From the herbarium back to the forest: a successful collection of wild Robusta coffee *(Coffea canephora)* in Guinea

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RATIONALE

Coffea canephora Pierre can be classified in two genetic groups: the Guinean group originating in West Africa and the Congolese group that stretches over a vast area from Atlantic Central Africa to Uganda. A recent genotyping study on old herbarium specimens showed that wild coffee of the Guinean group can be assigned to five sub-groups (sgG1 to sgG5) with distinct geographic distribution (Labouisse et al. 2020). We focused on the sub-group sgG1, which is represented by one population described by Chevalier (1905) as *C. canephora* var. maclaudii. Located in a forest island on the slope of the Bilima Hénéré plateau near Mamou, Guinea, this population is considered vulnerable and a priority target for conservation.

METHODS

The partners of FOGEFO-PLUS, a project of the SEP-2D programme (<u>http://sep2d.org</u>), undertook an inventory of the forest vegetation and a survey on the uses and products of the forest. Leaves were taken from 53 coffee trees and their DNA extracted. For comparison, we used DNA of herbarium specimens of the Guinean group collected between 1905 and 1993, as well as a few samples of the Congolese group. In total, we genotyped 83 coffee samples with 21 nuclear microsatellite markers. A representation of the structure of genetic diversity was obtained by a factorial analysis (PCoA), while genetic relationships between individuals were assessed using NJ method.

RESULTS

The Bilima Hénéré forest has a tree layer composed, inter alia, of *Piptadeniastrum africanum* and *Parkia bicolor*, and a shrub layer of *Maesobotrya barteri* and *C. canephora*. Neighboring villagers gather forest plants for food, pharmacopeia, and handicrafts making. The average density of coffee trees per ha (with $\emptyset > 5$ cm) is 177, and some of them can reach more than 10 m in height. Genotyping data analyses showed that all the coffee samples taken from the forest have close relationship with the herbarium samples collected from the same place as early as 1905. Within the Guinean group, the sub-group of *C. canephora* var. maclaudii is characterized by a low level of admixture with other sub-groups due to its geographical isolation and distance from the main areas of coffee cultivation.

CONCLUSIONS & PERSPECTIVES

Located in the forest-savannah transition zone, the forest in vulnerable to drought, fire, and crop extension. Coffee seeds and cuttings were collected and transferred to the gene bank of IRAG Sérédou Research Center for *ex situ* conservation and potential use in a future breeding programme. This should be complemented by measures for *in situ* conservation with the participation of people of neighboring villages to set up sustainable management of the forest resources.

References:

- Chevalier, 1905, Cr Hebd Acad Sci, 1472-1475
- Labouisse et al., 2020, Plant Ecol Evol, DOI: 10.5091/plecevo.2020.1584