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### **Identifying the Physiological and Genetic Traits Related to Drought Tolerance Mechanisms in Cassava**

To elucidate the mechanisms underlying drought tolerance in cassava and to determine the best physiological and genetic traits to be selected for in breeding programs, a collaborative work among Embrapa, CIAT, IITA, Cornell University, and African NARIs (National Agricultural Research Institutes) has been going on since 2005, funded by the Generation Challenge Program (GCP). Selected contrasting varieties have been screened and evaluated in four representative semi-arid environments in Brazil, Colombia, Tanzania and Ghana. Several trials have tested some hypotheses to characterize genotypes for drought tolerance traits, including: 1) genotypes that accumulate substantial stem starch reserves may be more able to sustain meristems and other respiring organs during a prolonged stress; 2) genotypes that maintain deep fibrous root growth would perform better in drought; 3) genotypes that maintain partitioning to storage roots and have high harvest index yield better in drought; and 4) genotypes that are more effective in closing stomata might be more able to maintain water status and retain leaves. Contrasting cassava varieties were crossed at CIAT and segregating populations of F1 seeds obtained. The embryos of each seed were rescued and micropropagated *in vitro*. A total of 370 individuals from three populations were cloned and around five *in vitro* copies of each genotype were shipped to the target sites for multiplication and phenotypic evaluation. A genotypic parental screen has revealed 168 polymorphic SSRs in COL1734 x VEN77 and 147 in COL 1468 x BRA 255, from 307 SSRs screened. Genotyping of the mapping populations is underway.