

# Research on the Application of Plant Materials in Landscape Design

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**Abstract:** *Landscape design is a comprehensive discipline covering many kinds of disciplines, including a wide range of disciplines. Broadly speaking, landscape design is through the use of aesthetics, design, psychology, architecture, as well as geography, history, culture and many other disciplines of interaction in a specific size area to build a variety of indoor and outdoor services for people to rest, watch, travel, play and entertainment public space. A successful landscape design cannot be separated from the rational application of plant materials. This paper makes a systematic analysis on the classification of plant materials and their growth habits, seasonal changes, functions, landscape characteristics and aesthetic value in landscape design, and finally summarizes the theoretical system of plant materials application research in landscape design.*

**Keywords:** *Landscape design, Plant materials, Application research*

## 1. Introduction

China's terrain is high in the west and low in the east, the climate is complex and changeable, and there are many kinds of vegetation. Has produced a variety of different geographical landscape in our country, the main creator of classical gardens in China and the service object is the ancient Chinese literati class, the class of the core values of Confucianism long-term received two edify, relatively inside collect implicative, imitating the natural harmony, at the same time with the natural landscape of landscape conception and the pursuit of a plateau land [1]. In recent years, with the continuous prosperity of our national strength and the continuous improvement of people's material living standards, all kinds of modern landscape, large and small, have sprung up like spring rain. There is no lack of some excellent landscape design cases, such as: Zhongjiang Qishan Park, Shenyang Jianzhu University Rice Field campus, Beijing Olympic Forest Park, Shenzhen Baoan Seaside Park Square, etc. These excellent design cases not only meet the requirements of national landscape design, but also make in-depth planning for functional areas, road systems and plant landscape display in the park. The application of plant materials is very important for landscape design.

## 2. The position and function of plant materials in landscape design

### 2.1. The proportion of plant materials in landscape design

As mentioned above, the design and application of plant materials in landscape design is a particularly important link. Plants should be analyzed and studied together with topography, buildings, paving materials and site structures as comprehensive elements at the beginning of the design process [2]. The variety of plant materials creates a variety of large and small functional space, semi-enclosed space, private space, etc. It presents different landscape characteristics in different seasons. In many of the landscape design case stylist according to the project area by topography, soil, and climate factors integrated to develop a suitable for various plant landscape of local climate conditions, in some city parks, residential area greening, public activity center and other plants in the landscape design of reasonable collocation not only can fusion architecture and greening, make it as a whole. It also reduces the abruptness of the edges of the building. Of course some inexperienced designers at the beginning of the design will be the application of plant material is just on the overall design scheme, satisfy the requirement of the national public area greening hard, put into the design of the plant materials used in the landscape design to the supporting position, this design without the design elements of plant material this big landscape research and use value, It is also difficult to design a landscape scheme that is rich in plant landscape and coordinated with other buildings.

## **2.2. Functional role of plant materials in landscape design**

The function of plant materials in landscape design is reflected in many aspects; Adjust microclimate, control temperature, build space, reduce noise, beautify the environment, etc. First, in terms of regulating the microclimate and controlling the temperature; With the increase of global temperature, the urban heat island effect (UHI) is aggravated, which is mainly caused by the light reflection of reinforced concrete buildings and a large amount of anthropogenic heat emission. However, plants living in urban growth environment will adjust their growth activities to adapt to environmental changes according to the changes in the surrounding environment. Absorbing more heat releases water to the environment through its own transpiration, lowering the ambient temperature and increasing the humidity. According to the analysis of relevant data, the surface temperature in summer in the vegetated area was compared with that in the open area, and the average summer temperature in the vegetated area was at least 2 degrees lower than that in the empty area without vegetation. The ratio is greater in areas with heavy vegetation. Secondly, in terms of building space and reducing noise; The construction space of plants is a major consideration in the landscape design of plant materials. Plants have a variety of appearance features, and different sizes of atmosphere Spaces can be configured by using different appearance and growth habits of plants. When people place oneself in the space that is large tree all round makes people feel mysterious, abstruse undoubtedly. In with low shrubs and various flowers on all sides of plant space and make people feel relaxed and cheerful, nature itself is a mysterious and vast space, from the tiny plants to big trees are in their respective play different roles, built one after another interesting and beautiful scenery of the four seasons of the space, to bring the world profusion is colorful, brought joy to human happiness. Plant construction space is manifested in three aspects; First, open space, this kind of space is most concentrated in the central park or large area of green area inside the city park, also more common in some natural vegetation greening area, characteristic is a general distribution around the tree and the tree species belong to large trees, leafy crown breadth is bigger, central area for large area lawn ornament or a few low shrubs and flowers. Second, enclosed Spaces, which are often found inside forests or large urban parks. Different from the open space, shrubs and small flowers are arranged around large trees. The audience of the park ranges from the elderly to the children. In addition to the open space, a certain proportion of closed space should also be created in the internal space of the park. It is one of the measures to relieve fatigue of more and more urban people to take their families to the closed space of the park to enjoy the weekend scenery quietly after a week's work. The third is the illicit close space, this kind of space is common in the city park, the designer may use a variety of different vegetation types to create a small illicit close space, shrub distribution around the illicit close space, can also according to the design needs to be piece of shrubs cut to style, plant wall in plant wall inside a small pavilion and rest seats and other facilities. The noise reduction function of plants is reflected in different heights, species and planting densities. The noise reduction function of large trees is the most obvious when it is above 40m, while the noise reduction function of small trees and shrubs starts to work within 10m distance. In some specific tree species, cypress, camphor, privet, heather, coral, small wax, cotinus, poplar and other plant noise reduction function is particularly obvious. The beautification function of plants is not out of date at any time. Evergreen plants are green all the year round, and deciduous plants have different appearance characteristics in the four seasons.

