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SOIL-VEGETATION RELATIONS IN TROPICAL FORESTS OF SOUTHERN NIGERIA

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ABSTRACT

Eighty one-ha plots at four locations (Oban, Omo, Owan and Sapoaba) in the reserved rainforest of southern Nigeria were sampled. Trees were measured at breast height and soil samples collected at five points 50 m apart at the centre line of each plot to investigate the soil-vegetation relationships. The results of soil analyses indicated that the mean values of the soil variable for all the four sites are: percentage organic matter, 4.25; percentage organic carbon 1.35; sand 79%, clay 15.8%, total nitrogen 0.08%, CEC 80.0 c mol kg^{-1}. Exchangeable Na, K, Mg and Ca, 1.4, 2.89, 3.47 and 8.83 c mol kg^{-1} respectively, while available phosphorus was 6.61 ppm; pH in water and pH in $CaCl_2$, 4.44 and 3.66 respectively. The results further showed that sites are significantly different in their contents of organic matter, organic carbon, sand, clay, magnesium, phosphorus and pH indicating high variability between sites for these soil properties. However, values for nitrogen CEC, exchangeable Na and K, are not significantly different. Biplot ordinations of the soil variables and tree species showed that clay, organic carbon, and CEC attain their optimum levels in Oban and were the most important in determining species distribution, while nitrogen, sodium and sand were the most important at Omo, Owan and Sapoba respectively. The tree species which are more adaptable to each soil variable were also indicated. The implications of these results are discussed in the light of the prevailing high deforestation which may necessitate the need for the reduction in the number of tree species to few ones for effective management.

Keywords: Soil, Vegetation, Tropical forests, Floristic composition, Southern Nigeria.