

## PB227

### Contribution of *Coffea arabica* Genetic Resources to the Adaptation of Coffee to Abiotic Stress. F1 Hybrids in Brazil, Cameroon and French Guiana. First Results.

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**Rationale:** Even though it is relatively narrow, the use of the genetic diversity of *Coffea arabica* is a source of high genetic gains in improving coffee varieties for adaptation and coffee quality. First, we evaluated Ethiopian wild accessions and coffee varieties for their diversity, for their adaptation to diverse conditions, namely Cerrados and Northern Parana in Brazil, French Guiana, and Cameroon. Special attention was given to drought tolerance in Brazil. We crossed a selection of progenitors with local cultivars. The oldest hybrid progenies are now two years old, in Brazilian Cerrados.

**Methods:** To evaluate wild accessions and varieties we first used data obtained from collections established in the 1970ies both in Cameroon and in Parana. From 2010 to 2012, we established a selection of accessions in a set of trials in Brazil, Cameroon, and French Guiana. We chose plants from seven accessions and crossed them with various cultivars from 2013 onwards. We then planted factorial hybrid trials in CPAC (Brazilian Cerrados), IAPAR (Parana), IRAD (Cameroon), and Cirad (French Guyana). The first trial (CPAC, 2014) has a tree-by-tree randomized design with 6 blocks. This paper presents early results from this trial. It gives insights of relations between descendants and progenitors for growth parameters (stem diameter, height) and general response to long dry spells.

**Results:** Most mortality (23%) occurred during the first six months (rainy season). In the following dry season, mortality was very low, with progenies from one Ethiopian parent having 2% mortality, and no difference between male cultivars parents. The male parents had no influence on the increase in stem diameter in the dry season, whereas it had some influence on growth (height). The variation between female Ethiopian was higher; for stem diameter, genitors from the West of the Rift Valley performed generally better than genitors from the East. Finally, hybrids observed showed a great variation, as their average stem diameter increase varied from 1.6 to 3.3 mm in the first dry season. Moreover, we observed a large variation in the persistence of leaves at the end of the dry season, and Ethiopian parents were responsible for most of that variation.

**Conclusions & Perspectives:** The above results confirm the interest of *Coffea arabica* genetic resources to improve cultivated varieties in terms of vigor thus possible adaptation to abiotic and biotic stress; maintaining plant compactness is possible based on the use of the quasi-dominant Ct gene of dwarfism. These results have to be confirmed in various conditions whence the interest of our multilocational partnership. Further use of this plant material for breeding may be through vegetative propagation or through backcrosses to commercial varieties.

#### References

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