



# 4th World Congress on Agroforestry

20-22 May 2019  
Montpellier, France

## Book of Abstracts



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## Shade tree species with Ca-enriched litter improve cocoa agroforest functions in Central Cameroon

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Associating shade trees to cocoa plantations supply many services to farmers, yet their contrasting impacts on soil fertility in relation to their traits remains little understood (Blaser et al., 2017). In 2017, 6 cocoa shading modalities of cocoa were studied across 8 farmers' plots (Bokito district, Cameroon): unshaded, shaded with *Canarium schweinfurthii*, *Dacryoides edulis*, *Milicia excelsa*, *Ceiba pentandra* and *Albizia adianthifolia*. For each shading modality, we analyzed the plant association community values of: litterfall; N and P resorption efficiency; litter C, macronutrients and tannins content; Van Soest fractions and litter pH. We measured soil C, N,  $\text{NO}_3^-$ ,  $\text{NH}_4^+$ , Olsen P, pH, bioassay and cocoa yield.

Shade tree – cocoa association increased total litterfall for all the species without impacting on cocoa yield. Further, litter N was higher with *Albizia*, while litter P and Ca were higher with *Milicia* and *Ceiba* and litter pH was lower with *Canarium* and *Dacryodes*. Soil properties were not impacted by *Canarium* and *Dacryodes*, while *Albizia*, *Milicia* and *Ceiba* increased soil inorganic N and P content and bioassays (Fig 1). Finally, soil pH and total C and N content increased under *Milicia* and *Ceiba*, leading to the highest increase in soil fertility. Multiple regression models suggested a critical role of litter Ca to improve soil fertility in such systems. Using shade trees like *Milicia* or *Ceiba* with high Ca cycling should thus be advised to farmers to improve their system.

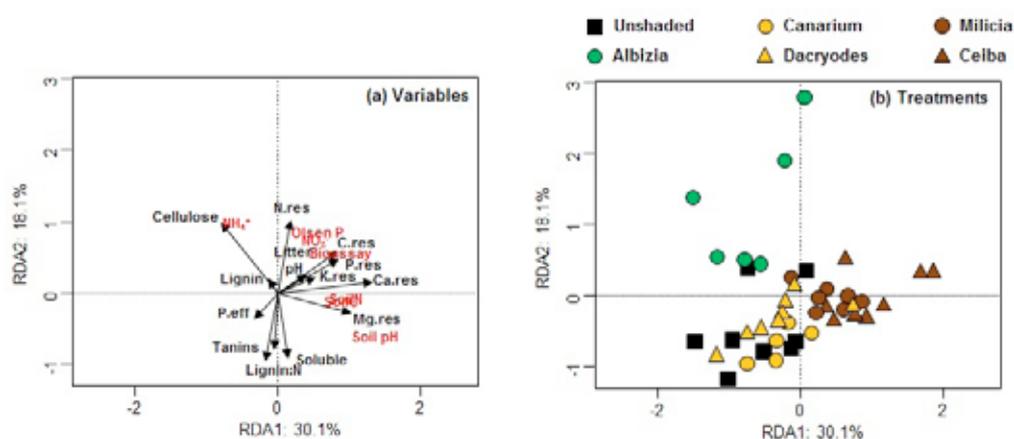


Fig. 1. Redundancy analysis correlation circle (a) and individual factor map (b) of agrosystem functions (in red) constrained by cocoa - shade tree association characteristics (in black). P res. eff: P resorption efficiency; %N, P, K, Ca, Mg: community litter N, P, K, Ca, Mg content.

**Keywords:** cocoa, shade type, plant traits, soil fertility, agrosystem functions.

References:

1. Blaser et al., 2017, Agric Ecosyst Environ, 83-91