RESEARCH ARTICLE

Analysis of durum wheat germplasm adapted to different climatic conditions

L. Mondini, A. Farina, E. Porceddu & M.A. Pagnotta

Department of Agrobiological and Agrochemistry, University of Tuscia, Viterbo, Italy

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Correspondence

M.A. Pagnotta, Department of Agrobiological and Agrochemistry, University of Tuscia, via S. Camillo De Lellis snc, Viterbo, Italy.
E-mail: pagnotta@unitus.it

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Abstract

A study of the extent and patterns of microsatellite diversity in 234 genotypes from Ethiopian durum wheat (*Triticum turgidum*) landraces was conducted to identify areas of diversity that could be used as a source of new germplasm for developing high yielding and stable varieties. Landraces belonging to nine populations, from three Ethiopian regions [Tigray (T), Gonder (G) and Shewa (S)] with different climates, were analysed by using 28 simple sequence repeat (SSR) markers. The level of polymorphism was high and quite consistent among populations underlining the great diversity existing. The highest level of diversity was found within populations, about 75.9%, while about 5.3% was attributed to differences between regions. The level of expected heterozygosity was on an average, rather high, ranging from 39% to 56%, whereas the observed heterozygosity was, on an average, limited to 14%. An average of about five alleles per locus was detected in each population. Nevertheless, alleles were not equally present in populations as confirmed by the high level of expected heterozygosity. The polymorphism information content (PIC) for the markers assessed showed a wide range of values from 0.14 to 0.92. The likelihood relationships among the nine Ethiopian populations indicated that the material collected in the Gonder region (a wet climate) was genetically more diverse than the materials from Shewa and Tigray (drier climates). The high number of loci in linkage disequilibrium (LD), up to 23, has demonstrated that the loci were associated irrespective of their physical location. This holds true even if the loci are located on different chromosome arms. Genetic diversity values between populations was very different and was used to produce a dendrogram showing population relationships.