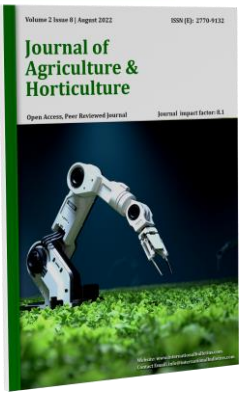

ANALYSIS OF THE FEATURES OF RECLAMATION OF SALINE GYPSUM SOILS AND THE TECHNICAL MEANS USED FOR ITS IMPROVEMENT

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Abstract:

Saline gypsum soils pose significant challenges to agricultural productivity due to their high salt content and low fertility. Reclamation of such soils involves the implementation of various technical means to improve their physical and chemical properties, making them suitable for sustainable crop cultivation. This article presents a comprehensive analysis of the features of reclamation for saline gypsum soils and highlights the key technical means used for their improvement. It provides insights into the importance of reclamation strategies, soil amendment techniques, and the application of advanced technologies in addressing the unique challenges associated with saline gypsum soils. The article further discusses the potential environmental implications and future research directions in this field.

Keywords: *saline gypsum soils, reclamation, soil salinity, gypsum content, soil amendment, drainage systems, irrigation management, sustainable agriculture*

Introduction

Currently, the total irrigated land area of our republic is 3.2 million ha, and approximately 15% of this land is gypsum saline land. The population of our republic and the year-by-year increase in the export of agricultural products to foreign countries require the regular increase of cultivated areas, the re-introduction of the old, low-yielding land areas into the agricultural cycle.

"On measures for effective use of land and water resources in agriculture" 17.06.2019. Presidential decree No. PF-5742 sets the tasks of organizing the production of agricultural, irrigation and land reclamation equipment, machines and devices that enable economical and rational use of land and water resources.

Saline gypsum soils are characterized by their high concentrations of salts, including sodium, calcium, and magnesium. These soils are prevalent in arid and semi-arid regions and pose considerable limitations to agricultural productivity. Reclamation of saline gypsum soils is crucial for optimizing soil fertility, reducing salinity, and promoting sustainable agriculture. This article aims to analyze the features of reclamation for such soils and explore the technical means used for their improvement.

Problems of gypsum production in soils were first discussed by I. Stebut (1868), M.A. Pankov (1974), A. U. Akhmedov, T. P. Gulkhova (1990), A. Khudoyokulov (1991), Sh. Shonazarov (1999) and others, but there is no clear theory of how gypsum soils are formed. Low productivity of gypsum soils has been proven in field practice and experiments. Application of manure, lime, compost and mineral fertilizers to gypsum soils increases productivity. Gypsum soils in Mirzachol and Fergana (40-80 cm layer) have a gypsum content of 25-66% and have a negative effect on soil properties.

Currently, the area of plastered land in our republic is 320-480 thousand hectares. Gypsum soils are found in almost all regions of our republic. Gypsum soils cover 75,000 hectares in Kashkadarya region, including Nishon, Mubarak, Kasbi and Mirishkor districts. Improvement of land reclamation of gypsum soils requires a separate complex. In this case, salt washing works well. There are 40-60% carbonate gypsum soils in the dense and low-fertility upper layers.

Current soil it is very important to correctly analyze the directions of formation, and according to these characteristics, gypsum soils are divided into 2 groups: accumulative and eluvial-accumulative.

This section outlines the key characteristics of saline gypsum soils, including their physical, chemical, and biological properties. It emphasizes the factors contributing to their high salinity, alkalinity, low water retention capacity, and poor nutrient availability. Understanding these properties is essential for devising effective reclamation strategies.

Saline gypsum soils, which occupy many areas, cause a lot of difficulties in the development and agricultural use of protected and wet lands. These difficulties are primarily determined by the low level of productivity of gypsum soils, low salinity of humus and nutrients, unfavorable agrophysical properties, and low biological activity. At the same time, another negative aspect of it is that irrigation methods developed and used for alluvial soils are unsuitable for these soils.

