

MECHANICAL COMPOSITION OF THE SOIL IN THE EXPERIMENTAL FIELD

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Abstract This article examines the mechanical composition of meadow-alluvial soils in the Bukhara region and its significance in determining irrigation regime parameters. Soil type, mechanical composition, and morphological characteristics play an essential role in irrigated agriculture and directly influence the development of scientifically based irrigation practices.

Keywords: Bukhara region, moderately saline meadow-alluvial soils, soil moisture, field moisture capacity, water permeability, capillary rise of groundwater.

Introduction

Studies aimed at determining optimal irrigation regimes and fertilizer application rates are of considerable importance for obtaining high and stable yields of high-quality cotton. In meadow-alluvial soils, which occupy a significant proportion of irrigated agricultural lands, the relationship between irrigation scheduling and nutrient management in cotton cultivation remains one of the most important research issues. This highlights the relevance of the timely implementation of advanced agricultural technologies in cotton production.

According to Resolution No. PQ-179 of the President of the Republic of Uzbekistan, adopted on March 25, 2022, entitled *"On Measures to Support the Improvement of Soil Fertility and Productivity in Cotton Fields and the Introduction of New Irrigation Technologies,"* special attention has been given to maintaining and improving soil fertility, increasing cotton productivity, implementing scientifically based crop rotation systems, and introducing modern irrigation technologies in cotton-growing areas.

The mechanical composition of soil is one of the most important diagnostic indicators characterizing its physical properties. The distribution of soil particles

according to their size directly affects water permeability, moisture-holding capacity, aeration, compaction, and soil structure. Determining the mechanical composition involves the quantitative assessment of soil particle fractions of different diameters.

The results of the study showed that the proportion of particles smaller than 0.01 mm in soil samples collected from the 0–30, 30–50, 50–70, 70–90, and 90–100 cm layers, as well as at a depth of 100 cm, was 37.25%, 35.03%, 37.01%, 36.10%, 34.81%, and 33.28%, respectively. The average value of this parameter was 35.58%, with variation ranging from 33.28% to 37.25%.

According to the accepted classification of soil mechanical composition, soils containing 30–45% of particles smaller than 0.01 mm are classified as medium loam, whereas soils containing 20–30% and 45–60% are classified as light loam and heavy loam, respectively. Since the proportion of particles smaller than 0.01 mm in all investigated layers ranged from 30% to 45%, the mechanical composition of the entire soil profile was classified as medium loam.

A comparison of soil layers demonstrated that the highest proportion of particles smaller than 0.01 mm was observed in the 0–30 cm layer (37.25%), followed by the 50–70 cm layer (37.01%). The lowest value was recorded at a depth of 100 cm (33.28%).

An analysis of the distribution of individual particle fractions revealed that the 0.05–0.01 mm fraction accounted for a relatively large proportion in all soil layers, varying between 28.01% and 33.90%. The highest value (33.90%) was observed in the 90–100 cm layer, whereas the lowest value (28.01%) was recorded in the 0–30 cm layer. The predominance of this fraction throughout the soil profile is one of the main factors contributing to the formation of a medium-loam texture.

The content of the 0.1–0.05 mm fraction varied between 17.30% and 25.02%, the 0.25–0.1 mm fraction ranged from 15.70% to 18.46%, and the 0.005–0.001 mm fraction varied between 16.03% and 19.89%, indicating a certain degree of differentiation among soil layers. Such a fractional composition suggests that

relatively fine and medium-sized dispersed particles constitute a substantial proportion of the soil mass. Since soil texture is determined by the relative distribution of particle sizes, this composition may significantly influence the soil's water retention capacity and capillary moisture movement.

Conclusion

The results of the study demonstrated that the mechanical composition of the investigated soil was classified as medium loam throughout the entire soil profile. The relatively stable proportion of particles smaller than 0.01 mm (33.28–37.25%) indicates a consistently high content of fine dispersed particles within the soil profile.

References

1. Nurmatov, Sh., Mirzajonov, Q., Avliyoqulov, A., & Bezborodov, G. (2007). *Methods of Conducting Field Experiments: Methodological Guide*. Uzbek Research Institute of Irrigation and Agricultural Technologies, p. 63.
2. Cotton Breeding, Seed Production and Agrotechnology Research Institute (PSUEAITI). (2019). *Recommendations on Agrotechnologies for Obtaining High and High-Quality Cotton Yields under the Soil and Climatic Conditions of the Bukhara Region*. Tashkent, pp. 13–20.
3. Rajabov, N.Q. (2019). *Agrotechnology for Obtaining High Cotton Yields*. Monograph. Tashkent, pp. 12–20.