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CHANGES IN WATER HOLDING CAPACITY OF *ARTEMISIA DIFFUSA* IN THE CONDITION OF DIFFERENT SHEEP GRAZING INTENSITIES

Abstract. *Soil water holding capacity (WHC) is an important indicator of its ability to retain moisture and support plant growth. This study investigated the variation in (WHC) characteristics of Artemisia diffusa, a common forage plant species, under different grazing intensities under livestock grazing conditions. Four intensities of livestock grazing were defined: initial (IG), light (LG), medium (MG), and heavy (HG). This study suggests that proper rangeland management can improve the water retention capacity of A.diffusa and increase its tolerance to drought conditions.*

Keywords: *water-holding capacity, grazing intensity, livestock grazing, Karbanchul desert, Soil moisture.*

INTRODUCTION

Rangelands in Uzbekistan are an important natural resource that provides rangeland for livestock and supports the life of many rural communities (1). The total land area of Uzbekistan is 447.4 thousand square kilometers, approximately 50% of which is rangelands (2). However, the following years saw a shift to intensive livestock production, which led to the overgrazing of rangelands and the degradation of rangeland ecosystems (3). Especially in the rangelands of the Karbanchul desert, the botanical composition of plant communities changing, and the process of degradation is intensifying (4). The Karnabchul desert covers an area of approximately 500,000 square kilometers and is characterized by an arid climate and gypseous and sandy terrain (5).

Water holding capacity is an important property affecting soil fertility, plant growth, and ecosystem stability (10). Livestock grazing is a common land use practice in many arid and semi-arid regions, including the Karnabchol desert. However, the effects of different grazing intensities on soil properties, particularly water-holding capacity, are not well studied. Livestock grazing can affect the water-holding capacity properties of *A.diffusa* by altering the plant's physiology and morphology (8). Grazing intensity is a key factor that can influence the extent of these changes (9). *A.diffusa* is a common perennial grass in the Karnabchul desert and plays an important role in maintaining soil stability and preventing erosion.

Therefore, it is important to study the changes in the water-holding capacity of *A.diffusa* under different grazing intensities to better understand the effects of livestock grazing on soil properties in the region.

This study aimed to investigate the effect of different grazing intensities on the water storage capacity of *A.diffusa* in the Karnabchul desert. In this way, we can gain insight into the changes in soil properties that occur under different grazing intensities and inform the development of sustainable grazing management practices.

MATERIALS AND METHODS OF RESEARCH

We selected 4 different grazing intensity areas from the gypsum soil rangelands of the Karnabchul desert. Initial, low, medium, and high grazing intensity rangeland areas. Research in the selected areas was conducted in April 2019-2021 during the period of physiologically active biomass accumulation (leaves) of *A.diffusa* plants. Taking into account that the roots of *A. diffusa* go underground up to 40 cm, samples were taken from the 0-20 cm, 20-30 cm, and 30-40 cm layers of the soil. To determine the moisture retention properties of the soil, initial masses were measured rapidly on electronic scales. Soil samples were dried in drying cabinets at 105°C for 6–8 hours until constant weight [6]. Soil moisture was calculated according to the following formula: SM = (Wet weight – Dry weight) x100%

To determine the water holding capacity (WHC) of *A.diffusa*, 1 g of green mass of *A.diffusa* from each study area at 10 ^{00}, 12 ^{00}, 14 ^{00,} and 16 ^{00} was weighed on a rapid electronic scale and heated at 65 °C. kept in a drying cabinet for 3 hours to constant weight (7). The experiment was repeated three times to obtain average results.

WHC is calculated according to the following formula: WHC = (Wet weight - Dry weight) x100%

RESULTS AND DISCUSSION

The influence of soil moisture at the initial grazing intensity (IG) showed a minimum indicator. A slight decrease in soil moisture due to grazing was observed at light grazing intensity (LG). At medium grazing intensity (MG), the effect on soil moisture was observed to be greater, and a significant difference was observed for sand grazing activity and greater disturbance of the soil surface. Heavy grazing intensity (HG) had the greatest impact on soil moisture due to high levels of grazing activity and potentially significant soil disturbance Table 1.

Soil moisture 100%			
Grazing intensity	0-20 cm	20-30 cm	30-40 cm
Initial	2,4	6,3	8,1
Low	2,3	5,6	7,2
Medium	2,9	4,2	4,6
High	1,1	2,6	2,8

This study suggests that proper rangeland management can improve the water retention capacity of *A.diffusa* and increase its tolerance to drought conditions. The results showed that *A.diffusa* WHC increased with grazing intensity. The highest WHC value was observed under HG (28.2%) followed by MG (26.2%), LG (23.3%) and IG (23.2%) Table 2.

Water holding capacity of *Artemisia diffusa*100%				
Grazing intensity	10 Am	12 Pm	2 Pm	4 Pm
Initial	15,4	21,4	23,2	16,8
Low	18,6	21,1	23,3	19,1
Medium	23,7	24,8	26,2	24,3
High	25,3	25,4	28,2	26,7

CONCLUSION

Overall, High grazing intensity can reduce the plant's water-holding capacity, while low grazing intensity can improve it. Therefore, it is essential to manage livestock grazing to maintain the health and productivity of *A.diffusa* and its associated ecosystems. However, further research is needed to investigate the long-term effects of different grazing intensities on the WHC of *A.diffusa* and other plant species.

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