is a rectangle two stories structure when seen from the outside and the pillared corridors that

support the two stories structure are connected on the inside. Building area covers 2,883 m² and the height of the building is 16m. There are four doorways and an information booth is placed in the main doorway, along with windproof rooms on the right and left doorways (Fig 2). The existing soil was clay soil which is impossible for growing trees, therefore, the area was excavated 1m deep and replaced with good clay sand, and drainage systems such as a stone filled drain was installed to create an environment for plant growth.

3.2. Creating an Environment for Plant Growth

Equipment for heating during the winter is placed and heating pipes are installed on the outside of the greenhouse. Also, pond heating pipes are installed for the growing aquatic plants. Ventilation for high temperatures during summertime is possible through opening the side windows and the skylight, and Temperature control equipment such as exhaust fans and flow fans are also installed. Furthermore, four valves are installed for watering the plants as well as a sprinkler system for controlling the humidity and temperature.

3.3. Plan for Interior Space & Travel Path

1) Spatial Configuration

The purpose of the Gyeongju East Palace Garden is flower cultivation and agricultural field experiment for Gyeongju agricultural research, and the building was created as an experience tourism facility in order to make the site into a tourism resource. The facility is largely divided into three sections which are the East Palace botanical garden, Gyeongju bird park, and farming experience area, and outdoor viewing areas/amenities include musical fountain, grass square, and souvenir shop.

The East Palace botanical garden is sectioned into five spaces of palm garden, flower plant garden, ornamental foliage plant garden, water lily garden, and tropical fruits garden in accordance with the characteristics of the growth as well as for viewing purposes (Fig.3).



Fig 2. The whole view of East Palace Botanical Garden.



Fig 3. Masterplan of East Palace Botanical Garden.

2) Travel Path Planning

The direction of the main traveling path starts by entering the central entrance hall and leads to viewer in the order of palm garden, ornamental foliage plant garden, flower plant garden, water lily garden, elevated viewing, tropical fruits garden, and then to the left side exit. The width of the viewing path is 1.5m and provides a direction of passage, and items (lotus pattern stone) that emphasize distinguish are placed in major points of connection. Although there is no difficulty in observing plants because the viewing path is located close to the planting area, detailed observations paths are planned for promoting observation and seamless viewing. The paving is mainly flagstones made from Jeju stones, and wooden decks are installed around the water lily garden for closely observation of the tropical water lilies. An aerial ramp of 7m in height and less than 12% in tilt is installed on the exterior of the botanical garden to pass the waterfall cave and is available for use by all including elderly, children, and the disabled, from which observation of the large tree's upper side as well as seasonal changes within the greenhouse and the formation process of the upper plant canopy is possible.

3.4. Facilities Planning

1) Reflect Local Cultural Items

Various facilities installed throughout the botanical garden are also important elements that indicate the characteristics of the botanical garden along with the vegetation. Cultural characteristics of Silla were introduced in the planning of this botanical garden in order for the garden to be associated as a part of the tourism area of Silla culture. To do this, representative factors of Silla culture such as the Cheonmachong, Anap pond, and various patterns and subject matters that symbolizes Silla were applied in the design of the facilities, and each space was planned to reflect the association in order for the botanical garden to maintain the local identity and become a unique botanical garden.

Inspired by the fact that Cheonmachong, which is a representative artifact of Silla, was drawn on Birch bark, a newly reproduced Cheonmachong based on the existing excavated form was installed together with the tree screen to be used as a photo zone. By adding Birch bark on top of the GRC artificial Cheonmachong and attaching it to the retaining wall, the created work becomes 2.7m in height and about 4m wide.

Installing the Hongyegyo (an arched bridge) that supports the Cheongungyo and Baekungyo of Bulguksa Temple, which is a representative monument of Gyeongju, by the first step of entering the viewing path passed the main entrance of the

botanical garden gives the symbolism of crossing into the Silla Dynasty from the present. Generally the Hongyegyo signifies an arch bridge or a rainbow bridge, and the Hongyegyo of Bulguksa Temple is known as the first Hongyegyo produced in South Korea, therefore, its formative characteristics and historicity are being evaluated.

