

Elucidation of Physiological and Biochemical Mechanisms of an Endemic Halophyte *Centaurea Tuzgoluensis* under Salt Stress

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Abstract : In this study, physiological and biochemical responses of *Centaurea tuzgoluensis*, a Turkish endemic halophyte, to salinity were studied. Therefore, the changes in shoot growth, leaf relative water content (RWC), ion concentrations, lipid peroxidation, hydroxyl (OH.) radical scavenging activity, proline (Pro) content, and antioxidant system [superoxide dismutase (SOD), catalase (CAT), ascorbate peroxidase (APX) and glutathione reductase (GR)] were investigated. The 60 days (d) old *C. tuzgoluensis* seedlings were subjected to 0, 150 and 300 mM NaCl for 7 d and 14 d. The relative shoot growth was generally did not change in the 150 mM NaCl, but reduced with 300 mM NaCl stress at 7 d and 14 d. RWC was higher in 150 mM NaCl-treated leaves than that of 300 mM NaCl. Salinity decreased K⁺/Na⁺ ratio, but increased Na⁺, Cl⁻, Ca⁺² and Na⁺/Cl⁻ ratio in the leaves. On the other hand, it did not change or increase the K⁺ content at 150 and 300 mM NaCl, respectively. MDA content in the 150 and 300 mM NaCl-treated leaves remained close to control at 7 d. This was related to enhanced activities of SOD, CAT, APX and GR enzymes, and their isoenzymes especially Fe-SOD in the leaves. On the other hand, the higher sensitivity to 300 mM NaCl at 14 d was associated with inadequate increase in antioxidant enzymes and the decreased OH radical scavenging activity. All these results suggest that *C. tuzgoluensis* has different antioxidant metabolisms between short- (7 d) and long-term (14 d) salt treatments and salinity tolerance of *C. tuzgoluensis* might be closely related to increased capacity of antioxidative system to scavenge reactive oxygen species (ROS) and accumulation of osmoprotectant proline under salinity conditions.

Keywords : antioxidant enzymes, endemic halophyte, ion exchange, lipid peroxidation, antioxidant, enzymes, endemic halophyte, ion exchange, lipid peroxidation, proline, *Centaurea tuzgoluensis*

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