

Supplement data in brief

Title:

Transcriptional regulation-mediating ROS homeostasis and physio-biochemical changes in wild tomato (*Solanum chilense*) and cultivated tomato (*Solanum lycopersicum*) under high salinity

Authors:

SP Kashyap^{1,2}, Nishi Kumari², Pallavi Mishra¹, Durga Prasad Moharana^{1,3}, Mohd Aamir⁴, B Singh¹, and HC Prasanna^{1,5}

Authors' affiliations:

¹*Division of Crop Improvement, Indian Institute of Vegetable Research, Indian Council of Agricultural Research, Varanasi-221 305, Uttar Pradesh, India*

²*Department of Botany, Mahila Maha Vidyalyaya, Banaras Hindu University, Varanasi-221 005, Uttar Pradesh, India*

³*Department of Horticulture, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi-221 005, Uttar Pradesh, India*

⁴*Laboratory of Mycopathology and Microbial Technology, Centre of Advanced Study in Botany, Institute of Science, Banaras Hindu University, Varanasi-221 005, Uttar Pradesh, India*

⁵*Division of Vegetable Crops, Indian Institute of Horticultural Research, Indian Council of Agricultural Research, Hessaraghatta, Lake Post, Bengaluru-560 089, Karnataka, India.*

*Corresponding author

Dr. HC Prasanna, Principal Scientist (Genetics and Plant Breeding)

Division of Crop Improvement, Indian Institute of Vegetable Research, Indian Council of Agricultural Research, Shahanshahpur, Jakhini, Varanasi-221 305, Uttar Pradesh, India

