

Shrub Landscape Design of the Summer Palace in Beijing

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Abstract As one of the outstanding representatives of classical Chinese gardens, the Summer Palace has a variety of shrub plant species, and the configuration of shrub plants is also unique. The shrub landscape configuration of the Summer Palace is varied, with solitary planting, pair planting, cluster planting and group planting as the landscaping forms, providing people with the functional role of watching, interacting and using in leisure and entertainment, so that domestic and foreign tourists will linger in the Summer Palace. Through detailed introduction of distribution, landscaping form and aesthetic value of shrub configuration in the Summer Palace, analysis and discussion of its role, people can appreciate the fun of plant configuration in the royal garden in more detail.

Keywords Summer Palace, Shrub configuration, Shrub landscape, Aesthetic value

DOI 10.16785/j.issn.1943-989x.2023.4.004

The Summer Palace was first built in 1750 in the 15th year of the reign of Emperor Qianlong, formerly known as “Qingyiyuan” (Gardens of Clear Ripples). It is famous for the art of gardening, and the interspersed plants add natural scenery to the garden^[1]. As a representative of imperial gardens, the Summer Palace has been very popular with tourists since its construction and completion, and the method of plant configuration in the garden is one of the representatives of classical Chinese gardens. The shrubs are exquisitely planted, and artistic skills are applied to show the natural beauty of its form, line, color, etc., in order to attract tourists to stop and watch. The study of shrub configuration can better protect, excavate and develop the culture of shrub plants in the Summer Palace, inherit the classic planting techniques, and provide a basis for the maintenance of tree landscape and a reference for modern plant landscape design.

At present, most domestic studies on the Summer Palace are horizontal studies on garden art and plant landscaping, and the artistic conception of garden implies a deeper and broader realm through concrete scenes^[2]. Shrub configuration in the Summer Palace is the most distinctive part of classical Chinese gardens, which not only have the function of plant landscaping, but also play a visual embellishment role. The shrub configuration in the Summer Palace not only has good ornamental value, but also conforms to the function of garden.

Shrubs play a very important role in the garden by forming unique landscape and producing good social benefits, ecological benefits and economic benefits. The shrub landscape in the Summer Palace is an organic whole. Each part depends on each other, sets off

each other, and connects with each other, jointly forming a complete and unified landscape. Shrub plants are an important part of the whole landscape, so it is particularly important to give full play to the landscape and ecological functions of shrub plants in the limited space.

1 Shrub configuration in the Summer Palace

The Summer Palace is the largest and best preserved imperial garden in China, with extremely rich plant resources. According to the existing data of the Summer Palace, there are 435 species of shrubs in the Summer Palace, belonging to 127 genera and 53 families. Shrub plants account for about 40% of the plant species in the Summer Palace, representing by *Hibiscus syriacus*, *Calycanthus praecox*, *Berberis thunbergii*, *Malus micromalus*, *Prunus cerasifera*, *Lagerstroemia indica*, etc. They not only have a wide range of application value in landscaping, but also are important landscape elements in the Summer Palace. The configuration of plant communities must follow the development law of natural communities^[3]. From the composition of shrubs, there are species groups of multiple plant species; from the perspective of spatial distribution, high-density planting is mainly adopted; from the perspective of time change, spring is the flourishing period of plant blooming.

The shrub plants in the Summer Palace are diverse, and are gradually interdependent and self-contained after three periods of change. According to a variety of shrub plants recorded in the *Annals of the Summer Palace*^[4], the plant landscape of the Summer Palace has been carefully constructed by landscapers and constantly improved in the long river of history (Table 1).

There are as many as 28 species of trees in the ruins cluster^[5]. The layout of the Summer Palace generally adopts a combination of artificial and natural art techniques, which can better reflect the superb attainments of plant configuration in the Summer Palace.

2 Internal shrub distribution and landscaping form

Through the field investigation and literature review of the Summer Palace, it is found that the main shrubs in the Summer Palace are *S. japonica*, *P. × cistena*, etc. In general, shrubs in the Summer Palace are mainly planted in high density, forming a variety of shrub communities, which are mainly distributed near several important scenic spots such as Seventeen-Arch Bridge, Tower of the Fragrance of the Buddha, etc. In Ten Thousand Buddha's Park, there is a piece of dwarf shrubs, with a shrub every 10 m, forming a dense thicket and a relatively complete thicket community.

