TEMPORAL TRENDS IN THE DIVERSITY OF DURUM WHEAT VARIETIES GROWN IN SPAIN BASED ON GLIADIN ALLELES

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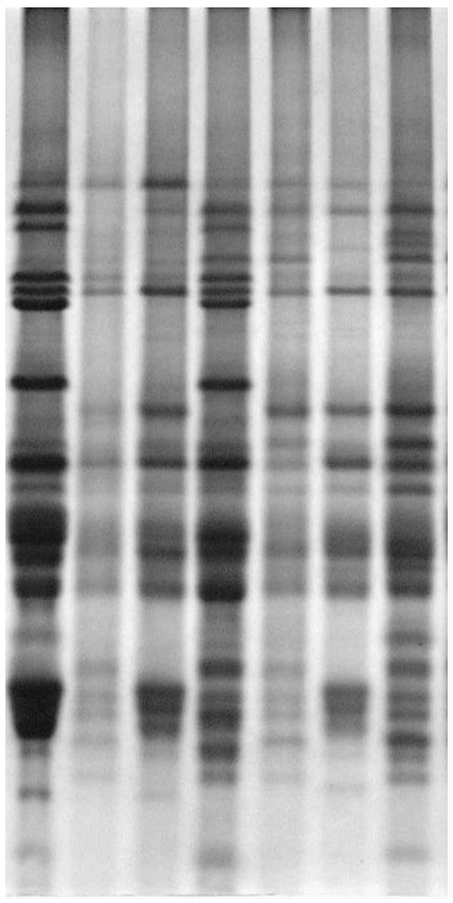

Fig. 1 Gliadin electrophoresis spectra of some Registered varieties in A-PAGE

Gliadin alleles are inherited co- dominantly, they have revealed large levels of inter-varietal polymorphism and identification of a genotype is possible immediately by the electrophoretic protein phenotype. The gliadin loci control the synthesis of a group of proteins named as blocks of gliadins. The main *Gli* loci are located on the chromosomes of the first (*Gli-1*) and sixth (*Gli-2*) homoeologous groups. Alleles at each locus differ in number and electrophoretic mobility of encoded gliadins. This ensures a great diversity of the A-PAGE patterns and, therefore, provides a great possibility to distinguish a high number of wheat genotypes and to describe them in terms of gliadin allele composition (Fig. 1). Comparative analysis of gliadin markers in different groups of wheats (old and new varieties, several samples of a cultivar…) may reveal genetic erosion, different types of selection and loss of genetic identity.

