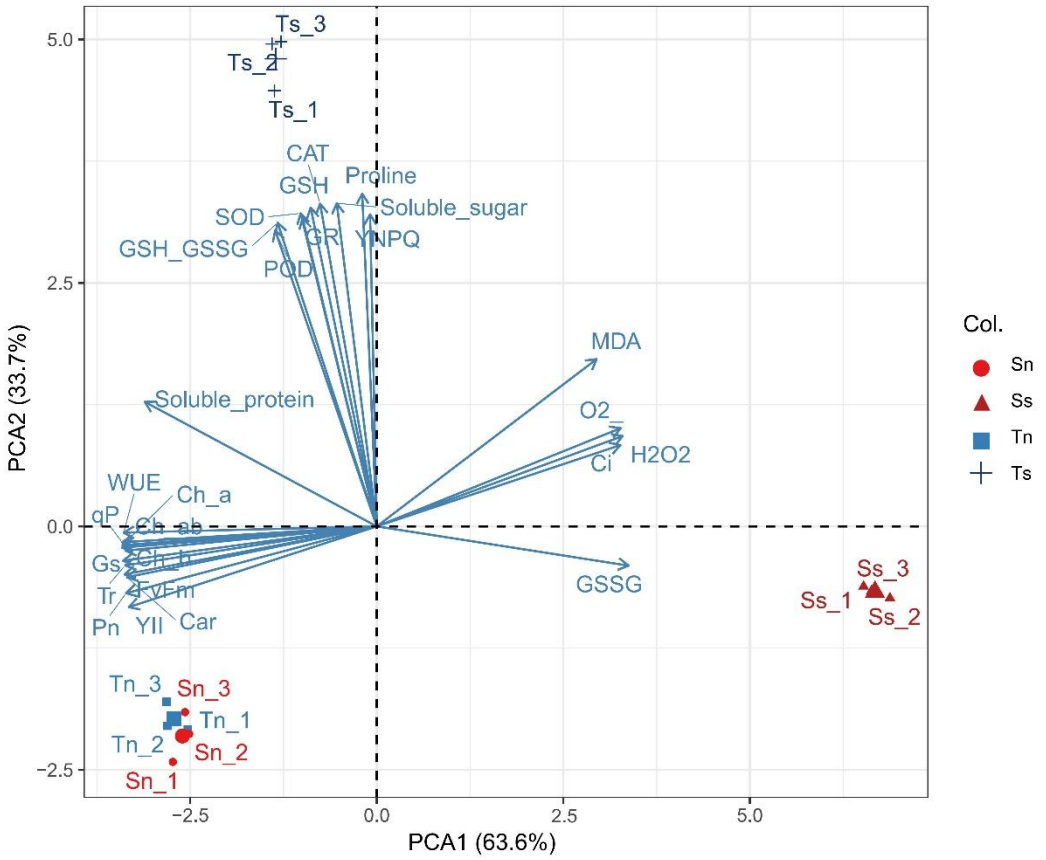



Supplementary Figure 3 Principal component analysis (PCA) biplot of 26 physiological parameters in leaves of ginger tolerant cultivar '2404' (T) and sensitive cultivar '61' (S) on day 7 under saline-alkali stress. Sample points are distinguished by different colors and shapes: Tn (tolerant control, red circles), Ts (tolerant under stress, red triangles), Sn (sensitive control, blue circles), Ss (sensitive under stress, blue triangles), with three biological replicates per treatment. Arrows represent loading vectors of individual physiological parameters; their direction and length reflect the contribution of each parameter to the principal components. The spatial relationships between sample points and arrows reveal the association patterns between treatment groups and physiological parameters.