

# Improving Saline-Alkaline Land with Ecological Restoration Technology of Salt-tolerant Plants

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## Abstract

**The problem of soil salinization is a development problem of international concern, which has a great negative impact on the development of modern agriculture. In view of global land degradation governance, attention should be paid to improving saline-alkali land, among which phyto-ecological restoration technology has a wide range of applications. Based on this, this paper analyzes the application of salt-tolerant plant ecological restoration technology in saline-alkali land improvement, integrates the experience of saline-alkali land improvement, and improves the improvement effect.**

## Keywords

**Saline-alkali Land Improvement; Ecological Restoration of Salt-Tolerant Plants; Technical Application.**

## 1. Introduction

In recent years, the process of urbanization in my country has been gradually accelerated, the amount of urban land in various regions has gradually increased, and the amount of cultivated area in agricultural production has decreased sharply. Among the existing land resources in my country, saline-alkali land is an important part, and its improvement and land restoration are an important basis for subsequent efficient utilization. The improvement of saline-alkali land is a soil remediation operation with high technical requirements, requiring the participation of many personnel to realize the efficient use of multiple technologies. In recent years, the application of salt-tolerant plant ecological restoration technology has achieved good application results in the improvement of multi-regional saline-alkali land.

An overview of saline-alkali land

There are many water-soluble salts in the saline-alkali land area, and this type of soil is the saline-alkali land. Only under certain natural conditions will saline-alkali land be produced. The essence of saline-alkali land is that various types of soluble salts are distributed vertically and horizontally on the ground, causing a large amount of salt to accumulate on the soil surface in the corresponding area. At present, the promotion factors for the production of saline-alkali soil mainly include climatic conditions, topographic elements, vegetation conditions, soil environment, and groundwater. Based on the alkaline reaction conditions, saline-alkali soils can be divided into alkaline and saline soils. Saline-alkali land will affect the stable growth and

development of various types of vegetation, which will lead to the growth and yield reduction of some crops. The construction of most construction projects in saline-alkali land is affected by the long-term corrosion of environmental elements, which will cause varying degrees of damage to the overall quality of the construction project. Saline-alkali land will affect the closing and opening of many plant stomata, causing plant growth to tend to wither. Physiological drought problems will occur during plant growth, and plant root cells will seep out of water, and will face the problem of withering and dying. During the growth of plants, it is difficult to obtain nutrients normally, and a large amount of chloride ions causes the leaves of the plants to turn yellow, the growth rate is slowed down, and early shedding occurs, resulting in changes in plant shape and structure. The damage to the soil structure will lead to an increase in the dispersion of soil particles. Soil permeability is reduced, resulting in a greater impact on microbial activity [1].

## **2. Application Theory of Salt-Tolerant Phytoremediation Technology**

It can be concluded from the study that the problem of secondary salinization can be controlled centrally through drainage and irrigation operations. However, due to insufficient water supply, it is difficult to be widely used in dryland environments. The distribution area of various plants has a great influence on soil moisture and salinity balance. The larger the plant coverage area, the faster the rate of water evaporation in the soil, and the lower the soluble salt content in the soil. Therefore, at present, the biological control model has been promoted and implemented in many areas with a wide distribution of saline-alkali land, and the planting of various types of salt-tolerant plants has been promoted to control the secondary salinized land. At present, the cultivation of salt-tolerant plants has a good effect on the improvement of saline-alkali soil, mainly using salt-tolerant organisms as the basic biological framework, which can effectively take away many salts contained in the soil and concentrate on improving the saline-alkali soil. Control the problem of soil evaporation, and focus on optimizing the accumulation of salt in the cultivated layer. It can comprehensively improve the basic physical and chemical properties of saline-alkali soil, control the basic bulk density of the crop planting soil environment, and comprehensively improve the soil fertility conditions in the planting area. At this stage, the application of salt-tolerant phytoremediation technology is outstanding, which can ensure that many plants can effectively adapt to the saline-alkali land environment. In the planting of various types of plants, expanding vegetation restoration and standardizing a variety of vegetation can effectively regulate the soil environment of saline-alkali land. Promoting the rapid growth of various types of plants enriches the planting community and can establish a more abundant plant environment [2].

## **3. Analysis on the Application Path of Salt-Tolerant Plant Ecological Restoration Technology in Saline-Alkali Land Improvement**

### **(1) Application of biological measures**

At present, some plants will emit a lot of water each year in the cultivation and cultivation. During the growth of woodland, the transpiration of the woodland is higher than the actual evaporation of the free water surface. Therefore, afforestation activities are an important measure to reduce the groundwater level in an all-round way. High afforestation density can effectively optimize the microclimate environment, which can control the amount of soil water evaporation and effectively control the return of soil salt. From this, it can be concluded that the current situation of saline-alkali land can be effectively regulated in the planting of saline-alkali land. In the planting and selection of salt-tolerant plants, it is necessary to pay attention to selecting plants that are drought-tolerant, waterlogging-tolerant, salt-tolerant, easy to reproduce, and have a faster growth rate. It can focus on improving the soil environment and

comprehensively select native tree species. In the selection of saplings, we should pay attention to selecting more seedlings with lower cost, and analyze the adaptability of seedlings [3].

