

# AFZELIA POPULATIONS, A POORLY KNOWN TIMBER TREE SPECIES COMPLEX FROM AFRICAN TROPICAL FORESTS

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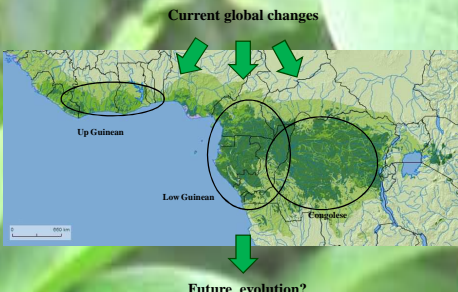
## Context

> Dense Humid Tropical Forests (DHTF) represent the most diverse terrestrial ecosystems on the planet (Doucet, 2005). Despite the important services they provide, Central African DHTF regress in a context of global change (Carnaval & Moritz, 2008) ;

>The *Afzelia* genus (fig.1) is a good model to test various hypotheses concerning the impacts of past climate changes (speciation in forest refuges) and current anthropogenic impacts in order to assess future dynamics of such biological types.



Role of DHTF fragmentation in speciation ?



## Afzelia models

> Distinctive morphological traits used to distinguish species of the genus *Afzelia* are seldom useful: only a few reproductive characteristics can be used to identify rigorously these taxa (fig.2 & 3.);

> The spatial range of *Afzelia* in Africa (fig.4) suggest influences of various mechanisms, including ecological gradients and paleoclimatic effects which may have resulted in incomplete lineage sorting among species of this widespread and long lived tree genus.

**Globally, the genus (particularly rainforest taxa) remains understudied in Africa although some of its species are considered as endangered or vulnerable and are highly logged in Central Africa.**



Fig.2. Flowers of savana and rainforest *Afzelia*

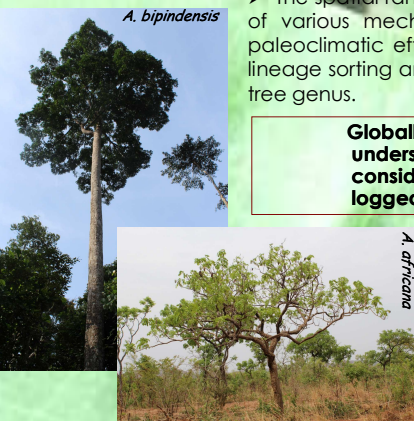


Fig.1. Trunk and crown of rainforest and savana *Afzelia*

Thus our PhD projects focuses on the genus *Afzelia* and aims to disentangle species boundaries, assuming the existence of 7 species: *Afzelia africana* Sm, ex Pers, *Afzelia bella* Harms, *Afzelia bipindensis* Harms, *Afzelia pachyloba* Harms, *Afzelia parviflora* (Vahl) Hepper, *Afzelia peturei* De Wild and *Afzelia quanzensis* Welw.

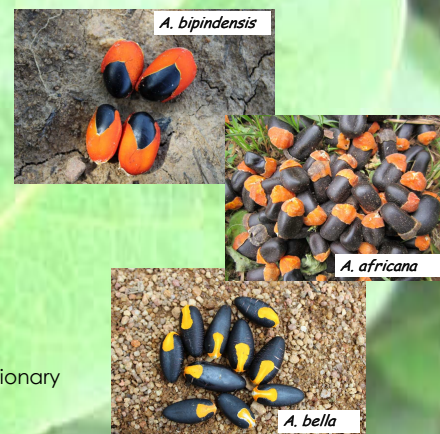


Fig.3. Seeds of three species of *Afzelia*

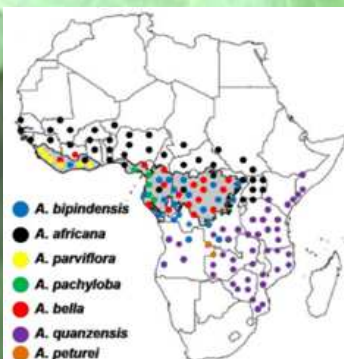


Fig.4. Natural range of the seven African species of the genus *Afzelia* (map adapted from the database of the Conservatory Botanical Gardens of Geneva (CJBG), accessed 06/11 / 2012, and White, 1986)

## Objective

> The main objective of this project is to characterize the evolutionary history of the genus *Afzelia* by morpho-genetic and ecological studies.

## Methodology

- > Sampling at large (West & Central Africa) and local populations of East-Cameroon scales. 600 *Afzelia* samples are already collected ;
- > nSSR molecular markers development. Twenty markers have already been identified and we are polymorphism assessment is currently in progress ;
- > Phylogenetic relationships of the species will be made through sequencing of chloroplast molecular markers ;
- > 135 *Afzelia* individuals are monitored each month in permanent plots for phenology characterization in eastern Cameroon (fig.5). This study may provide insights for explaining reproductive isolation patterns obtained from genetic analysis ;
- > Fine spatial scale genetic structure of *Afzelia* populations will be inferred for estimating gene dispersal (pollen and seeds) and describing mating system ;
- > The phylogeography of *Afzelia* populations will be characterized over the distribution range of each species.

## Conclusion :

A revision of its **taxonomy** (interspecific and intraspecific) along with through investigations of **ecological** and **genetic** aspects of *Afzelia* populations, should be relevant and of great interest for conservation and sustainable management purposes



Fig.5. Study of phenology of *A. bipindensis*

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