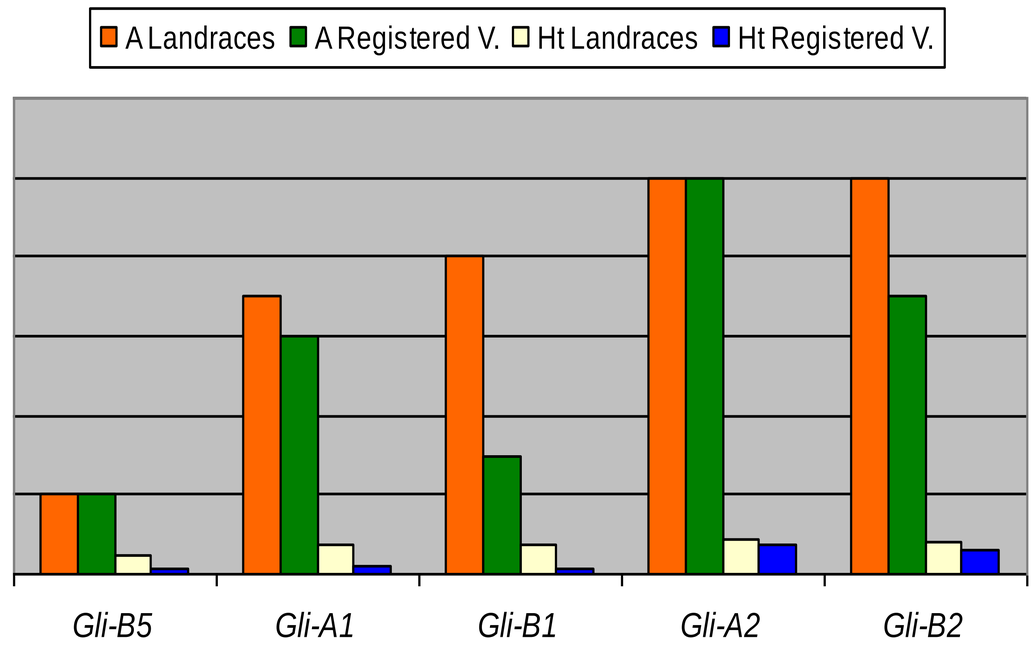

Fig. 2 Number of alleles (A) and total gene diversity (Ht) in the five loci analysed for the Landraces and the Registered varieties

In this work, gliadin analysis has been used to describe the genetic diversity in a sample of durum wheat varieties following the allele catalogue for durum wheat (Fig. 1). The varieties were grouping in Landraces released before 1966 (23 accessions) and Registered varieties after 1980 (111 varieties). A total of 45 alleles were identified at the five gliadin loci *Gli-B5*, *Gli-A1*, *Gli-B1*, *Gli-A2* and *Gli-B2.* In general, the number of alleles identified were higher in Landraces than in the Registered varieties, mainly for the locus *Gli-B1*. The *Gli-A2* and *Gli-B2* loci were the most polymorphic in both groups of materials (Fig. 2).

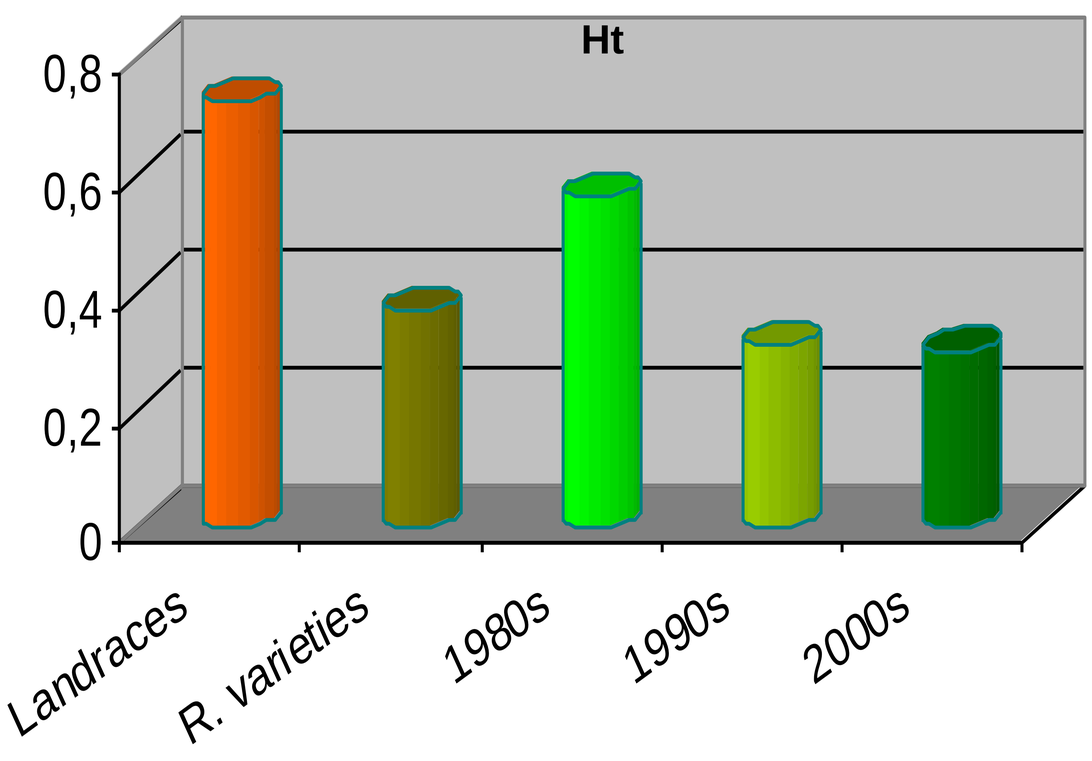

Fig. 3 Total gene diversity (Ht) in the Landraces, the Registered varieties and in the Registered varieties gathered in decadal groups

