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## The Effect of Species Identity, Litter Diversity and Habitat Quality on Litter Decomposition Rate in Gerese District Southwest Ethiopia

SEYOUM GETANEH AYDAGNEHUM<sup>1,3</sup>, OLIVIER HONNAY<sup>2</sup>, ELLEN DESIE<sup>1</sup>, SIMON SHIBRU<sup>3</sup>, BART MUYS<sup>1</sup>

<sup>1</sup>*KU Leuven, Dept. of Earth and Environmental Sciences, Belgium*

<sup>2</sup>*KU Leuven, Plant Conservation and Population Biology, Belgium*

<sup>3</sup>*Arba Minch University, Dept. of Biology, College of Natural Sciences, Ethiopia*

### Abstract

Attempts to rehabilitate degraded highlands are made by the Ethiopian government, mainly by tree plantation. But so far, less attention was given to species identity and stand composition. In this study, three indigenous and two exotic trees species were selected for litter decomposition study. The objective was to identify a better combination of tree leaf litters for the restoration of degraded land. Litter bags were incubated into potential restoration sites (disturbed natural forest and plantation) in comparison to intact natural forest. Tested litters includes three natives, two exotics and their mixtures (five monospecific litters, ten 3 species litter mixtures and one 5 species litter mixture) in comparison to standard green tea and rooibos tea. A total of 1033 litter bags were retrieved for weight loss analysis after one, three, six and twelve months of incubation. Beside the linear mixed model both Student t-test and Spearman rank correlation were employed for data analysis. The results reflect the significant impact of litter quality and diversity. *Millettia ferruginea* was shown to have a comparable fast decomposition rate as green tea. Both *Cupressus lusitanica* and *Syzygium guineense* were shown to have a lower decomposition rate than the slowly decomposing rooibos tea. The decomposition rate of *Croton macrostachyus* and *Eucalyptus globulus* were in between the above two groups. Student t-test was confirming the existence of non-additive effects of litter mixture. Significant correlation was also observed between litter mass loss and initial leaf litter chemical composition. The findings suggests that litter diversity and admixture of native species play a significant role in restoring degraded land.

**Keywords:** Antagonistic effect, forest types, litter bag, litter mixture, litter quality, non-additive effect, tea bag