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Thoughts about Plant Landscape Forms of Urban Gardens

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Abstract Landscape presents nature to us in another way through artificial transformation. At the same time of rapid development, cities should attach great importance to setting of urban green landscape. Plant landscape of urban gardens is an essential part of urban green landscape. To study plant landscape of urban gardens, it is necessary to find out growth habits and characteristics of plants, and ornamental benefits of plants. Different plants can be combined together to produce different space forms and generate different aesthetic effects. Through enriching plant landscape forms of urban gardens, it is feasible to increase the interest of urban landscape.

Key words Garden plants, Landscape form, Thoughts

1 Introduction

The design of space forms for urban plant landscape is an essential part of urban landscape design. A city is a small ecosystem, thus building of landscape forms is inseparable from building of urban plant landscape forms. With acceleration of pace of life in urban areas, space forms of plant landscape are often neglected. We usually care about selection of plant species, instead of building forms of plant landscape. Therefore, in the design of urban landscape, space forms of garden plants should be based on characteristics of local climate and culture, so as to make the landscape forms of urban plants better integrate into urban forms.

2 Connotation of landscape form

Landscape refers to natural scenery of certain region or certain type, and also refers to artificially created forest landscape. According to the *Old Testament of the Bible*, landscape has the same meaning as scenery and scene. With social development, visual aesthetic demands of people are gradually growing. Landscape gets penetrated to people's daily life. Thus, people have higher and higher pursuits for abundance of landscape form. Landscape of urban gardens plays a very important role in urban landscape. To a certain extent, it is the represent of urban landscape culture and also manifestation of ecology and green of a city. For example, Humble Administrator Garden and Lingering Garden nearly become another name of Suzhou. The essential element of urban garden is garden plant. In garden design, it is feasible to combine different plant varieties according to growth condition in different seasons, to create specific landscape space. With the deepening of environmental protection and green concept, the demands of people for garden plants become higher and higher. Forms should satisfy design demands, and functions attract wide attention. Garden plant has become a leading role in urban garden landscape.

3 Space forms and functions of garden plant landscape

Garden plants are plants suitable for garden green, including woody plants and herbaceous plants. Plant is an essential element of garden construction. The design of space forms of garden plant landscape is not merely creation of environment, but manifestation of a kind of art.

3.1 Types of space forms of garden plant landscape Space forms of garden plant landscape have rich types. According to enclosure forms, space forms can be divided into enclosed form, semi-enclosed form, and open form. Firstly, the enclosed space is the space enclosed by tall arbors. In fact, the space created by tall arbors is not totally enclosed space. In elevation, the space is sparse and sunshine will penetrate through leaves and branches of trees. Such enclosed space will not bring sense of feeling, instead it will give people strong sense of safety. Secondly, semi-enclosed space is the space where plant partially shelter buildings or sight of tourists. Such semi-enclosed space provides mysterious veil for gardens and reflects special beauty of gardens. Finally, the open space is area of land without human-built structures. In open space, people's sight is higher than surrounding scenery^[1], and there is no secret thing. Generally, open space plants lawns or flowers. Tourists can play games in open space and feel pure beauty of nature.

3.2 Landscape space created by garden plants In public space of garden design, there are abundance plant types and diversified forms. It has its own form characteristics, and also characteristics different from surrounding environment. Thus, it can bring about different effects in scenery creation and bring different levels of visual experience to tourists. According to difference in garden locations, there are also certain differences in native plants. When creating scenery using garden plants, designers will give different consideration. Some may choose more native plants, while others may choose evergreen plants and introduce exotic varieties. Besides, varied design thoughts of designers and different participation level of the public will also produce different effects, bring people different artistic conception of plant culture, and ac-

cordingly make each garden have its unique feature. Different design methods will create different space for gardens, including enclosed space, semi-enclosed space, and open space. Enclosed plant forms will create quiet and secluded space, semi-enclosed plant forms will give people sense of safety and relaxation, depending on mood of tourists. By comparison, due to no boundary, open plant forms will bring people broad feeling, like standing on a mountain and letting thoughts fly.

3.3 Spatial coordination function of garden plants Garden plants can bring each space of gardens more coordinated. Plants exist in flexible area of each space and are also main elements of each area. Since basic color of plants is green, and green brings comfortable feeling, taking green color as dominant color of gardens can realize coordination of each area to a certain extent. *Apart* from uniform hue, combination of different garden plants also enhances coordination of gardens. Besides, collocation with water, land and buildings manifests importance of garden plants. On surface of water, phytoplankton is often designed, to increase vitality of water space. Dotted some trees like willow along the banks can better reflect soft beautify of water line. Plants can play a special coordination role in both big or small space. In big space, tall arbors can be planted and dotted with suitable shrubs. In small space, some landscape elements may be used to fill the space and increase interest of gardens. Around buildings, tall arbors can better protect secrecy of buildings, while short shrubs can better guide people to find buildings. Selection of plant varieties depends on nature of use of buildings.