A reproduced of the Jaemaejeong water well located on the birthplace of General Kim Yoo-Shin is installed at the starting point of the stream, and that stream flows through a channel in the shape of Poseokjeong and Anap pond into the pond in the water lily garden. Also, after reproducing the dugout excavated from Anap pond through GRC artificial boat, the sculpture is placed within the pond to be used as tool for plant decoration. Lotus flower patterns, which are representative patterns of the Buddhist culture in Silla, are engraved into the granite flagstone and placed at each starting point of the garden in order for the viewer to recognize the entrance to a new theme garden in a symbolic way.

2) Characterization Planning as a Botanical Garden

A distinctive plan was performed in comparison with the existing botanical garden planar arrangements regarding the placement the botanical garden. The plants when beyond the existing form of only being display horizontally to being able to view the whole upper part of the arranged trees through the viewing ramp passed the waterfall cave. By securing the three-dimensional viewing path in this way, not only can the viewer experience the botanical garden with more dimensions, but it also provides a role of a photo zone. Also, by going beyond the pattern of exposing the supporting structure of the botanical garden and creating decorative pillars in the shape of a waterfall cave and trees with GRC on the building pillars, the structure adds to the decorative form which leads to an effect of increasing the favorability of the viewer. Furthermore, facilities that harmonize with the plants such as fragrance tunnel, hanging pergola, shade house, and pond deck are installed and enact the role of being a support for the plant exhibition (Fig 4~5).

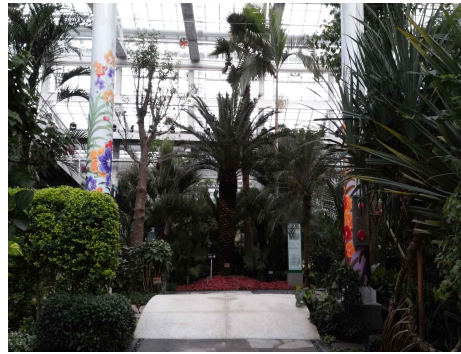
3.5. Exhibition Plan for Facilities

The factors to consider when selecting species for the botanical garden are its increasing effect on tourism, emphasizing the importance of the natural environment, educational effectiveness, and expression of the regional symbolism.⁶⁾ Thus, *ficus religiosa*, which is a tree that symbolizes Buddhism as the state religion of Silla, was planted as a symbol of the botanical garden in order to

6) Huh, S.S., and 4 others. "A Study on the Choice, Arrangement and Operation of Plantation for Development of Tourism Botanical Garden", J. Korean Institute of Landscape Architecture, 1999, 26(4).



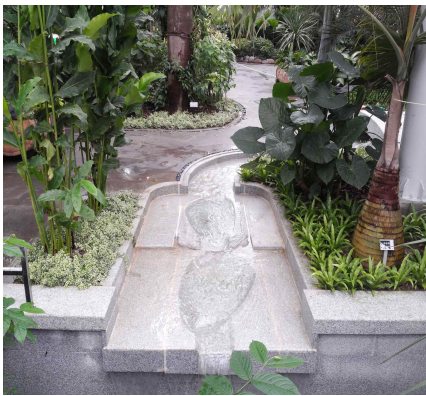
(a) Cheonmado(天馬圖)



(b) Stone Arch Bridges



(c) Jaemaejung(財買井)



(d) Anapji(雁鴨池入水溝)

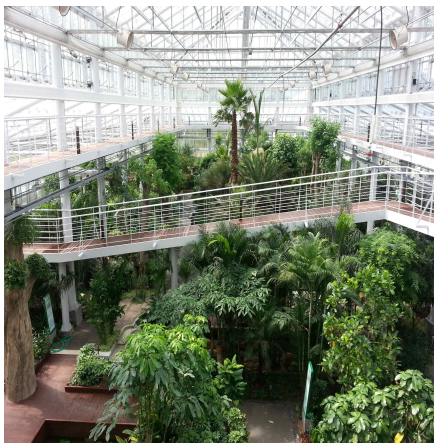


(e) Posuckjung(鮑石亭)

