

Study on Preventive Protection of Garden Plant Landscape Space

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Abstract: As a representative of Chinese classical gardens, Liuyuan Garden is a fusion of culture and nature, history and reality. With the change of modern environment, the garden and its internal plant landscape are facing various challenges. These threats may change the historical and cultural characteristics of the park and may also affect its ecological stability. This paper discusses the various threats of the plants in the garden, and then combs out the protection and repair strategies. It aims at the inheritance of traditional culture, the practice of ecological civilization and the pursuit of harmony between man and nature. Effective protection measures not only help to maintain the history and culture of the garden, but also the key to promote the harmonious coexistence of modern cities and nature.

Keywords: Plant landscape; Preventive protection; Measures

Introduction: As a treasure in the history of Chinese garden architecture, Liuyuan is not only an ecological oasis in the city, but also a rich place of cultural and historical heritage. In order to maintain its historical integrity and ecological stability, it is necessary to gain insight into possible ecological and cultural disturbance factors, and formulate scientific and systematic protection and management strategies. Ensuring the ecological and cultural integrity of the park is essential for its long-term ecological health and cultural heritage protection.

1. Common threats to garden plants

1.1 Invasive alien species

Invasive alien species are biological species that are capable of establishing populations after being spread by man-made or nature in non-native areas and may cause harm to ecosystems, economies or health. In the garden landscape, due to the lack of natural predators or pathogens, these species often expand rapidly and replace local species, resulting in reduced biodiversity^[1]. For example, paulownia trees, Canadian nasturtium, etc., which may quickly occupy new land through seed dispersal and inhibit the growth of native plants. In addition, plant diseases such as cucumber mosaic virus, powdery mildew, etc. may also pose a considerable threat to the remaining garden plants. These diseases can spread rapidly among plants and even cause the death of the entire vegetation.

1.2 Diseases and pests

The growth and health of plants in the garden are often threatened by various diseases and pests, which not only affect the beauty of the landscape, but also may lead to plant death. Such as rust, phytophthora, powdery mildew, etc., usually in plant leaves, stems or fruits on the typical disease problems. Pests are also one of the main threats to the health of plants in the garden. A variety of pests may attack all parts of the plant, from the roots to the leaves and from the seedlings to the mature plants. For example, aphids mainly suck up the sap of plants, causing the leaves to curl, turn yellow or fall off.

1.3 Climate Change and Environmental Pollution in

1.3.1 Climate change

Temperature increase: High temperatures can lead to increased transpiration, which can lead to water loss, slow growth and even death. For temperature-sensitive plants in the garden, such as some ornamental plants, high temperature may directly affect their life cycle.

Changes in precipitation patterns: Too much or too little rain can pose a threat to plants in the garden, possibly causing root decay,

salt accumulation or soil degradation.

1.3.2 Environmental pollution

Water pollution: The accumulation of heavy metals, organic pollutants or other toxic substances may affect the growth and physiological processes of plants in the garden, and long-term exposure may cause plant growth retardation or death.

Soil pollution: Chemical pollutants in soil, such as pesticide residues and toxic metals, may enter plants through plant roots, affect plant growth and health, and even cause plant death.

2. Preventive protection measures for plant landscape space in the garden

2.1 Selection and Configuration of Suitable Garden Plants

2.1.1 Use native plants and plant varieties with strong suitability

After a long period of natural selection, the native plants in the garden have formed a high degree of adaptability to the local ecological environment, which can better cope with local climate change, diseases and insect pests and other ecological threats. In addition, native plants often coexist with native flora and fauna, contributing to the maintenance of biodiversity. Choosing these plants can not only enhance the ecological function of the landscape, but also reduce the frequency and cost of manual maintenance. At the same time, the garden plant landscape is more diverse.

2.1.2 Plant configuration according to soil, hydrological and light conditions

The growth and reproduction of plants in the garden depends largely on soil, hydrological and light conditions. Therefore, it is very important to analyze these factors in depth and select plants accordingly. A shady and wet environment is more suitable for ferns and certain herbaceous plants, while arid or well-drained areas are more suitable for growing cacti or other drought-tolerant plants. The correct plant configuration can ensure the healthy growth of plants and reduce plant diseases or deaths caused by discomfort in the growing environment.

2.2 Soil Management and Rational Utilization of Water Resources in

Healthy soil and rational management of water resources are the basis for the robust growth of plants in the garden. This is not only related to the survival and health of plants, but also related to the sustainability and ecological benefits of the garden landscape.

