

## CREATING NEW COFFEE VARIETIES TO COPE WITH CLIMATE CHANGES: CURRENT KNOWLEDGE AND FUTURE CHALLENGES

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### ABSTRACT

Like many other crops, coffee production is threatened by climate changes. Therefore, research on coffee adaptation to abiotic stresses as well as alternative faster breeding programs are priorities in many coffee growing countries. During the last decade, studies have been focused on identifying the physiological, molecular and genetic determinisms of coffee drought-tolerance, mainly on *C. canephora*. By comparing drought-tolerant and -susceptible clones, several candidate genes (like *CcDREB1D*) were highlighted. Recent studies demonstrated that *CcDREB1D* promoter haplotypes differentially regulate the expression of this gene under drought (and other abiotic stresses), mainly in leaf guard cells. In order to predict the adaptedness of *C. canephora* populations to climate change, statistical analyses are in progress to associate SNPs found in such candidate genes with climate parameters. Regarding *C. arabica*, new F1 hybrids resulting from conventional varieties crossed with wild Ethiopia accessions, were recently created. With high vigor and yield, these hybrids were proved to be better adapted to agroforestry (low light) and full-sun (high light) conditions than traditional cultivated varieties\*. Even though the molecular mechanisms of heterosis in these hybrids are largely unknown, preliminary studies suggested higher homeostasis probably linked to a better regulation of genes involved in the circadian clock.

\*BREEDing Coffee for AgroForestry Systems supported by UE H2020-SFS-2016-2 project ([www.breedcafes.eu](http://www.breedcafes.eu))