Public Abstract
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Salinity is an important abiotic factor that drastically reduces crop yield by limiting water uptake and causing ion-specific stress. Soybean is sensitive to soil salinity. Previous studies, however, have shown that there is variability among soybean genotypes and wild relatives for salt tolerance, which suggests that genetic improvement may be possible. Objective of this study was to identify physiological traits underlying differences in salt tolerance among accessions of four *Glycine* species. Four NaCl (salt) treatments, 0, 50, 75 and 100 mM were imposed for 14 days on *G. max*, *G. soja*, *G. tomentella* and *G. argyrea* accessions with different levels of salinity tolerance. Salt-induced leaf scorch was high in sensitive accessions and little or none in tolerant accessions. Tolerant genotypes had a greater capacity to prevent sodium and chloride transport from soil solution to leaves than sensitive genotypes. Moreover, the magnitude of leaf injury per unit increase in sodium or chloride concentrations in leaves was lower in tolerant than in susceptible accessions. In addition, salt tolerant accessions had greater chlorophyll-meter readings than sensitive ones at all NaCl concentrations. Sensitive genotypes showed a significant decrease in leaf, stem and root dry weight and stem length, while in tolerant genotypes these parameters had no significant variations. *Glycine argyrea* and *G. tomentella* accessions possessed higher salt tolerance than *G. soja* and *G. max* genotypes. Identification and understanding of traits differentially expressed in salt tolerant and sensitive genotypes will allow further improvement in breeding salt tolerant soybean.