



Effect of different soil conditioners application on some soil characteristics and plant growth.II-Soil evaporation and dry-wet cycles

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Abstract:Soil conditioners are used to improve soil hydrophysical properties for alleviate some of poor physical properties of sandy soils such as low water retention and inefficient water use, especially under new reclaimed soil in Egypt. The present study aims to assess the influence of bentonite application rates as natural deposits on intermittent evaporation from sandy soil.The evaporation experiment was conducted during August to December 2014 in the greenhouse of Water Relations and Field Irrigation Dept. NRC, Egypt. Sandy soil was mixed with bentonite (of 0, 2, 4, 6 ; 8 %wb) and farm yard manure (FYM) at 2 %wb and packed in transparent PVC columns to depth of 30 cm. Cumulative evaporation against time was measured daily. The soil moisture distribution at the end of the experiment was determined gravimetrically for each 5.0 cm interval.

The obtained results showed that increasing application rate of bentonite restricted the wetting front movement and need more time to reach 30 cm depth. Application of bentonite to sandy soil significantly reduced the cumulative evaporation throughout the three evaporation cycles and the reduction significantly increased with increasing the application rates, except for the higher rate (8%), which increased the cumulative evaporation under the present conditions.The decreasing in the amount of moisture lost by evaporation attributed mainly to the role of clay deposit in increasing the soil aggregation that decreased the pore space. The relation between residual moisture content as percentage from water holding capacity is linear, positively and highly significant at 1% level, which means that application of bentonite to sandy soils (coarse textured soils) meets a progressive increase of the soil water characteristics.

Keywords: Sandy loam, bentonite, farm yard manure, sandy soil, cumulative evaporation, dry-wet cycles.

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