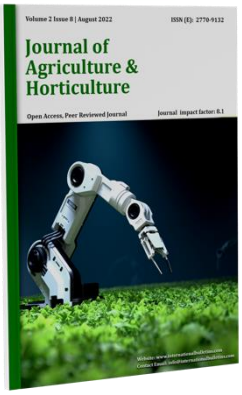

PHYSIOLOGICAL CHARACTERISTICS OF SAXAUL SEEDS AND PLANTS AND THEIR PROPAGATION METHODS

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Abstract. The reproduction, dispersal, germination, and physiological properties of saxaul seeds, as well as methods for harvesting them with electrically activated water, are presented.

Key words: saxaul, seed, pasture, hayfield, desert, soil, plant, electrical activator, aggravation, water, biological, thermal, physical, chemical, thermochemical, spectral, electromagnetic radiation and electrically activated water.

Introduction. Currently, effective methods such as fundamentally improving pastures, greening desert areas, and creating long-term cultivated pastures for use in autumn-winter and summer seasons are being recognized and widely implemented in practice [1].

As emphasized, in order to carry out such large-scale measures, it is necessary to produce a significant amount of saxaul seeds annually across the republic, taking into account 100% field germination and the purity of the sown seeds. This indicates that seed plantations should be established for each type of desert forage plant.

When improving pastures and hayfields and planting seed plants, protective barriers consisting of saxaul strips with a minimum width of 25 m are created to protect the pastures. It is recommended to leave natural pastures with a width of 200–250 m between the pastures and protective strips [2].

Determining and applying the optimal seeding rate is crucial for improving pastures and hayfields and establishing seed production areas. It is recommended to use only first- or second-class seeds.

The optimal seeding rates for saxaul seeds are 5 kg/ha, and for shrub seeds, 3 kg/ha. The specified seeding rates are applied based on 100% economic (sowing) suitability and seed purity [3,4].

Seed contamination can reach up to 50% in saxaul and up to 75% in shrubs. The moisture content of the seeds should not exceed 15%.

For the creation of autumn-winter and summer pastures, as well as hayfields, seeds are sown with row spacings of 3 m (for saxaul).

When developing pastures, hayfields, and seed production, it is necessary to rationally select the area to be improved, properly prepare the soil for sowing, and choose the

appropriate plant species and sowing method. According to agrotechnical indicators, seeds of desert forage plants are harvested during the autumn-winter period, and homogeneous seeds are sown in the same period, in winter (December-February) and early spring (the first half of the year).

Existing research indicates that the stimulation of seeds and desert plants is not uncommon. However, an analysis of the literature reveals that in desert conditions, the stimulation of saxaul seeds and plants through soaking in electrically activated water has not been implemented.

Main Part. The intensification of agricultural production, particularly crop production, aims to increase crop yields and requires an understanding of the biological characteristics of the «seed-soil-plant» system [5].

Enhancing plant productivity is possible by identifying the hidden potential of seeds. One way to achieve this is by improving seed quality for sowing. Among such stimulation methods in this study is the use of electrically activated water.

A seed is a specialized multi-cellular structure with a complex composition that serves for reproduction and dispersal. The outer part of the seed is covered by a seed coat, which protects its internal parts from desiccation and mechanical damage. The seed coat develops from the entire part of the ovule (integument). The structure, thickness, durability, and hardness of the mature seed coat largely depend on the type of pericarp. The maturation stage is mainly determined by the final transformation of integumentary tissues and the last stage of fruit dehydration. The primary characteristic of the chemical composition of mature seeds is their low water content, ranging between 5% and 20%. The chemical composition of seeds depends on maturation conditions and plant species. Some plant seeds contain more proteins, while others are richer in carbohydrates or fats [6,7].

Seed germination is a biological process in which seeds transition from dormancy to active life. After maturation, seeds remain in a dormant state, during which growth and development temporarily stop. Naturally, seeds exit dormancy under the influence of heat and water.

Research has shown that this process (stimulation) can be accelerated through physical, chemical, thermal, thermo-chemical, spectral, electromagnetic radiation, electrically activated water, and biological methods [8,9,10].

Pre-sowing stimulation of saxaul crop seeds using the energy of electrically activated water is one of the most effective methods for improving the productivity-related indicators of these seeds.

Therefore, long-term studies by both local and foreign researchers indicate that pre-sowing seed treatment with electrically activated water (EAW) significantly enhances its effectiveness.

Electrically activated water ensures the activation of the latent biological (potential) reserves of seeds, which, in turn, positively influences their germination and germination intensity. When using volumetric electro-optical converters, uniformity increases, as seeds are distributed in a uniform layer of 5 mm thickness relative to radiation sources.

The designated range and mode correspond to the region where the moisture absorption coefficient of saxaul seeds reaches 40-45%, which further increases treatment efficiency. However, if the moisture level exceeds 55%, the seeds may rot.

The use of ultraviolet radiation and electrically activated water aligns with «green technologies» and ensures the activation of the biological parameters of the processed material.

Conclusion

Based on the analysis, treating saxaul seeds using the optimal parameters of experimental electrical activation modes leads to an increase in seed germination. In the coming years, it is necessary to further develop scientific research in this field.

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