The two major scenic spots of the Summer Palace, Longevity Hill and Kunming Lake, planted many shrubs and plants in accordance with the principle of “more fruits, trees, pines and bamboos can be planted in the garden with vast land”^[6]. For example, a variety of ornamental fruit trees such as apricot, peach and Nanking cherry are planted on Longevity Hill^[7]. Since the Garden of Clear Ripples was built, many flowering shrubs have been planted on Longevity Hill, giving it a colorful seasonal landscape^[8]. Most of the shrubs along the shore of Kunming Lake are neatly planted, such as *Yulania denudata*, *L. indica* and *P. pekinensis*, which greatly enrich the landscape of building facade^[9]. The shrubs of the Summer Palace are mainly distributed around the architectural

complex, and there are two main shrubby masses in the political activity area and living area around the East Palace Gate. In different zones, the respective theme plants are selected to create different scenic themes in various zones^[10], and plant configuration in the Summer Palace highlight the buildings^[11]. For example, three trees of *Malus spectabilis* var. *riversii* are planted in front of Hall of Joyful Longevity on each side.

Shrub plants are widely used in the gardening of different scenic spots in the Summer Palace. For example, *K. japonica* in front of Longevity Hill has been made into a unique handrail; *P. pekinensis* on the north bank of Kunming Lake also form a unique landscape. In addition, a large number of flowering shrubs with colored leaves are planted in the garden, such as *P. cerasifera*, *C. coggygria*, *P. × cistena*.

These shrubs and plants not only beautify the garden environment, but also enrich the garden landscape color (Fig.1).

3 Landscaping effect of shrubs in the Summer Palace

3.1 Ornamental effect

Shrub plants in gardens serve the theme of gardens and express the aesthetic interest and

Table 1 Shrub plants planted in the Summer Palace

No.	Latin name	Blooming period	Planting mode	Ornamental value	Distribution site
1	<i>Prunus × cistena</i>	April–May	Cluster planting	Viewing leaves	Xing bridge
2	<i>Punica granatum</i>	May	Solitary planting	Viewing flowers	Xihe Gate
3	<i>Hibiscus syriacus</i>	July–October	Group planting	Viewing flowers	Xinyi Branch Garden
4	<i>Syringa reticulata</i>	April–May	Solitary planting	Viewing flowers	Suyunyan
5	<i>Lagerstroemia indica</i>	June–September	Group planting	Viewing stems	Naval Training School
6	<i>Chionanthus retusus</i>	March–June	Solitary planting	Viewing flowers	West Gate
7	<i>Yulania liliiflora</i>	March–April	Cluster planting	Viewing flowers	Hall of Joyful Longevity
8	<i>Cotinus coggygria</i>	May–June	Solitary planting	Viewing leaves	Garden of Harmonious Interests
9	<i>Forsythia suspensa</i>	March–April	Pair planting	Viewing flowers	Lianqiao Road
10	<i>Jasminum nudiflorum</i>	February–April	Cluster planting	Viewing flowers	Plowing and Weaving Scenery Area
11	<i>Euonymus fortunei</i>	June	Cluster planting	Viewing leaves	Longevity Hill
12	<i>Prunus triloba</i>	April–May	Pair planting	Viewing flowers	Ten-mile Corridor
13	<i>Cercis chinensis</i>	March–April	Cluster planting	Viewing flowers	Yanyun Hall
14	<i>Malus micromalus</i>	April–May	Solitary planting	Viewing flowers	Hall of Benevolence and Longevity
15	<i>Prunus davidiana</i>	March–April	Solitary planting, group planting	Viewing flowers	The whole palace
16	<i>Michelia alba</i>	March–April	Solitary planting	Viewing flowers	Longevity Chamber
17	<i>Kerria japonica</i>	May–June	Cluster planting	Viewing flowers	Front Hill of Longevity Hill
18	<i>Berberis thunbergii</i>	March–August	Group planting	Viewing leaves	The whole palace
19	<i>Armeniana sibirica</i>	March–August	Group planting	Viewing flowers	Back Hill of Longevity Hill
20	<i>Prunus cerasifera</i>	March–April	Solitary planting	Viewing leaves	Plowing and Weaving Scenery Area
21	<i>Rosa chinensis</i>	April–September	Group planting	Viewing flowers	Seventeen-Arch Bridge
22	<i>Paeonia suffruticosa</i>	May	Group planting	Viewing flowers	National flower platform
23	<i>Cerasus tomentosa</i>	April	Solitary planting	Viewing fruits	Plowing and Weaving Scenery Area
24	<i>Jasminum floridum</i> Bunge	May–September	Group planting	Viewing flowers	Longevity Hill
25	<i>Lonicera maackii</i>	April–May	Solitary planting	Viewing flowers	Plowing and Weaving Scenery Area
26	<i>Rosa xanthina</i>	April–June	Solitary planting	Viewing flowers	Plowing and Weaving Scenery Area
27	<i>Paeonia lactiflora</i>	April–May	Cluster planting	Viewing flowers	Longevity Chamber
28	<i>Syringa reticulata</i>	March–May	Solitary planting	Viewing flowers	Lenong Hall
29	<i>Calocedrus macrolepis</i>	March–April	Solitary planting	Viewing leaves	Hall of Joyful Longevity
30	<i>Buxus sinica</i>	March	Group planting	Viewing leaves	Qiqing Hall
31	<i>Osmanthus fragrans</i>	September–October	Cluster planting, solitary planting	Viewing flowers	East Palace Gate
32	<i>Jasminum sambac</i>	May–August	Cluster planting	Viewing flowers	Tower of the Fragrance of the Buddha
33	<i>Lonicera fragrantissima</i>	February–April	Cluster planting	Viewing fruits	Zhenyi Pavilion
34	<i>Chimonanthus praecox</i>	November–March of the following year	Group planting	Viewing flowers	Lenong Hall
35	<i>Rosa banksiae</i>	April–May	Solitary planting	Viewing flowers	Yuebo Tower
36	<i>Philadelphus pekinensis</i>	May–June	Group planting	Viewing flowers	Kunming Lake
37	<i>Lyonia ovalifolia</i>	May–June	Group planting	Viewing flowers	Longevity Hill
38	<i>Spiraea japonica</i>	June–July	Cluster planting	Viewing flowers	Tower of the Fragrance of the Buddha
39	<i>Rosa multiflora</i>	April–May	Group planting	Viewing flowers	Hall of Jade Ripples
40	<i>Sorbaria kirilowii</i>	July–August	Cluster planting	Viewing flowers	Plowing and Weaving Scenery Area
41	<i>Rosa rugosa</i>	May–June	Cluster planting	Viewing flowers	West Gate, South Wall
42	<i>Lespedeza floribunda</i>	June–September	Solitary planting	Viewing flowers	Longevity Hill
43	<i>Caragana sinica</i>	April–May	Group planting	Viewing flowers	Longevity Hill
44	<i>Cytisus scoparius</i>	April–November	Group planting	Viewing flowers	Kunming Lake
45	<i>Poncirus tuiifoliata</i>	May–June	Solitary planting	Viewing fruits	Chongcui Court
46	<i>Forsythia viridissima</i>	March–April	Cluster planting	Viewing flowers	Plowing and Weaving Scenery Area
47	<i>Fontanesia fortunei</i>	April–June	Group planting	Viewing flowers	West Causeway
48	<i>Sambucus williamsii</i>	April–May	Solitary planting, cluster planting	Viewing fruits	Longevity Hill
49	<i>Rhus tythina</i>	June–July	Column planting	Viewing fruits	Houxi River Scenery Area
50	<i>Polygonum cuspidatum</i>	August–September	Solitary planting	Viewing leaves	Plowing and Weaving Scenery Area

