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THE EFFECTS OF ORGANIC FERTILIZERS ON DRY BIOMASS ACCUMULATION AND GROWTH PARAMETERS OF OKRA (Abelmoschus esculentus (L.) Moench)

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Abstract
This study investigated the effects of combined applications of cattle, sheep, and poultry manure on the dry biomass of okra (Abelmoschus esculentus (L.) Moench) at the Piskent and Oltinkol experimental farm during 2024-2025. In addition, the effects of different soil moisture levels, expressed as percentages of field capacity (FC), on plant height and stem diameter were evaluated under Piskent conditions. In the organic fertilizer treatments, each type of manure was applied at rates of 5, 10, 15, or 20 t\ha. According to the source data tables, at Piskent, the combined application rate of 10+10+10 t\ha (cattle+sheep+poultry manure) resulted in the highest total dry biomass in all three years, reaching 80.5 and 64.1 g, respectively. At Oltinkol, the highest values were obtained with the 15+15+15 t\ha treatment, amounting to 70.9 and 84.3 g, respectively.

Keywords: okra, Abelmoschus esculentus, organic fertilizers, cattle manure, sheep manure, poultry manure, dry biomass, field capacity (FC).

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INTRODUCTION

The growth and accumulation of vegetative biomass in okra (Abelmoschus esculentus (L.) Moench) vary depending on the applied agronomic practices. Comparing field experimental results across different regions and years, particularly regarding organic fertilizer application rates and soil moisture management, is essential for evaluating the effectiveness of cultivation technologies. The objective of this study is to identify and clearly demonstrate the differences among experimental treatments in terms of dry biomass, plant height, and stem diameter based on the experimental results presented.

Previous international studies have investigated the effects of cattle and poultry manure on okra growth, yield, and soil chemical properties [1]. Research findings on poultry manure application rates [2], the types and quantities of livestock manure [3], as well as the combined effects of organic fertilizers and mineral nutrition [4], indicate the need to evaluate organic fertilization rates under specific experimental conditions.

RESEARCH CONDITIONS AND METHODS

The dry mass (gr) of leaves, stems, roots, and total biomass was analyzed in 2024 and 2025 at the Piskent (Tashkent Region) and Oltinkul (Andijan Region) experimental farm in relation to organic fertilizer application. The control treatment received no fertilizers. In the experimental treatments, cattle, sheep, and poultry manure were applied in combination at rates of 5, 10, 15, or 20 t\ha.

At the Piskent site, the highest total dry biomass was recorded in both years under the treatment combining cattle, sheep, and poultry manure at 10 + 10 + 10 t\ha. The total dry biomass reached 80.5 gr in 2024 (compared with 53.0 gr in the control) and 64.1 gr in 2025 (compared with 42.3 gr in the control). The increases relative to the control were 51.9% and 51.5%, respectively (minor rounding differences may occur compared with the percentages reported in the original source). Under the 15 + 15 + 15 t\ha treatment, total dry biomass was 73.9 and 53.4 gr in 2024 and 2025, respectively.

