

# Characteristics and Utilization Principle of Native Plants in Highway

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## Abstract

Highway greening projects, in essence, is a kind of ecological restoration project. Plant as the prerequisite and important material basis of ecological restoration, the choice and utilization of plant is the key to the success of green. In the current green design, this part also has many problems. Therefore, this paper puts forward the definition of native plants in ecological theory, and summarizes the characteristics and the use of different types of plants.

**Keywords:** highway; native plant; characteristic; principle

## I. Introduction

Native plants are also known as native plants. The generalized indigenous plants can be understood as a general term for the natural plant flora, which is adapted to the local conditions, the physiological, genetic, morphological characteristics and local natural conditions. Native plants, which are discussed in this paper, only refers to the local environmental conditions, which are best adapted to local environmental conditions, and have the ability to adapt to the local ecological environment.

## II. Native plant characteristics

Local highway greening plants can use more varieties, mainly herbaceous plants, shrubs, vines and trees etc.. Analysis of the characteristics of the following:

### 2.1 Herbaceous plant

Herbaceous plant is the most widely used in the highway greening, especially in the area of slope, interchange and dump. It is built up fast, the soil is not high, the early soil erosion effect is better, and as the starting point for the restoration of ecological system,

is conducive to the formation of the early table soil, the growth of shrubs, trees, and build a stable ecological environment, effectively promote the recovery of damaged vegetation. However, there are some disadvantages in the comparison between herbaceous plants and shrubs:

- 1) The roots of herbaceous plants were shallow, the tensile strength was small, and the effect of soil protection was poor. In the continuous rainy season, the high and steep slope of some of the grass layer and basic layer peeling phenomenon;
- 2) The community is prone to decline, and the two vegetation difficulties after the recession;
- 3) With the poor coordination of the natural landscape, the improvement of the environment is weak, and so on;
- 4) The process of recovery on the ecological system is hard to continue, easy to become a hotbed for breeding liana;
- 5) The need to take the continuous management measures, etc., maintenance and management of large.

Therefore, the simple herbaceous plants used for road greening is not ideal.

## 2.2 Shrubs

As the main disadvantage of the green plants, shrubs are the cost of the plants, the early growth is slow, the vegetation coverage is low, and the early soil erosion is not good. If mixed with herbaceous plants, the two complement both can achieve the effect of fast and lasting slope protection, but also has good landscape benefit. However, when the seed is mixed with the herb, it can sometimes be defeated. The main reason is that the growth of herbaceous plants is fast, and when the growth of herbaceous plants is strong, the following results may be triggered:

- 1) Seedlings of shrubs are covered by herbaceous plants, which are subsequently died due to insufficient light.
- 2) In the soil, there are too many of the nitrogen in the soil. Some shrubs have poor resistance to the pathogen in the seedling stage.
- 3) When the root of herbaceous plants and shrubs roots in the same soil layer, due to competition between each other, Bush will die. For the above circumstances may be taken by limiting herbaceous plant trees and use less nitrogen fertilizer types containing limit the growth of herbaceous plants, usually under herbaceous plant trees should be in the 200-500 lines / square meters within the scope of control.

## 2.3 Vines

Vine plant is mainly applied to the vertical greening of the rock slope or the earth rock slope. Vertical greening is a special form of the ecological protection of highway side slope for highway slope vertical greening lianas include *Mucuna*, *Parthenocissustricuspidata*, *Ampelopsis*, three lobed leaves snake grape *chrysanthemum* and the ivy. Vine plants should be planted in patron side bare rock are generally not easy to collapse or landslide area, or with gentle slope cutting rock slope. With vines of vertical greening of benefit is less investment, small, good beautifying effect. The disadvantage is that the slope is generally longer due to, liana completely covered slope for a long time.

## 2.4 Tree

Tree has always been the main body of the green quantity structure of expressway, and it is also the main body of the highway greenbelt system. Road green land is very limited, but huge trees can be used to produce a huge amount of green space on the ground. In different community structure, the green quantity of the mixed tree stands is the highest, and it is a few times of green lawn. Therefore, the lower the level of the road, the less the green land, the more you want to pay attention to the use of large trees. Trees, which is mainly used for Road on both sides of the trees, with protective net around the door, sensitive point source in the vicinity of the forest to reduce noise, interchange area, tunnel area, real construction area of the plant landscape. Characteristics of trees is tree is tall, leaves rich, have the function of shade, dust, noise reduction, wind sand, solid slope, improve local climate etc., and the landscape effect in all plant species effect is the best, so the road greening is widely used.

