

# EFFECT OF COMPOST ON MAIZE (*Zea mays*) YIELD AND SOME CLAY SOIL PHYSICAL PROPERTIES UNDER DEFICIT IRRIGATION

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## ABSTRACT

Field experiments were conducted for two seasons in the clay soil located at South of Sahl El-Hosainiya Research Station, Port-Said Governorate, Egypt. Maize (*zea mays*) was used as an experimental plant. The current work aims to asses effect of compost application as organic amendment at rates of zero (C<sub>0</sub>), 5.5(C<sub>1</sub>), 11.0(C<sub>2</sub>), and 16.5(C<sub>3</sub>) Mg f<sup>-1</sup> (1 Mg "megagram"= 10<sup>6</sup> g *i.e.* metric ton); under irrigation using two water levels of full irrigation (I<sub>1</sub>) of 3300 m<sup>3</sup> f<sup>-1</sup>, and deficit irrigation (I<sub>2</sub>) of 2640 m<sup>3</sup> f<sup>-1</sup> (80% of full irrigation). Grain yield in non-amended treatments was 1.788 to 2.482Mg f<sup>-1</sup> while it was 2.757 to 6.316 Mg f<sup>-1</sup> in compost- amended treatments. Water-use efficiency (in kg grains/m<sup>3</sup> water) was 0.542 to 0.940 for non-amended treatments and 0.835to 2.392for those compost-amended treatments causing, average increases of 34.1, 161, and 92.9% for the C<sub>1</sub>, C<sub>2</sub>, and C<sub>3</sub>, respectively. The deficit irrigation I<sub>2</sub> surpassed the full one I<sub>1</sub> by 58.3%. Soil moisture curves at tensions of 0.01 up to 15.00 atm and available water (AW) increased due to compost. Compost had a slight effect on total porosity, but affected the distribution of pore size fractions creating more water-useful pores (*i.e.* the quickly drainable-, slowly-, drainable- and water-holding-pores) and decreasing the less-water-useful ones (*i.e.* the fine capillary pores). Aggregation and aggregate stability increased by compost; the high rate gave 6.8% large aggregates while the no compost gave 4.3% only.

**Keywords:** Deficit irrigation, compost application, maize aggregation, soil moisture curve, porosity.