THE INFLUENCE OF SOIL TILLAGE SYSTEMS ON BULK DENSITY IN THE BRAILA ISLAND

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Abstract

The paper analyzes the influence of three soil tillage systems: conventional (CT), minimum tillage (MT), and no-tillage (NT) on bulk density values, under the specific conditions of alluvial soils in the Great Island of Brăila, an area with unique soil characteristics, characterized by high textural variability and a marked degree of heterogeneity. The study was based on a field experiment in which soil samples were collected from four depths (0–10 cm, 10–20 cm, 20–30 cm, and 30–40 cm) at two key moments: three days after sowing and immediately after harvesting. The samples were analyzed in the laboratory according to the Canarache method (1991), and the bulk density values were correlated with the tillage system applied. The results showed a progressive increase in bulk density with depth. At sowing, the lowest values were recorded in MT (1.09 g/cm³), and at harvest, NT recorded the highest values (1.22 g/cm³) at a depth of 0–10 cm. However, all values determined were below the critical threshold of 1.4 g/cm³, indicating that none of the systems led to compaction harmful to root development. Statistical analysis (ANOVA) showed no significant differences between the tillage systems. The study confirms that the application of conservative systems does not adversely affect the physical structure of the soil and can be a viable alternative for the sustainable management of alluvial soils, while also offering stable and high agronomic potential.

Keywords: bulk density, working systems, conservation agriculture, alluvial soils, compaction