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Poster Communication Abstract – 1.08

EXPLOITING THE POTENTIAL OF GLOBAL DURUM PANEL FOR PLANT AND HUMAN HEALTH

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Durum wheat (*Triticum turgidum* L. ssp. *durum* (Desf.) Husn.) is the 10th most important cultivated cereal worldwide. Empirical and modern breeding has created new high-yielding varieties, but a side effect in selecting the "best" individuals is the genetic erosion of the cultivated durum wheat germplasm in comparison with their wild relatives. A recent effort to overcome this effect is the Global Durum Panel (GDP) developed by the international durum wheat research community to collect, share and exploit available genetic diversity. GDP is a freely shared wide collection of 1011 genotypes composed by modern germplasm and landraces, with a selection of emmer and primitive tetraploid wheats. The collection has been genotyped with the Illumina 90k wheat array. For our purposes, we selected a subset of the GDP collection (more than 200 genotypes), including 195 landraces. The population structure is in progress to verify: i) how much of the genetic variability from the original population has been retained in our subset collection; ii) how many groups compose the subpopulation; iii) if outliers to be discarded are present. Preliminary results indicated that the subpopulation matched the geographic origin of the genotypes. This subcollection will be exploited to perform genome wide association studies (GWAS) to address two topics in durum wheat farming and seed processing. The first topic is related to the durum wheat disease caused by the soil-borne cereal mosaic virus (SBCMV), transmitted via roots by the plasmodiophorid protist *Polymyxa graminis* Led. Both new SBCMV variants and climate change can contribute to a significant impact of infection in the near future. The use of the GDP subcollection could be very useful to identify genetic determinants of plant resistance. The subcollection will be grown in greenhouse using a soil infected by SBCMV. Infection will be evaluated by visual evaluation of symptoms and qRT-PCR. The second topic is related to human health as durum wheat is an important raw material for processed typical food of the Mediterranean region. The processing of wheat flour products at high temperatures produces unsafe compounds, including acrylamide, a molecule known to be neurotoxic and suspected to be carcinogenic. A direct correlation between free Asparagine (fAsn) content in wheat seeds and acrylamide formation has been

shown. We are investigating the subcollection to explore the natural variation for fAsn content in the seeds and to identify novel traits useful for breeding programs. A first year preliminary GWAS revealed some genomic regions putatively associated to seed fAsn content.

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