

Relationships between glutenin alleles and the genetic structure in a core set of Spanish durum wheat landraces

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Genetic variability is the cornerstone of any breeding program. Wheat landraces locally adapted to specific environments provide new alleles that could widen the genetic base of modern wheat cultivars. In durum wheat, pasta quality is determined by the composition of the endosperm storage proteins, glutenins and gliadins. Profiling of these prolamins will facilitate the identification of landraces with favorable quality alleles that might be used in breeding programs.

In this work, we have characterized the glutenin alleles in the Spanish durum wheat core collection created from the 591 accessions conserved at CRF-INIA. Moreover, we have extended this analysis to include an extra set of 97 landraces and 23 reference varieties when analyzing the high molecular weight (HMW) glutenins. Regarding to low molecular weight (LMW) glutenins, we have detected the presence of the *Glu-B3 u* allele, related with enhanced quality, in more than the 25% of the landraces analyzed. Furthermore we have identified new alleles not previously described in other materials. In HMW glutenins, the presence of subunit encoded by the *Glu-A1* locus has been linked with enhanced quality. For this locus, almost all subspecies *dicoccon* and *turgidum*, plus a third of subspecies *durum* accessions presented subunit, while all reference varieties presented the *Null* allele. When we tried to link the variability observed in the glutenins with the genetic diversity of the collections, we failed to identify any clear link with LMW glutenins. However, for HMW glutenins a clear relation between subspecies and alleles frequency was detected. Moreover, accessions with the same alleles were grouped in a Principal Coordinates Analysis based on genetic data. The identification of landraces harboring good quality glutenin alleles coupled with the description of these landraces genetic relations will facilitate the employment of this material in breeding programs.