Assessment of fine scale population genetic diversity and regeneration in Congo basin logged forests

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There is a clear lack of knowledge on the reproductive biology and the mechanisms of regeneration of the Congo Basin timber species, whereas sustainable management and certification policies require such informations. In this ongoing research, we integrate ecological and genetic approaches to characterize the reproductive and regeneration patterns of a set of priority timber species: *Afzelia bipindensis, Baillonella toxisperma, Entandrophragma angolense, E. candollei, E. cylindricum, E. utile, Erythrophleum suaveolens, Milicia excelsa, Pericopsis elata* and *Terminalia superba*.

Methods

Isolation gradient. On the basis of tree inventory made by the FSC-labelled company Pallisco, we selected 3 zones where the target species vary in abundance.

Direct approach. We established two 400-ha plots where all adults and seedlings of the target species were mapped and genetically sampled . Lots of seeds also were collected from a subsample of mother trees.

Indirect approach. We collected samples of leaf or cambium from 62 adults of *M. excelsa* within a 10 km-radius area and collected seeds produced by each female tree to assess seed germination rate

Dispersal agents were identified by direct observations and camera traps underneath *P. elata* and *M. excelsa* adult trees (Results for these latest species in Table 1). **Seedrain** was obtained by installing quadrats underneath the parent trees.
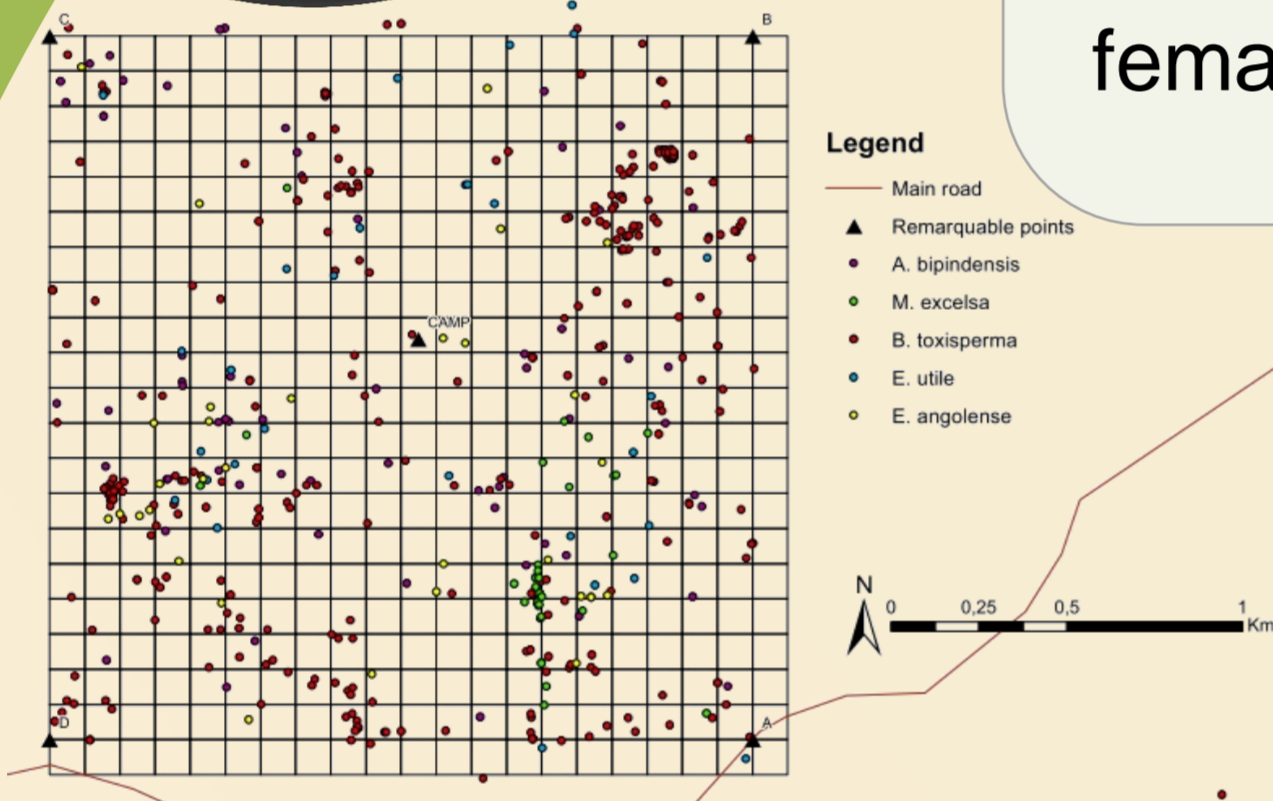

