International Conference
FROM SEED TO PASTA III
A Sustainable Durum Wheat Chain
for Food Security and Healthy Lives
Bologna - Italy, 19-21 September 2018

DURUM WHEAT GENOME REVEALS PAST DOMESTICATION SIGNATURES AND FUTURE IMPROVEMENT TARGETS

Anna Maria Mastrangelo

International Durum Wheat Genome Sequencing Consortium

The domestication of wild emmer wheat led to the selection of modern durum wheat widely grown mainly for pasta production. The 10.45 Gb assembly of the genome of durum wheat cv. Svevo enabled a genome-wide genetic diversity analysis in a global collection of 1,854 accessions of wild and cultivated tetraploid wheat. Regions exhibiting strong signatures of genetic divergence associated with speciation, genetic drift, and selection events were widespread in the genome. One such region carries a gene coding for a metal transporter (*TdHMA3-B1*) with a non-functional variant causing high levels of dietary cadmium (Cd) in grain. We demonstrate that the high Cd allele, widespread among durum cultivars but undetected in wild emmer accessions, increased in frequency from domesticated emmer to durum landraces and ultimately to modern durum wheat. The rapid cloning of *TdHMA3-B1* allowed us to identify this wheat's domestication bottleneck and rescue a wild beneficial allele, thus demonstrating the practical utility of the Svevo's genome for wheat improvement.