

Effect of different soil conditioners application on some soil characteristics and plant growth IV-Effect of bentonite rates on the some soil chemical properties

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Abstract : This paper investigate the efficacy of the use of bentonite clay as a potential soil conditioner on the some soil chemical properties such as exchangeable sodium percentage (ESP), sodium adsorption ratio (SAR) and electrical conductivity values (EC, dS/m) of coarse textured soils. Field experiment was carried out in Research and Production Station, National research Centre, El-Nobaria, El-Beheara Governorate, Egypt during the season of 2013 on a sandy loam soil. The experimental design was randomized completely block in sex replicates. Barley (*Hardium vulgare* L-Giza 124) followed by Maize (*Zea maize* L- hybrid 310) were sown. Bentonite was added at rates (0, 2, 4, 6 and 8 %) comparing with farm yard manure (FYM) at 2 % on the half of the plots were treated by 50%, the first one applied before barley and the second one during soil preparation of maize.

The obtained results showed that: ESP values increasing by increasing bentonite application rates to sandy soil in surface layers. Application bentonite at 8% increased ESP by about 98% comparing with untreated one. While 2% bentonite increased ESP by 57% relative to the control and the increase relative to the difference between 8 and 2% bentonite application rate was 41%. ESP values of subsurface soil samples after maize, were highly comparing with surface ones after barley crop. SAR values after barley resulted from treated soil by bentonite 2; 8 % and FYM at 2% increased SAR value by about 33, 77; 20 % relative to the control in the first soil depth. Soil salinity (EC, dS/m) revealed that reasonable EC values were obtained through addition of bentonite at different used rates and increased bentonite rates associated with increase in soil EC values. The highest percentage of increase was 21-43, 13-36, 21-43 % relative to the control after maize, while the values were -10, -7; 0, -19; 21, 43 % after barley for the three studied depths after 6, 8 % bentonite. while the FYM had a promotive effect to reduce soil EC which decreased in the examined soil depths in same sequences after maize by about -7, +2, -7; -42, -37, -7%.

The main conclusion is that bentonite play an important role not only increasing soil fine particles but also increase its CEC that play a vital role in soil fertility till 8 % without any risk effect on Soil ESP.

Keywords: bentonite, exchangeable sodium percentage, sodium adsorption ratio, EC.