Email: prasanahc@yahoo.com, prasanna.c@icar.gov.in

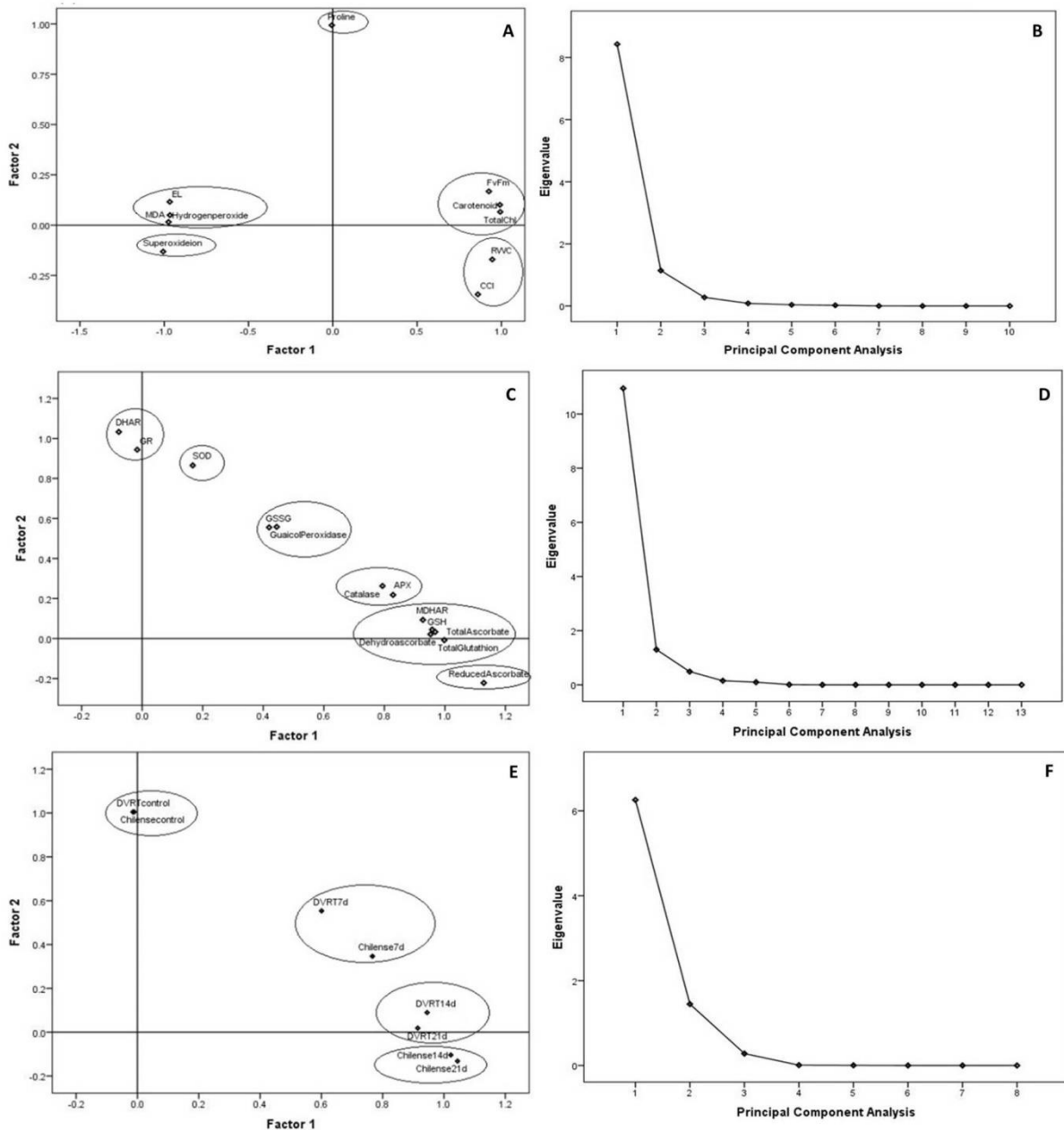
Mobile: +91-9455178097

Email address of authors

singhsarvesh10@gmail.com (SP Kashyap); kumaridrnishi@yahoo.co.in (Nishi Kumari); pallavimishra23@gmail.com (Pallavi Mishra); dpmhort03@gmail.com (Durga Prasad Moharana); khan.aamir18@gmail.com (Mohd Aamir); bsinghiivr@gmail.com (B Singh); prasanahc@yahoo.com (HC Prasanna)

