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18 ANTIOXIDANT RESPONSES TO SALT STRESS IN *MEDICAGO TRUNCATULA* LINES

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Legumes are important in sustainable agriculture providing high value protein, supporting meat and dairy production and are unique in their ability to improve soil fertility. However, legumes are sensitive to abiotic stresses most significant of which are water deficit and soil salinity. Modern agriculture encounters salinity as a major factor limiting crop productivity worldwide. Soil salinity induces water deficit that leads to nutrient deficiencies. Aside of water and ionic stress, salinity is accompanied by generation and accumulation of high levels of reactive oxygen species (ROS), known as oxidative stress. Plants deploy antioxidant mechanisms to alleviate the deleterious effects of elevated ROS. The aim of this study was to explore, elucidate and decipher the role of antioxidant genes/enzymes and mechanisms under salt stress in the model legume *Medicago truncatula*. Three lines of *M. truncatula* with differential tolerance to salinity have been used to study the antioxidant responses. The *M. truncatula* lines used were: Jemalong A17; tolerant to salinity, TN1.11; very tolerant to salinity, and TN6.18; sensitive to salinity. Enzyme activities of catalase, superoxide dismutase, ascorbate peroxidase and guaiacol-peroxidase were determined along with their gene expression profiles by qRT-PCR method, in roots and leaves after 24 and 48 hours of salt stress. Enzyme activities increased in response to salt stress in roots while in leaves a differential pattern was exhibited for each line examined. Following, gene expression profile in roots and leaves followed a differential pattern in each line. Our data show that antioxidant responses to salt stress are concentration, tissue, time and genotype specific. In conclusion, highly regulated and finely tuned antioxidant mechanisms operate in roots and leaves of *M. truncatula* in order to effectively protect the plant from increased levels of ROS generated by the imposed salt stress.