The ADOC project (GCP 2006-02) aimed to characterize allelic diversity at orthologous loci of candidate genes for drought tolerance in seven GCP crops (rice, barley, sorghum, bean, chickpea, cassava and potato), working on reference collections of around 300 accessions for each crop. Six gene families (ERECTA, DREB, SS, SPS, ASR and VIN) were selected as the initial subset of target genes. Except the DREB gene family, for which a specific focus has been given to DREB2A, and the SPS gene family in cereals, for which only the Os01g69030 orthology group was studied, they represent a set of relatively small gene families acting at different levels of the drought stress response (transcriptional regulation, carbohydrate metabolism…) for which a comparative analysis of gene families was undertaken. Obtaining complete gene families was easier in whole sequenced genomes like rice and sorghum. Polyploidy and heterozygosity induced difficulties in analyzing data for cassava and potato; However sequences for a few genes were obtained and analyzed for SNP diversity across all species. Population structure influenced partially haplotype patterns. A large range of haplotype diversity was found and the degrees of this differed between species. Different patterns and range of sequence diversity were found within gene families and between species for orthologous genes. For a few genes, computation of a sequence-based neutrality test suggested selection events acting at the species and/or subgroup level.