Brief Analysis on the Application of "Four Modernizations" Plants in the Reconstruction of Green Space in Yangpu District

Guangqiang Zhai1,*

1 Shanghai Yangpu Urban Construction Investment (Group) Co., Ltd.
*Corresponding author. Email: 18321252571@163.com

ABSTRACT

Through the research method of combining theory with practice, this paper first summarizes the concepts related to "four modernizations" plants, and explains the introduction and characteristics of four modern plants; The degree of application in the 6 public green space projects further describes the characteristics and application effects of commonly used colored trees and shrubs. Then it expounds the problems encountered in the process of planting and maintenance of "four modernizations" plants, and proposes a reasonable solution through literature retrieval and analysis and research methods of current conditions. Finally, the summary and prospect of the application of "four modernizations" plants in Yangpu District will provide a reference for continuing efforts to improve the level of fine management of greening and the construction of ecological environment quality in Yangpu District.

Keywords: Colored plants, renovation of public green space, beautiful neighborhoods, road green space.

1. INTRODUCTION AND CHARACTERISTICS OF FOUR MODERNIZATION PLANTS

Since the 18th National Congress of the Communist Party of China, General Secretary Xi Jinping put forward the conclusion that "lucid waters and lush mountains are invaluable assets", and Shanghai has further put forward the requirements of "greening, coloring, preciousness, and efficiency" (referred to as "four modernizations") for greening. In 2018, Shanghai issued the "Guiding Opinions on Implementing the "Four Modernizations" to Improve the City's Greening Quality, requiring the "beautiful neighborhoods" as the starting point to coordinate the promotion of the "four modernizations" construction, comprehensively improve the level of greening technology and maintenance, and allow the blocks, the road greening effect and the service to the public are further promoted.1] Greening is an inevitable requirement and an important foundation, and is the core of ecological civilization construction, which is mainly reflected in ecological, environmental and landscape functions. Colored plants are the features and highlights of the "Four Modernizations", including flowers, leaves, fruits, and dried plants. Colorful plants are lively and vivid. If they are combined with the surrounding rigid and monotonous buildings, the environment will be more colorful and colorful. Be flexible. Precious seedling varieties generally include seedling varieties with robust growth, rare, long growth cycle and beautiful shape, mainly including the protection of ancient and famous trees and the introduction and cultivation of precious seedlings. Efficiency mainly includes ecological, social and economic benefits, and it is characterized by sustainable development.2]

2. COLORED PLANTS COMMONLY USED IN THE RECONSTRUCTION OF GREEN SPACES IN YANGPU DISTRICT

2.1. The application of four chemical plants in the transformation of green space in recent years

Through the actual project participation and related project survey and investigation, the current situation of the reconstruction of green space construction in Yangpu District is obtained. The green space reconstruction projects involved in this article are Zhoujiazui Road (Dalian Road-Jungong Road), Longchang Road (Zhoujiazui Road-Xiang Yin Road), Songhuajiang Road...
(Shuangyang Road-Jungong Road), Huangxing Road (Guoding East Road - Zhongshan North 2nd Road), Dalian Road (Siping Road - East of Yangshupu Road) road reconstruction green space and 138 blocks of public green space (the following project names use abbreviations). "Four modernizations" plants have an application rate of 100% in the 6 plots of green space renovation projects, and the area and varieties of trees and shrubs are relatively rich (Table 1).

Table 1. 6 plots of green space renovation project situation table

| Name            | Type of green space                  | Location                        | Area (㎡) | Variety of trees and shrubs |
|-----------------|--------------------------------------|----------------------------------|-----------|----------------------------|
| Yingkou Road    | City appearance and environment improvement | Zhoujiazui Road-Xiangyin Road   | 10944.5   | 56                         |
| Zhaoujiazui Road| City appearance and environment improvement | Dalian Road-Military Industry Road | 18590    | 32                         |
| Songhuajiang Road| City appearance and environment improvement | Shuangyang Road-Military Industry Road | 8326.5 | 32                         |
| Huangxing Road  | City appearance and environment improvement | Guoding East Road-Zhongshan North 2nd Road | 3972.3 | 37                         |
| Dalian Road     | City appearance and environment improvement | Siping Road-East side of Yangshupu Road | 7642.4 | 64                         |
| 138 Neighborhood| New public green space                 | Zhoujiazui Road Longchang Road southeast side | 4787     | 15                         |