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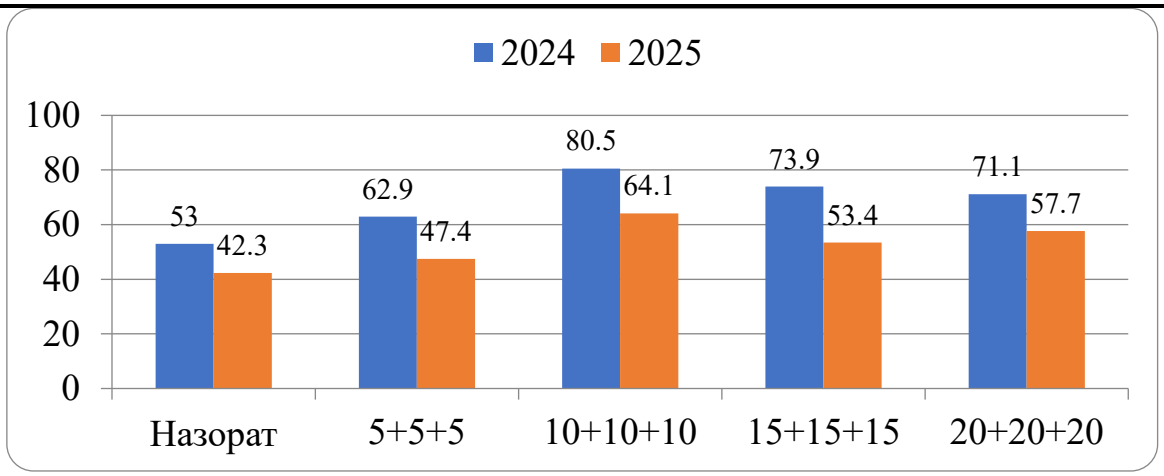


Figure 1. Total dry biomass under different organic fertilizer application rates at the Piskent Experimental Farm, 2024-2025.

The regional results obtained are consistent with previous research findings [1–4], which indicate that the effects of organic fertilizers may vary depending on the type of manure applied and its application rate.

At the Oltinkul Experimental Farm, the 15 + 15 + 15 t\ha treatment showed the highest total dry biomass in both years, reaching 70.9 gr in 2024 and 84.3 gr in 2025. The corresponding values in the control treatment were 48.5 and 54.1 gr, respectively, representing calculated increases of 46.2% and 55.8% compared with the control.

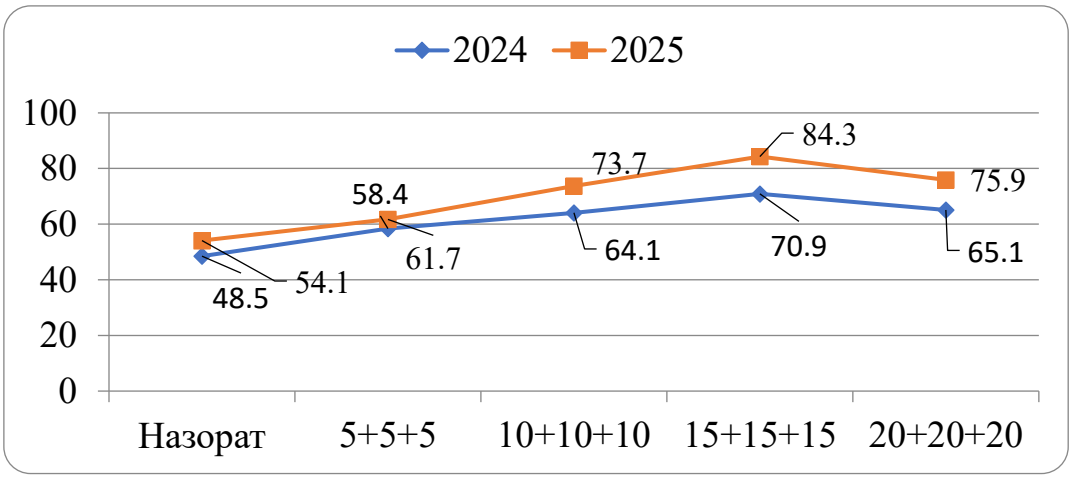


Figure 2. Total dry biomass under different organic fertilizer application rates at the Oltinkul Experimental Farm, 2024-2025.

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CONCLUSIONS

1.At the Piskent Experimental Farm, the highest total dry biomass values in both 2024 and 2025 were recorded in the treatment where each type of manure (cattle, sheep, and poultry) was applied at a rate of 10 t\ha, giving a combined application rate of 30 t\ha.

2.At the Oltinkul Experimental Farm, the treatment involving the application of 15 t\ha of each type of manure (cattle, sheep, and poultry), corresponding to a total application rate of 45 t\ha, produced the highest total dry biomass in both years.

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