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RESPONSE VARIATION TO SALT AND DROUGHT STRESS AMONG DURUM WHEAT GENOTYPES AT SEEDLING STAGE

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Drought and salinity are the main abiotic factors that threaten food security and cause the most damage to crop grain yield. In the frame of the project H2020-ECOBREED (No 771367) present aim was to investigate variations in morphological (plant high, root length), physiological (chlorophyll content), and biochemical (real time PCR of transcription factor WRKY) responses to drought and salt stresses, among six durum wheat genotypes, replicated three times, under glasshouse conditions. The WRKY transcription factor is widespread in plants and associated with plant growth, development, and abiotic stress tolerance.

Drought and salinity treatments were assessed two weeks after sowing, when the seedlings reached two fully expanded leaves stage. Drought conditions were managed by discontinuing watering and evaluating field capacity (FC) in pots. Salt conditions were reached adding to the nutrient solution 250 mM of NaCl and watering the plants three times per week.

The ANOVA revealed highly significant differences among the testedgenotypes and treatments for seedlings height already at two weeks aftertreatment stage. The interaction genotypes per treatments was notsignificant at this first stage, conversely with the results at other moreadvanced stages. Both, salt and drought slowed down the seedling's growthrate, however, the pattern of growth varied between genotypes. Salt-tolerant genotype J. Ketifa after two weeks of treatments has shownunchanged growth rate under both drought and salt. Moreover, genotypeSebatel2 has not altered the growth rate during salt stress but decreasesdue to drought. However, in Vulci, Cham1, and Pelsodur the growth slowedmore due to drought than salt stress, and vice versa for Azeghar.

As expected, under drought conditions the roots of five from six genotypes analysed lengthened searching for water; especially Cham1 which shown a root length doubled under drought compared to control. However, in the case of salt, roots length decreased from one to 23%, compared with the control condition. Interestingly, Sebatel2 shows similar reduction for root length in both salt and drought conditions. The ANOVA for roots length, two weeks after stresses, showed significant differences among only treatments (T) and the interaction (G×T).

The ANOVA for chlorophyll content performed two weeks after treatment, revealed significant differences among the tested genotypes and treatments. Salt and drought had nearly similar negative effects on chlorophyll content for all genotypes, except Sebatel2, which was affected with salt more than drought.

Real time PCR and HRM showed different amplicons of WRKY gene expression among control, drought, and salt treatments for all the analysed genotypes. Other genes, related at the morphological differences, are currently under analysis with the purpose of identifying differences of genes expression among the genotypes, the treatments, and the phenological stages of durum wheat.