## **3. Classification of plant materials and their growth habits**

### **3.1. Classification of plant materials**

Plant species can be divided from many aspects; Plant growth type, environmental requirements, ornamental characteristics and appearance characteristics, etc. In this paper, according to the growth types of plants, plant species are generally divided into five types, mainly trees, shrubs, flowers, ground cover, turf.

Arbors are generally tall trees, trunk prominent, luxuriant crown and other characteristics. Usually, we refer to the woody plants with obvious trunk and crown above 3M as trees, those above 20m as large trees, and those between 10m and 20m as medium trees. 3M-10m high called small trees, according to their growth habits and seasonal characteristics can be divided into evergreen trees and deciduous trees. In landscape design, it is mainly used for street trees or separate plant landscapes. For example, in the Yanta campus of Shaanxi Normal University, two old pine trees next to the rockery in the campus are unique plants, tall trees, lush branches and leaves, especially in summer is the posture of the bank, green. The locust trees on both sides of the main road of the campus create a green barrier, so that the teachers and students passing by have a little cool in the hot summer.

Shrubs are called shrubs according to their height below 3M without obvious trunk and branches. They are often used to isolate Spaces or match trees around them in landscape design, and can also form landscapes with landscape stones. Shrubs are characterized by branching, clump growth and resistance to pruning. According to this characteristic horticulturist can clip shrub vegetation into a variety of modelling chic plant landscape.

Flower plants are mainly planted in the form of cluster in landscape design. Large flower beds and flower belts are ideal display sites for flowers. In recent years because of garden plant landscape construction technology innovation in the various seasonal plants landscape sculpture, investigate its principle was made good iron frame internal filling and planting soil nutrients to configure a variety of plants, after waiting for a certain period you will see a wide variety of plant landscape sculpture, there are plants, animals, in the form of form, architectural form, and so on. It has greatly enriched people's viewing experience.

Ground cover plants are generally planted in flower pools, gardens and lawn centers or slopes with slopes in landscape design, which have great advantages in soil and water conservation, and can also be divided into deciduous ground cover and evergreen ground cover according to the season. Evergreen ground cover has certain cold tolerance.

Nowadays, lawn plants are an indispensable part of landscape design, which can be divided into cold season lawn and warm season lawn. Most of them appear in the green land around trees and shrubs, and play a certain supporting role in the landscape of trees, shrubs, flowers and plants. Soil and water conservation effects are also prominent, the 2:1 slope of the park greening must be planted lawn or other vegetation to preserve soil and water.

### ***3.2. Growth habits of plant materials***

Climate varies from region to region, and so do plants. According to climate and geographical distribution, the growth habits of plants are classified into three groups: cold-tolerant plants, heat-tolerant plants and plants in temperate regions. Cold-resistant plants are mainly distributed in cold areas. Plants in this region grow all year round in cold areas with low temperature, and are cold-resistant and heat-resistant. For example, tulip, rose, spruce, peach, wisteria and so on. Thermotolerant plants grow in high temperature areas all year round and are heat resistant but not cold, while some are drought resistant and not cold. Plants in temperate regions show different appearance characteristics in each season due to obvious alter country of seasons, most of which have the characteristics of dormancy in winter and growth in spring, summer and autumn, but individual plants that are not resistant to high temperature and drought are excluded.

## **4. Landscape characteristics and aesthetic functions of plant materials**

### ***4.1. Landscape characteristics of plant materials in four seasons***

Plants have different landscape appearance in different seasons, and plant landscape plays a pivotal role in landscape design. An excellent landscape designer will design plant landscape or plant landscape matching with other buildings and structures according to the growth characteristics and ornamental characteristics of plants in different seasons. In this way, the design has different landscape characteristics throughout the year. Specific plant landscape design scheme designers should do the following:

Suitable for trees, reasonable landscape. At the main entrance, overlapping trees, low shrubs and seasonal flowers are used to create scenes, attracting visitors with bright colors and patterns.

The height is appropriate. In the design of cluster plant landscape, the landscape design is carried out according to the height collocation of different plants.

