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Reconciliating Conservation and Sustainable Use of Biodiversity

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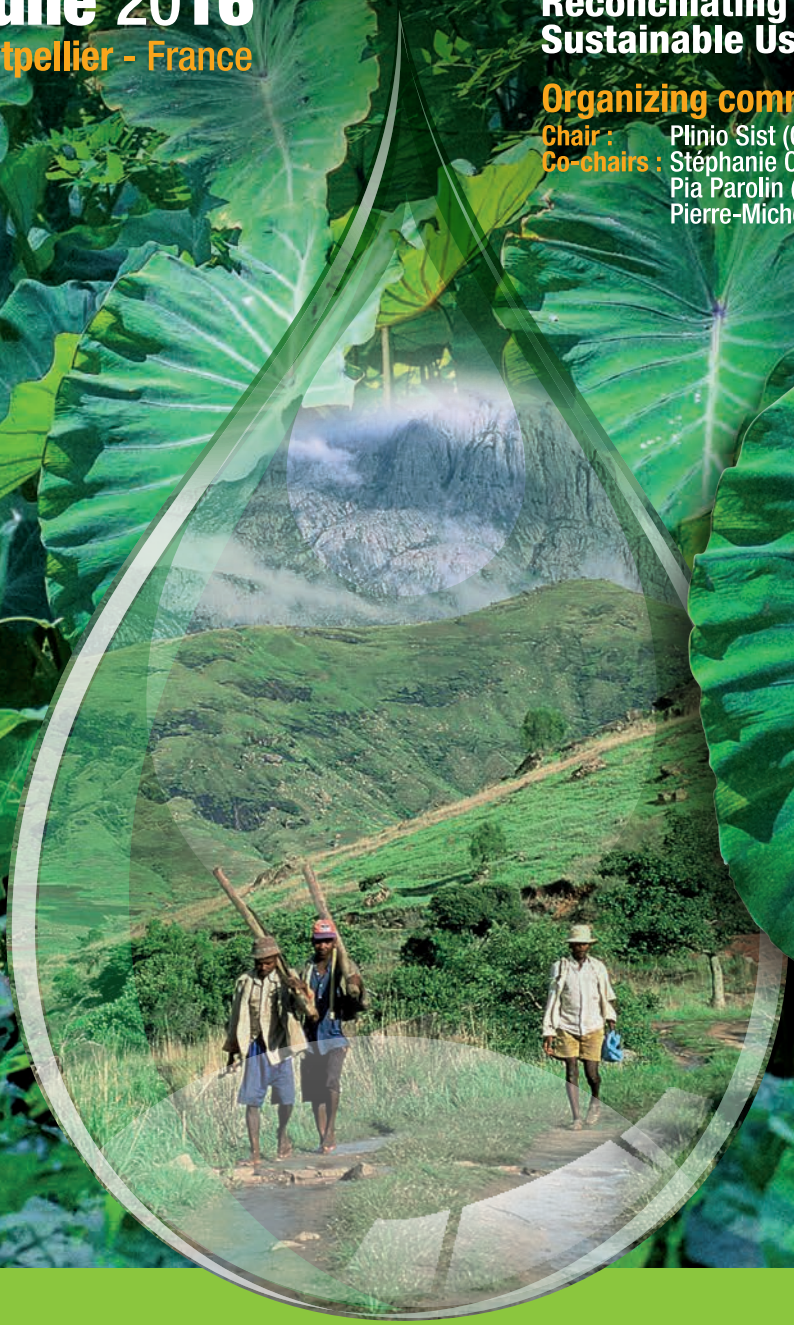

PROGRAM & ABSTRACTS

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P45-03 – S45 *Biodiversity patterns and processes along altitudinal gradients in tropical forests*
17:30 – 18:30 – Joffre Area (Level 1)

Are the floristic composition of montane forest changing within their woody layers? A study in the Kahuzi-Biega National Park (Democratic Republic of the Congo)

