

## CHARACTERIZATION OF A GLOBAL DURUM RESOURCE FOR SPIKE AND GRAIN TRAITS

CAMPANA M.\*, STAFFOLANI G.\*, DI TELLA B.\*, BOZZOLI M.\*, INVERNIZZI C.\*\*,  
VIOLA P.\*\*, OLIVERI F.\*\*, ELISABETTA M.\*\*\*, DESIDERIO F.\*\*\*,  
CATTIVELLI L.\*\*\*

\*) Alma Mater Studiorum - University of Bologna, Bologna, ITALY

\*\*) APSOVsementi S.P.A. - Voghera, Pavia, ITALY

\*\*\*) Council for Agricultural Research and Economics-Research Centre for  
Genomics and Bioinformatics, Fiorenzuola d'Arda, Italy

*wheat, spike, fertility, grain*

Durum wheat (*Triticum turgidum* L. ssp. *durum*) is one of the major staple crops in the world and the ever-growing food demand of the world population has led to the need of an improved grain yield, which in wheat is a complex trait mainly defined by components divided in 3 main groups: 1. the n° of spikes per area, 2. the n° of grains per spike and spike/floret fertility, 3. the kernels (grain shape and weight). Moreover, understanding the genetic basis of those traits is valuable to the objective of fine tuning the development of the crop based on the diverse environment and management conditions.

Many morphological and fertility spike traits can determine the n° of grains per spike and other quality-related traits, that might as well affect quality and yield potential.

In this ongoing study, 2 different panels are being evaluated in the field (Bologna and Grosseto, Italy) over 2 seasons for yield and quality traits, grown in 1 m<sup>2</sup> plots under a modified augmented design. 6 landraces and 6 modern cultivars were used as replicated checks.

The first panel is the GDP (Global Durum Panel), composed mainly of durum modern cultivars and durum landraces, for a total of nearly 800 accessions. The second panel is the TGC (Tetraploid Global Collection), which consists of 1856 accessions: wild emmer wheat, domesticated emmer wheat, durum

landraces, and other durum subspecies. GDP and TGC were both genotyped with the wheat Illumina iSelect 90K SNP assay to provide a common genotype framework.

For each accession, 6 spikes have been imaged and characterised for different yield traits (i.e. average spike length, sterile spikelet n°, fertile spikelet n°, florets per central spikelet, thousand grain weight, grain size/shape).

For both panels, the average scores of sterile and fertile florets n° were calculated.

The GDP ranged from 15.5 to 24 for fertile spikelets and from 0 to 2.50 for sterile spikelets. The TGC ranged from 12.0 to 28.60 and 0 to 5.50 for fertile and sterile spikelet respectively, showing a higher range of diversity in the ancestral wheat.

Yield/spike traits are characterised by a quantitative nature, thus are affected by environment and expected to be controlled by many small effect QTLs, but also by phenology loci with pleiotropic effects like Rht, Ppd, and VRN. A divergence based on the subgroup and the geographical origin of the accessions is also expected.

We will report a final assessment of the phenotypic traits herein considered and a preliminary marker-trait association analysis.