

# Pedochemical studies of some zones of encroachment between the Nile delta and the desert in Qalubia governorate

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Pedological studies were carried out on zones of encroachment between the Nile Alluvial Delta soils and the neighbouring desert sands of Eastern desert in Qalubeya. Five traverse lines were taken and included 29 profiles extending from the Nile (Domietta branch) to the Eastern desert. Soils varied considerably from the alluvial thick-layered fine textured near the Nile to the sandy coarse j:..e at the desert side. Bulk density was 1.16 to 1.76 g/cm<sup>3</sup>, particle density 2.52 to 2.81 g/cm<sup>3</sup>, total porosity 44 to 55%, pH 6.86 to 8.60, CaCO<sub>3</sub> nil to 23.9%, gypsum was less than 1%, organic matter: nil to 2.66%, EC 0.31 to 25 dS/m, exchangeable sodium percent (ESP): 3.9 to 60%. Soluble cations were dominated by Na followed by Ca then Mg; potassium was very little. Soluble anions were dominated by SO<sub>4</sub> in most profiles followed by Cl then HCO<sub>3</sub> with no CO<sub>3</sub> except in 3 horizons. Cation exchange capacity CEC : 2.7 to 56.2 me/100 g soil dominated by Ca in most cases followed by Mg then Na and K. Light minerals of the sand fraction were dominated by quartz which constituted more than 96% of them, feldspars constituted less than 4% of the light minerals. The main feldspars were plagioclase and orthoclase with microcline being the least. Heavy minerals of the sand fraction constituted of opaques (representing 27.5-66% of them), non opaques (9-24 pyroxenes; 8-24% amphiboles; 5 to 16% epidotes). Other heavy minerals included rutile, tourmaline, zircon, garnet, kyanite, biotite, and staurolite. Clay minerals of the clay fraction were mainly montmorillonites followed by vermiculites then kaolinite and there were interstratified minerals. Quartz and feldspars were the major constituents of accessory minerals. There were calcites and apatites also. Soils of the Nile Delta were r:rrerts and 1 forrifuvents and those of the encroachment zones were iforrifuvents, ltorrorthents, -rorripsamments and Ealciorrhids, while the desert sands were Torripsamments, and 'lOrrorthents. Sedimentology assessments were carried out on the soils and the indications showed water as well as wind influence on soil formation