

Plant Configuration and Landscape Construction in Blind Gardens

Zhang Qi^{1,2}, Zegiimaa Ch^{1,*}

¹ Graduate University of Mongolia, Ulanbator, 11100, Mongolia

² Xiangtan Institute of Technology, Xiangtan, 411100, China

*Corresponding author: zegiimaa1017@icloud.com

Abstract: In daily life, landscape design often takes able-bodied people as considerations, while ignoring the blind people who lack vision. According to the blind people's psychological needs and the need for space and landscape, based on taking into account the safety of the blind people and the integrity of the landscape structure, The blind garden plant configuration and landscape construction are carried out based on the principles of sex and accessibility. The content of landscape design includes the design of olfactory landscape, tactile landscape, visual landscape, and auditory landscape; barrier-free design mainly relies on barrier-free design of terrain, road design and public facilities; In order to arouse society's attention to the blind and improve urban gardens. The design theory enables the blind to have a space suitable for their own leisure and entertainment activities, enriching their daily lives, and discusses the design principles and plant configurations of the blind garden construction, hoping to provide some reference for the construction of blind landscapes.

Keywords: Garden for the blind; Garden plants; Plant landscaping; Landscape Design.

1. Concepts Related to The Blind Gardens and Plant Configuration

1.1. Blind Garden Concept

Gardens have a long history. Traditionally gardens are places where flowers, vegetables, medicinal herbs, fruits and other ornamental plants are planted and where people can play and rest. With the development of garden design, gardening, technology and the deepening of humanized landscape concepts, the function of gardens is no longer limited to creating a warm and comfortable natural environment. Therefore, gardens are now mostly used in open parks or private gardens of villas.[1]

The blind garden is a garden that primarily caters to blind individuals, as the name implies. It is equipped with safe facilities and can carry out activities such as tactile perception, auditory perception and olfactory perception. The garden for the blind is designed through different configurations of scented plants, plants that are noticeable to the touch, and plants that make individual sounds when shaken, and combined with other garden elements. [2]

1.2. Garden plant configuration

According to the ecological habits of plants and garden layout requirements, [3]reasonable allocation of various plants in the garden (trees, shrubs, flowers, turf and ground cover plants, etc.)[4]in order to play their garden functions and ornamental characteristics.[5]

2. Main Plant Types in Blind Gardens

2.1. Aromatic plants

2.1.1. Concept

Aromatic plants are plants that have aromas themselves or can obtain aromatic substances artificially. Such Plants have both medicinal and beautiful value. Aromatic plants are also valued for their beauty and beautification development.[6]

Include many types, including grasses, flowers, vegetables, fruits, trees, etc. The aroma of aromatic plants or extractable spices are mainly aromatic molecules secreted during the synthesis process of plant cells, which are then aggregated into sachets and distributed in the roots, stems, leaves, flowers and fruits of plants. The main types of substances include esters, ethers, phenols, ketones, alcohols, etc. [7] They are characterized by mainly aromatic compounds and a variety of lower ester compounds that can emit fragrance.[8]

2.1.2. Classification

There are many kinds of aromatic plants, and the classification methods are also various. Sun Ming et al. Divided aromatic plants into three categories: trees and shrubs, vines and herbs according to their ecological characteristics; [9] Wan Yu et al. Divided aromatic plants into floral, leaf-scented and fruit-scented plants. There are four categories; [10] fragrance and other categories; some are divided into five categories according to the fragrance type: strong fragrance, light fragrance, faint fragrance, light fragrance and sweet fragrance. Commonly used are classified according to their aroma source and plant characteristics, as follows:

1. Fragrant flower plants

Fragrant flower plants generally refer to aromatic plants whose flowers can emit volatile fragrance. The petals of these plants contain volatile aromatic substances. It can be extracted from it and used in the manufacturing process of various cosmetics and toiletries, such as soap, shampoo, shower Lu et al. Such common plant species include: yellow-heart nightlily, ginger flower, plum blossom, osmanthus, Milan, gardenia, jasmine, Orange, magnolia grandiflora, wild chrysanthemum, smile, big-leaved buddleia, white orchid, acacia, wintersweet, lily of the valley, etc. [11]

