

Physico-Chemical Properties of Three Salt-Affected Soils in the Lower Volta Basin and Management Strategies for their Sustainable Utilization

D. F. K. Allotey^{1*}, R. D. Asiamah², C. D. Dedzoe² and A. L. Nyamekye¹

¹ CSIR-Soil Research Institute, Accra Centre, P. O. Box M. 32, Accra, Ghana

² CSIR-Soil Research Institute, Academy Post Office, Kwadaso-Kumasi, Ghana

*Corresponding author; E-mail: dfkallotey@yahoo.com or soilri@ncs.com.gh

Abstract

Differences in physical and chemical properties of three salt-affected soils, designated as pedons 1, 2 and 3, in the Lower Volta basin of Ghana were evaluated. Pedons 1 and 2 were located at Mokordzie in the South Tongu District while Pedon 3 was at Salo in the Ketu District of the Volta Region of Ghana. The soil properties determined included texture, pH, organic carbon, available P and K, exchangeable bases and acidity. The texture of the soils varied from clay to silty clay. The low pH of the soils, attributed to the presence of pyrite, ranged from moderately acidic to extremely acidic and vary in the order Pedon 1 > Pedon 3 > Pedon 2. The electrical conductivity of all the three pedons were more than 4 dS/m, thus, their rating as moderately saline. Organic C content in the A-horizon of pedons 1 and 2 were comparatively higher than Pedon 3. Total N contents of the three pedons was generally low. Available K, on the other hand, was very low within all the horizons of Pedon 2; medium in Pedon 3 and ranged from very low to medium in Pedon 1. The CEC of the A-horizon of Pedon 1 is medium but the B-horizon is between low to high. Those of pedons 2 and 3 were between medium to very high in both horizons. The CEC is generally in the decreasing order Pedon 1 > Pedon 2 > Pedon 3. Exchangeable sodium percentage (ESP) of all the three pedons were lower than 15, hence, the soils were rated saline. Based upon these data, pedons 1, 2, and 3 were classified as Gleyic Solonetz, Endogypsi-Gleyic Solonchak and Gleyic Solonchak, respectively. Suggested management practices to improve upon the productivity of these soils are ridges/mounds, application of lime (gypsum or oyster shells), organic manures and residues, planting of salt-tolerant crops, agroforestry, leaching and drainage.