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Study on Plant Landscaping Methods in Garden Landscape Construction

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Abstract Garden landscape is a beautiful complex formed by space and time complementing each other and acting together. Garden plants are the core landscaping elements in garden landscape construction. It is necessary to flexibly use a variety of plant landscaping methods to create a richer and more vivid natural landscape, and promote the improvement of the quality of the living environment and the harmonious coexistence between man and nature.

Key words Garden landscape, Plant landscaping, Vertical greening, Double-row and multi-row, Grass block paver

1 Introduction

The ingenuity in landscape is inseparable from the exquisite integration of various elements. The static elements can be subdivided into two categories: hard landscape and soft landscape. Hard landscape, such as sculpture, pavement, buildings and flower walls, gives space a skeleton with its stable form; soft landscape covers green plants and water bodies, injecting life and vitality into the space with a flowing posture. In addition, the change of seasons and climate also add poetic and pictorial splendor to the garden landscape. Garden plant landscaping is to flexibly use the combination of trees, shrubs, flowers, grasses, vines and other plants, to create a rich, beautiful and functionally applicable natural landscape by giving full play to the characteristics of the plants including shape, lines, color, fragrance, fruit, and seasonal phase changes[1], which brings people an enjoyable and comfortable experience.

2 Main planting patterns of trees and shrubs

2.1 Isolated planting Isolated planting refers to the planting method of individual trees or shrubs planted in isolation. It is mainly to reflect the individual beauty of plant and make it the absolute focus of the local landscape. It is often used in areas with wide views, in the center of landscapes or in delicate corners. Generally, tree species with luxuriant branches, beautiful canopy, tall and straight trunk or trees and shrubs with very unique landscape shapes are selected.

The commonly used tree species for isolated planting include the following:

(i) *Cedrus deodara* (Roxb.) Loud.: *Cedrus* Trew. in the Pinaceae family. It is large evergreen tree, and the height of the tree can reach more than 30 m. Large branches are irregularly whorled, flat or slightly drooping. The leaves are needle-shaped and firm, green in color. It is tall and magnificent, growing rapidly, especially with strong cold tolerance, and is evergreen in winter.

(ii) *Salix babylonica* L.: *Salix* L. in the Salicaceae family. It is deciduous tree, and the height can reach up to 18 m. The canopy is flexible and soft, and the branches droop naturally. The leaves are narrowly lanceolate, with a long tip at the apex and finely serrated margins. The root system is developed, and it is particularly resistant to water and humidity, so it is often planted on the water's edge and on the bank, and the slender willow branches dance in the wind amidst the rippling waves.

(iii) *Magnolia grandiflora* L.: *Magnolia* L. in the Magnoliaceae family. It is large evergreen tree, up to 30 m in height. The leaves are leathery and have a shiny surface. The flowers are white, fragrant, shaped like lotus flowers, and the flowering period is from May to August. The tree is tall and majestic, with big white flowers blooming at the top of the branches.

(iv) *Osmanthus fragrans* (thunb.) Lour.: *Osmanthus* Lour. in the Oleaceae family. It is evergreen shrub or small tree, generally 3 - 5 m tall. The corolla is yellow, the small flowers are clustered, the flowering period is September - October, and the fragrance is strong. It is one of the top ten famous flowers in China. The green leaves are scattered with dots of golden yellow, and the fragrance spreads all over the corner in the autumn wind.

(v) *Chimonanthus praecox* (L.) Link.: *Chimonanthus* Lindl. in the Calycanthaceae family. It is deciduous shrub with a height of 3 m. The flowers are wax yellow, with a flowering period from December to March of the following year. It is hysteranthous, and blooms in winter with a delicate fragrance, bringing a touch of warmth in the cold winter.

2.2 Coupled planting Coupled planting refers to the planting method of selecting the same or very similar tree species which are planted opposite to each other on both sides of a specific place or

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object, such as roads, entrances and exits, and buildings. It is mainly to reflect the symmetrical beauty of scene composition. The selection of plants should pay attention to the fact that the tree species for coupled planting should be as consistent as possible in terms of tree height, shape and color.