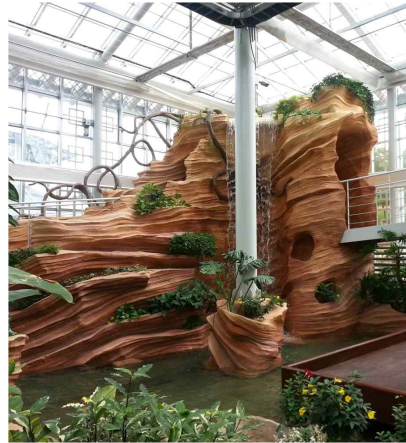


(f) Lotus Flower Patterns

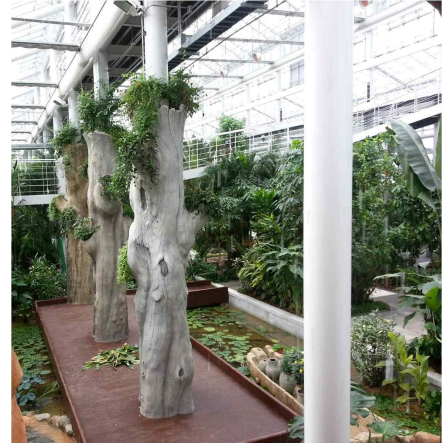
Figure 4. Photo of the items connected with Silla culture



(a) sky walkway



(b) waterfall cave



(c) pole decorations

Figure 5. Construction photo of greenhouse landscape facilities

express the cultural region of Shilla. Furthermore, other plants were also considered for whether they can harmonize with the facilities that reflect the locality of the garden as well.

Most greenhouse botanical gardens are places that artificially create natural conditions to bring life as much as possible in order to present sceneries to the viewer through the year without limitation in the visiting time, and must provide the desire for a revisit. For this reason, characteristics of plant species and characteristics by application was set in order to increase the

tourism effect and attract visitors throughout the year. The representative species of each garden was categorized by trees, shrubs, and ground cover plants (Table 3). The flower plant garden which is comprised of a fragrance garden, a rock garden, and a hanging garden provides viewing of flowers through the year as well as fragrance through the planning of fragrant plants. The ornamental foliage plant garden is created with an atmosphere of a dense forest through trees that grow in the jungle rainforest, and tropical & subtropical fruit trees are on display at

