

Pores reconfiguration in compacted Bernam series soil

Abstract

The introduction of mechanization in oil palm (*Elaeis guineensis*) plantations resulted in soil compaction with increased bulk density and reduced porosity due to reconfiguration of soil pores. This could be a serious problem in the future as soil pores are important for aeration and water movement. Approach: This study was carried out to determine the effect of mechanization on the morphological characteristics of pores of Bernam series soil. The treated plots were compacted using a tractor with 4 tonnes trailer weight. Undisturbed soil samples were taken from the harvesting path and the frond pile path at 0-10 cm depth. Thin sections image analysis of impregnated undisturbed soil samples were examined using a Leica DFC 290 microscope and analyzed using the associated software. Results: After six years of soil compaction treatments, the results showed a significant decrease in the mean total porosity of the compacted harvesting path with significantly smaller mean diameter of mesopores and macropores. In contrast, the percentage of macropores was significantly higher in the frond pile path and the control plot. Conclusion: Soil thin sections micromorphological image analysis is a better approach for quantitative measurements of altered soil porosity and pores distribution. Compaction caused reduction not only in total porosity but also causes reconfiguration and redistribution of pore sizes within the soil system.