2. Vetiver plants

The roots of these plants themselves contain essential oils or spices, which can be used to make flavours, aromatic oils, or seasonings. Common plant species include: Huashan ginger, cryptomeria, Asarum, yew, yew, Dalbergia, Yunnan hemlock, skullcap, toon, sand cypress, Huashan pine, etc.[12]

3. Herb plant

Vanilla plants are also called medicinal plants, and their English name is "herb". They are often used in courtyard greening abroad. Common plant species include duhen, adenophora, perilla, ambrette, thyme, cistus, mint, patchouli, basil, lemongrass, schizonepeta, oregano, etc. [13]

4. Woody spice plants

It refers to the volatile aromatic substances in the branches, leaves and trunks of some aromatic plants, which can be used to extract spices and can also be used as landscaping tree species. [14] Common plants include pine tabulaeformis, masson pine, Huashan pine, osmanthus, Tokyo benzoin, jasmine, laurel, camphor, etc. [15]

2.1.3. Characteristics of aromatic plants

(1) Beautifying Properties of Aromatic Plants

In addition to being used in the manufacture of flavours and spices, aromatic plants also have important ornamental value and are ornamental plants with both fragrance, colour and shape. Because in addition to the aromatic nature of these plants, their plant shape, flower shape, leaf shape and flower colour also has strong ornamental value. Mainly reflected in the beautiful colours and unique flower shapes of flowering plants; The beautiful leaf shapes and diverse leaf colours of foliage plants; In addition to the beautiful colours and unique leaf shapes of fruit-bearing plants, their fruits are also ornamental in colour and shape. Therefore, aromatic plants play an important role in courtyard beautification, urban landscaping, and cash crop income generation.

(2) Aromatherapy properties of aromatic plants

Aromaticity is the basic characteristic and unique feature of aromatic plants. The aroma of aromatic plants can be expressed through different organs, such as flowers, leaves, fruits, and rhizomes, and different organs have different aromas at different stages. If the roots and leaves are aromatic, then such plants can be fragrant from germination to withering; While plants with fragrant flowers and fruits have a shorter aromatic period and mainly have aroma in the later stages of the plant. Moreover, the aroma of different plants also changes greatly. The aroma of the same plant in different periods also differs, whether it is strong or light, bitter or sweet. Therefore, when using aromatic plants, we must consider both the type of plant and the aroma period of the plant, so that the aroma can be emitted at different stages and fully utilized in landscaping.

(3) Health care properties of aromatic plants

The aroma of aromatic plants not only has the role of beautifying the environment and improving the living environment, but also has a greater role in health care. Mainly embodied in the aromatic plants issued by the material contains more alcohols, ketones, esters, these aromatic substances, under photosynthesis can be decomposed into many volatile aromatic oils and fats, and these oils and fats through the gas These aromatic substances can decompose many volatile aromatic oils and fats under photosynthesis, and these oils and fats enter the human body through the form of gas, which can stimulate the human brain, promote the excitement of the respiratory system, and make people energetic and quick thinking. Moreover, these substances can diffuse with the gas and enter the human nervous system in the form of ions, promote the blood circulation system, and increase the immunity and resistance of the human body. For example, the patchouli liquid that people often drink has the effect of increasing the body's resistance and treating colds, while mint leaves can cure colds; mosquito repellent grass

also has the effect of removing pests and purifying the air.

2.2. Plants with obvious touch

2.2.1. Plants with obvious leaf characteristics

1. Leaf size

Some plants have leaves that are not only other shaped but also have large blades. It allows blind visitors to touch and feel them up close. Common plant species in this category include: plantain, plantain, monocotyledon, magnolia, locate, tortoise shell holly, bright green Lonicera, and so on.

2. The softness and hardness of leaves

Such common plant species include: magnolia grandiflorum, camellia sasanqua, big-leaf holly, double-pod cassia, Ditang, hibiscus, red-leaf plum, etc.