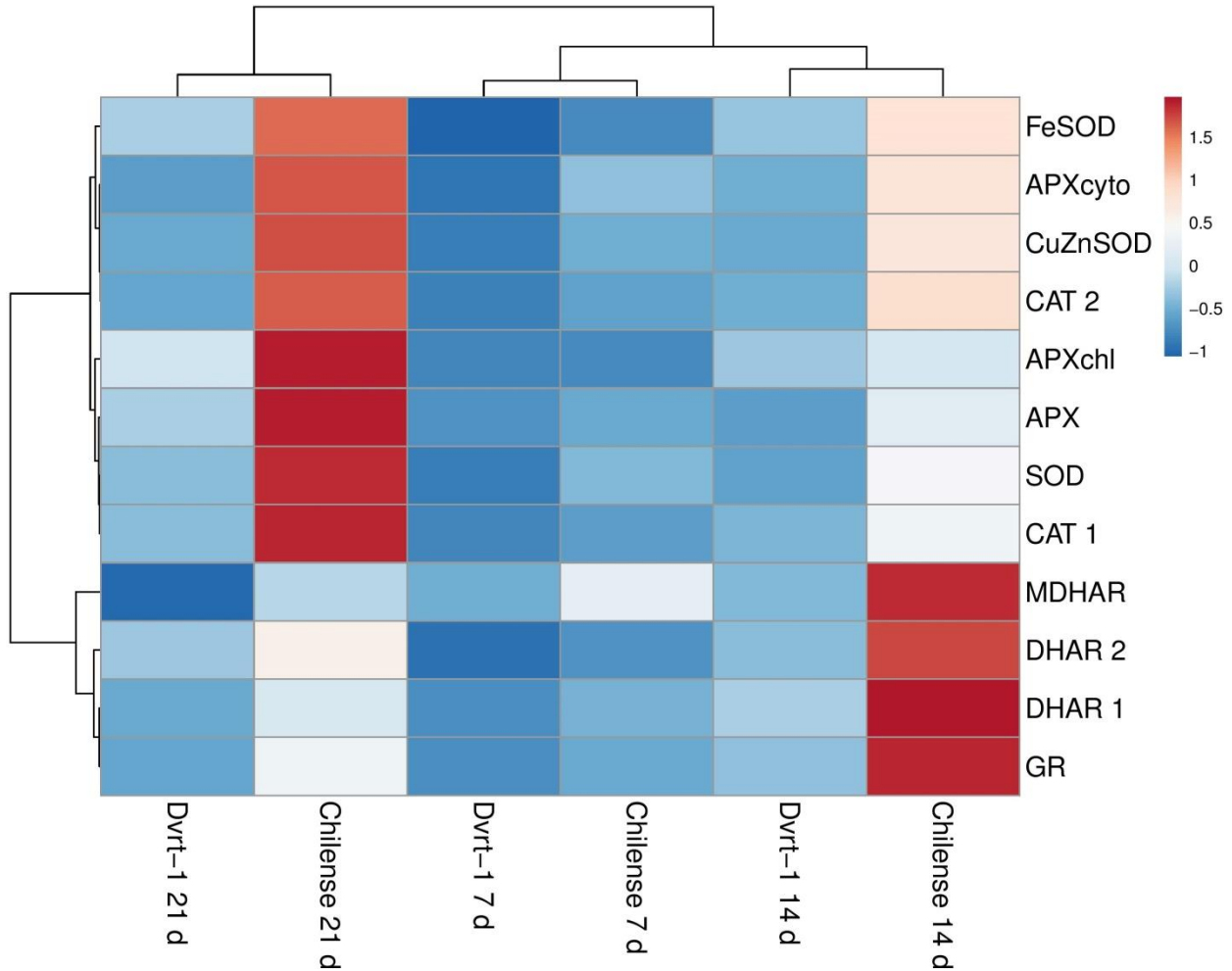
Supplemental Fig. S1

Multivariate principal component analysis. (A) loadings values (B) eigenvalues of the first two factors (PCs) of physiological and biochemical parameters related attributes (C) loadings values (D) eigenvalues of the first two factors (PCs) of different biochemical parameters, and (E) loadings values (F) eigenvalues of the first two factors (PCs) of salt stress time duration associated with *Solanum lycopersicum* and *Solanum chilense*. Fv/Fm, CCI, Total chlorophyll, Carotenoid, Proline, MDA, RWC, EL, $O_2^{\cdot-}$, H_2O_2 , CAT, SOD, APX, GR, DHAR, MDHAR, GPX, glutathione; GSH, GSSG, AsA, RAsA, DHA at 0 d, 7 d, 14 d, and 21 d of salt stress conditions are the variables.



Supplemental Fig. S2

Heatmap and clustering analysis of antioxidant defence related genes *Solanum lycopersicum* and *Solanum chilense*. The figure includes a “heatmap” which is the part of the figure containing colors (red, blue, and white) with dendrogram. The rows represent genes while the treatments are shown as columns. The row dendrogram represents the gene clusters with similar pattern. The expression levels are mapped on the colour scale provided at the right top of the figure along with the categories scale on the right.



Supplemental Table S1

Primers used for quantification of mRNA levels by qRT-PCR.

Gene	Encoded protein	Primer sequence(5'-3')	Accession number
<i>Actin</i>	Actin	Forward GCTCCACCAGAGAGGAAATAC Reverse GCACTTCCTGTGGACAATAGA	NM_001330119.1
<i>Catalase 1</i>	Catalase	Forward CATTGAGGAGAACTGGAGGATA Reverse CTGTAATCCGTTGGGAGACAA	M93719.1
<i>Catalase 2</i>	Catalase	Forward GGGAAACTTTGATCTGGTAGGG Reverse CTCCTGGATATGGGACTTAGGA	AF112368.1
<i>DHAR 1</i>	Dehydroascorbate reductase	Forward GAAGTGGAGTGTGCCTGAAA Reverse GACGTACTTCTCTTCAGCCTTG	AY971873.1
<i>DHAR 2</i>	Dehydroascorbate reductase	Forward TGGAACAGAGCAGGCTTTAC Reverse TCAGCAGCAGATACCTCATTTT	AY971874.1
<i>MDHAR</i>	Monodehydroascorbate reductase	Forward CAAGGGTTTTCGGTTCTTCT Reverse TGCATTTCTCCTCCAACACTAC	AY971875.2
<i>GR</i>	Chloroplast glutathione reductase	Forward GCTCACCAAAGCTCAGTACAA Reverse GGAGAGGCTTGATAGGGTTAGA	EU285581.2
<i>APXchl</i>	Chloroplast stromal ascorbate peroxidase	Forward CCTCAAAGAGGTGGAGCTAATG Reverse CCTTGATAGGCTGGAGAAGTTT	EU251405.1
<i>APXcyto</i>	Cytosolic ascorbate peroxidase 1	Forward TACAGTTGCCGTCAGACAAG Reverse CCTCAGCATAGTCAGCAAAGA	DQ096286.1
<i>APX</i>	Ascorbate peroxidase	Forward CGCAAAGAGGTGGAGCTAAT Reverse CCTTGATAGGCTGGAGAAGTTT	AF413573.1
<i>SOD</i>	Superoxide dismutase	Forward AGAAAGCTGTTGCTGTCCTTA Reverse CCAGGAGCAAGTCCAGTTATAC	M37151.1
<i>Fe SOD</i>	Iron superoxide dismutase	Forward TACACACCACTCCTCACCAT Reverse CTTCCCATGACACCAACTTCTC	AY262025.1
<i>CuZn SOD</i>	Cytoplasmic Cu-Zn superoxide dismutase	Forward CGGAAGGATTGCTTGTGGTA Reverse GGCTCAGCAGCTCCAATATAA	X14040.1

