

## EDUCATIONAL

# Botanical Education: Management of Greening and Maintenance of Modern Landscape

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### ABSTRACT

In the management of greening and maintenance of modern garden landscape, the prevention of natural disasters should be emphasized. Adequate fertilizer and water are provided to the plants to meet their growing needs. Pests and diseases are effectively prevented and controlled.

## 1. Introduction: Necessity and Characteristics of Management for Greening and Maintenance of Modern Garden Landscape

### 1.1 Effects on Plants

Modern garden landscape always consists of several different species of plants. The greening and maintenance for modern garden landscape means to maintain the healthy growth of those plants. Maintenance work in specific should be targeted and different maintenance methods should be selected according to the species of plant. Plants have their own life characteristics, and their maintenance methods are complex<sup>[1]</sup>. The greening and maintenance of modern garden, in a sense, is equivalent to providing a better environment for plants to ensure a balanced growth. Therefore, spe-

cific maintenance conditions, such as humidity, soil and temperature, are needed to ensure the healthy growth of plants.

### 1.2 Effects on Overall Design

Greening and maintenance of a modern garden is a kind of plastic art, and the maturity of techniques can bring great changes in the overall aesthetics. In modern gardens, plants are rich in variety and diverse in color, and the overall shape is formed by a combination of many different factors. The degree of greening and maintenance also determines the form style of the garden landscape. It is believed that greening and maintenance of modern garden is a step in the shape design of gardens, and a work item generated to highlight the artistic conception different from other art forms.

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## **2. Problems of Management for Greening and Maintenance of Modern Garden Landscape**

### **2.1 Systematic Issues on Management for Greening and Maintenance of Modern Garden Landscape**

In China, this work has been doing well in some economically developed areas. However, in some other economically underdeveloped areas, due to the serious shortage of funds for garden maintenance, this work is done perfunctorily, as the destruction and occupation of vegetation occur constantly. These areas are ubiquitous of unsound management systems in greening and maintenance of modern garden landscape, with a poor performance in execution and lack of a complete set of assessment methods, thus leaving many projects half done.

### **2.2 Epistemic Issues on Management for Greening and Maintenance of Modern Garden Landscape**

Only by fully completing greening and maintenance management of modern garden landscape in later stage can an originally expected result of greening for modern garden landscape being achieved, which will bring people a pleasing landscape and enjoyment for beauty. Meanwhile, its economic, ecological, social, scientific, educational and other functions can be maximized. Excellent maintenance management can consolidate the existing achievements of greening for modern garden landscape, stimulate people's enthusiasm to join and support the career of greening for modern garden landscape, and greatly improve the public's awareness of cherishing and protecting vegetation, thus promoting the constructive development of greening for modern garden landscape<sup>[2]</sup>. If the garden maintenance or management is lacking or insufficient, the intent of modern garden construction will not be implemented, whose social value, ecological value and humanity value will not achieve a maximum efficiency. If modern garden designers' design intent cannot be fully reflected, the original spirit of construction is bound to lose.

### **2.3 Quality Issues of Maintenance Workers and Managers**

At present, methods of greening and maintenance management of modern garden landscape are generally simple, that is, basic watering, simple pruning, daily sanitation cleaning, etc., with low technical content. Due to lack of necessary technical training for maintenance managers, and general maintenance management company has very few professional staffs, most of the recruited workers are

employed after simple training. Their technical and professional quality is generally low, who could only do the maintenance work step-by-step without any innovation, and lead to a poor effect and low efficiency of maintenance. They are usually only responsible for maintaining plants' life, and make the least effort to ensure the plants are alive.

## **3. Measures for Greening and Maintenance Management of Modern Garden Landscape**

### **3.1 Improve the Management System for Greening and Maintenance of Modern Garden Landscape**

Maintenance and management works need better management standards and technical specifications. To grasp all aspects of maintenance work, it is necessary to formulate complete and detailed maintenance management measures. Greening areas with poor maintenance level and inadequate management should also be analyzed in time to find out the reasons. Greening areas with excellent maintenance measures and outstanding management should be summarized, promoted and demonstrated. Inviting professional teachers to train relevant personnel at regular intervals and encouraging innovation and practice to improve their professional skills of maintenance. Meanwhile, training in modern garden technology should also be carried out so that employees could master the rules of maintenance management and plant-protection techniques such as watering, fertilization, pruning, as well as prevention and control of pests, thereby practical problems in greening and maintenance can be well resolved<sup>[3]</sup>.