Color coordination, four seasons have scenery. The selection of species takes into account the comprehensive factors of different leaf colors, flower colors, leaf stage and flowering stage of plants, so that plants have rich seasonal variations [3].

After a long winter of dormancy, most plants will sprout in the spring and compete to show their vitality. Most tree plants such as: weeping willow, elm, camphor and so on are tender green buds, of course, there are plum blossom, peach blossom, cherry blossom, apricot flowers and other plants compete for posture capture yan and other spring blooming flowers and plants. The landscape characteristics of plants in this season should mainly be considered from the spring appearance and flowering duration of

plants.

In summer, plants have various appearance characteristics and rich colors, and a variety of heat-loving and heat-resistant plants show their appearance in this season, such as Magnolia, Schima superba, phoenix wood, rose, gardenia, night primrose, rhododendron, chinchilla, sage, Ophianthema, daylily, lotus, morning glory and so on. Designers can select plants suitable for planting and displaying in specific areas according to the seasonal characteristics of plants in this season.

Autumn and winter season the earth gradually faded the vast gold covered with gray and white. During this period, designers had to consider the seasonal scene of plants in autumn and the original branches and density of plants in winter. Most plants entered a dormant period in winter, and the landscape features were mainly based on the image of plants' branches and the appearance after winter snow cover.

#### **4.2. Aesthetic function of plant materials**

The proper use, reasonable collocation and rich varieties of plant materials in landscape design can greatly improve the landscape quality, make the overall design of the park more beautiful, and maximize the aesthetic function. The aesthetic function in the design process of plant landscape is not the monotonous planting of certain kinds of plants in a large area, but the specific method and planting scheme of plant landscape planting in the design area based on the design needs, through the comprehensive investigation of topography, buildings, cultural needs, plant ratio, aesthetics and other aspects. To meet people's sensory, cultural and historical, aesthetic appreciation and other aspects of the needs. Specific plant landscape construction scheme contains Joe - irrigation - wood composite, shrubs - flowers - lawn combination, Joe - shrub - portfolio, Joe - shrub - vine - flowers, shrubs, combination - by - lawn, shrubs, flowers - are composed, plant landscape structure combination, stone plants - combination, stone sculpture - the combination of the water, and other methods.

The aesthetic function of plant landscape mainly lies in the following aspects; First, create a sense of space. In the landscape design, the use of trees and shrubs combined with a variety of areas of different enclosed space can make people happy, pleasing to the eye. Such Spaces are common in national city parks and wetland parks. Second, beautify the environment, visual feast. The better a city's ecological greening, the more comprehensive the quality of people's living space, the higher the environmental quality, and the lower the vice versa. The better the public space for people's activities and the green environment in the living space, the better people's mood will be, and the happiness index will increase. In today's digital information age, it is the common desire of people to build an ecological city. Third, create rhythm, ease and order. Different plant species make plants have a variety of morphological characteristics. Through the comparison and collocation of plant forms and the pruning of horticulturists, a number of rhythmical and interconnected landscape Spaces are created, which breaks the visual fatigue brought by monotonous plant landscapes and enriches people's enjoyment of playing and viewing.

#### **5. Principles of plant material planting design in landscape design**

After the above research and analysis in many aspects, plant materials play a pivotal role in landscape design, we can not simply think that plant materials are used to provide hard landscape as a supporting role. It is necessary to make a preliminary plan for the structure of the plant landscape at the beginning of the landscape design scheme, so that the plant landscape and other hard landscapes are at the same height and cooperate with each other to maximize the function and beauty of the overall landscape. The specific design should first consider the local terrain, climate, common plant species, and then according to the park design requirements of trees and shrubs, flowers, landscape stones, landscape structures, pavilions, corridors, terraces and other buildings to carry out a reasonable collocation. Finally, in the process of specific plant landscape construction, the appearance characteristics, growth habits, flowering period and other aspects of plant materials are considered comprehensively, and the soil is changed when necessary to ensure the required nutrients for plant growth. Large areas of plant landscape should be maintained by professional horticulturists. Another important aspect is that certain plants represent certain meanings, which is why there are so many pine trees in the cemetery. This requires landscape architects to have a more comprehensive study of plant history and culture. The final design of both beautiful and functional landscape works can be achieved by combing the knowledge of various aspects.

## 6. Conclusion

Through in this paper, the study found that the current lot no design experience of the landscape designer to the application of plant material as a minor part of the design work, more is used after finish design plant materials to decorate the landscape of hard, not from the particularity of the plant landscape and the landscape design of comprehensive, such design is not correct, Plant material itself is a complex subject, as garden designers, we should design more popular landscape works from the habit of plant material itself, appearance characteristics, combined with history, culture, aesthetics and other disciplines of mutual cooperation. I hope this research can give some help to the workers in this field. Of course, one person's knowledge and ability are limited, and the research content of this paper needs to be further deepened. I hope you can criticize and correct the deficiencies.

## References

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