3.4 Landscape function of garden plants Garden landscape includes water, terrain, and green land. Garden plants can enrich garden landscape. Garden plants are numerous in varieties. Changes of seasonal aspect are varied. Besides, there are many methods of collocation. In space design of gardens, various dotting method can be applied. To a great extent, garden plants can enrich urban garden landscape. Difference in plant forms also enriches garden landscape. Rows of arbors create regular linear space, large area of lawns creates planar space, and flowering shrubs dot natural mountains and rivers, favorable for manifesting natural beauty and reducing rigid feature of artificial landscape. Methods of treating garden plants are varied, so they will bring different moods to people and bring more and richer visual experience.

4 Elements for building garden plant landscape forms

4.1 Humane element Humane element is a core element of garden landscape building. It refers to local human feelings and culture. At the early stage of building space forms of garden landscape, questionnaire should be used to raise the participation level of the public. In the design of garden landscape, both the garden design and the design of garden plants should combine local cultural characteristics, as well as demands of residents, which is a guarantee for utilization ratio of gardens after completion of building, to maximally satisfy spiritual demands of people.

4.2 Aesthetic element Aesthetic element is also an essential part of garden landscape construction. In different seasons, garden plants have different forms, which bring various beautify of forms, enrich the space of garden landscape, and exert a deeper impact on aesthetic feeling. Aesthetic element is also manifested in design of vertical space. Vertical space can be arranged to be regular and irregular form. For regular form, designers select garden plants with varied vertical manifestation, and conduct customized cutting, to establish landscape element with special meaning. For irregular form, designers do not make additional cutting, keep growth status of garden plants, and manifest more natural beauty of form.

4.3 Ecological element Ecology is combined with green concept. After the industrial civilization, ecological civilization becomes the mainstay of current social development. State leaders always propose ecological construction and the concept of sustainable development is deeply tainted with trend of the times. For the landscape space of garden plants, the design should follow the ecological concept. In the selection and design of garden plant varieties, it is required to keep the ecological concept, to make urban garden landscape manifest special charm of sustainable development of cities.

5 Thoughts for building garden plant landscape forms

5.1 Flexible building thought Flexible building of garden plants is a rational method of building. It generates different final forms due to seasonal changes and growth conditions. Garden plants have unique meaning in garden landscape, different from water, terrain and building landscape. Plants are objects with vitality. With seasonal changes and variation of regional environment, plants themselves will generate quite different effects. Besides, plant types are diversified. Different plant forms are quite different. Roughly speaking, shape of plants can be divided into round, square, creeping, and vertical. In addition, the same variety of plants may also have different shape due to difference in tree age. This provides much thinking space for design of garden plants in form, and provides richer experience of urban garden plant landscape forms. The largest change in garden plants should be changes along with seasons. Spring flowers, summer green, autumn fruit, and winter snow^[2] are general understanding of four seasons, and also the truest reflection of plants in four seasons. Seasonal changes of plants not only bring rich level experience for garden landscape space, but also bring different experience for tourists. Both psychological or emotional feeling may change with variation of plants. In spring, everything in urban gardens becomes green, flowers and grasses will bring enthusiastic feeling; in summer, garden plants bring leisure and recreational place, resist scorching sunshine, and bring comfortable inner feeling; in autumn, it is harvest season, different varieties of plants manifest different scene, some become yellow, some bear fruit, all of these bring tourists with more natural feeling; in winter, urban gardens may bring us desolate scene, however, if it

snows, the entire urban garden will become white and bring us a special feeling.

5.2 Artistic building thought Art is higher level spiritual culture pursued by people. In garden plants, art is mainly manifested in combination of regional culture, hue matching, and space forms. (i) Regional culture is basic artistic element of urban gardens and culture is internal drive for development of a city. If the history of a city can be traced by urban gardens, urban gardens can optimally pass on culture of this city, and artistic form can be expressed reasonably through culture. (ii) Hue matching is also an essential approach to art of garden plants. Different hue matching will generate different effects. Thus, it is very important to use plant hues more skillfully. Hues of plants not merely remain mutual coordination of plant colors, but also include coordination between plants and surrounding environment, such as water and buildings. (iii) Combination of space forms of plants is also varied. Combination of different varieties of plants generally generates unexpected effects. In urban gardens, plant varieties can be roughly divided into herbaceous plants, woody plants and climbing plants. Combination of these three types of plants can generate different space forms and generate better artistic ornamental effect. Pavilions, terraces and open halls are often designed with creepers and arbors, which not only enrich landscape space, but also create certain blind spot for buildings, making them partly hidden and partly visible and accordingly attracting people to see. Art is a method of expressing beauty. Through building of the above three aspects, it is feasible to demonstrate artistic beauty to a great extent. This is a task of building plant forms for urban gardens.

5.3 Subject building thought Building methods of garden plants are varied and diversified. Subject building refers to the method of building with single plant as subject. Such method of building reflects to a certain extent the central status of garden plants. Thus, we propose taking those garden plants with high ornamental benefits as subject. Through combining plane space and vertical space of plants, it is expected to make landscape elements more humanized. When building forms of garden plants, we should create comfortable environment and ecological space, to satisfy ornamental and ecological demands of tourists.