3. Leaf shape

Such common plant species include: ginkgo, octagonal golden disk, bayberry, rhododendron, citrus, giant grass, maple, five-pointed maple, triangle maple, horse chestnut, etc.

4. The surface of the leaf (smooth or rough)

Such common plant species include: weeping willow, knotweed, mosaic willow, tamarisk, miscanthus, pampas grass, etc.

2.2.2. Plants with obvious tactile flowers and fruits

Some plants don't only have beautiful flowers and fruits, but also have unique textures when touched by hand. They are very suitable for planting in blind gardens. Such common plant species include: loquat, pomegranate, Hubei crabapple, peach, apricot, hawthorn, sunflower, cockscomb, straw chrysanthemum, cherry blossom, etc.

2.2.3. Plants with obvious branches that feel to the touch

The branches of some plants are very distinctive. For example, the branches of Zhuxiang are soft and can be knotted, and the branches of Sophora japonica are curved and have a unique flavor. Using this kind of plants in blind gardens can not only enrich the variety of plants, but also give blind people different feelings. Common types of such plants include: weeping willow, noted, mosaic willow, tamarisk, Miscanthus, pampas grass, Sophora japonica, etc.

2.2.4. Plants with obvious tactile trunks

The trunks of some plants are very smooth and comfortable to the touch, while the branches of some plants are very mottled, giving people another wonderful feeling when touched. Common species of this type of plant include: crape myrtle, Peach trees, sycamore trees, etc.

2.3. Making sound plants

Some plants can make crisp sounds when swaying in the wind. If such plants are planted in the garden of the blind, they can enjoy the beautiful hearing of the blind people. Common types of such plants include Cixiao bamboo, Wubuji bamboo, Feibai bamboo, and Feihuang bamboo.

3. Plant Arrangement and Landscape Construction in The Garden for The Blind

3.1. Plant configuration for the blind garden

3.1.1. Principles of plant arrangement in the garden for the blind

1. Follow the habits of plants

Plants have their own habits, and things in different regions and climates have different habits. The same is true for the plants in the blind garden. The characteristic of native tree

species is that they have grown locally for a long time. Under the influence of long-term ecological cycles and natural conditions, they have adapted to the local natural environment. They not only have a high survival rate, but also grow well. While saving manpower and material resources, the effect can be seen quickly and local characteristics can be reflected.

2. Create four-season landscape

Plants display different postures in spring, summer, autumn, winter and climate changes. In the construction of the blind garden, not only to fully understand the climatic period and growth habit of aromatic plants, but also through the reasonable selection and configuration of different flowering period, flower colour varieties, to create a seasonal flowering, four seasons of evergreen, year-round fragrance of the environment space that people long for a heart. For example, the spring delicate and elegant plum blossoms, summer white as snow magnolia, autumn fragrant osmanthus and winter snow welcome the wax plum; can be planted on both sides of the pedestrian walkway herbaceous aromatic plants or low shrubs, such as lemon verbena, sage, geranium, roses, western chamomile, thyme, lemongrass, geranium, rose, rosemary, lavender, gardenia, etc. visitors will smell a burst of walks! Fragrance, people are relaxed and happy, cultivated.

3.1.2. Plant configuration in blind garden

1. Collocation between plants of the same type

Nowadays, the plant design of blind people's gardens is often used in the traditional landscaping method of combining trees, shrubs and grasses, but we should also take into account the characteristics of these plants. [16] For example, when creating an aromatic garden, more attention is paid to the matching of trees, shrubs and grasses to create a sparse forest and grassland landscape. But according to the plant's fragrance to consider, some strong aromatic plants only need to be dotted in some position a few on the fragrance; and perennial aromatic herbs, can be dotted with a variety of complementary aromatic plants, choose common colour leaf plants and lawn, combined with the lower plants to aroma environment will be better, so as to achieve the seasonal aroma, everywhere aroma purpose, to achieve the unity of the ecological beauty of the garden, the beauty of the visual sense, the beauty of the olfactory sense. When creating tactile botanical gardens, we should consider the maximum characteristics of the plants to optimise the matching, and we should consider the seasonal changes of the plants, so as to form a four-season scenery.[17] When creating a sound experience garden, we should first focus on whether the sound formed by the collocation of plants is pleasant to the ear, and then consider the colour of the plants, seasonal changes, as well as the spatial atmosphere created. [18]

