

Anatomical Adaptations of Three Astragalus Species under Salt Stress

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Abstract : The effect of NaCl stress on root and leaf anatomy was investigated in three *Astragalus* species grown in 0-300 mM NaCl for 30 days under greenhouse conditions. Root cross section and cortex thickness was reduced under salt stress in both species while *A. tenuifolius* showed thinner cortex and the root cross section was unchanged. The epidermis stele thickness was unaffected by salinity in *A. armatus* and *A. tenuifolius* and was reduced in *A. mareoticus* with smaller xylem vessel size. In addition, vessel density and wall thickness of xylem was increased under salt conditions in the studies species. The entire lamina and mesophyll of the three species were thinner in salt-stressed plants. *A. armatus* and *A. tenuifolius* showed the higher thickness with increased size of the lower epidermis. NaCl (300 mM) reduced leaf water content by 41.5 % in *A. mareoticus* while it was unchanged in the other species. The size of the vascular bundle increased under salinity in *A. tenuifolius* leaves and it was unchanged in the other ones. A longer distance between leaf vascular bundle was occurred in *A. mareoticus*. The effects of NaCl on root and leaf ultrastructure are discussed in relation to the degree of salt resistance of these species. The unchanged biomass production under salt stress confirmed the higher tolerance of *A. tenuifolius* to salinity. *A. armatus* was moderately salt tolerant with decrease of biomass production by 14.2 % while *A. mareoticus* was considered as salt sensitive plant when the decrease in biomass production reached 56.8%.

Keywords : *Astragalus* species, leaf ultrastructure, root anatomy, salt stress

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