The commonly used tree species for coupled planting include the following:

(i) *Pinus bungeana* Zucc. : *Pinus* L. in the Pinaceae family. It is large evergreen tree, and the height of the tree can reach more than 30 m. It is a unique and precious tree species in China. The umbrella-shaped green crown is matched with mottled milky white trunk, forming a unique ornamental characteristic.

(ii) *Punica granatum* L. : *Punica* L. in the Punicaceae family. It is deciduous shrub or small tree, 5 – 7 m tall. The flowers are bright orange-red, flowering from May to July, and the flowers bloom brightly and densely. The berries are nearly spherical, light yellowish brown when mature, and edible. They ripen in autumn from September to October, hanging high on the branches.

(iii) *Photinia serrulata* Lindl. : *Photinia* Lindl. in the Rosaceae family. It is evergreen shrub or small tree, generally 3 – 6 m tall. Young leaves are red. Flowers are white in clusters, flowering from May to July. The fruit is spherical and red, and the fruit maturity period is October – November. It is a tree species with excellent ornamental effect. It is evergreen all the year round, with red leaves in spring, flowers blooming in summer and red fruits in late autumn.

2.3 Belt planting Belt planting refers to the planting of trees or large shrubs in rows according to fixed row spacing. This mode is mainly used in the plant arrangement of street trees. The selection of plants should pay attention to mainly reflecting the uniform characteristics of plant groups, and it is not suitable to plant special or obtrusive tree species in individual locations.

The commonly used tree species for belt planting include the following:

(i) *Platanus acerifolia* Willd. : *Platanus* L. in the Platanaceae family. It is large deciduous tree with flaky peeling bark. The tree can be as high as 35 m tall, and the leaves are 3 – 5 lobed, resembling the shape of a widely opened palm. Cone, usually 2 balls and 1 bunch, is also the source of its name. It is tall and imposing, with a large crown and thick shade, and strong adaptability. It is an excellent street tree species in the world, and is also known as the "king of street trees".

(ii) *Sophora japonica* L. : *Sophora* L. in the Leguminosae family. It is a large deciduous tree with a height of up to 25 m. The bark is gray-brown, with longitudinal cracks, pinnate compound leaves, flowering from July to August, and the nectar is edible. It is also a famous street tree species with lush branches and vigorous vitality. However, compared with the magnificence and elegance of *Platanus acerifolia* Willd. , the tree shape of *Sophora japonica* L. is more beautiful and delicate.

(iii) *Ginkgo biloba* L. : *Ginkgo* L. in the Ginkgoaceae family. It is a rare relic tree species. It is a large deciduous tree with a height of up to 40 m. The leaves are fan-shaped, with long stalks, light green, and turn yellow before falling in autumn. It is tall and beautiful in shape, and its leaves are unique. Especially in autumn, the leaves turn golden yellow and scatter all over the ground to form a unique landscape.

2.4 Cluster planting Cluster planting refers to the planting method in which several or more than a dozen trees, shrubs, flowers, grasses and other plants are flexibly combined and configured into a small plant community according to the landscape principle of natural aesthetics. It is the main application method of plant landscaping in gardens. It is necessary to consider how to reflect the beauty of overall balance and the beauty of differences among individuals through the combination, complementarity and contrast among various tree species in plant communities in terms of shape, color and seasonal changes.

2.5 Mass planting Mass planting refers to a large-area plant community formed by mixed planting of various trees, shrubs and ground cover plants[2], and its scale is much larger than that of cluster planting. The irregular and well-arranged landscape characteristics in the community are more abundant, but the interspecific relationships that need to be considered are also more complicated.

3 Main planting patterns of ground cover plants

3.1 Flowers Because of their rich kinds and diverse colors, flowers are often used in landscapes as the main body of structural patterns. There are mainly two planting modes: flower beds that need specific growth containers and flower borders that simulate natural growth.