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The comparison between overstorey and understorey (woody layers) composition had been investigated in many studies without taking into account the altitude. Therefore, the impact of altitude on the variation of the floristic composition of the understorey vs overstorey remains poorly understood. We postulate here that the rate of overstorey species present in the understorey tends to increase with the altitude. The objective is to assess the dynamic trends of a forest in a case of altitude variation.
To investigate the variation of the floristic composition of the understorey and the overstorey of montane forests, we inventoried the highland forests (1800 to 3315m asl) of the Kahuzi-Biega National Park in the Democratic Republic of the Congo. Trees greater than 10 cm of diameter at breast height (dbh) were numbered and identified in 10 x 1ha plots (overstorey), in each of which we nested a 0.1ha (understorey, woody plant with dbh<10cm). We measured the altitude for each plot. Fisher alpha and rarefaction r were calculated. For each couple of plot, we calculated the percent of overstorey species which are present in the understorey to see if the overstorey species are well represented in the understorey.
In the two layers alpha and r decrease when the altitude increases. The overstorey species are well represented in the understorey varying from 47.37% to 76.92% and tend to increase with the altitude (coefficient of correlation = 0.34, p=0.34). At least, 23.08% of the overstorey species are absent in the understorey. Differently from the rate of overstorey species present in the understorey, some of the most abundant species in the overstorey are present but rare in the understorey albeit the most common species in the understorey are those which will likely incorporate later on the overstorey. This means that these species don't meet suitable conditions to regenerate or seldom regenerate beneath themselves. We found a likely future change in the floristic composition of the overstorey in these forests.
As already found in other studies, woody plant diversity decreases with increasing altitude. We found also that floristic elements of the understory that will likely integrate the canopy are often different from that of the current overstorey. This suggests future changes in the floristic composition of these montane forests if there are no major disturbance in the forest or if the mortality rate will not be greater among the abundant understorey species.

P45-04 – S45 *Biodiversity patterns and processes along altitudinal gradients in tropical forests*
17:30 – 18:30 – Joffre Area (Level 1)

Biodiversity patterns of butterflies and moths (Lepidoptera) communities along a complete Afrotropical forest gradient

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Background: Altitudinal gradients, as important models for explaining biodiversity changes with various environmental conditions, have been recently studied in many places around the world. However, in contrast with others tropical regions, Afrotropical rainforests still offer a substantial lack of comprehensive data. The highest mountain in West/Central Africa, Mt. Cameroon (4095 m a.s.l.), offers the only complete tropical forest gradient from seashore to timberline in the whole continent, as well as an important hotspot of biodiversity and endemism. Here, we present the first results of our intensive research of both butterfflies and moths along the complete altitudinal gradient of Mount Cameroon.
Method: We have been sampling butterflies and moths at 7 elevations equally covering the complete forest gradient. Focusing on both nocturnal and diurnal communities of Lepidoptera, we have applied two main methodological approaches. Fruit-feeding butterflies and moths were captured by 80 traps baited by fermented bananas per elevation covering both understorey and canopy layers (as much as we know, the most intensive bait-trapping worldwide, especially for moths). Simultaneously, we have sampled moths by standardized active light collecting. In the last three years, our sampling covered dry season, as well as both transition seasons.
Result: So far, more than 35,000 specimens were collected and are under process. The species richness of majority of the already processed groups is firstly growing with the altitude with a peak of diversity at about 300-700 m a.s.l. with a continuous decrease in higher elevations. Simultaneously, a high species turnover among the elevations was detected. On the other hand, both these patterns vary among the seasons.
Discussions: We bring the first study of a complete altitudinal gradient in the Afrotropical forests, together with the most intensive standardised bait trapping along an altitudinal gradient. Both altitude and seasonality show important effects on biodiversity patterns of butterflies and moths. Including of often avoided lowest elevations revealed interesting patterns of low biodiversity not observed in many other studies. Although we have detected an interesting shift of the biodiversity patterns with the seasons, the low species numbers at the lowest elevations are consistent.