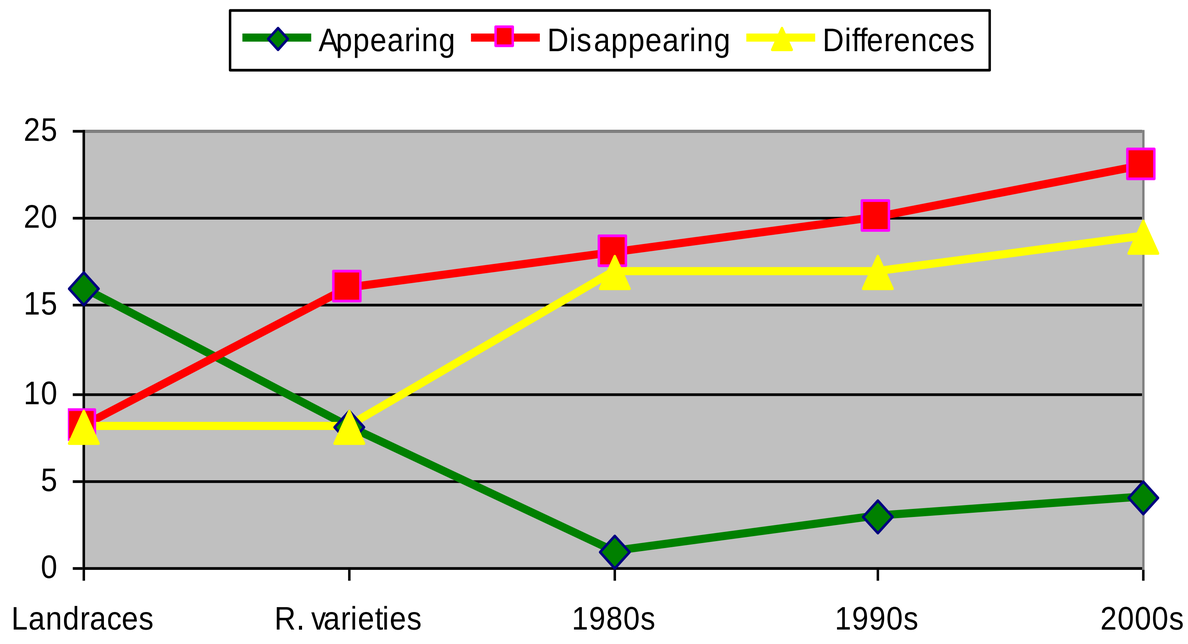

Fig. 5 Number of alleles appearing and disappearing in Registered varieties and decadal groups, compared to Landraces

Comparison of gliadin alleles among Landraces and Registered varieties revealed that genetic diversity has decreased dramatically in Registered varieties (Fig. 3). Significant quantitative and qualitative differences in alleles frequencies were also observed. Registered varieties were gathered in three decadal groups according to their registration date: 1980-1990, 1990-2000 and after 2000. Some rare alleles (frequency < 0.05) were lost in the Registered varieties (Fig. 4) and conversely, some new alleles no present in the Landraces, appeared in the genepool released after 1980 (Fig. 5). Also, some alleles have increased their frequency in the Registered varieties like the *Gli-B1c* (coding for the γ-45) associated with high gluten strength. The results showed that the genetic variability of Registered varieties was higher within decades than among them (Fig. 6).

