EFFECT OF TILLAGE AND POULTRY MANURE APPLICATION ON SOIL INFILTRATION RATE AND MAIZE ROOT GROWTH IN A SANDY ALFISOL

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ABSTRACT
This study was carried out in Abeokuta, South-western Nigeria in 2008 and 2009 to assess the impact of tillage and poultry manure (PM) on soil infiltration rate and maize root growth. The experiment was a split-plot design with three replications. The main plot consisted of three tillage treatments: zero tillage (ZT), minimum tillage (MT) and conventional tillage (CT) while the sub-plot comprised three PM treatments (0, 10 and 20 Mg ha⁻¹). Soil infiltration characteristics were determined on the field using disc permeameter while root mass was evaluated by excavation method. In 2008, the soil infiltration rate (IR) was significantly higher under MT than other tillage systems while the IR was higher by about 11% under CT than ZT. Though, there was no significant difference in IR among the three tillage systems in 2009, IR was lower under CT by about 9% and 3% compared with MT and ZT, respectively. The IR of 10.87 cm hr⁻¹ observed in 2008 under the plots treated with 20 Mg ha⁻¹ of PM decreased to 6.19 cm hr⁻¹ in 2009 possibly due to reduction in the large pores of the sandy soil by repeated application of 20 Mg ha⁻¹ of PM. The implication of this is that nutrients are likely to be held against leaching when 20 Mg ha⁻¹ PM is applied in a sandy soil. Root mass was insignificantly higher under MT than CT in both years of the study while root mass was lower under ZT than CT by about 26% in 2009. Plots treated with poultry manure gave significantly higher root mass than the control. Therefore, fast draining pores dominating sandy soil may be modified by application of large quantity (20 Mg ha⁻¹) of PM to improve the soil water and nutrient holding capacities and maize root growth.

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