Effective reclamation strategies for saline gypsum soils involve a combination of physical, chemical, and biological approaches. This section discusses the primary techniques used, such as leaching, drainage, amendment application, and soil management practices. It also explores the importance of irrigation and water management in reducing soil salinity and leaching out excess salts.

Soil amendment plays a vital role in improving the physical and chemical properties of saline gypsum soils. This section discusses the application of organic matter, gypsum, and other soil conditioners to enhance soil structure, water-holding capacity, nutrient availability, and microbial activity. It highlights the role of these amendments in reducing soil salinity and promoting plant growth.

Recent advancements in technology offer new opportunities for the reclamation of saline gypsum soils. This section explores the application of remote sensing, geospatial analysis, precision agriculture, and molecular techniques in monitoring and managing reclamation efforts. It discusses their potential to optimize resource utilization, increase agricultural productivity, and minimize environmental impacts.

Reclamation activities for saline gypsum soils can have both positive and negative environmental implications. This section addresses the potential impacts on soil quality, water resources, and biodiversity. It emphasizes the importance of sustainable practices and proper monitoring to minimize adverse effects.

Fertilizers are applied before planting (main fertilization before autumn plowing), during planting and sowing (at the same time as planting and for feeding after planting and planting seedlings. During main fertilization, fertilizers are spread on the field surface (by

hand, on trailers, on special fertilizer spreaders) is spread and then buried in the soil during plowing.

Observing the condition of agricultural crops on gypsum soils proves in a word that gypsum horizons are less productive, their plants are not able to maintain water-nutrition regimes in the required range. The reasons for low productivity are varied. Gypsum is a moderately soluble salt in the soil solution, the concentration of calcium sulfate salt is around 1.5-2.5 g/l. This in itself does not affect the regime of water supply to plants (if there are no other salts in the solution), but due to the increase in osmotic pressure, it increases the upper limit of moisture that cannot be absorbed by plants.

Future Directions and Conclusion

The final section highlights the gaps in current knowledge and suggests future research directions for the reclamation of saline gypsum soils. It emphasizes the need for interdisciplinary approaches, long-term monitoring, and adaptive management strategies to address the complexities associated with these soils. The article concludes by reiterating the significance of reclamation efforts and the utilization of technical means for the sustainable improvement of saline gypsum soils.

Thus, among the gypsum soils, the profile has a genetic gypsum horizon and the amount of gypsum is more than 10%. Soils can be added. Gypsum horizon can have different forms depending on the conditions and amounts of its formation. More difficult-to-identify gypsum aggregates in the size of sand and dust can be of different colors: white, light brown, pink, gray, black, gray, etc., depending on the impurities in it. Gypsum soils are found in different soil geographical conditions of arid region. Evaluation of the melioration qualities of gypsum soils depends on geomorphological and hydrogeological conditions.

When applying mineral fertilizers, the following requirements are observed:

- uniform distribution of fertilizers in the coverage width should not be less than 75% when applied with centrifugal spreaders, and not less than 85% when applied with plate spreaders;

- the depth of burying fertilizers in the soil and the norm of applying fertilizers per 1 ha should not deviate by more than 20% from the specified;

- it is necessary to spray the humidity of the fertilizer spreading devices of the combined seeders without deviating from 5% at the normal fertilizer spreading rate of 50-70 kg/ha.

Organic fertilizer spreaders should thoroughly soften, grind and distribute the entire fertilizer mass on the field surface with an unevenness of no more than + 15%. Deviation from the norm of fertilizing is not more than + 25%.

In conclusion, the analysis of the features of reclamation for saline gypsum soils presented in this article emphasizes the importance of understanding the unique characteristics of these soils. It underscores the significance of employing various technical means, such as soil amendments and advanced technologies, to enhance soil quality and fertility. Reclamation efforts for saline gypsum soils have the potential to promote sustainable agriculture, mitigate environmental degradation, and ensure food security in regions affected by these challenging soil types.

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