All the data in this paper are through the "Four Chemical" Wooden Plants List in Shanghai (First Batch) (No.88,2019), "Four Chemical" woody Plant Application Manual ," The First Batch of Key Application and Second Batch of Recommended List of "Four Chemical" Woody Plants in Shanghai " and China Botany Network (http://www.iplant.cn), A long retrieval and viewing period, With the seasonal changes, the flowers, leaves and fruits of plants show gorgeous colors and different morphological changes, Or the branches and leaves are different from conventional plants, Including flower-viewing plants; Color leaf plants (including autumn leaf plants, spring leaf plants and common leaf plants); [3]fruit-watching plants; Dried plants, Through the retrieval analysis as described above, And the project site survey and research comparison and analysis is obtained. The distinctive and applied varieties are giant Bauhinia and diamond embroidered chrysanthemum in the isolation belt of Huangxing Road, accounting for 55% of trees and shrubs; Begonia, crabapple and crape myrtle on Longchang Road in 58.5%; clover, magnolia and plum in 55.6%, and 53.8% in 138 neighborhoods and 53.7%.After the application of colorful plants, the landscape characteristics of "One Road One Product" in the beautiful block are presented, and the surrounding environment has been greatly improved and improved. According to the actual investigation and survey of the green space reconstruction project of the 6 plots, the proportion of colored plants in parks and various green areas is calculated as follows:[4]

(1) Proportion of colored trees = number of colored trees/total number of trees × 100%

(2) Proportion of colored shrubs = area of colored shrubs/total shrub area × 100%

(3) The proportion of colored plants = (the proportion of colored trees + the proportion of colored shrubs)/2.

It is concluded that the average application proportion of colored plants in the green space renovation projects of the 6 plots is 61.6%, and the average proportion of colored plants is 81.9% (Figure 1), which exceeds the "Four Modernizations" Planning Outline of Shanghai Parks and Green Spaces 2018 Requirements for more than 70% colored plants in new parks and green spaces. Overall, the number of applications of colored plants in these 6 renovated green spaces is generally good.
2.2. Analysis of commonly used varieties of colored plants

In this paper, selected Yangpu District in recent years, new 6 pieces of green space samples, a total of 136 kinds of tree plant varieties, through the Shanghai "four" woody plant list (the first batch) (Shanghai green, 88) file recommended plant varieties and Chinese flora, retrieval and analysis of the 6 pieces of green space color plants in about 89 plants, accounting for about 65.44%. Among them, the most commonly used varieties are bright golden virgin, red maple, small wax, safflower wood and crape myrtle, and the utilization rate is 100% among the 6 green areas, and the application rate of heather, hibiscus and eight immortals is 83.33% (see Table 2).

Table 2. Number and use of colored plants in green space of plot 6

| Plant name             | Color characteristics and seasonal performance                  | Quantity (plant) | Distribution                        |
|------------------------|-----------------------------------------------------------------|------------------|-------------------------------------|
| Hall crabapple flower  | Falling leaves / flower viewing, fruit / spring flowers, autumn fruit | 609              | Yingkou Road Longchang Road         |
| Hibiscus syriacus L    | Leaves / flower viewing / summer flowers                        | 486              | Songhua River Road, Zhoujiazui Road  |
| Beauty plum            | Falling leaves / flower viewing / spring flowers                 | 401              | Songhua River Road, Zhoujiazui Road  |
| Michelia alba          | Falling leaves / flower viewing / spring flowers                 | 292              | Dalian Road, Zhoujiazui Road         |
| Diamond leaf embroidery line chrysanthemum | Leaves / flower viewing / summer flowers                          | 287              | Huangxing Road, Dalian Road          |
| North American begonia fragrans | Falling leaves / flower viewing, fruit / spring flowers, autumn fruit / Evergreen / flower viewing, leaf / normal color leaves | 240              | 138 Neighborhood                     |
|                        |                                                                  | 229              | 138 Neighborhood, Songhua River Road, Yingkou Road |
In terms of quantity, the number of crabapple, hibiscus, plum, magnolia, chrysanthemum, crabapple, osmanthus, chestnut, yinji small wax is relatively large, accounting for 65.12% of the total (see Figure 2). The orderly planting of color leaf plants can bring rich and impact visual experience for pedestrians. Most of the more applied varieties are the main tree species of one project. In order to revitalize the old block and comprehensively improve the quality of the beautiful block project, the landscape characteristic streets of "One Road, One Product" of the beautiful block are presented.

