

Mugendi DN and Nair PKR 1997. Predicting decomposition patterns of tree biomass in tropical highland microregions of Kenya. *Agroforestry Systems* 35:187-201.

ABSTRACT

Decomposition- and nitrogen-release patterns of biomass from three agroforestry multipurpose trees (*Calliandra calothyrsus*, *Cordia africana* and *Grevillea robusta*) were investigated in four contrasting environments (microregions) in the Kenyan tropical highlands during two cropping seasons. Dried leafy biomass was placed in 2-mm litter bags, buried at 15-cm depth and recovered after 2, 4, 7, 10, 15 and 20 weeks. Decomposition patterns were best described by first-order exponential decline curves. The decomposition rate constants ranged from 2.1 to 8.2 yr⁻¹, and the rates of decomposition among the species were in the order: calliandra cordia > grevillea. There was a species-by-environment interaction during both seasons, but the nitrogen released did not follow such a pattern. Among the three tree species, calliandra released the highest amount of cumulative N, followed by cordia and grevillea. Using multiple regression techniques, decomposition pattern was described as a function of three groups of factors: biomass quality (N, C, lignin and polyphenol), climate (soil temperature and rainfall), and soil conditions (pH, soil organic C, total N and P). For all the species and factors combined, the adjusted R² values were 0.88 and 0.91 for seasons 1 and 2, respectively. Among the three groups of factors, climate and biomass quality had the most influence on decomposition rates. Climatic factors accounted for 75% of the total rate of decomposition in season 1 (irregular season with less rainfall and more soil temperature fluctuations), whereas biomass quality factors were more influential in season 2 (regular season), accounting for 65% of the total variability. *Predicting the decomposition patterns of tree biomass in tropical highland microregions of Kenya.*

Available from:
https://www.researchgate.net/publication/226528442_Predicting_the_decomposition_patterns_of_tree_biomass_in_tropical_highland_microregions_of_Kenya .