Supplemental Table 2 Correlation coefficient values (r) among the different physiological and biochemical parameters of *Solanum lycopersicum* and *Solanum chilense* under 0, 7, 14, and 21 d of salt stress conditions.

	Fv/Fm	CCI	Total Chl	Carotenoid	Proline	MDA	RWC	EL	H ₂ O ₂	O ₂ ^{•-}
Fv/Fm	1									
CCI	0.101	1								
Total Chl	0.104	0.785**	1							
Carotenoid	-0.032	0.721**	0.898**	1						
Proline	0.004	-0.470*	-0.139	-0.100	1					
MDA	-0.050	-0.839**	-0.851**	-0.805**	0.185	1				
RWC	0.088	0.774**	0.871**	0.851**	-0.344	-0.798**	1			
EL	-0.076	-0.878**	-0.901**	-0.845**	0.293	0.894**	-0.862**	1		
H ₂ O ₂	0.009	-0.786**	-0.800**	-0.744**	0.212	0.880**	-0.821**	0.855**	1	
O ₂ ^{•-}	-0.034	-0.773**	-0.866**	-0.848**	0.059	0.871**	-0.849**	0.885**	0.914**	1

Fv/Fm; CCI, chlorophyll color index; Total Chl, Total chlorophyll; Carotenoid; Proline; MDA, malondialdehyde; RWC, relative water content; EL, electrolyte leakage; O₂^{•-}, superoxide anion; H₂O₂, hydrogen peroxide: * and ** indicated a significant correlation at $P \leq 0.05$ and $P \leq 0.01$, respectively.

Supplemental Table 3 Correlation coefficient values (*r*) among the different biochemical parameters of *Solanum lycopersicum* and *Solanum chilense* under 0, 7, 14, and 21 d of salt stress conditions.

	CAT	SOD	APX	GR	DHAR	MDHAR	GPX	Glut	GSH	GSSG	AsA	RAsA	DHA
CAT	1												
SOD	0.770**	1											
APX	0.919**	0.721**	1										
GR	0.679**	0.853**	0.588**	1									
DHAR	0.698**	0.865**	0.647**	0.768**	1								
MDHAR	0.917**	0.707**	0.847**	0.565**	0.630**	1							
GPX	0.801**	0.695**	0.762**	0.601**	0.726**	0.680**	1						
Glut	0.826**	0.552**	0.820**	0.409**	0.521**	0.798**	0.693**	1					
GSH	0.814**	0.668**	0.764**	0.643**	0.572**	0.838**	0.728**	0.733**	1				
GSSG	0.307	0.224	0.266	0.194	0.308	0.353	0.434*	0.373	0.281	1			
AsA	0.935**	0.713**	0.836**	0.598**	0.603**	0.922**	0.738**	0.804**	0.880**	0.255	1		
RAsA	0.826**	0.417*	0.789**	0.352	0.428*	0.719	0.765**	0.753**	0.698**	0.157	0.816**	1	
DHA	0.850**	0.679**	0.697**	0.607**	0.530**	0.831**	0.642**	0.674**	0.876**	0.276	0.922**	0.692**	1

CAT, catalase; SOD, superoxide dismutase; APX, ascorbate peroxidase; GR, glutathione reductase; DHAR, dehydroascorbate reductase; MDHAR, monodehydroascorbate peroxidase; GPX, guaiacol peroxidase; Glut, glutathione; GSH, reduced glutathione; GSSG, oxidized glutathione; AsA, total ascorbic acid; RAsA, reduced ascorbic acid; DHA, dehydroascorbate: * and ** indicated a significant correlation at $P \leq 0.05$ and $P \leq 0.01$, respectively.