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Screening for Variability in Salt Tolerance within a Georgian Wheat Germplasm Collection

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Abstract

Bread wheat *Triticum aestivum* L. possesses a genetic variation for the ability to survive and reproduce under salt stress conditions. Durum wheat (*T. durum* Desf.) is in general more sensitive in comparison to bread wheat, however, exceptions can be found showing the same extent of salt tolerance. Endemic wheats in general are characterised by a high adaptability to their environment. In Georgia several wheat species were already cultivated since the Neolithic and Early Bronze Age and the region is known for the abundance of endemic species. The level and variability of salt tolerance were assessed in a germplasm collection of 144 winter and spring wheat accessions from Georgia comprising *Triticum aestivum* L., *T. durum* Desf., *T. dicoccon* Schrank, *T. polonicum* L. and Georgian endemics: *T. carthlicum* Nevski, *T. karamyshevii* Nevski, *T. macha* Dekapr. et Menabde, *T. timopheevii* (Zhuk.) Zhuk. and *T. zhukovskyi* Menabde et Ericzjan. The accessions were tested for salt tolerance at the germination stage using four sodium chloride (NaCl in H₂O) concentrations (0, 175, 210 and 350 mmol l⁻¹). Large variability in salt tolerance within the Georgian germplasm was found among the different wheat species. The genetic background of the endemic hexaploid winter wheat *T. macha* comprises a higher potential for salt tolerance traits than *T. aestivum*. In general, the accessions of the tetraploid species responded to the lower sodium concentration with similar germination scores as the hexaploid wheat accessions, but germination and growth were severely reduced when the genotypes were subjected to the highest concentration of NaCl. The endemic wheat *T. timopheevii* was among the most tolerant tetraploid materials. Therefore, the Georgian endemic wheats represent promising donors for salt tolerant traits for future breeding efforts for salinity tolerance in wheat.

Keywords: Georgian germplasm, germination stage, salt tolerance, *Triticum*