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O64-03 – S64 *Towards an unified vision of the central african forests*

Thursday 23 June / 08:00-10:00 – Antigone3

Patterns of tree species composition across tropical African forests and within central African moist forests: the need for adapted management and conservation strategies

SYLVIE GOURLET-FLEURY¹, ADELINE FAYOLLE², JEAN-LOUIS DOUCET², MICHAEL D. SWAINE³,

¹CIRAD - Department : BSEF, F 34398 Montpellier - France

²Gembloux Agro-Bio Tech, Université de Liège Foresterie tropicale, Gestion des Ressources Forestières BIOSE Department 5030 Gembloux - Belgique

³University of Aberdeen Department : Institute of Biological and Environmental Sciences Aberdeen - United Kingdom

Background: Differences in the distribution of biota across Africa have been described for well over 100 years. There is however little information on the forest types at a regional scale. In this study we aimed to identify large-scale variation in tree species composition across tropical Africa, and within central Africa, to detail the structure and functioning of moist forests.

Methods: Distribution data were gathered for 1175 tree species in 455 samples from the literature scattered across tropical Africa, from Senegal to Mozambique, and including all types of tropical forests. The value of elevation and 19 climatic variables (BIOCLIM) were assigned to each sample. Management forest inventory data were assembled for 49,711 0.5-ha plots across central Africa, covering an area of more than six million hectares. Using ordinations, we determined the variations in species composition across tropical African forests and for central African moist forests we used both genus composition and forest structure. We defined floristic clusters and identified the characteristic species/genera at both levels of resolution. **Results:** We found floristic evidence for three main biogeographic regions across the tropical African forests, and described six floristic clusters with particular environmental conditions within these regions: Coastal and Upland for East Africa, Dry and Wet-Moist for West Africa, and Moist and Wet for Central Africa. Within the central African moist forests, we identified 7 forest types based on genus composition and forest structure. Most of these forests were composed of a mosaic of the structural derivatives of the Celtis (Ulmaceae) forest. Secondary Musanga (Moraceae) forest was located along roads and around main cities; mixed Manilkara (Sapotaceae) forest covers a huge area in the Sangha River Interval; and monodominant Gilbertiodendron (Fabaceae) forest was sparsely distributed along rivers.

Conclusions: The forest types identified across tropical African forests and within central African moist forests call for adapted management and conservation strategies. Specifically, the old-growth secondary Celtis forests that cover huge areas in central Africa should be managed for future timber productions, possibly complemented by artificial regeneration while the very specific and low productive Manilkara forests should be carefully managed with lower intensity practices.

O64-04 – S64 *Towards an unified vision of the central african forests*

Thursday 23 June / 08:00-10:00 – Antigone3

Complementarity of environmental factors explain spatial floristic variations in mixed lowland rainforest of Cameroon

MOSES LIBALAH¹, VINCENT DROISSART², NICOLAS BARBIER², BONAVENTURE SONKÉ¹, DONATIEN ZEBAZE¹, GILLES DAUBY³, GISLAIN MOFACK¹, NARCISSE KAMDEM¹, NICOLAS TEXIER³, PIERRE PLOTON³, RAPHAEL PÉLISSIER², STÉPHANE MOMO¹, PIERRE COUTERON²

¹Laboratory of Plant Systematics and Ecology, Biology, Higher Teachers' Training College, 00237, Yaounde, Cameroon

²Institut de Recherche pour le Développement (IRD), Unité Mixte de Recherche AMAP, 34398, Montpellier cedex 5, France

³Herbarium et Bibliothèque de Botanique Africaine, Université Libre de Bruxelles, 1050, Bruxelles, Belgium

Background. Analyzing floristic composition is important to understand species diversity and its response to varying environmental factors. As such, focus of previous papers has been on selected species or local scales. We assessed the explanatory power of environmental factors on species distribution in central African rainforest. We aimed to determine floristic gradients and question the extent to which soil and/or climate could explain these gradients.

Method. We sampled 61 1-ha plots (407 species, 28,944 individuals with diameter at breast height above 10 cm) distributed over six sites in evergreen to semi-deciduous forests on about 100,000 km² area. Bioclimatic variables (temperature, precipitation) were extracted from newly improved remote sensing datasets and assigned to each plot. On a subset of 28 plots, 14 soil chemical and physical properties were also analyzed. We determined variation in species composition by correspondence analysis (CA) that emphasizes scarce species and non-symmetric correspondence analysis (NSCA) that emphasizes abundant species. In order to link floristic gradients to soil/or climate, we apportioned the total floristic variances with respect to the environmental factors.

Result. Floristic gradient was depicted by scarce species (*Funtumia africana*, *Baphia leptobotrys*) and observed a north-south shift concomitant with a prominent precipitation gradient on axis I (66.8% variance). The response of abundant species (*Greenwayodendron suaveolens*, *Tabernaemontana crassa*) was evident only at the third axis (16.6% variance) but poorly correlated with soil and climate gradients. Independently, soil explained more total variance (CA; 55.5% & NSCA; 56.2%) than climate (CA; 29.9% & NSCA; 34.3%). A residual analysis showed that soil and climate were non-redundant in predicting floristic variations. Both factors explained as much as 75.9% of floristic variation while this proportion sharply dropped when either the effect of soil or climate was factored out. While climate (precipitation intensity) discriminated forest sites (i.e. large spatial scale), soil properties (texture) differentiate plots (i.e. local spatial scale).

Conclusion. Our study highlights the influence of soil and climate in regulating floristic variation in central African rainforests. It emphasizes on the importance of accounting for both scarce and abundant species and recommends that non-environmental factors be considered to capture variation in abundant species.