Here are two key strategies:

2.2.1 Maintain and improve soil fertility

The physical, chemical and biological properties of soil directly affect the growth and health of plants. For this purpose, regular soil testing to ensure its nutrient balance and suitable pH is essential. According to the test results, organic matter can be added to enhance the organic matter content and structure of the soil, while promoting the activity of beneficial microorganisms in the soil. Avoid excessive application of chemical fertilizers to avoid soil salinization or other soil problems.

2.2.2 Implementation of efficient irrigation and rainwater harvesting systems

Reasonable water management can ensure the water supply of plants and reduce water waste and environmental pollution. Using high-efficiency irrigation systems such as drip irrigation and micro-spray, water can be delivered directly to plant roots, reducing evaporation losses and unnecessary surface runoff. At the same time, establish a rainwater collection and storage system to use natural rainfall to supply water to the remaining gardens, reduce dependence on urban water supply systems, and reduce the risk of urban flooding caused by drainage.

2.3 Integrated management of pest control

2.3.1 Application of biological control method

Biological control method is the use of natural enemies, parasites and pathogens and other biological resources to control pests and diseases. For example, natural enemies such as ladybugs, spiders or spider ticks are introduced to control aphids, white mealworms and other pests. In addition, microbial agents, such as nematicides or bacilli, can also be used as biological control agents for pests. This method aims to establish a healthy ecological balance, reduce the use of chemical pesticides, and ensure the health of plants and the beauty of the garden.

2.3.2 Preventive agronomic measures

Prevention is often better than cure. Appropriate agronomic measures, such as reasonable plant spacing, correct fertilization and irrigation methods, can enhance the natural resistance of plants and reduce the incidence of diseases and insect pests^[2]. Ensuring that plants are under optimal growth conditions can reduce their susceptibility to disease. Regular inspections to identify and remove infected plants or plant parts in a timely manner to reduce the spread and spread of disease.

2.4 Diversified Landscape Design and Layout

2.4.1 Combination of plant species with trees, shrubs and herbs

Use a variety of plant species to ensure that different trees, shrubs and herbs are represented in the garden. It creates a rich visual hierarchy and depth of landscape, and also ensures that when one plant is threatened or unsuitable, other plants can continue to provide beauty and functionality to the garden. In addition, different plants can form beneficial interactions, such as shading, suppressing weeds or providing food and habitat for insects.

2.4.2 Restoration of traditional habitat structure

In the garden landscape, it is very important to pay attention to the restoration and presentation of traditional garden habitats, such as classical water systems, rockery and courtyard vegetation. For example, restoring the water system of ancient gardens, reproducing the historical hydrological landscape, and providing water for birds and other small organisms; while the classic vegetation in the courtyard, such as plum, orchid, and chrysanthemum, not only gives cultural symbolism, but also provides food for insects such as butterflies and bees. This respect and restoration of traditional habitats not only highlights the cultural and historical value of the park, but also promotes ecological diversity and balance ^[3].

2.5 Continuous monitoring and evaluation

2.5.1 Establish a regular health check mechanism

Regular health and ecological inspections of the plants, soil, water, etc. in the garden are carried out to detect any abnormal signs or changes in time. This includes the growth status of plants, the nutrient and moisture levels of the soil, and the water quality and ecological health of the water body. For detected problems, such as diseases, pests or nutritional imbalances, intervention and management can be carried out at an early stage, thereby avoiding greater damage or repair costs ^[4].

2.5.2 Combining traditional methods with modern technology for garden management

As a representative of classical gardens, its management methods are generally rooted in traditional experience and wisdom. With the development of modern technology, it is possible to combine traditional and modern, using traditional horticultural techniques combined with soil sensors to monitor soil moisture and nutrient status; using traditional garden layout techniques, supplemented by modern remote sensing technology, to monitor the vegetation, lakes and buildings of the garden ^[5]. This combination of classical and modern methods, while maintaining the traditional charm of the garden, but also to ensure its more scientific and sophisticated management to meet the modern conservation and protection needs.

Conclusion:

To sum up, the preventive protection of plant landscape space in the garden is not only a technical problem, but also a comprehensive problem, involving ecological, social, economic and cultural aspects. Only by comprehensively applying various strategies and methods can we ensure the health, beauty and function of the park in the face of complex threats and challenges, thus promoting the further development of China's ecological environment.

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