The vine used more are flower leaf stone in the green space of Songhua River Road, windmill jasmine in the non-isolation belt of Yingkou Road, and the central isolation belt of China and Zhoujiazui Road. In the central isolation belt of Zhoujiazui Road, Angela Rose not only plays a role in separating the traffic flow and dividing the space, but also improves the color quality of the green space, increasing the comfort of driving and the beauty of the street. "Angela" rose cluster, small cluster, cup blossom form, continuous bloom; "vine rainbow" rose with red, yellow, pink, white, and borders, but it has the characteristics of "beautiful", long flowering period, luxuriant flowers (see Table 3), are good color-colored varieties.[5]

![Figure 2 "Colorized" plant application quantity analysis chart](image)

Table 3. Colorful vines of green space reconstruction project in plot 6

| Family belongs to | Plant name          | Color characteristics and seasonal performance | Quantity | Location               |
|-------------------|--------------------|-----------------------------------------------|----------|-----------------------|
| Rostone in the family Apocynaceae | Flowers and lobes | Evergreen / green / regular leaf | 438 m²  | Zhou Jia mouth road    |
| Rostone in the family Apocynaceae | Windmill jasmine | Evergreen / flower viewing / spring flowers | 1300     | Zhoujiazui Road, Huangxing Road |
| The genus Rosaceae | Angela's Chinese rose | Evergreen / flower viewing / spring, summer | 2409     | Yingkou Road           |

[5] Malus halliana Koehne
- Hibiscus syriacus Linn.
- Prunus × blireana cv. Meiren
- Yulania denudata (Desrousseaux) D. L. Fu
- Spiraea vanhouttei (Briot) Zabel
- Malus 'American'
- Osmanthus fragrans (Thunb.) Lour.
- Aesculus chinensis Bunge
- Ligustrum sinense 'Variegatum'
- Lagerstroemia indicaDynamite
- Ligustrum × vicaryi Rehder
- Loropetalum chinense var. rubrum
- Lagerstroemia indica L.
- Acer palmatum 'Atropurpureum'
- Cercis gigantea cheng & Keng f.
- Others

---

---

---

---

---
3. ANALYSIS OF THE CONSTRUCTION EFFECT OF COLORED PLANTS

3.1. Beautiful Block, Yingkou Road

Yingkou Road (Yanji East Road-Songhua River Road) machine non-isolation belt planted 173 crape myrtle with a diameter of 7-8 cm, which is the same as the original crape myrtle on Longchang Road of Yingkou Road (Jiamusi Road-Xiangyin Road), and the crape myrtle green belt is 1.8 kilometers long. The flowers is bright red, like a fireball, lasting for 3-4 months. In the red fire ball crape myrtle under the wood planting red heather and dwarf crape myrtle, red heather four seasons evergreen, do the isolation belt four seasons have considerable scenery.

Yingkou Road Longchang Road (Zhoujiazui Road-Kongjiang Road) non-isolation belt and planted 602 hanging crabapple with chest diameter of 4-9 cm in the green space. The effect of the flowering period is March-April, and the fruit period is September-October, which is more spectacular. A total of 7-11 cm of 78 ‘gorgeous’ begonia are planted in the southwest side of Jingyu Middle Road. Its main characteristics are upright trees, compact trees, purple leaves, gradually becoming emerald green, with good flower and fruit viewing in spring and autumn. In terms of maintenance, after flowering, apply nitrogen, phosphorus and potassium fertilizer to promote the formation of medium and short branches; during the flower bud differentiation, apply quick phosphorus and potassium fertilizer 2-3 times to promote flower bud differentiation; solid long-acting organic fertilizer should be applied after falling leaves in autumn and before spring.

The original cherry blossoms are reserved in the green space to the southeast of Songhua Road, Yingkou Road, the original 2-layer platform foundation is reserved, and colorful laurel is planted in the upper layer of the platform and the lower layer is turf. Colorful laurel under suitable climate conditions, all the year round, the leaves turn white when half-aging, and finally from the central main vein began to both sides, until dark green. Therefore, the application of colorful plants creates a whole green space with four seasons of colorful landscape.

3.2. Zhoujiazui Road Beautiful Block

The 204 Buckeye trees with a chest diameter of 17cm on Zhoujiazui Road are all new seedlings. In order to coordinate the tunnel project of Zhoujiazui Road, the pipeline under the tree hole in this section is complex and the construction is difficult, so all of them are manually excavation. After the completion of the river tunnel and road greening transformation, the overall road landscape is open and clean. Seven chestnut trees magnificent, branches and leaves, crown such as canopy, leaves big and beautiful. The application of ‘rattan rainbow’ in the central isolation belt of the river tunnel increases the comfort of pedestrians and the beauty of the block.

Table 4. Situation of colorful plants in green space of Xuchang Road

| Plant name          | Color characteristics and seasonal performance                                      | Quantity |
|---------------------|----------------------------------------------------------------------------------|----------|
| *Vine rainbow*     | Evergreen / flower viewing, leaf / normal color leaves                            | 246      |
| *Chinese rose*     | Evergreen / flower viewing / spring, summer and autumn flowers                   | 246      |
| *Gorgeous* begonia|                                                                                   | 78       |
| 'Red fireball' crape myrtle |                                                                                           | 78       |
| Keep the cherry blossom |                                                                                           | 78       |
Xuchang road northeast side of 1305 ㎡ triangle green space, 11 nata oak for the whole piece of green skeleton, wood configuration big rose, red prince brocade, fire thorn, chrysanthemum multi-color colorful plant collocation, Xuchang road southwest retain original cedar, then configuration red maple, yellow, purple grass, make the space here more "lively".

