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SOUTENANCE:

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ABSTRACT

Even if several studies exist on the flora and vegetation in Africa, several woody species remain little or partially studied. However, most of these species are of high socioeconomic importance and there is a high relationship between their derived products and their uses by local communities. The Republic of Benin has three biogeographical zones, each characterized by specific climatic conditions. This study is a contribution to the sustainable management of woody plant species populations in Benin. It combines different approaches: ethnobotanical surveys, prioritization methods, ecology, geographical information system and germination trials to (i) assess the biodiversity, ethnobotanical knowledge and factors supporting the choice of woody species, (ii) identify priority timber species needing urgent conservation strategies, (iii) assess effects of habitat disturbance and environmental variables on the keystone woody species *Pterocarpus erinaceus* populations, (iv) identify factors affecting seeds germination and seedlings growth of *P. erinaceus* for ecosystem restoration and (v) evaluate the effect of soil types and age plantation on *Khaya senegalensis* (another keystone woody species) growth in plantations to sustain reforestation actions. Logging remains an income generating activity for rural development and for the improvement of living conditions. Findings showed that thirty three woody species were currently logged for diverse purposes (timber, firewood, charcoal, etc.) in Benin. The Sudano-Guinean zone appears to hold the highest species-richness (27) in terms of logged trees species. Local populations perceived *Isobertinia doka*, *Isobertinia tomentosa* and *Daniellia oliveri* as most abundant woody species while *Milicia excelsa*, *K. senegalensis* and *P. erinaceus* as rare. Ten species were selected as priority for conservation out of which the top five were *K. senegalensis*, *Khaya grandifoliola*, *Azelia africana*, *Milicia excelsa*, and *P. erinaceus*. Active conservation of these species requires allocating more effort for developing silvicultural packages. Regarding factors affecting germination and seedling growth, the highest germination rate was recorded for seeds from the Sudanian zone, up to 45% on day 39 after sowing. Seedlings attacks were found with no significant interaction with provenances and pre-treatments. The effect of habitat disturbance and environmental variables on *P. erinaceus* stands shows that, structural parameters differed significantly ($p < 0.05$) across the three biogeographical zones. It was found that the species regeneration were higher in savannah than in the forest while large individuals were rare. The scarcity of large individuals in all vegetation type comes from the overexploitation of the species for its highly prized timber for the local and international market. Large occurrence of large class distribution was found in Pendjari Biosphere Reserve, suggesting suitable place for seed collection for reforestation purposes. Moreover, many environmental variables could be used to predict dendrometric parameters of *P. erinaceus*. Silvicultural management of native timber species is required for long term productivity of native species plantations. Even if vertisol shows better growth rate of *K. senegalensis* in pure plantation, demand for agriculture can negatively impact its long term conservation. Implications of the study for conservation and management were discussed and future research avenues were suggested.

Keywords: Local knowledge, threatened plants, germination, ecology, anthropogenic pressure, conservation.

CURRENT PUBLICATIONS FROM THE DOCTORAL RESEARCH:

- **Akpona et al. 2017 (In press).** Inventory and prioritization of commercial timber species for conservation in Benin: A multicriteria approach. *Bois et Forêts des Tropiques* 333.
- **Akpona et al. 2017.** Factors affecting *Pterocarpus erinaceus* Poir. Seed germination and seedlings growth in the Republic of Benin. *Annales des sciences agronomiques* 21(2): 153-167.
- **Akpona et al. 2016.** History, impact of soil types on stand structure and growth of the Dry zone mahogany (*Khaya senegalensis* (Desr.) A.Juss.) in plantation in Benin (West Africa). *Environment and Ecology Research* 4(4): 193-199.