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Comparative analysis of soil's properties of teak plantation under different parent materials in southwest Nigeria

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Abstract

Teak plantation has assumed prominence as a silvicultural practice of meeting the local and regional demands for increased wood production and ensuring environmental conservation. Previous studies principally focused on the effects of teak (Tectona grandis) on soil nutrient fluxes in comparison with natural forest, but the effect of soils derived from different parent materials on the growth and nutrient cycling of teak is somewhat novel in the literature of agroforestry practice. This study examined the influence of parent materials on the soil physic-chemical and micronutrients of teak plantation in south-western Nigeria.

Systematic sampling design (systematic line transect) was employed to establish sample plots of 900m^2 across plantations aged 37, 40 and 42 yrs. in Ilaro and Olokemeji. In each plantation age of the two study sites, 6 plots were randomly selected out. Hence, at Ilaro, 18 plots of sizes 900m^2 across the plantation ages were selected, the same was applied to Olokemeji. In all, 36 plots were selected for soil, plant part and teak biomass sampling. From the sampled plots, 72 soil samples (topsoil and subsoil) were collected and analyzed for physico-chemical and micronutrient parameters.

For the 37-years-old plantation, the results show that the topsoil sand contents were higher in Ilaro plantation soils than in Olokemeji plantation soils, with mean values of 89.96% and 61.98%, respectively and the subsoil's with mean values of 89.15% and 61.21%, respectively. For the 40-years-old plantation, the results show that the topsoil's sand contents were higher in Ilaro plantation soils than in Olokemeji plantation soils, with mean values of 91.04 and 60.70%, respectively and the subsoil's with mean values of 87.31% and 60.03%, respectively .The results also show that the topsoil sand contents were higher in Ilaro plantation soils than in Olokemeji plantation soils, with mean values of 91.04 and 60.30%, respectively and the subsoil's with mean values of 89.62% and 60.61% respectively for the 42-years-old plantations respectively. Therefore, the conclusion was made that Ilaro soils is sandy.

Though, Olokemeji teak plantation which is on basement complex terrain is more suitable for teak cultivation than Ilaro teak plantation which is on sedimentary formation due to higher proportion of soil nutrients. However, the management practice in Olokemeji plantation should be improved upon to conserve the available soil nutrient for improved teak production while, an intervention is needed for appropriate soil management strategy to boost teak production in Ilaro plantation.

Keywords: Teak plantation, Parent materials, Soil nutrients, Soil properties

Biography

Fatai Olakunle has just completed his PhD Thesis programme but awaiting the final defense of the project anytime from now at Nigeria prestigious and the premier University (University of Ibadan, Department of Geography). He also holds a masters degree in Geographic Information System from University of Lagos in 2002. He teaches Biogeography and Soil science at the Department of Geography and Planning, Lagos State University, Ojo Lagos Nigeria. He has published more than 40 papers in reputable well indexed journal in soil and plant biodiversity and other environmental related issues.