4. MATTERS NEEDING ATTENTION WHEN PLANTING

Soil fertility is the basic property and essential feature of the soil, and it is the basic ability of the soil to supply and coordinate nutrients, water, air and heat for plant growth. These six pieces of rebuilt green space are all public green space, with large pedestrian and traffic flow, so the original soil is characterized by poor soil, poor nutrition and serious hardening, with poor soil permeability and much water, which will lead to hypoxia and rot of the root system, and even death. Therefore, the 6 pieces of green soil have been transformed to a certain extent, and the third party soil testing institutions qualified. The soil test of Xuchang Road, Zhoujiazui Road was qualified (see Table 5).

Table 5. Soil detection of green space in Zhoujiazui road and Xuchang Road

| Surveillance project | Test method           | Technical standard | Sample results | Evaluation results |
|----------------------|-----------------------|--------------------|----------------|-------------------|
| Ph price             | LY/T1239-1999         | 6.0-7.5            | 7.47           | Qualified         |
| Saltness             | LY/T1239-1999 (2010)  | 0.15-0.9           | 0.195          | Qualified         |
| Organic matter      | LY/T1237-1999         | 12-80              | 14.4           | Qualified         |

Although soil pH is not a nutrient, it controls plant nutrient availability. Soil pH does not match the associated plants that will be insoluble and absorb nutrients. The pH requirements for the general green planting soil are 5.50-8.0 (CJ / T340-2011). Soil salt content is the quality of the salt (mainly chloride, sulfate, etc.) in the percentage of dry soil quality. When the salt content is high, the soil salinization occurs. The accumulation of salt in the surface soil will not be conducive to the plant to absorb nutrients. Planting soil shall meet the total soil salt content of 0.1% -0.3% (construction standard [2008] No.102).

5. CONCLUSIONS

According to the municipal guidance of "four modernizations" construction, compared to the samples of 6 new projects selected in Yangpu District in recent years, the application rate of this sample project is good, but the research on precious and benefit is insufficient, and the control sample is insufficient. However, according to the current situation analysis and evaluation of the Outline of the "Four modernizations" of Shanghai Park Green Space 2018, the overall proportion of precious plants is at a low level, and the overall number of precious plants is insufficient. Although the number of colored plants in the sample of 6 green space in Yangpu District is sufficient, due to the limitation of time and energy, the length and structure of the paper, the plant selection needs to be further considered and studied on the balance of the four seasons and the ornamental characteristics of the diversity, so as to further improve the visual effect of colored plants in quality.

REFERENCES

[1] Zhang Lang, Zhu Yi. "The Ways and Measures to Improve Greening System in Super-large Cities——Based on Interpretation of "Guiding Opinions on Improving Greening Quality of Shanghai’s 'Four Modernizations’ Work". Landscape Architecture 1(2019):6.

[2] Miao Yihong, Landscape Planning and Design of Cultural Theme Parks—Taking the Planning and Design of Suburban Stadium Parks in Nanjing as an Example, Nanjing Agricultural University, No. 1 Weigang, Nanjing City, Jiangsu Province, 2015.

[3] Zhang Mingxin. Research on the application of colorful leaf plants in domestic gardens [J]. China Science and Technology Investment, 2018, 000(004):326.

[4] Zheng Sijun, Guan Qunfei, Li Xiaoce, Li Yuezhong, Zhang Lang. Interpretation of the "Four
Modernizations" Planning Outline of Shanghai's Parks and Green Spaces." Landscape Architecture 1(2020):6.

[5] Wu Xiaqing, Shan Xuxu. "The Selection and Application Mode of Chinese Roses in Three-dimensional Greening." Modern Horticulture 44.9(2021):2.

[6] Wang Xiaoming, "Introduction test and stress resistance study of new varieties of red rocket and red fireball crape myrtle." The 7th National Academic Conference on Forest Genetics and Breeding of Chinese Forestry Society Forest Genetics and Breeding Branch 2013.

[7] Cao Weiqing. "Research on Proposals for Promoting Soil Fertility Management in the Context of Climate Change." Regional Governance 34(2020):1.

[8] Yu Yongzhong et al. "Discussion on earthwork design and soil improvement technology for landscaping." Modern Agricultural Science and Technology 14(2013):2.