3.2 Turf The application of turf can bring a large area of pure greenery, but the ecological benefits of turf are not high, and its growth state is easily degraded. To maintain a good landscape effect, a lot of meticulous post-maintenance management work, including watering, pruning, fertilization, *etc.*, needs to be done[3]. Therefore, in modern garden plant landscaping, it is not advocated to use turf in a large area, but only for supporting and embellishment.

4 Several other distinctive landscaping methods

4.1 Vertical greening The three-dimensional greening can effectively alleviate the contradiction between the shortage of construction land for greening and the requirements of improving urban ecological environment, so it has gradually become an important part of urban landscape, guiding the landscape to expand from two-dimensional to three-dimensional direction. The main forms of three-dimensional greening include roof greening, balcony green-

ing and vertical greening. Among them, vertical greening is the most common three-dimensional greening mode.

Vertical greening, literally, refers to greening perpendicular to the ground. It takes advantage of the climbing and adsorption characteristics of some plants, which can grow upward along the surface of buildings, structures, fences, flower stands, columns and other objects until it covers the whole vertical surface, forming a vertical green landscape. At present, vertical greening plants are generally planted on the ground. Because of rapid growth, vigorous growth, extensive management and low cost, a small plant can quickly cover a large area, and it has been greatly recognized and popularized.

Vertical greening can not only double the amount of urban green on the limited green space, but also play a positive role in improving the green space rate. Moreover, it has the same effect as ground greening in many aspects, such as effectively improving air quality, alleviating urban heat island effect, absorbing dust, and reducing noise hazards. Equally importantly, it also reduces the overall operation energy consumption of buildings and improves and enriches the green looking ratio of urban garden landscape.

4.2 Application of double-row or multi-row street trees In recent years, as residents pay more and more attention to urban "greenery", green is not only reflected in the increasing "green quantity", but also in the higher and higher requirements of "green efficiency". Therefore, many landscaping upgrading and renovation projects are actively carried out. The construction of tree-lined roads has gradually attracted attention, and the design of double-row or multi-row street tree roads has also emerged in this case.

After the planting of double-row or multi-row street trees, the roads are diverse and rich, and the coverage rate of green shade can basically reach 100%. The trees are shaded, and the shade forms a net. Whether it is a motor vehicle, a non-motor vehicle or a pedestrian, passing among double or multiple rows of street trees will fully make us feel the comfort of green space, especially in summer.

The construction of double or multiple rows of street trees has greatly increased the amount of urban green. It can not only alleviate the urban heat island effect, reduce dust and noise, effectively reduce the glare caused by sunlight on drivers and pedestrians, but also allow motor vehicles, non-motor vehicles and pedestrians to have their own dedicated lanes without disturbing each other, so that they can not only pass but also enjoy the scenery.

4.3 Application of grass block paver Grass block paver is an ecologically and environmentally friendly garden construction mode. It combines stone and turf, and has the characteristics of hard and soft landscape at the same time. It has the characteristics of water permeability, breathability and turf growth, so it is widely used in parking lots, walking paths, squares and other places.

It is most widely used in the parking lot, but the greening benefit of single grass block pavers is low. The combination of grass block pavers and shading trees can achieve more efficient ecological effects. If we add a proper quantity of low shrubs and flowers, it will be the icing on the cake. Many people think that planting trees in parking lots with grass block pavers will affect the parking quantity and the effect of entry and exit. In fact, if it is properly designed, these problems will not occur. Planting shading trees at the front or rear of the car, especially in the middle of the rear of every 2 or 3 cars, will form a better shading effect, especially in summer. At the same time, low shrubs or flowers are planted in the middle of every 2 or 3 cars to form a small hedge, which not only serves as a parking space dividing line, but also increases the greening landscape effect.

5 Conclusion

Garden landscape is a beautiful complex formed by space and time complementing each other and acting together. Garden plants are the core landscaping elements in garden landscape construction[4], and the selection and application of other elements are carried out around the species and planting methods of greening plants. It is necessary to flexibly use the scientific allocation methods of trees, shrubs, flowers, grasses, vines and other plants to continuously improve the quality of landscape greening[5], open up urban ecological utilization space, and promote the improvement of living environment and the harmonious symbiosis between man and nature.

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