value orientation of landscape gardeners^[12]. In the shrub landscaping of the Summer Palace, a very distinctive shrub landscape is created with the shrub as the skin and its flowers as the decoration^[13](Fig.1). Different species of shrubs coexist in harmony, adding colors to the shrub landscape of the garden. However, the plants used in the Summer Palace are mostly “focusing on fragrance and ignoring color”^[14], and the difference in fragrance attracts a lot of tourists.

Different species of flowering shrubs have diverse ornamental values. In the garden, the application of flowering shrubs in the garden landscape mainly plays the following roles. ① Beautifying the environment: Flowering shrubs have unique flowers, gorgeous colors, rich colors, and can play a role in enriching landscape. ② Increasing green quantity: Flowering shrubs have certain green quantity in the garden, and can play a role in protecting the environment. ③ Creating a sense of hierarchy: Flowering shrubs can be used as a separator or isolation belt, which can reduce the damage to green quantity by tourists, and create a sense of hierarchy.

3.2 Effect of dividing space

The shrubs in the Summer Palace have the function of dividing space, and shrubs can be enclosed into semi-open, covered and enclosed spaces. ① Semi-open space: The semi-open space enclosed by shrubs can guide people's sight and the direction of space extension. The open entrance generally uses plants to block the line of sight, and when people bypass the obstacle scenery, they will suddenly become clear when entering another place. ② Covered space: Shrubs with high crown width in the Summer Palace can form a covered space, which can provide people with a larger resting space. ③ Enclosed space: The Summer Palace is enclosed by shrubs to form a small space, which is highly private and suitable for young people to whisper or for people to rest quietly.

3.3 Ecological protection effect

The use of shrubs in different scenic spots varies. *L. ovalifolia* in front of Longevity Hill are used for enjoying; *P. pekinensis* in Kunming Lake is interspersed in the sight of tourists. In addition, these shrubs not only have good ornamental effects, but also purify the air and improve the soil. At the same time, shrubs play a good ecological role by regulating the microclimate.

