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ORGANIC CARBON, TOTAL NITROGEN AND AVAILABLE PHOSPHOROUS CONCENTRATION IN AGGREGATE FRACTIONS OF FOUR SOILS UNDER TWO LAND USE SYSTEMS

NWEKE, I. A[1] & NNABUDE P. C[2]

[1]Department of Soil Science, Anambra State University, Igbariam Campus, Uli, Nigeria

[2]Department of Soil Science and Land Resources Management, Nnamdi Azikiwe University Awka, Anambra State, Nigeria

ABSTRACT

This study was undertaken to evaluate the effect of cultivation and fallow on the Organic Carbon (OC), Total Nitrogen (TN), and available phosphorous (P) concentration in aggregate fractions of four soils. The four soils used for the study are; Entisol, Ultisol and two Inceptisols, all collected from four different locations in Nsukka area of Southeastern, Nigeria. The land use types considered were Fallow and Cultivated. The soils collected from 0-25 cm depth were separated into five aggregate fractions, 5-2 mm, 2-1mm, 1-0.5 mm, 0.5-0.25 mm and < 0.25 mm, and changes in their OC; TN and P concentrations due to cultivation were determined for both dry and wet sieved fractions. The result of the study showed that the OC concentration among the soils were in the order Entisol at Nsukka (ENsk) > Ultisol at Nsukka (UNsk) > Inceptisol at Eha-Amufu (IEh) > Inceptisol at Ikem (Iik). The total N concentration in dry sieved samples of ENsk was higher compared with those of similar fractions of UNsk, IEh and Iik, while wet sieved samples showed no consistence in the decrease of the TN concentration of the aggregate sizes. The total N concentration in both dry and wet sieved samples of UNsk increased progressively as the aggregate sizes decreased, while the highest TN in IEh was obtained in 0.5-0.25 mm aggregate size of dry sieved of fallow soil and wet sieved of cultivated soil.

The lowest concentrations of TN in Iik was obtained in 1-0.5mm aggregate size for the dry sieved samples of fallow soil, and no particular change in the TN concentration of 1-0.5mm and 0.5-0.25mm size of cultivated soil. The wet sieved samples of the same soil showed that the highest concentration of TN was obtained in 0.5-0.25mm size in fallow soil and 17.3% decrease in < 0.25mm fraction relative to the 0.5-0.25mm fraction in cultivated soil. The TN concentration obtained in two Inceptisol in both dry and wet sieved samples of fallow and cultivated soil was low compared to the ones obtained from ENsk and UNsk. There was no uniform trend or pattern of available Phosphorous distribution in the aggregate fractions of dry and wet sieved samples. From the result of this study it can be deduced that the concentration of OC, TN and P of dry aggregate and wet aggregate fractions differ substantially even though their diameters are same. Hence their loss during fertility erosion will have differing impacts on the residual soil.

KEYWORDS: Fallow, Cultivated, Aggregate, Fractions