The general situation of subject building for garden plants lies in landscape node. Making subject building for certain landscape node can attract more tourists. Non-subject plant building generally uses large area of the same variety plants to cover the garden, build linear space, non-linear space, and dot natural environment, playing the role of guiding tourists. Garden plants have high ecological benefits. When building landscape, designers should not neglect ecological functions of plants such as adjusting humidity and cleaning up environment. Taking full consideration of ecological functions can greatly improve sustainable development of urban gardens, to get closer to development objectives of urban gardens.

5.4 Mode building thought Building modes of garden plants can be divided into simplicity, diversity, emphasis, balance, and

proportion^[3]. (i) Simplicity. Simple technique of expression is easier to be accepted than complex expression method. Simplicity does not mean single. For the design of urban gardens, simplicity mainly refers to repeated use of the same variety of plants to create landscape space. (ii) Diversity. In the design of urban gardens, diversity principle is to prevent excessive repetition of plants and guarantee diversified plants in gardens, so as to attract attention of people. Diversity of garden plants can be manifested in selection of plant varieties, and also can be reflected in selection of plant color. Using plant color to make diversified arrangement can make gardens more appealing. (iii) Emphasis. Any form of composition has clear distinction between primary and secondary features. Garden landscape is no exception, the emphasized object is subject. Subject object can be emphasized through form and color elements. In form, we mainly use regular and irregular features to make differentiation. Regular and symmetrical forms bring people the solemn feeling, while irregular subject object brings easy and relaxed feeling. (iv) Balance. Balance is the equilibrium status of elements. In plant landscape, it generally includes symmetrical balance and asymmetrical balance^[4]. Symmetrical balance is common. Subject object lies in the middle, plants are symmetrically arranged in the right and left, which can be adjusted through plant color and texture. (v) Proportion. Proportion is one of the most important elements in design. Any object has golden ratio, and garden plant landscape is no exception. Proper proportion of plants directly influences visual appearance of landscape. Similarly, plants should obey strict proportional control in both plane and elevation design. Better development space can be obtained through attaching importance to self-form building and the space proportional relation between surrounding botanical colony and buildings.

5.5 Artistic conception building thought Artistic conception is implication and realm conceived but difficult to expound in words. In urban gardens, the artistic conception created by plants needs to be tasted attentively. Garden plants demonstrate artistic conception mainly through building space. Combining artistic conception and culture will bring greater charm. Garden plants can bring different experience for tourists through varied plant colors. Red represents enthusiasm, green represents life, and yellow represents harvest. These colors can bring different feelings for people. The specific charm needs to be experienced personally. Space created by garden plants also can bring different artistic conception. Enclosed space is the expression of safety, while open space brings broad feeling. In allocation of garden plants, full consideration may be given to artistic conception, to realize the dense and sparse effect and obtain excellent ornamental effect. Garden plants can be designed for artistic conception according to zone. Each zone has a classical theme to create the desired artistic concept. It is preferred to conduct design on the basis of culture of the garden area. This not only creates ornamental value, but also passes on traditional culture.

control group, the growth rate of the SMBC of four salt treatments was 7.0%, 1.0%, 1.0%, and -1.0% respectively. Therefore, the growth degree of the SMBC with addition of carbon source was higher than that with addition of carbon + nitrogen source. The influence of addition of nitrogen source on the SMBC was not significant. With increase in the salt concentration, the growth rate of the SMBC of four substrate treatments declined accordingly.

4 Conclusions

(i) After addition of different substrates, the SMBC in high salt content (S3 and S4) is obviously lower than that in low salt content (S1 and S2). The decline rate of S3 and S4 is 5.4% and 14.2% for no addition of substrate; the decline rate is 9.0% and 24.0% for addition of nitrogen source; the decline rate is 11.5% and 28.0% for addition of carbon source; the decline rate is 19.5% and 39.5% for addition of carbon source + nitrogen source.

(ii) Compared with no addition of substrates, addition of nitrogen source could not increase the SMBC. Addition of carbon source and carbon + nitrogen can significantly increase the SMBC, and the increase in low salt content soil (80.0% - 81.0% and 58.0% - 59.0%) is obviously higher than high salt content soil (52.0% - 69.0% and 34.0% - 50.0%).

(From page 84)

6 Conclusions

Garden space is receiving closer attention, especially in the design of landscape forms of garden plants. As a major element of urban landscape design, garden plant is directly connected with sensory experience of urban landscape space. Therefore, building the landscape forms of urban garden plants should not remain at the stage of drawing, but should select proper garden plants according to local culture, climate, and regional characteristics, and assign garden plants with spiritual implication, cultural, aesthetic and ecological elements, to build artistic and picturesque plant landscape forms for urban gardens.

(iii) Generally, when the soil salt content is low ($\leq 0.5\%$), the influence of different substrate treatment is little on the SMBC, and increasing the soil salt content can obviously reduce the SMBC.

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