

SNP GENOTYPING TO EXPLORE GENETIC DIVERSITY: THE CASE OF MONTENEGRIN DURUM WHEAT LANDRACES

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Landraces of durum wheat (*Triticum turgidum* subsp. *durum*), were the main cereals of Montenegro until the mid-20th century, where they were collectively recognized as Rogosija. After the Second World War, the introduction of high-yielding common wheat cultivars threatened the survival of Rogosija landraces, that were almost extinct in farmers' fields. Starting from 1955, sampling of durum wheat accessions in Montenegrin regions allowed the conservation of a Rogosija durum collection in the Montenegro Plant Gene Bank. This assortment represents an unexplored durum wheat germplasm that can be analyzed for the identification of valuable alleles, useful to increase the wheat crop adaptability to climate change. Aims of this study were: *i*) to estimate the genetic diversity and

population structure of the Rogosija collection using SNP markers; *ii*) to investigate correlation between genetic clusters and the Montenegro eco-geographic conditions. The collection was analyzed with a high-throughput genotyping system based on the 25K Illumina SNP wheat array. A total of 6,915 high-quality SNPs were retained and mapped on the durum genome. Principal components and phylogenetic analyses discriminated two different genetic durum clusters. Analysis of molecular variance revealed that 16% of the total variation was due to differences among the genetic clusters, whereas the remaining variance occurred within clusters. To estimate whether the genetic clusters detected are related to Montenegrin eco-geographic regions, the durum accessions were geo-referenced and evaluated according to ecological data of the collecting sites. Interestingly, one genetic cluster included samples located around Lake Skadar, while the second genetic cluster comprised accession sampled in the Montenegrin littoral coast. This result suggests that the Rogosija durum collection stored in the Montenegro Plant Gene Bank enclosed two Rogosija durum populations, evolved in two different eco-geographic micro-areas.