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Latitudinal Gradient in Woody Species-richness in Western Burkina Faso

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Abstract

Understanding plant species distribution patterns and the underlying factors is a crucial step for the conservation and management of plant communities in the savannah-woodland ecosystem. Anthropogenic disturbances (agriculture, livestock, fire, wood cutting) and environment heterogeneity (climate, soil) have a positive or negative effect on woodland dynamic, species richness and diversity. Latitudinal gradient of diversity are ultimately dependent on the historical, geographic, biotic, abiotic and stochastic forces affecting the geometry, internal structure, and location of species ranges in ecological or evolutionary time. Latitudinal is not ecologically meaningful, but correlates with variation in ecologically meaningful variables such as climate, area and soil. The primary explanatory variables for latitudinal gradient are likely to vary continuously from the low latitude to the high one mirroring the special variation in species richness.

We describe the species composition, structure and diversity of woody species at four sites along a latitudinal gradient: North Sahelian sector, South Sahelian sector, North Sudanian and South Sudanian sector in Western Burkina Faso. We did a survey to identify the woody species on 82 sample plots of 50 $\times$ 20 m^2. Density, dominance, frequency, and species and family importance values were computed to characterise the species composition. Some diversity indexes were calculated to examine the heterogeneity of each site and the similarity between sites. Precisely, we calculated, Shannon's diversity index (H'), Simpson's diversity index (D), Simpson's Evenness (E), Jaccard's similarity index and Horns' modification of Morisita's index.

A total of 74 species were found. A low similarity in tree species composition between sites was found, which indicates high beta diversity and reflects differences in habitat conditions, topography and between sites distances. The site-specific difference accentuates the importance of landscape-scale approaches to understand species distributional pattern, composition, structure and diversity as well as to undertake restoration and conservation measures which promote total basal area and diversity in these ecosystems.

Keywords: Biodiversity, Conservation, Environmental relation, Fragmented landscape, Sahelian zone, Species richness, Sudanian zone

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