

**COMPARISON OF WOODY SPECIES REGENERATION AND
SOIL FERTILITY IN AN INDIGENOUS FOREST AND
NEIGHBOURING EXOTIC TREE PLANTATIONS IN
MUGUGA FOREST.**

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Abstract

The regeneration of understory woody vegetation in different plantation forests was investigated in Muguga Forest Station. Species composition, vegetation structure, understory woody species regenerates structure and soil physiochemical characteristic were assessed in five different forest types, the Indigenous forest, Cypress plantation, Eucalyptus plantation, Mixed Acacia-Eucalyptus plantation and Pine plantation. The Eucalyptus, Cypress, Pine and mixed Acacia-Eucalyptus plantations had significantly higher densities of mature trees as compared to Gachuthi indigenous forest ($F_{5, 96} = 56.43, p < 0.05$). The mean densities of immature woody species were only significantly higher in Gachuthi than in the Pine plantation ($F_{5, 298} = 2.45, p < 0.05$) but mean densities for saplings and seedlings did not vary significantly ($p > 0.05$) among the different forest types. Foliar cover and woody species abundance of immature trees showed a significant positive correlation ($r = 0.362$) in Gachuthi ($t_{0.05 (2), 34} = 2.26, p < 0.05$) and a significant negative correlation ($r = -0.414$) in the mixed Acacia-Eucalyptus plantation ($t_{0.05 (2), 34} = 2.65, p < 0.05$). The sapling and seedling abundance had no significant correlation to foliar cover ($p > 0.05$) in the different forest types. Soils in the forests studied were classified as clay soils with no significant differences in pH, soil nitrates and organic carbon ($p > 0.05$) among the different forest types. The woody species abundance of immature trees and soil nitrates showed significantly negative correlation in Gachuthi ($t_{0.05 (2), 34} = 2.39, p < 0.05$) while there were no significant correlations in the other forest types. Soil pH, nitrates and organic carbon showed significant ($p < 0.05$) negative correlations to sapling abundance in Gachuthi and significant ($p < 0.05$) positive correlations to sapling abundance in the Pine plantation. Soil pH and seedling abundance showed significant negative correlation ($r = -0.35$) in the Cypress plantation ($t_{0.05 (2), 34} = 2.18, p < 0.05$) whereas it was not significant among other forest types. In this study, the significantly low percentage foliar cover and higher soil nitrates content in the indigenous forest seemed to favour the survival of seedlings to the immature age class.