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IMPACTS OF ORGANIC RESIDUE MANAGEMENT IN EUCALYPTUS FOREST ON MICROBIAL COMMUNITIES.

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Harvest residue management during inter-rotation period greatly influences the availability of nutrients in the soils and the sustainability of future rotations in fast growing plantations established on highly weathered tropical forest. Impact of forest management treatment on productivity was shown, particularly in plantations where organic matter (OM) content is extremely low like in Congo. Consequences of OM management on microbial communities were rarely taken in account. However, changes in microbial biodiversity can impact decomposition processes indicating that understanding the significance of biodiversity is essential to assess the consequences of forestry practices for carbon and nutrient cycles. Experiment was conducted in Eucalyptus plantations in Congo. Three treatments were studied (all aboveground organic residues removed from the plot; only stemwood harvested which correspond to Congolese commercial plantation; or double supply of residues). DNA and RNA were co-extracted from leaf-litter and upper soil layers (0-10 cm). Density and structure of bacterial and fungal communities were assessed by the quantitative PCR (qPCR) and fingerprinting technique (DGGE), respectively based on 16S and 18S rRNA. We also investigated functional microbial communities potentially involved in C cycling: the phylum of the Actinobacteria, known for their saprophytic activities; the BphDox bacterial community involved in the degradation of aromatic compounds and Laccase fungal community implicated in the degradation of phenolic compounds. Altogether, these data allowed to progress in the establishment of links between nutrients flux measured in field and microbial analyses which is a challenge to a better understanding of the functioning of forest ecosystems.