### **3.2 Enhance the Public's Protection Awareness of Vegetation**

The construction of modern gardens is not easy, whose consolidation and maintenance are even harder. The greening and maintenance management of modern garden landscape needs the close cooperation of the masses. Various ways such as media, newspapers, radio, internet and billboards should be utilized to promote the glory of cherishing and protecting vegetation, and lower the shameful behavior of destroying it, thus raising the awareness of the masses to care for the ecological environment. At the same time, it is necessary to strengthen the legal education propaganda and strive to raise the legal awareness of the whole people. Through various forms such as voluntary tree planting, adoption of Greening areas or trees and flowers, it evokes the concern and care of the whole people for ecological construction, motivates people to partic-

ipate in it and cultivates citizens' enthusiasm to care about and love the Greening environment, which make people voluntarily devote themselves into actions of greening and beautifying the environment, and create an atmosphere in which a beautiful homeland is preserved.

### **3.3 Maintain Gardens in Accordance with the Maintenance Management Guidelines**

(1) Trees should be regularly brushed with lime and sprayed with insecticide for disinfection and pest control, and be properly trimmed as needed. (2) Care work should be carried out in strict accordance with the order of watering, fertilization, weed removal, loosening, pruning, de-worming, and disease healing. (3) For the maintenance of plants, we advocate the artificial control and biochemical control, and the dosage of pesticides in use should be subjected to inducing no harm to human health and the environment. The use of pesticides should be done in one time in clear and windless weather, in case the spread of pesticides causes harm to humans and the environment. (4) Fertilization can be moderately implemented according to the growth of the plant, and the appropriate fertilization should be implemented based on the actual needs of plants.

### **3.4 Choose Native Species for Priority**

In the choice of plants, native plants should be preferred for planting. Appropriate native plants are selected according to the climatic characteristics and soil conditions of different places. Since native plants can better adapt to the local soil and environment, they can survive better than those introduced in the field. In addition, the cultivation of native plants can also better represent the local characteristics and distinguish them from other garden landscapes. Meanwhile, the selection of a large number of local ground cover plants can effectively save costs and increase profits. The different niches of native plants can meet the various requirements of garden landscapes, and can also effectively reduce the invasion of alien species, which is conducive to the coordinated development of natural development<sup>[4]</sup>.

### **3.5 Put Eco-configuration into Practice**

The mastery of environmental factors is a prerequisite for garden landscape planting. Putting Ecological configuration into practice means selecting suitable ground cover plants according to the actual conditions of environment to fulfill their growth efficiency, so that the overall plants condition can be best optimized. Environmental factors such as terrain and ecological conditions should be inves-

tigated on the spot to ensure the survival rate of plants in this environment.

### **3.6 Collocate Various Plants Reasonably**

The combination of plants is also one of the important factors affecting the maintenance of landscape gardens. Ground cover plants are generally distributed at the bottom of the plant community, and play a role in setting off the best combination of plants such as shrubs. In the case where the branch point of the upper plant is low, the ground cover plant sticking to ground can be selected, and when it is higher, the ground cover plant with higher plant height can be selected. In capacious planting areas, shrubs with a sparse upper layer can be collocated with higher ground cover plants, while in narrow planting areas, shorter ground cover plants can be planted. Work in this respect will also greatly improve the maintenance level.

## **4. Methods of Management for Greening and Maintenance of Modern Garden Landscape**

### **4.1 Fertilization**

The arbor tree is tall, with a developed root system that spreads deeply and widely in the ground. When planting, it is necessary to open a large hole with a square of 0.8-1.0 cubic meters, and fill it with fertile soil, 30 cm above the flat land. In terms of fertilization, the fertilizer type is mainly compound fertilizer, and the ratio of N, P, and K for the young trees of 1-3 years old is 5:3:2, for the trees over three years is 3:2:1. Within three years after planting, fertilization should be applied once every spring, summer and autumn. Each time, 1-2kg of compound fertilizer will be used, and small trees will be applied less while big trees, more. The method of fertilization is as follows: the small tree is applied with liquid fertilizer, combined with losing its soil, and the big tree is uniformly dry applied to the ground in the crown width. The tall trees of three years or more may not be fertilized in principle. The shrub tree is small, mainly planted in dentpits or shallow ridges, with shallow clumps of roots. The appropriate amount of compound fertilizer is applied according to the soil and tree vigor. Liquid application is combined with dry application. For flower and fruit shrubs, the P and K fertilizer should be properly increased, and for foliage shrubs, the N fertilizer be increased.

### **4.2 Irrigation**

In addition to factors such as planting methods, habits of tree species and climate, irrigation should also take soil types into consideration. For saline-alkali soil, irrigation

should be combined with intervillage loose soil as much as possible, preferably using river water. Considering that the sand has poor water retention and leaks easily, the frequency of irrigation for sand land should be increased appropriately. For sand land, the frequency of irrigation should be increased appropriately with a small amount of water at a time. Organic fertilizer should be applied to increase water retention and fertility. Bottomland should also be poured with small amount of water without any accumulation, and alkali prevention and drainage are concerned. Heavy clay soil has strong water retention, for whom the frequency and amount of irrigation should be both reduced and organic fertilizer and river sand should be applied to increase its permeability.

