



International Conference

FROM SEED TO PASTA III

A SUSTAINABLE DURUM WHEAT CHAIN
FOR FOOD SECURITY AND HEALTHY LIVES



Bologna - Italy, 19-21 September 2018

P.5.44

GENOMIC REGIONS INFLUENCING YIELD STABILITY IN DURUM

M. Zaïm, H. Kabbaj, A. Al-Abdallat, G. Gorjanc, J. Poland, M. Nachit, A. Amri, B. Belkadi,
K. F. Maltouf, F. M. Bassi

Durum wheat (*Triticum durum* Desf.) is a major staple crop and it represents a base of the Mediterranean diet. This region is subject to a Mediterranean climate, which is extremely unpredictable with severe changes in moisture and temperature occurring each crop season. This unpredictability is summarized by breeders as GxE and the identification of traits controlling this interaction is quintessential to ensure stability in production season after season. To study the genetics of yield stability, four RILs populations derived from elite x elite crosses were assessed for yield and 1,000-kernel weights across five diverging environments in Morocco and Lebanon. These 550 RILs were characterized with 4,909 polymorphic SNPs via genotyping by sequencing. A consensus map was derived by merging the individual genetic maps of each population. Finally, imputation was used to fill all the missing haplotypes and reach a reduction of missing data to below 8%. Several significant QTLs were identified to be linked to TKW, grain yield and a stability index, namely AMMI wide adaptation index (AWAI). A second approach to identify loci controlling stability was the use of a global panel of 288 elites, accessions and landraces tested in 15 diverging environment. Multi-locations data were compiled via GxE models to derive the AWAI stability index. In addition, this panel was characterized with 8,173 polymorphic SNPs via Axiom 35K array. Significant associations were identified for all traits, including QTLs unique to AWAI. The sum of the identified QTLs can now be pyramid via marker assisted selection and molecular designed crosses in order to obtain very stable cultivars.

ABSTRACT