

Stomatal and Photosynthetic Traits Are Associated with Investigating Sodium Chloride Tolerance of *Brassica napus* L. Cultivars

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Abstract: The negative effects of salt stress vary among different rapeseed cultivars. In this study, we investigated the sodium chloride tolerance among 10 rapeseed cultivars based on membership function values (MFV) and Euclidean cluster analyses by exposing seedlings to 0, 100, or 200 mM NaCl. The NaCl toxicity significantly reduced growth, biomass, endogenous K⁺ levels, relative water content and increased electrolyte leakage, soluble sugar levels, proline levels, and antioxidant enzyme activities. SPAD values were highly variable among rapeseed cultivars. We identified three divergent (tolerant, moderately tolerant, and sensitive) groups. We found that Hua6919 and Yunyoushuang2 were the most salt-tolerant cultivars and that Zhongshuang11 and Yangyou9 were the most salt-sensitive cultivars. The rapeseed cultivars were further subjected to photosynthetic gas exchange and anatomical trait analyses. Among the photosynthetic gas exchange and anatomical traits, the stomatal aperture was the most highly correlated with salinity tolerance in rapeseed cultivars and thus, is important for future studies that aim to improve salinity tolerance in rapeseed. Thus, we identified and characterized two salt-tolerant cultivars that will be useful for breeding programs that aim to develop salt-tolerant rapeseed.

Keywords: *Brassica napus*; salinity; cluster analysis; stomata; growth; antioxidant enzymes