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GROWTH AND DEVELOPMENT OF TRANSPLANTED CAMPHOROSMA (CAMPHOROSMA LESSINGII LITV) AND SALT-LOVING WORMWOOD (ARTEMISIA HALOPHILA KRASCH)

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Abstract

This paper presents the results of the growth and development of *Camphorosma lessingii* Litv. and *Artemisia halophila* Krasch. under the degraded sagebrush-ephemeral conditions of the Karnabchul desert. The findings are of significant importance for desert pasture reclamation, strengthening the forage base, and ensuring ecosystem stability.

Keywords: Seedling, seed, desert, pasture, degradation, halophytes, adaptation, survival rate, growth dynamics, productivity.

Introduction

In recent years, ecological problems such as pasture degradation, soil salinization, and loss of biodiversity have been steadily intensifying in the desert and semi-desert regions of our republic. Particularly in the sagebrush-ephemeral pasture

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areas of Karnabchul, degradation processes have significantly accelerated under the influence of climate change factors and anthropogenic pressure [1].

Under these conditions, ensuring the stability of desert ecosystems, restoring degraded areas, and increasing their biological productivity stand out as urgent tasks. Therefore, selecting plant species adapted to arid, saline, and other unfavorable ecological conditions of the desert and introducing them into practice is of paramount importance [5].

Various agrotechnical measures are applied to improve pastures and reclaim degraded lands. Specifically, along with sowing seeds of desert forage plants, transplanting seedlings is considered an effective approach. Practical experiments show that in certain cases, utilizing the seedling method yields higher results than seed propagation because it increases plant survival rates and ensures faster development [5].

Research conducted by M. Makhmudov and A. Rabbimov, scientists at the Research Institute of Karakul Sheep Breeding and Desert Ecology, studied the possibilities of improving the ecological state of desert pastures by planting black saxaul and kandym seedlings [3]. These studies investigated seedling transplantation methods, which proved more effective than seeding for restoring degraded desert pastures. The efficiency of these experiments showed that when seedlings were transplanted, the plant survival rate ranged between 65–85%, whereas for seeding, this indicator was usually around 20–40%; furthermore, biomass productivity increased 1.5–2 times within 2–3 years. Due to a deeper root system development, the seedlings demonstrated higher viability even under severe drought conditions. The seedling method remains one of the most reliable agrotechnical measures for restoring desert pastures, showing particular efficacy in highly saline and wind-eroded areas. High results were recorded when seedlings were planted in early spring or late autumn [3].

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Therefore, introducing these plant species to other saline areas not only through seeds but also via seedling transplantation and studying their adaptation processes is of great scientific and practical significance.

Materials and Methods

Forage plants resilient to various adverse desert pasture conditions—*Camphorosma lessingii* Litv. and *Artemisia halophila* Krasch.—served as the research objects. Planned field experiments, biometric measurements, and standard methods accepted in plant science and plant introduction [6] were utilized.

The seedlings of the tested species—*Camphorosma lessingii* Litv. and *Artemisia halophila* Krasch.—were collected from the Issyk-kul naturally saline areas of the Forish district in the Jizzakh region. The study aimed to evaluate their survival and adaptation rates by testing their growth under Karnabchul conditions.

Research Results and Discussion

In November 2023, during an expedition to collect desert forage plant seeds, *Artemisia halophila* and *Camphorosma* seedlings dug up from the natural fields of the Forish district, Jizzakh region, were transplanted into the experimental fields of the Karnab research site in the exact same month. Currently, satisfactory results are being recorded regarding the survival, growth, and development of our seedlings.

Out of 56 transplanted *Camphorosma* seedlings (100%), 23 seedlings (41%) were recorded to survive in 2024. According to observations conducted in the first ten days of April 2025, the survival rate of *Camphorosma* seedlings remained unchanged at 23 plants (41%) (Table 1).

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Table 1. Survival rates of *Camphorosma lessingii* and *Artemisia halophila* seedlings brought from the natural fields of Forish district, Jizzakh region.

Plant Name	Survival Indicators, <u>pcs</u> %		
	2023 (Autumn)	2024 (Autumn)	2025 (Autumn)
Camphorosma	<u>56</u> 100	<u>23</u> 41	<u>23</u> 41
Artemisia halophila	<u>50</u> 100	<u>20</u> 40	<u>14</u> 28

During the summer month of June, no decrease was recorded in the survival rate of *Camphorosma* seedlings. For the 50 transplanted *Artemisia halophila* seedlings (100%), a survival rate of 20 plants (40%) was recorded in October 2024. This indicator adjusted during the spring month of April and summer month of June 2025, maintaining a bush count of 14 plants (28%) (Table 1). In June, the survival rate of *Artemisia halophila* seedlings matched the bush count preserved in spring, and identical survival rates were recorded in the first ten days of November (Table 1).

Analysis of the height growth dynamics indicates that for the seedlings transplanted to the Karnab field in November 2023, the height growth reached 20.1 cm in April of the second vegetative year. By autumn, this parameter increased by 5.5 cm, showing a distinct contrast to the summer season growth. For *Artemisia halophila*, a height growth of 30.4 cm was recorded in the spring, while the summer season showed a minor variance of only 1.6 cm compared to the autumn growth (Table 2).

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Table 2. Height growth indicators of *Camphorosma* and *Artemisia halophila* seedlings brought from the natural fields of Forish district, Jizzakh region, cm

Plant Name	Height growth indicators of <i>Camphorosma lessingii</i> and <i>Artemisia halophila</i> seedlings, cm ($X \pm S_x$).		
	Spring	Summer	Autumn
<i>Camphorosma</i>	20,1 $\pm$ 0,2	37,6 $\pm$ 0,6	43,1 $\pm$ 1,9
<i>Artemisia halophila</i>	30,4 $\pm$ 2,8	63,3 $\pm$ 3,8	64,9 $\pm$ 2,9

Productivity Indicators. Productivity is inherently linked to plant age. Evaluating the above-ground phytomass parameters of these two new species during their second vegetative year in the Karnabchul environment was performed by measuring each plant individually. Based on determining the above-ground phytomass of 10 plants per species across 3 replications, the following results were obtained: the phytomass yield in the second year of vegetation reached 8.8 g/bush for *Camphorosma*, while *Artemisia halophila* yielded 7.8 g/bush (Table 3).

Throughout the experiments, the growth dynamics, survival rates, and environmental adaptation characteristics of the plants were comprehensively evaluated. The obtained results demonstrate that introducing forage plants into saline soils offers a viable pathway to boost pasture productivity.

Table 3. Above-ground phytomass yield of *Camphorosma lessingii* and *Artemisia halophila* in their 2-nd vegetative year, g/bush ($X \pm S_x$).

Plant Name	Above-ground Phytomass Yield, g/bush
<i>Camphorosma</i>	8,8 $\pm$ 0,7
<i>Artemisia halophila</i>	7,8 $\pm$ 0,8

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Conclusions

According to the research results, transplanting seedlings of these species is highly crucial for restoring biological biodiversity, increasing desert pasture yields, and ensuring long-term sustainable land use under the sagebrush-ephemeral conditions of Karnabchul. From this perspective, testing halophytic plant species like *Camphorosma* and *Artemisia halophila* via the seedling method stands out as a promising direction for desert ecosystem restoration.

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