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THE ANCIENT MEDITERRANEAN DURUM WHEAT QUALITY QTLOME ASSESSED BY DARTSEQ-SNP MARKERS

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Durum wheat (*Triticum turgidum* L. var. *durum*) was originated in the Fertile Crescent and spread over the Mediterranean Basin developing into local landraces specifically adapted to their growing regions. The wide genetic diversity and the high level of polymorphism in quality genes of landraces can be used as a source of genetic variation for agronomical and quality traits in breeding programs. The aim of this study is the identification of molecular markers linked to quality traits in a set of 161 durum wheat Mediterranean landraces by association mapping (AM).

Experiments were carried out during the 2007, 2008 and 2009 harvesting seasons in north-eastern Spain, under rainfed conditions. Quality analysis were performed for the following traits: grain protein content (GPC; %), gluten strength (GS; ml), yellow colour index (YI) and test weight (TW; kg/hl). Phenotypic data was fitted to a linear mixed model to produce the best linear unbiased predictors (BLUPs). High throughput genotyping was conducted using DArTseq Technology at Diversity Arrays Technology Pty Ltd (Canberra, Australia) and 5212 DArTseq single nucleotide polymorphism (SNPs) were used for mapping purposes. Association mapping (AM) was performed using a Mixed Linear Model and marker trait associations (MTA) were considered significant using a threshold of $-\log_{10}(P) > 3$.

A total of 85 marker trait associations (MTAs) involving 70 SNPs were significant for the 4 traits in the 3 years and across years. Twenty-eight markers were located in genome A and 42 in genome B. Test weight was the trait with the highest number of associations (54), followed by YI (16), GS (8) and GPC (7).

ABSTRACT