



Does plant functional diversity predict litter quality in silvipastoral systems?

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Aboveground litter quality has an important function in enhancing soil quality by transferring organic matter and nutrients to the soil, which in turn may affect nutrient cycling. The C:N ratio is a proxy of litter quality that can be influenced by plant diversity. The objective of this study was to evaluate if plant leaf functional traits of five production systems are predictors of the C:N ratio of litter. The study was carried out at the Canchim farm, Embrapa Pecuária Sudeste, São Carlos, SP in the followings land-use systems: forest; *Urochloa decumbens* pasture; *Urochloa brizantha* pasture; silvipastoral system with eucalyptus; and silvipastoral system with native trees with seven species of tree and *U. decumbens*. Twenty-six plant leaf traits were evaluated, and through exploratory principal component analysis, ten traits were selected. Functional dispersion (FDis) and community-weighted means (CWM) of each trait were calculated in relation to the abundance of all species occurring in each land-use system using Fdiversity software: specific leaf area (CWM.SLAF, cm² g⁻¹), total specific leaf area (CWM.SLAT, cm² g⁻¹), lignin (LIG, %), potassium (K, g kg⁻¹), magnesium (CWM.Mg, mg kg⁻¹), dry matter (CWM.DM, %), shear force (CWM.FC.M, N), mean dry matter (CWM.M.MS, %), mean height (CWM.ALT, cm). A multiple regression model was obtained with the Stepwise procedure in R program with an R² adjustment of 0.94. The traits significantly associated with C:N ratio were FDis, CWM.SLAF, CWM.SLAT, CWM.ALT, CWM.CF.M, CWM.K and CWM.MS.M. The C:N ration of litter had positive association with FDis, CWM.SLAT and CWM.ALT. FDis based on relevant traits showed the importance of diversity on litter quality. Therefore, selecting plants based on functional traits with beneficial effects, weighted by abundance in the arrangements, can contribute to the planning of sustainable production systems that optimize desirable stoichiometries as C:N ratio of the litter.

Keywords: functional traits, stoichiometries, sustainability, environmental services.