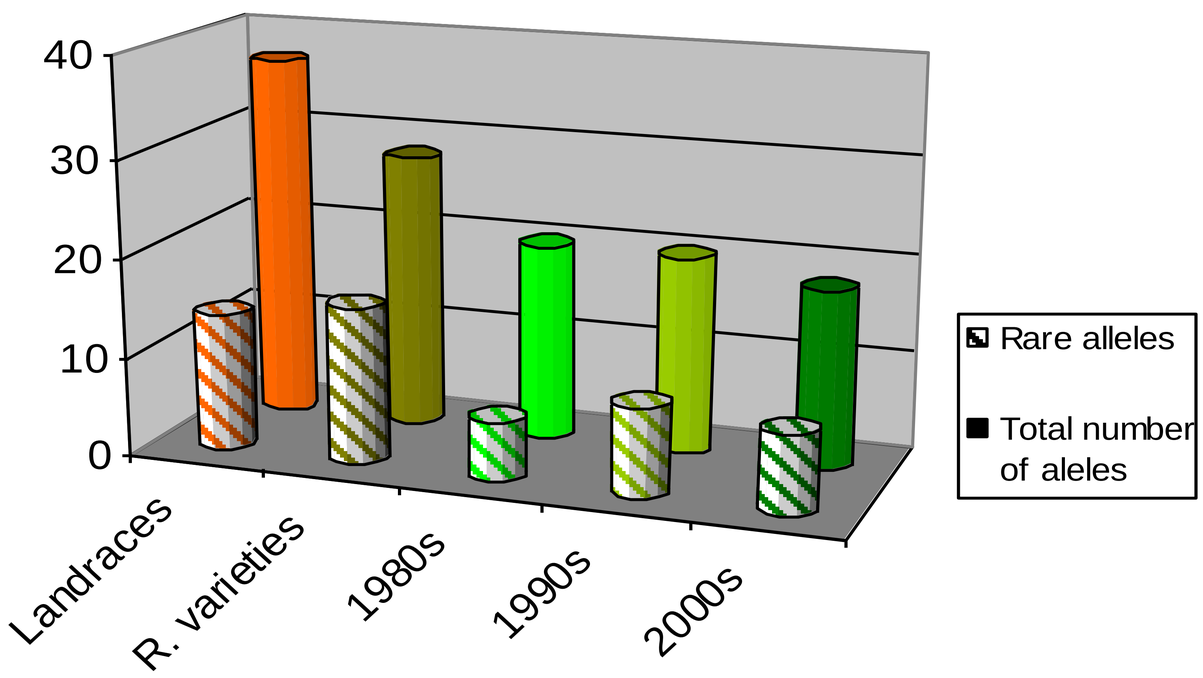

Fig. 4 Differences in allele number between Landraces, Registered varieties and Registered varieties gathered in decadal groups

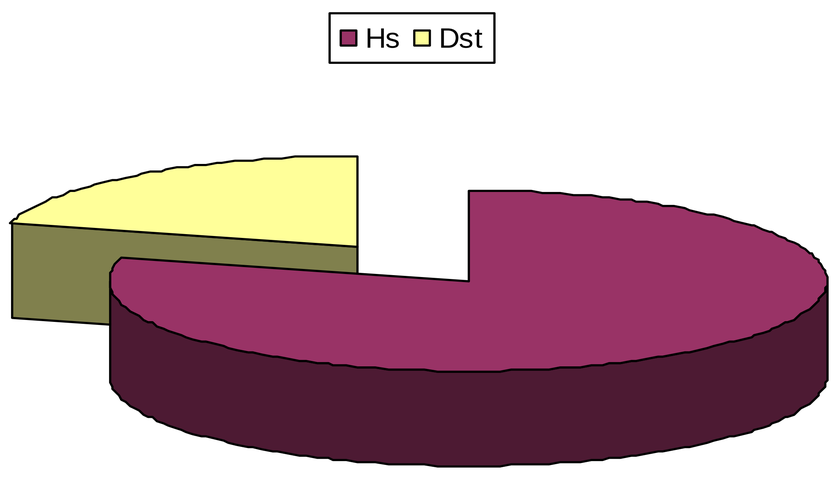

Fig. 6 Average gene diversity within (Hs) and between (Dst) the decadal groups (1980s, 1990s and 2000s) in the Registered varieties