The water management of trees should focus on young trees, based on the principle of moisturizing without stains and the topsoil is dry but not white. Tall trees are thick with leaves and deep-rooted, whose growth will not be affected by water shortage. Shrubs are short with shallow root systems. Whether potted or planted in the field, they must be protected from drought and kept in moisture without stains, so that they can grow normally.

### **4.3 Prevention and Control of Diseases and Pests**

Tree beetles, spiders, scarabs, etc., are the main pests of trees. Although conventional pesticides can prevent and treat them, chemical pesticides should be used in a reasonable way. Meanwhile, biological and physical methods should be actively carried out, and various control methods should be used in combination. Considering a variety of factors such as control effects, economic benefits, social security and ecological balance, pests should be controlled within the allowable range, rather than killing them all.

### **4.4 Pruning Trees**

Trees use photosynthesis to gain energy through leaves. Trimming trees too much will weaken its overall vitality and is not conducive to the growth of trees. Excessive deep pruning provides a path for fungal and bacterial infections while causing serious damage to trees. Therefore, the trimming of trees should be reduced.

### **4.5 Maintain Garden Trees for Greening**

Through art design and careful management, trees for greening could grow in balance with bunch of large branches. This is one of the keys to the success of greening that will allow plants remain high inside and low outside, and form the natural and plump spherosomes scattered delicately. Arbor trees are required to have tall and straight trunks. Therefore, the old branches should be

removed in a planned schedule to cultivate new branches. Adult trees should be cut off irregular branches in time, which will be broken in case of heavy wind and rain, and make roots to be uprooted and cause losses in more severe cases. While those little branches with large crown and thick leaves should be kept to resist the wind. Shrubs are required to be neat and orderly with shape, which is formed through continuous growth and artificial trimming. The shape of shrubs can be trimmed into spheres, squares, fans, mushrooms abstract patterns, etc.. You can even use iron wire to weave text, “two dragons frolicking with a pearl” and “peacock spreads its tail” to allow branches and leaves of trees grow in them and trim to form the shape. Whether arbor trees or shrubs, it is necessary to clean up the spent flowers and fruits in time to avoid the consumption of nutrients.

### **4.6 Maintain Garden Grasslands for Greening**

The principle of grasslands maintenance is: homogeneous and uniform, pure without stains and evergreen in all seasons. In general, grasslands for greening can be divided into four stages according to the length of planting time. The first stage ranges from just-planted to fully-grown, which refers to a period (approximately one year) in which the freshly planted grass grow to full coverage (100% coverage without vacancy), and is also named as fully-grown period. The second stage is the prosperous growth stage, which refers to 2-5 years after planting, and is also named as prosperous growth period. The third is the slow growth stage, which refers to 6-10 years after planting, and is also named as slow growth period. The fourth is the degradation stage, which refers to 10-15 years after planting, and is also named as degradation period. The growth rate of grassland decreased after 6-10 years of planting, and the key emphasis in work turns to pay attention to the prevention and control of pests. Push aside the grass during inspection to detect larvae and it is necessary to find them out in time and apply pesticide at their young age. Remove the hay that has been harmed three days later, and replenish the spot with urea solution, then the growth resumes after a week

### **4.7 Maintain and Manage Hedgerows**

The hedgerow has higher requirements for fertilizer and water conditions. When the hedgerow is first planted, it is necessary to mix the appropriate amount of decomposed organic fertilizer in the soil, so that it grows fast after planting. The principle of fertilization is: sufficient base fertilizer and speedy replenishment, and fertilizer must be applied after cutting. Root fertilization is also carried out

when necessary. Irrigation management is mainly focused on moisturizing to make sure that the topsoil is dry but not white. Drain away water after rain to avoid accumulation so as not to cause rotten roots and affect growth.

#### **4.8 Maintain and Manage Potted Flowers**

In garden greening industry, potted flowers mainly refer to two types: potted seasonal flowers and potted shade plants. Potted flowers are cultivated in two stages. The first stage is to cultivate in the flower nursery, and the second stage is to cultivate in the pots and let it grow till its ornamental value arises, or it is close to blossom, then put it in the green spots to embellish the life. In addition, there are a small number of finished pot culture in garden greening industry, which is placed in the scenic spots of special need. The cultivation management is roughly the same with the wooden potted flowers. The key point of difference is the trimming and shape preserving. Different pot cultures have different artistic shapes. Without trimming, the original design style will be lost. The trimming for pot culture needs to be operated by technicians or gardeners with professional knowledge and skills, and should not destroy the viewing surface and lose the original genre, style and artistic shape.

#### **5. Conclusion**

In summary, garden workers should consider plants' demands for water in different conditions such as climates and soil, carefully observe changes in climatic environment, fully master the characteristics of various types of trees, and take reasonable measures in a targeted manner. Water should be supplied regularly and quantitatively to ensure the normal growth of the trees in various periods to fully display their seasonal beauty and spread the urban civilization.

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