



Effect of different soil conditioners application on some soil characteristics and plant growth III- Effect on saturated and unsaturated water flow

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Abstract : Soil conditioners used for improvement poor physical properties of coarse textured soils like low water retention and reduction of water use, especially in arid and semi-arid regions like Egypt. The aim of the study is to investigate the influence of bentonite clay as natural deposits (0, 2, 4, 6; 8 %) and farmyard manure, FYM at 2 %wb on water flow under saturated and unsaturated condition in treated sandy soil. Soil sample was collected from surface layer (0-30 cm depth) of the Agricultural Experiment and Research Station at Production and Research Station of National Research Centre, Nubaria, Behera Governorate, Egypt.

Results indicated that increasing the application bentonite significantly decreased the cumulative infiltration, which more pronounced at higher rates. Also, Bentonite at 8 % was more effective to reduce the cumulative infiltration. However, application of bentonite deposits to sandy soil led to decrease hydraulic conductivity from 9.75 to 1.75 cm h⁻¹, intrinsic permeability improved from 11.63 to 2.09 m² and mean weight diameter from 19.29 to 8.17 μ as compared with control and soil treated by 8 % bentonite, respectively. Bentonite addition encouraged soil resistance to water movement 0.103 (day/meter) in untreated soil while the value in soil treated by 8 % bentonite recorded 0.571 (day/meter). The percent of change of the studied soil properties, there is no match between increasing bentonite by unite (2%) and percentage of change especially for hydraulic conductivity, intrinsic permeability and mean weight diameter. So it is clear that increased bentonite application rate associated with improvement in all studied soil characteristics.

Keywords: Sandy loam, bentonite, hydraulic conductivity, infiltration rate, Intrinsic permeability; MWD.

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