Taking the Summer Palace as an example, a large number of flower hedges are planted in the palace. ① Lenong Hall in Longevity Hill: Lenong Hall is located on the east hillside

of Longevity Hill, east of Hall of Increasing Longevity. There are a dozen *C. praecox* planted in front of the gate. It is a famous *C. praecox* appreciation place in Beijing despite of small quantity, and *C. praecox* plays a role of adjusting humidity (Fig.2a). ② Hall of Joyful Longevity: When the spring flowers are in full bloom in March, *Y. denudata* flowers in the Hall of Joyful Longevity are blooming and beautiful, and *Y. denudata* has a special ability of “sulfur absorption” (Fig.2b). ③ Longevity Chamber: There are two small *P. lactiflora* gardens in front of the Longevity Chamber. *P. lactiflora* is planted under the east wall of the small courtyard, creating a quiet environment. *P. lactiflora* plays a role of regulating the climate (Fig.2c). ④ Kunming Lake: On the east bank of Kunming Lake (new palace gate to Wenchang Pavilion), there are many shrubs planted under tall poplar trees on the roadside, with green leaves and white flowers, which are very good-looking and have the effect of purifying the air (Fig.2d).

Flower hedge has a special artistic effect, that is, naturally forming a variety of beautiful shapes. Because flower hedges are used in various forms in gardens, they can be designed according to different landscape characteristics. Flower hedges are mostly natural or regular shapes, with rich seasonal and hierarchical changes. Because of the fine mesh of flower hedge, it can effectively prevent the invasion of diseases and pests, and it is easily trimming. In addition, flower hedge has good adaptability to the environment and low requirements for management level, so it is widely used in urban environment.

4 Applicable population analysis

The Summer Palace is a model of traditional Chinese gardening art, and it is also the most complete and magnificent ancient imperial garden in China. The plants in the garden are planted with different plant materials according to diverse terrain conditions, so as to show the landscape characteristics of each area and render its unique artistic conception. The combination of plant configuration and architecture in the garden shows the wisdom of craftsmen in different periods according to various factors such as location, environment and climate. The unity of shrubs and buildings, the plants planted in different parts of the garden representing the identity of the users and the role of the buildings, as well as the implication of a lot of humanistic, historical and geographical knowledge, not only shocks people but also attracts scholars from

all walks of life to understand and contact it. In addition, there are some shrubs planted in harmony with the garden environment. For example, as an important landscape in the Summer Palace, “weeping willows” has a natural and elegant shape, and evergreen trees are matched with deciduous trees; as an important landscape in the Summer Palace, “begonia spring dawn” has a good landscaping effect.

5 Analysis and significance of landscape effect

5.1 Visual effect

Shrub plants can not only play the role of embellishment and guiding tourists, but also create a certain landscape space. Matching appropriate shrubs according to the actual use of the surrounding buildings and giving them meaning and complementing each other are the basic principles of plant configuration in the Summer Palace. Through the texture and color collocation of shrub leaves, tourists have a poetic and picturesque feeling. It brings different sensory experiences to tourists with different visual effects, such as beautiful, quiet, bright and so on. The shrub is not only green, its branches, barks, leaves, flowers and fruits have a variety of colors, and the colors are rich and changeable. Different colors are produced through configuration of different plants, bringing different feelings to people. In plant landscaping, the appearance of shrubs should be fully taken into account, so that shrub plants are staggered inside and outside, forming the rhythm of the landscape. Several shrubs of different heights are interspersed and combined with each other, which not only increase the depth of the scene, but also enrich the line and color matching form in the volume.

5.2 Space effect

The spatial layout of shrubs is an indispensable part of the landscape planning of the Summer Palace. Without the participation of shrubs, the overall spatial layout of the Summer Palace landscape would not be realized. The use of various natural characteristics of shrub plants, such as color, shape, size, texture, seasonal changes, etc., can build a variety of natural spaces, and combine them with sketches, rocks, landforms, etc., forming a rich variety of shrub vegetation under different functional requirements of the Summer Palace. The open space formed by shrub plants in the Summer Palace makes people's sight higher than the shrub space of the surrounding scenery. In large open lawn, in addition to a few groups of dwarf shrubs, there are also several tall shrubs dotted



Fig.1 Shrub landscape of the Summer Palace



Fig.2 Landscape shrubs in the Summer Palace

inside, forming a sharp contrast, but they do not hinder people’s line of sight, and it is also called open space.

6 Conclusions

The Summer Palace is one of the most representative works of imperial gardens in China. The existing shrub plants in the garden are studied and the configuration methods and forms of shrub plants are understood. As a famous imperial classical garden in China, the Summer Palace has the vast majority of shrub

landscapes, and its plant landscaping methods are also unique, forming a unique plant landscape by combining various factors such as climate, terrain and the owner’s aesthetic needs. The Summer Palace has beautiful scenery in all seasons, and the plants in the garden show different postures as the seasons change. By studying the shrub plants of the Summer Palace and learning about its long history, plant configuration and species, people can immerse themselves in its infinite scenery and comprehend the wisdom of predecessors.

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