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EFFECTIVENESS OF ESTABLISHING ROBINIA PSEUDOACACIA-BASED PROTECTIVE LINES AROUND AGRICULTURAL LANDS

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Annotation: This article analyzes the role of Robinia pseudoacacia (white acacia) shelterbelts in protecting agricultural areas from wind erosion, dust, soil degradation and microclimate changes. The article describes the agroforestry parameters of this species, agrotechnical aspects of establishing plantations around croplands, environmental and economic advantages, and practical suggestions. The results of the study show that the use of Robinia in planning shelterbelts is effective, taking into account climate, soil and intended use.

Keywords: Robinia pseudoacacia, shelterbelt, agroforestry, wind erosion, soil stability.

Introduction

Protecting agricultural land and maintaining productivity in arid and semi-arid climates is an important environmental and economic issue. Shelterbelts ensure the stability of the agrarian system by reducing wind speed, slowing soil erosion, moderating microclimates, and increasing biodiversity. Robinia pseudoacacia, a fast-growing, nitrogen-fixing, and adaptable plant, can be widely used in agroforestry and protection purposes. This article examines the theoretical and practical effectiveness of Robinia-based shelterbelts in agricultural fields.

Materials and Methods

The article is based on a synthesis of the results of a literature review, agroecological analysis, and practical experience. The sources analyzed were general scientific articles, information from agroforestry manuals, and regional project recommendations. In practical terms, the following parameters were shown to be important for buffer strip planning: row length and height, number of layers, variety mix, spacing, establishment time, and maintenance. The article took into account the current national agroforestry conditions in covering the issues.

Results and Discussion

1. Agroforestry properties of Robinia pseudoacacia

The main advantages of Robinia are: fast growth, nitrogen fixation, drought and salinity tolerance, as well as high economic value of biomass. These properties make Robinia effective in shelterbelts - especially in areas where quick results are required and soil fertility needs to be restored.

2. Agroecological effects of shelterbelts

Shadebelts reduce wind speed, improve the microclimate, strengthen the physical condition of the soil and create a habitat for beneficial insects. The belts have been shown to increase crop yields by 10–20%, retain moisture and reduce erosion.

3. Economic aspects

Shadebelts require initial costs (planting, labor, irrigation), but in the long term they provide economic benefits by restoring soil fertility, stabilizing yields and recycling biomass. Robinia wood is used for construction, fuel, and organic fertilizer.

4. Practical recommendations and challenges

A strip structure of 2–4 layers is recommended. Planting Robinia mixed with species such as poplar and alder increases ecological stability. Engineering barriers can be used to control the spread of the root system. Irrigation, pruning and phytosanitary monitoring should be carried out regularly.

Conclusion

Robinia pseudoacacia-based protection strips are an effective tool for protecting agricultural land and ensuring agro-ecological stability. Its nitrogen fixation, rapid growth and biomass richness can improve soil, mitigate microclimate and stabilize yields. However, for maximum benefit, strip design — variety selection, layering, location and maintenance — should be carried out on a scientific basis and taking into account local conditions.

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