2. Combination of different types of plants

In the garden for the blind, in addition to the collocation between aromatic plants, tactile obvious plants, and sound-producing plants themselves, several types are commonly used for collocation in order to enrich the hierarchy of the spatial environment and create diversity in the landscape.[19]For example, most of the aromatic plants are herbs, which belong to the groundcover layer in the landscape, and they should highlight the main body when making plant configurations and be matched according to the following principles. [20]

(1) Complement each other. Grasp the living habits of different aromatic plants as well as the climatic period, reasonable with the height of the plant, flower colour, flower shape, posture, leaf colour, leaf shape, when a plant to create

a single landscape, you can make up for it and enrich it by using other plants to set off the technique. When making plant combinations, it is not easy to combine plants with large differences in morphological characteristics. For example, osmanthus as an evergreen plant, winter can also become a landscape, but a single tone, to combine the seasonal changes, and other flowers and foliage plants configured with each other.

(2) Balance each other. Herbaceous aromatic plant form variable, do ground cover configuration, not only to pay attention to the coordination between plants, but also pay attention to plants and other elements of the environment between the sense of harmony, the upper layer can be configured in a more regular form of plants, but also to consider the plants in the different stages of growth and seasonal changes, to avoid resulting in an imbalance of the situation.

(3) Integration of movement and static. Sound-making plants and other plant configurations should reflect the sense of rhythm, static and dynamic combination. Roadside and strip plant configuration can best show a sense of rhythm, at the same time can be combined with the terrain, to do the ups and downs of the change, the height of the staggered, to avoid the layout of the stagnant.

(4) Highlight the level. Modern landscape more and more respect for the configuration of natural communities, pay attention to the Joe irrigation grass rich levels of collocation. Layers of plants with different flowering periods and different flower colours can form a rich local landscape. In the open area or piece of landscape area, generally with tall trees as a background, forming an undulating skyline, planting density should be large, can form the effect of light and shadow, at the same time the background and the foreground in the colour of a certain difference, rich sense of hierarchy.[21]

3.2. Landscape Creation for the Blind Garden

3.2.1. Terrain

Landscape terrain is the carrier of garden trees, landscape vignettes and buildings. For a long time, the garden is good at using "micro-terrain" to create and divide different spaces, in the formation of rich landscape levels, but also to enhance the quality of the landscape and improve the ecological environment. Changes in the size, scale, appearance and height of the terrain can give people a different sense of space, large areas need to have a large lawn, sparse grass and planted landscapes; in small areas, the reasonable creation of micro-topography, division and enclosure of space. The creation of terrain can form different spaces, open, closed, semi-enclosed, different spaces, thus affecting the different sensory experience. At the same time, the treatment of the terrain must be coordinated with the buildings and vignettes landscape, so that the natural landscape and artificial landscape into one. Combined with the terrain, fully reflect its original natural landscape. The design of the terrain should be combined with the natural landscape of the planning area to deal with, to achieve a good transition and integration of the landscape. For example, the Honeysuckle Garden in Qingdao Fushan Xiangyuan is processed with the help of the original topography, adding landscape pavilions in the area themed with honeysuckle, adding red maple in terms of plants, enriching the colours and seasonal landscape of the garden, and using the original mountain as a view to increase the permeability and spatial level of the landscape.

3.2.2. Roads and squares

The activities of the users of the Blind Garden are basically realised by walking, and the quality of the walking environment is closely linked to the quality of the users' visit. Walking is one of the most basic activities in an aromatic garden, so the design of paths is particularly important. The design of roads and squares should be considered from the following aspects:

Texture: paving tiles are made of a variety of materials, but the popularity of cobblestone, cobblestone texture is delicate and smooth. The texture of pebbles is delicate and smooth, and has affinity. For example, Qingdao Fushan Xiangyuan strolling experience garden, is to colourful cobblestones paving, visitors in the enjoyment of the scenery of the At the same time can also do foot massage, active meridians, is a very good fitness paving materials; in the less crowded areas, appropriate In less crowded areas, the design of some grass tiles or stone paths, increasing the interest of visitors to watch; wooden paving tiles give a person a sense of simplicity and nature.

