Supplemental Information – Chen et al. An Optimized Protocol for Comprehensive Evaluations of Salt Tolerance in Crop Germplasm Accessions: A Case Study of Tomato (*Solanum lycopersicum* L.)
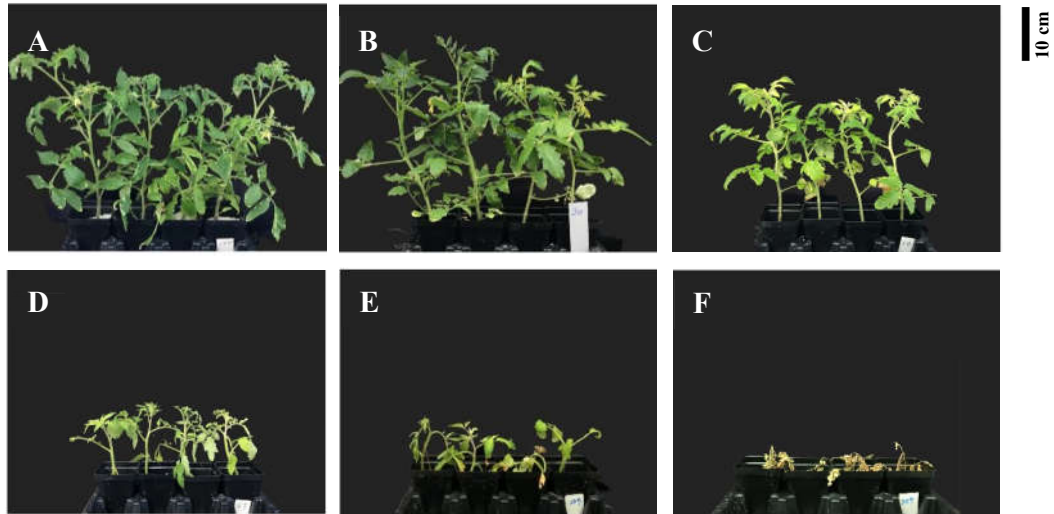

Figure S1. Phenotypes of tomato germplasm accessions exhibiting different degrees of salt damage.

Note: A: Normal phenotype (NX132), B: Grade I damage (NX20), C: Grade II damage (NX10), D: Grade III damage (NX47), E: Grade IV damage (NX299), F: Grade V damage (NX259).
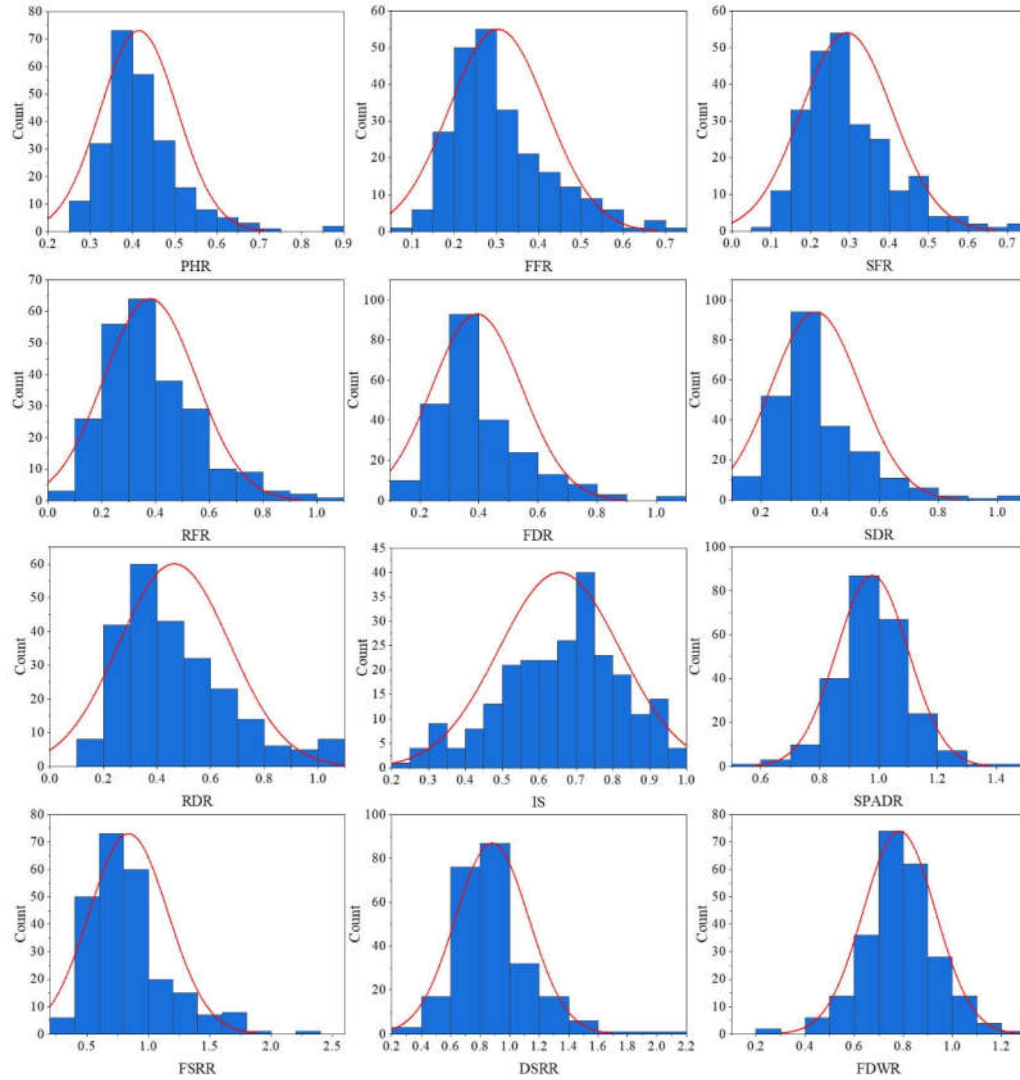
Figure S2. Distribution of salt tolerance coefficients and index of salinity damage (IS).