Table 3. Representative plants introduced in Gyeongju East Palace Garden

Type	Plant Species
■ Palm garden	
Trees	<i>Amorphophallus campanulatus</i> , <i>Butia capitata</i> , <i>Butia yatay</i> , <i>Chamaerops humilis</i> , <i>Chrysalidocarpus lutescens</i> , <i>Mascarena lagenicaulis</i> , <i>Ptychosperma macarthurii</i> , <i>Roystonea regia</i> , <i>Wodyetia bifurcata</i> .
Shrubs	<i>Ctenanthe kummeriana</i> , <i>Philodendron 'Temptation'</i> , <i>Pyrostegia venusta</i> .
Ground Cover	<i>Cuphea hyssopifolia</i> , <i>Nepenthes spp .</i> , <i>Pinguicula spp .</i> , <i>Platynerium spp .</i> , <i>Schizocentron elegans</i> , <i>Tecca intefrifolia</i> .
■ Ornamental foliage plant garden	
Trees	<i>Adansonia digitata</i> , <i>Brachychiton rupestris</i> , <i>Chorisia insignis</i> , <i>Cyrtostachys lakka</i> , <i>Ficus microcarpa</i> , <i>Ficus religiosa</i> , <i>Ficus triangularis</i> , <i>Hibiscus tiliaceus</i> , <i>Livistona chinensis</i> , <i>Moringa oleifera</i> , <i>Nolina recurvata</i> , <i>Phoenix dactylifera</i> , <i>Spathodea campanulata</i> , <i>Veitchia merrilli</i> .
Shrubs	<i>Bougainvillea glabra</i> , <i>Osmanthus fragrans</i> , <i>Pseuderanthemum laxiflorum</i> , <i>Zamia furfuracea</i> .
Ground Cover	<i>Asplenium antiquum</i> , <i>Crinum amabile</i> , <i>Hymenocallis speciosa</i> , <i>Scindapsus aureus</i> .
■ Flower plant garden	
Trees	<i>Alstonia scholaris</i> , <i>Bauhinia blakeana</i> , <i>Bombax ceiba</i> , <i>Brachychiton discolor</i> , <i>Breynia officinalis</i> , <i>Chorisia speciosa</i> , <i>Citharexylum spinosum</i> , <i>Datura mollis</i> , <i>Delonix regia</i> , <i>Jasminum 'Molle'</i> , <i>Magnolia coco</i> , <i>Michelia champaca</i> , <i>Spathodea campanulata</i> .
Shrubs	<i>Acalypha godseffiana 'Firestorm'</i> , <i>Calliandra emarginata</i> , <i>Clerodendrum ugandense</i> , <i>Dona aurora</i> , <i>Melastoma candidum</i> , <i>Michelia figo</i> , <i>Tabernaemontana coronaria</i> .
Ground Cover	<i>Acalypha pendula</i> , <i>Anthurium andreamum</i> , <i>Calathea zebrina</i> , <i>Crinum amabile</i> , <i>Kalanchoe pinnata</i> , <i>Pteris ensiformis</i> .
■ Water lily garden	
Trees	<i>Alocasia macrorrhiza</i> , <i>Alocasia macrorrhiza 'Aurea'</i> , <i>Calathea cylindrica 'Green Ice'</i> , <i>Etilingera elatior</i> , <i>Philodendron selloum</i> , <i>Ravenala madagascariensis</i> , <i>Zingiber specabile</i> .
Shrubs	<i>Acanthus ilicifolius</i> , <i>Acrostichum aureum</i> , <i>Kadsura japonica</i> , <i>Philodendron 'Temptation'</i> , <i>Jasminum hemsleyi</i> , <i>Pyrostegia venusta</i> .
Ground Cover	<i>Asplenium antiquum</i> , <i>Ficus pumila</i> , <i>Hoya carnosa</i> , <i>Thalia dealbata</i> , <i>Victoria amazonica</i> .
■ Tropical fruits garden	
Trees	<i>Achras zapota</i> , <i>Annona cherimola</i> , <i>Artocarpus heterophyllus</i> , <i>Averrhoa carambola</i> , <i>Carica papaya</i> , <i>Coffea arabica</i> , <i>Duranta repens</i> , <i>Ensete ventricosum</i> , <i>Mangifera indica</i> , <i>Olea europea</i> , <i>Psidium cattleianum</i> , <i>Sterculia nobilis</i> , <i>Theobroma cacao</i> .
Shrubs	<i>Garcinia mangostana</i> , <i>Salac zalac</i> , <i>Carissa grandiflora</i> , <i>Garcinia mangostana</i> .
Ground Cover	<i>Adiantum raddianum cv .</i> , <i>Ananas comosus</i> , <i>Davallia mariesii</i> , <i>Peperomia obtusifolia cv .</i>

the tropical fruits garden. Various palm trees are planted for viewing in the palm garden, and the water lily garden is created to provide viewing of tropical water lilies. The species introduced are trees that grow in regions such as Southeast Asia, Latin America, and Africa, and broaden the visitor's awareness of trees and plants through their unique foliage, flowers, and appearance of the tree. All plants have labels to increase learning effectiveness and to facilitate the plant life management of the botanical garden.

4. CONCLUSION

East Palace botanical garden is a combination between the function of the botanical garden and the local characteristic of Silla culture, and the planned characteristics can be summarized as the following.

1) This botanical garden integrates the cultural resources of the local Silla characteristic from construction to internal landscape facilities as well as the selection of plant species, and gives a sense of an affiliation with Silla culture as a unique botanical garden theme, and also tries to become a creative botanical garden

differentiated from existing botanical gardens.

2) Regarding the designing of the facilities, emphasis was placed whether the integrated Silla heritage such as the Cheonmado Statue, Jaemaeyeong, the stone bridge, lotus flower pattern stone, Poseokjeong channels, and the Anap pond water entrance can harmonize with the surrounding vegetation such as tropical plants and water lilies.

3) The gardens were divided into palm garden, flower plant garden, ornamental foliage plant garden, water lily garden, and tropical fruits garden in accordance with the characteristics of the growth as well as for viewing purposes. The five gardens was planned and the species were selected in the vegetation structures of upper, middle, and lower layer in order to recreate the natural ecosystems as much as possible.

4) By planning the botanical garden as a space that integrates the Silla culture along with unique features of the tropical botanical garden, the place becomes a multi-purpose function space that satisfies educational and viewing features at the same time, and the occurrence of a new tourism pattern can be expected.

Further multilateral user satisfaction survey is required, and this paper may be effective for utilization as data for diversification and revitalization of the botanical garden features.

Acknowledgements

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