Proceedings of the LXIV SIGA Annual Congress
Online, 14/16 September, 2021
ISBN: **978-88-944843-2-8**

Poster Communication Abstract – 5.22

RELATIVE WATER CONTENT AND OSMOTIC ADJUSTMENT ANALYSIS ON CONTRASTING DROUGHT RESPONSE DURUM PANEL ACCESSIONS

BOZZOLI M.*, CONDORELLI G.*, GROLI E.*, NEUMANN K.**, D'AURIA J. C.**, MACCAFERRI M.*, ALTMANN T.**, TUBEROSA R.*

*) DISTAL, University of Bologna, Viale Fanin, 44, 40127 Bologna, Italy
**) Leibniz Institute of Plant Genetics and Crop Plant Research (IPK), Gatersleben, Germany

drought stress, durum wheat, relative water content, osmotic adjustment, metabolomics

Drought is the major abiotic stress limiting wheat yield worldwide. Global climate warming models predict more severe heat waves and droughts, especially in the Mediterranean Basin. These predictions underline the importance and urgency to better understand the genetic and functional basis of the adaptive response of wheat to heat stress, particularly when associated to drought stress. The study of osmotic adjustment (OA) and relative water content (RWC) is of major importance in wheat in order to understand the genetic and molecular dynamics of stress tolerance among different genotypes/varieties. UNIBO, in collaboration with University of Arizona in Maricopa (USA) tested 189 durum panel varieties in the field for drought stress resistance during 2018 and 2019. RWC and OA were measured for all the accessions and 14 genotypes were selected based upon their contrasting OA capacity, 7 with high OA (HOA) and 7 with low OA (LOA)). In order to compare results obtained in the field also in a controlled environment, the 14 accessions were evaluated in the Lemnatec platform. This facility allowed to plan the drought stress for every accession under a controlled water regime for 6 weeks, moreover images were taken every day with RGB and fluorescence camera at different angle with a high resolution camera on every accession. For each accession, leaves of 15 plants were sampled in both well-watered (WW) and drought-stressed (DS) conditions. Plant available water (PAW) content was approximately 90% in WW plants, whilst DS plants were sampled at 50, 30, 10 and 5%. PAW. At each sampling, one leaf from each of 5 plants was collected to measure RWC and another one for metabolite analysis based on GC-MS. Additionally, leaf samples for OA were collected as well at T3 (10% PAW). RWC data showed a strong decrease in RWC from 83.5% at T1 to 59.2% at T4. As to OA, more osmolites were detected in stressed plants in comparison to controls as expected, consistent with RWC data. In addition, yield traits were collected after harvest, showing differences among WW and DS and control genotypes only for some of them: biomass, grain weight, straw weight ear and fertile ear number. On the other hand, the difference between HOA and LOA as well as RWC detected in field conditions Maricopa was not confirmed in this experiment. RWC data did not show significant difference between the two groups. As to future experiment, the GC-MS analysis will allow for a better interpretation of the findings herein reported.