From the selection status of various types of salt-tolerant plants in recent years, it can be concluded that amorphia, sand jujube, strange willow, ash and so on are the key cultivated tree species. At present, willow and ash are commonly used tree species in saline-alkali land improvement projects in most areas. In the construction of soil improvement and restoration projects, attention should be paid to digging drainage systems, building planting sites, and concentrating and leveling the terrain of the planting areas before afforestation. It can also analyze the natural climate in the saline-alkali land area. When the natural precipitation increases, it can centrally control the salinity in the soil through precipitation. In the process of plant cultivation, the soil salinity content in many coastal areas is relatively high, and the groundwater salinity is relatively high. In order to comprehensively improve the growth and survival rate of various tree species, it is necessary to focus on planting tree species with strong salt resistance. From the comprehensive planting and long-term cultivation of salt-tolerant plants, it can be concluded that various types of salt-tolerant plants can effectively optimize the ecological environment of saline-alkali areas, and focus on promoting the development of aquaculture activities around saline-alkali land. Analyze the development status of saline-alkali land, introduce more salt-tolerant plant varieties, and do a good job in plant cultivation and screening. The selected plants should be subjected to soil planting experiments and demonstration cultivation [4].

#### (2) Application of comprehensive measures

In order to comprehensively improve the effect of saline-alkali land improvement, it is necessary to focus on the centralized analysis of the elements of saline-alkali land improvement. For example, the actual content of soluble salt is an important factor. Based on the centralized analysis of the dynamic change laws of water and salinity in the soil environment, many salts in the soil will be gradually eliminated by the absorption of water by plants and the action of water. Technicians should pay attention to supplementary supplementation of corresponding fertilizers, so that the soil environment can be improved intensively. From the practical activities, it can be concluded that the saline-alkali soil improvement activities are based on the standardized planning and comprehensive management measures of the management department, and can implement measures such as water conservancy, agriculture, and biology, and are important measures for the application of salt-tolerant plant ecological restoration technology. At present, in the construction of saline soil remediation projects in many regions in my country, it is necessary to follow the principle of development according to local conditions, and select more salt-tolerant plants that use soil remediation. In the long-term research and practice, it is necessary to focus on selecting more advantageous plants, to realize large-scale resource garden planting, and to promote the stable development of regional economy on the basis of protecting the ecological environment.

#### **4. Analysis on the Effect and Application Prospect of Salt-Tolerant Plant Ecological Restoration Technology in Saline-Alkali Soil Improvement**

From the current situation of saline-alkali soil improvement in most regions in my country, it can be concluded that there are good application results in soil improvement, but there are also many negative effects. In the application of traditional improvement technology, we should focus on eliminating chloride ions, sodium ions, etc. in the soil environment, and we should also focus on integrating freshwater resources to implement soil washing salt, but many beneficial mineral elements, such as iron, will also be eliminated in washing salt. Elements, phosphorus and zinc have a great negative impact on the stable growth of salt-tolerant plants. From the perspective of the long-term development status of plants, the application of phytoremediation

technology can have a good treatment effect on saline-alkali land. In the planting of various salt-tolerant plants, it can effectively expand the plant coverage, improve the evaporation of the soil environment in the planting area, and promote the effective accumulation of many salts in the soil environment in the deep soil layer, which can regulate the soil accumulation in the planting layer. The rapid growth of plant litter and plant roots can comprehensively improve soil fertility and increase soil organic matter content.

Salt-tolerant plants in saline-alkali land can effectively optimize soil structure and optimize soil environment. The current salt-tolerant plant resource garden has a good development market, which is an important basis for the full realization of large-scale planting of salt-tolerant plants in saline-alkali land. In the construction of salt-tolerant plant resource gardens, more salt-tolerant plants should be introduced, and the bare ground of saline-alkali land should be covered intensively. Highlight plant transpiration, optimize soil evaporation, reduce soil evaporation, and regulate soluble salts in the soil environment. In the selection of various salt-tolerant tree species, it is necessary to focus on the centralized analysis of soil conditions in the soil region. From relevant studies, it can be concluded that the saline-alkali soil has a prominent influence, and the construction of the salt-tolerant plant resource garden can comprehensively improve the overall quality of the saline-alkali soil.

## 5. Conclusion

In the process of planting in saline-alkali land, the planting of salt-tolerant plants can comprehensively optimize the soil structure and improve the soil ecological environment in a concentrated manner. In the process of ecological restoration of saline-alkali land in the future, it is necessary to promote the construction of salt-tolerant plant resource gardens, further optimize the ecological restoration technology of salt-tolerant plants, and improve the effect of saline-alkali land restoration.

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