In the design of the square, often the topography of the square to do lift or sunken processing, such as sunken plaza cohesion view line, can be used as a place for mass recreation, assembly and fitness.

3.2.3. Water body

Water is dynamic, the landscape with water is the most dynamic. Water can produce a large number of negative oxygen ions, can enhance the dynamism of the landscape, the water body can be static can also move. Flowing water can give people attractive, stimulate people's excitement, and can also create an auditory landscape, mainly fountains, waterfalls, waterfalls, curtains and other forms of static water has a slight reflection, shimmering, can give people a sense of tranquillity, harmony, the common form of ponds, lakes and so on. When dealing with the water in a blind person's garden, attention should be paid to the combination of movement and static to meet the different needs of the population. It has been shown that negative air ions are very beneficial to human health, it can be through the movement of the body of water and air friction, and then produce a lot of small ionised negative ions. Therefore, when designing the blind garden, some streams and waterfalls can be built according to local conditions, so as to produce more negative ions in the air that are beneficial to the body and mind. At the same time, trees can be planted near the water body, so that the water environment space is more colourful, and at the same time can be added to shallow water, water space, improve people's participation in the landscape.

3.2.4. Architectural Sketch

Although the garden for the blind is dominated by plants, there should be a small number of buildings and rest facilities to cater for other aspects of the visitor's needs. Architecture is first and foremost to satisfy the function, and the style should be as simple, ecological and artistic as possible; the building materials should be environmentally friendly and non-polluting; and the building should be combined with the topography and terrain of the planning area, with good ventilation and a good view. Rest facilities are what must be considered in the design of the environmental space of the garden for the blind. Users need to have a short rest time when they are tired of touring, especially for those with poor physical condition, therefore, rest facilities such as trellises, pavilions, seats, etc. should be designed in appropriate areas or tour routes. The style of rest facilities should be

coordinated with the environment, beautiful and comfortable and durable, and the scale and size should be user-friendly. Trees should be placed next to the rest facilities to create a pleasant space.

(1) Seat: Seating is generally positioned along the edge of a building or space so that visitors have a sense of dependence and security, as well as a view of the opposite side of the building. This will give visitors a sense of security and a view of the opposite side of the building or space. Seats can be planted with aromatic plants that can be touched, so that visitors can feel the aromatic atmosphere while resting. In addition, more innovative forms of seating, such as steps, low walls, pool edges, etc. can be used as rest facilities.

(2) Pavilion: Pavilions should be set up in conjunction with the environment, and the form of the pavilions in the Garden for the Blind should be consistent with the overall atmosphere of the garden. Pavilions can be set up in plant communities in different zones to provide visitors with an aromatic private space; they can also be set up in groups at the water's edge, on top of mountains, etc. they can also be set up in large fields of herbaceous landscapes, which play a role in enriching and strengthening the landscape.

(3) Flower rack: The use of vine plants can also design a flower rack, flower corridor, total visitors rest, enjoy the scenery. The shape can be varied, upright, curved, etc. not only can organise space, but also increase the depth of view. Trellis plants to branch and leafy, beautiful flowers, fragrant vine plants, such as wild rose, wisteria, honeysuckle, Chinese trumpet creeper and so on.

(4) Sculpture: sculpture can highlight the theme of the landscape, the blind garden garden should be combined with the theme of the region, from the classical gardens and some poems and songs in the extraction of materials, design the form of beauty, modelling chic, rich visual impact of the theme of the sculpture.

(5) Vignettes: Cultural landscape vignettes are an important way to disseminate culture, spirit, and ideas, and can make the asexual cultural essence essence figuratively in the garden green space.

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