Note: PH: Plant Height, FF: Full Fresh weight of seedling; SF: Shoot Fresh weight, RF: Root Fresh weight, FD: Full Dry weight of seedling, SD: Shoot Dry weight, RD: Root Dry weight, SPAD: relative chlorophyll value, FSR: Fresh weight ratio of Shoot to Root, DSR: Dry weight ratio of Shoot to Root, FDW: ratio of Fresh weight to Dry Weight. PHR, FFR, SFR, RFR, FDR, SDR, RDR, SPADR, FSRR, DSRR and FDWR represent the salt tolerance coefficient for the corresponding traits.
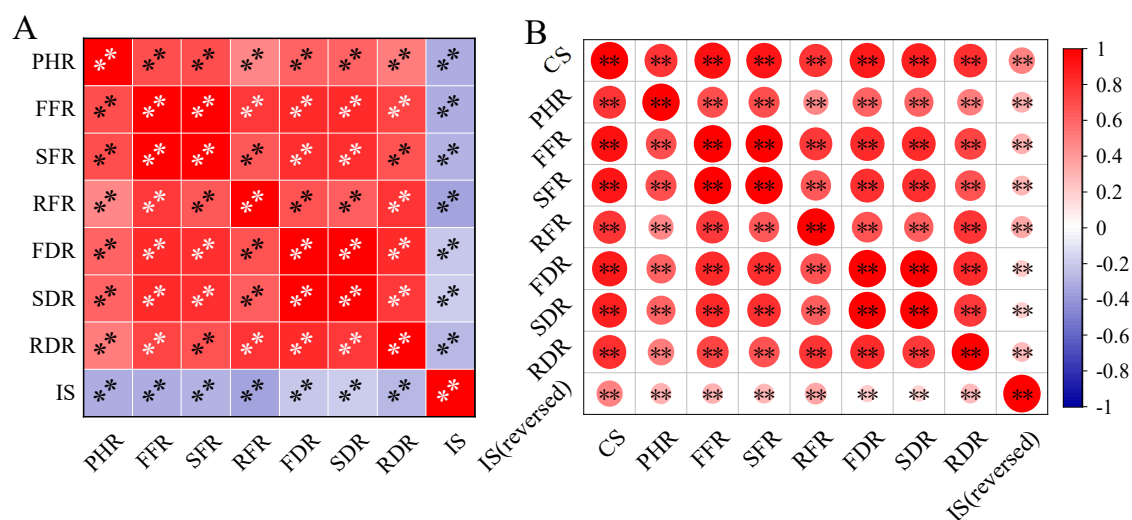
Figure S3. Correlation analysis of salt tolerance traits in tomato initial germplasm.

Note: PH: Plant Height, FF: Full Fresh weight of seedling; SF: Shoot Fresh weight, RF: Root Fresh weight, FD: Full Dry weight of seedling, SD: Shoot Dry weight, RD: Root Dry weight, PHR, FFR, SFR, RFR, FDR, SDR and RDR represent the salt tolerance coefficient for the corresponding traits. CS: Comprehensive Score, IS: Index of Salinity damage, IS (reversed): the values of inversion of the IS. **: $p < 0.01$.
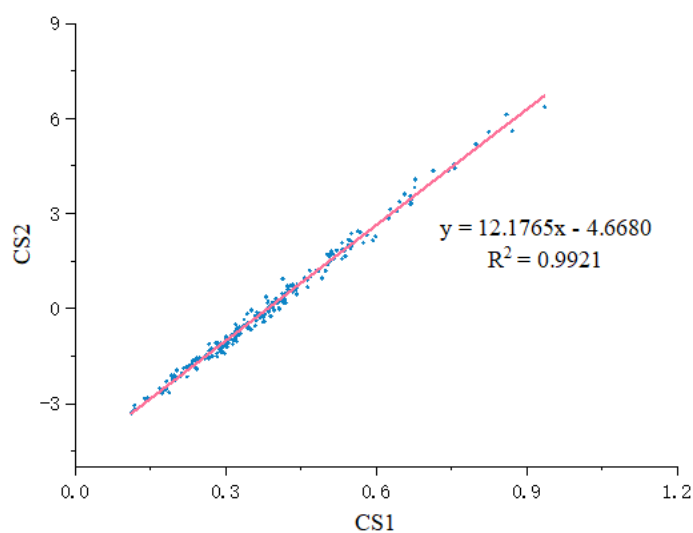

Figure S4. Correlation analysis of comprehensive scores derived from two different weighting methods.