## III. The utilization principle of native plants

According to the special environment of expressway greening area - summer high temperature high drought, cold and windy in winter, dry soil early pimple thin, green maintenance difficulties such as harsh living conditions, plant selection should follow the following principles:

### 3.1 Functional principle

Select plants to meet the functional requirements of the highway greening, especially in the areas of engineering, such as the middle part, the interchange, the tunnel and so on. The function that the highway afforestation needs to meet:

- 1) The safety function: the green must satisfy the need of "safety first", to improve the traffic environment and to improve the safety and operation efficiency.
- 2) Protection function -- can effectively protect the roadbed, pavement, prevent soil erosion, planting

some deep roots, strong resistance, the leafy trees, to purify the air, absorbing dust, reduce the noise, wind sand, temperature adjustment function, can also protect traffic protected from the wind and the snow hit or mitigate the effect degree and guarantee the highway unblocked.

- 3) Landscape function: the plant is not only playing the ecological role in the highway greening, but also can play the role of cultural and ornamental. In order to create a comfortable driving environment, the color, smell, appearance and the organic collocation, which can be adopted to improve the landscape effect and the ornamental of the green landscape.
- 4) The ecological functions of the plant should be as close as possible to the native plant community, so that it can be integrated with the surrounding environment, and provide habitat for various species.

### 3.2 Adaptive principle

Suit measures to local conditions, focusing on local plant applications, highlighting local characteristics. Can also be appropriate to introduce some of the effect of good, adaptability of the garden green plants, to enrich the effect of highway greening. At the same time, the highway site conditions are poor, the requirements for the plant resistance is high, the late management of the extensive, should choose a strong plant varieties.

#### 1) Priority selection of indigenous plants

Selection of native plants in the expressway greening project, has the following advantages: labor saving, save money. The ecological landscape and the surrounding landscape can be maintained in a high degree, and the impact of the highway to the original landscape is reduced to a minimum. Then, native plant species close to the local plant communities, through to take appropriate protection measures can promote faster to the stabilization of community development. The native plants reflect the local style, reflect the cultural connotation. And keep the ecological balance,

protecting local biodiversity.

#### 2) Rational use of exotic plants

The references of exotic plants in the highway greening occupy a certain proportion. It can enrich the road landscape, improve the biological diversity index. Plant species monotone, evergreen species, lack of colored leaf trees, the characteristics of seasonal changes in plant is not prominent weaknesses in the current number of road greening. This has seriously affected the effect of road greening landscape.

### 3.3 Economic principle

In the greening design, the choice of plant needs to consider the landscape, ecological and economic. In order to ensure the landscape effect, ecological benefits, the choice of higher economic plants. Highway greening is different from the general landscape, the purpose of landscape gardening is mainly for viewing, while the highway greening contains a variety of functions, while the scale is larger, so the plant selection should be more consideration of economic factors.

### 3.4 diversity principle

Plant selection in combination with Joe, shrub, grass, and evergreen, evergreen and deciduous, combined with fast-growing trees and slow growing trees. Biological diversity is a rich life form in a region. It is the result of the interaction between life and various environmental factors in the process of its formation and development. It is the result of the continuous evolution of the ecosystem. As a result, biodiversity is often used as an important indicator to evaluate the health of an ecosystem. When choosing green tree species, it should pay attention to the configuration of plant species and quantity of different levels, so that the species can cooperate in stable environment and develop a natural biological protection system which is close to the original ecological system.

### 3.5 Enforceable principle

In access to sources of and need to unit and afforestation seedling producers more communication, timely understanding of the recent supply of seedlings, not been, timely replacement of species, in order to avoid the selection of seedling sink passivity, or even detour.

## IV. Conclusion

Compared with the introduction of exotic plants, native plants have many advantages, which cannot be compared with the former, it has a strong adaptive capacity, the destruction of the ecological environment is small, and can achieve the effect of landscape greening. And different native plants also have their own advantages and disadvantages, the choice should be based on the characteristics of the plant itself is reasonable collocation. In addition, the choice of local plants should follow the five principles of functional, adaptive, economic, diversity, and Enforceable.

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