Fig. 1. One 400 ha plot with focal trees mapped (349 *B. toxisperma*, 66 *A. bipindensis*, 49 *M. excelsa*, 32 *E. utile*, 31 *E. angolense*)
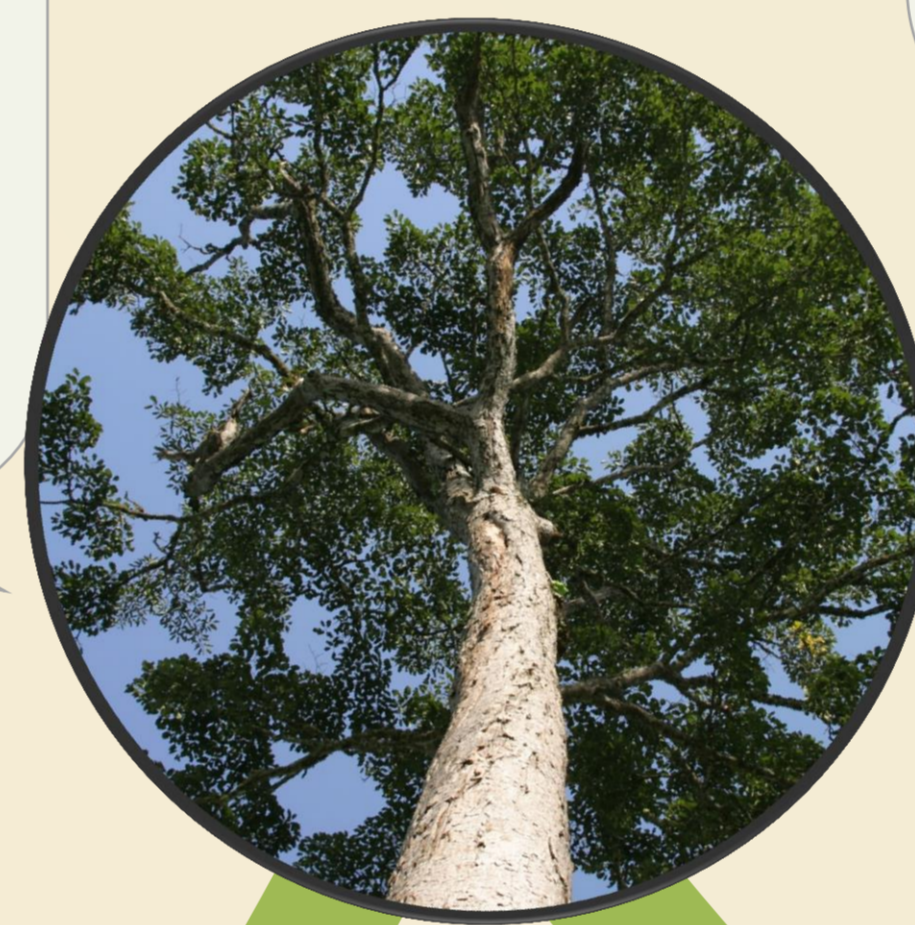
Preliminary results

Table 1. Relative contribution of the main consumer of *M. excelsa* fruits.

Detected animal	Relative contribution (%)
Cricetomys emini	31
Undetermined *Muridae*	38
Epixerus wilsoni	13
Others	18

Seed **germination** rate was characterized in nursery for *P. elata* (see picture for seedlings) trees sampled on a gradient of spatial isolation, and for 10 *M. excelsa* female trees.

Table 2. First main results from the germination test and the seeds categories for *P. elata* seeds.

Density of adults	Seed germination rate (%)	Cause death (%)			
		Larvae	Rotten	Aborted	Gnawed
High	55.18	40.88	34.16	22.27	2.71
Intermediate	68.69	25.41	29.31	25.41	19.87

Genetics. Samples are currently being genotyped using specific nuclear microsatellites (Fig. 2).

Final goal: Characterization of **pollen and seed dispersal distances and agents** and **mating system** for each focal species.

The data acquired in this ongoing project will **strengthen the application of sustainable forest management and certification practices** by adjusting harvesting norms through the use of scientifically-relevant data. In particular, we will tentatively **define a maximum distance to be maintained between two adults** to allow a qualitative reproduction (limiting inbreeding).

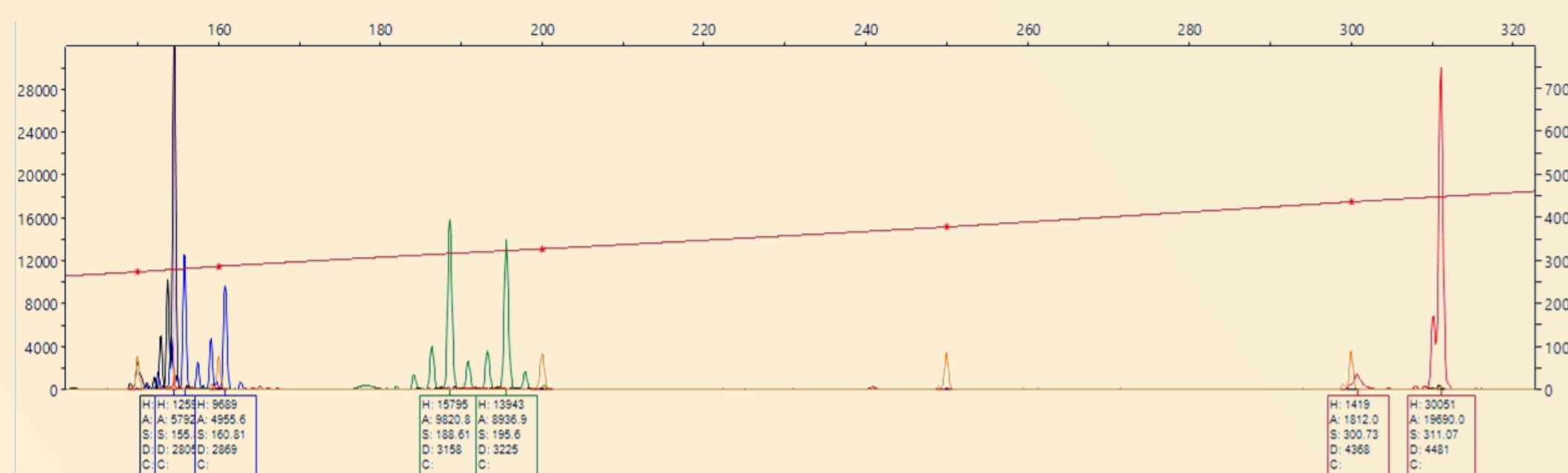**Fig. 2.** An example of alleles reading graph produced by the software Peak Scanner for a sample of *B. toxisperma*.

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