Note: CS: Comprehensive Scores. CS1 and CS2 refer to scores calculated using weighting method 1 and 2, respectively.
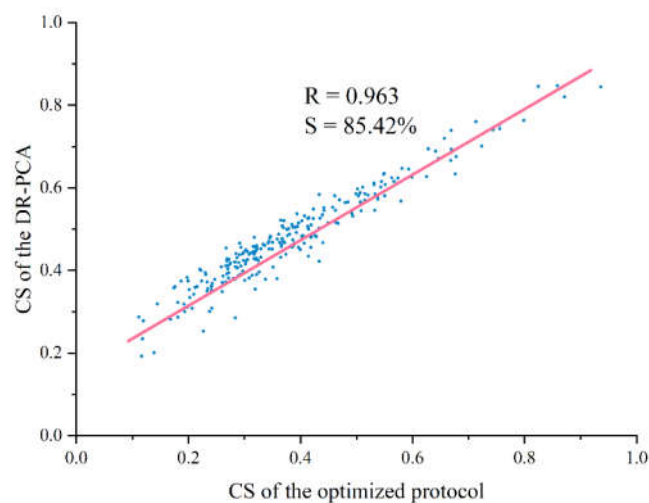
Figure S5. Concordance analysis of comprehensive evaluation results between the newly proposed approach and the classical DR-PCA approach.

Note: CS: Comprehensive Scores. R: Correlation coefficient. S: Side sameness. DR-PCA refers to the classical approach—Dimensionality Reduction-Principal Component Analysis.
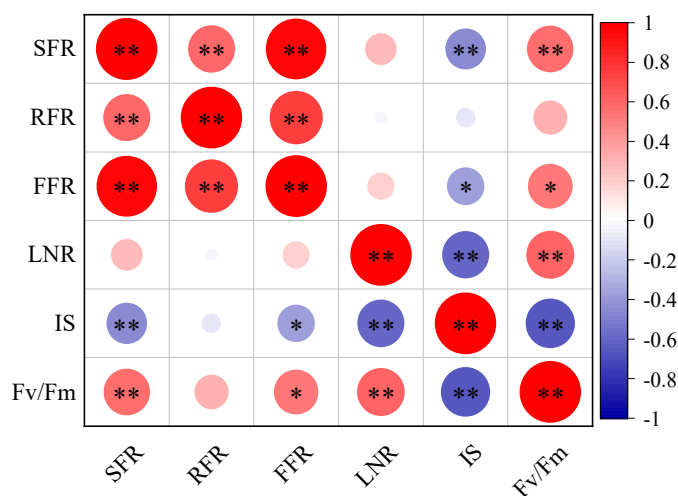

Figure S6. Correlation analysis of salt tolerance traits in new tomato population.

Note: SF: Shoot Fresh weight, RF: Root Fresh weight, FF: Full Fresh weight of seedling; LN: Leaf Number. SFR, RFR, FFR and LNR represent the salt tolerance coefficient for the corresponding traits. IS: Index of Salinity damage; Fv/Fm: maximum photochemical efficiency. *: $p<0.05$, **: $p<0.01$.
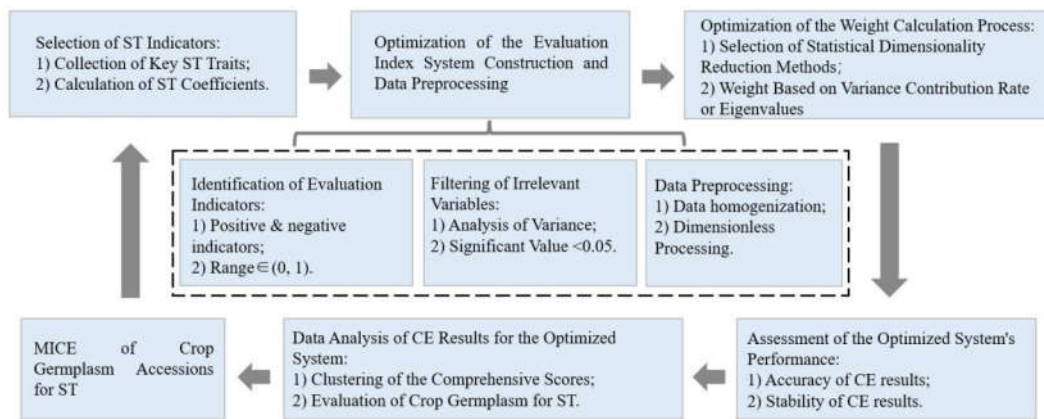
Figure S7. Framework for the comprehensive evaluation of salt tolerance in crop germplasm utilized in this study. Note: ST: Salt Tolerance, CE: Comprehensive Evaluation, MICE: Multi-Index Comprehensive Evaluation.