

Figure S1. Experiment equipment installation design and greenhouse cultivation (A): Greenhouse VPD control system. It increasing air humidity with a fogging system (machine output air moisture diameter: 5-10 μm , water vapor output per hours: 1-3 L, MCH-03, Gemei Electric Co. Ltd. China). (B): LVPD was maintained at below 1.5 KPa by VPD control system. For HVPD, the greenhouse air humidity was unregulated.

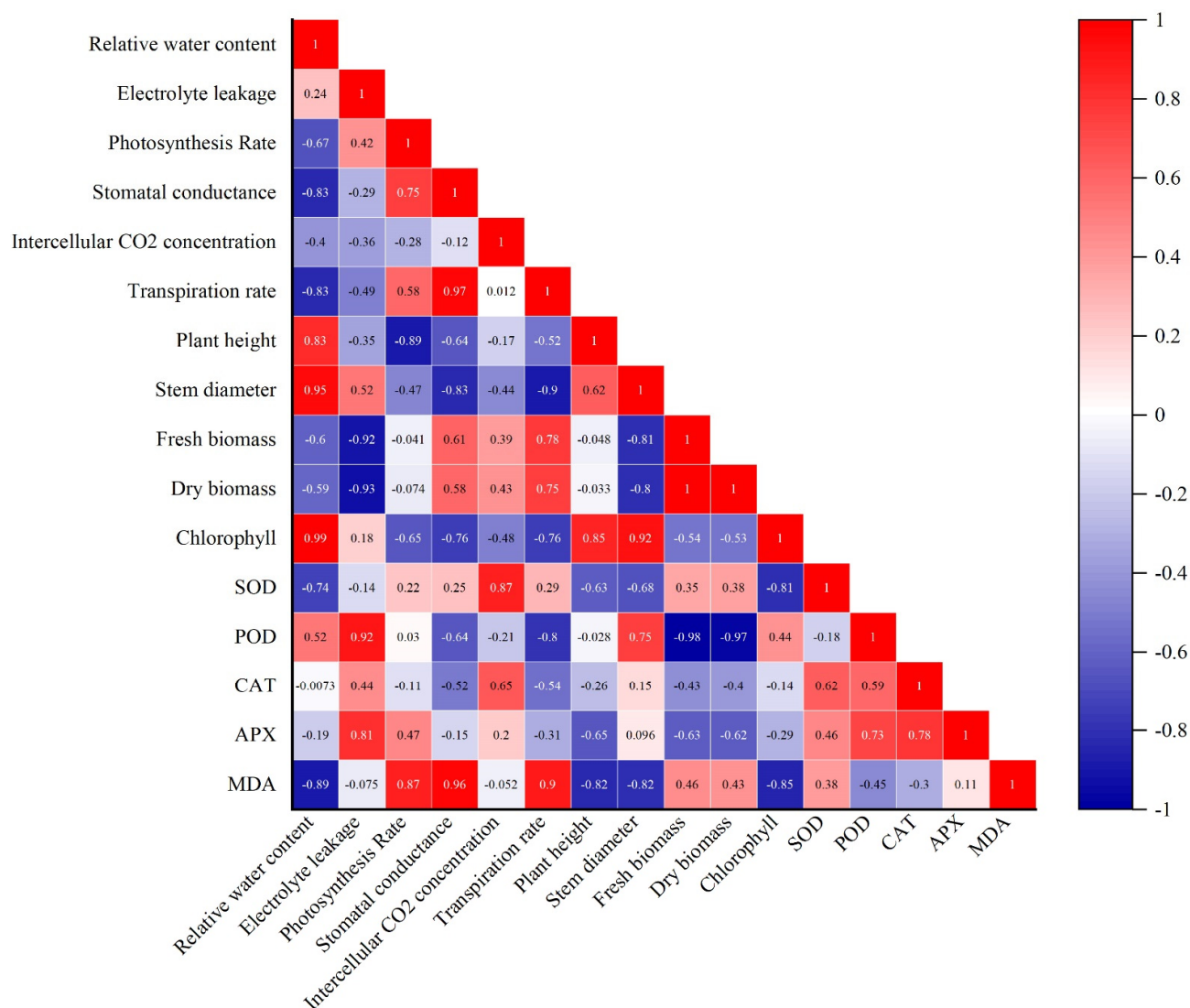


Figure S2. Correlation analysis of all experiment parameters which affected by vapor pressure deficit (VPD) and soil relative water capacity (FC). Red represents positive correlation, white represents no correlation, blue represents negative correlation, and the number (-1to1) in each box represents correlation coefficient.

Table S1. Two-factor analysis of variance (ANOVA) between vapor pressure deficit (VPD) and soil relative water capacity (FC) on cucumber and tomato experiment parameters. *means Significant differences ($p < 0.05$); **means Significant differences ($p < 0.01$); ***means Significant differences ($p < 0.001$); NS means NO Significant differences. The analyzed results were subjected to least significant difference among the experiment parameter means (LSD).

	Cucumber			Tomato		
	VPD	FC	VPD&FC	VPD	FC	VPD&FC
Relative water content	0.1244NS	0.004**	0.0474*	0.0001***	0.001***	0.0621NS
Electrolyte leakage	0.1603NS	0.0002**	0.0166*	0.0002**	0.0688NS	0.0141*
Photosynthesis Rate	0.0019**	0.0719NS	0.0147*	0.0323*	0.0441*	0.2412NS
Stomatal conductance	0.0398*	0.0311*	0.0116*	0.0012**	0.0007**	0.0018**
Intercellular CO ₂ concentration	0.0161*	0.0104**	0.0443*	0.0001***	0.3735*	0.0001***
Transpiration rate	0.0366*	0.0026**	0.0363*	0.0004**	0.0033**	0.0106*
Plant height	0.0003**	0.0192*	0.0919NS	0.0003**	0.0312*	0.0356*
Stem diameter	0.0144*	0.0001***	0.0017**	0.008**	0.0001***	0.0005**
Fresh biomass	0.0013**	0.0061**	0.0147**	0.0001***	0.1266NS	0.6427NS
Dry biomass	0.0063**	0.0464*	0.0662NS	0.0001***	0.3652NS	0.4676NS
Chlorophyll	0.0037**	0.0275*	0.1988NS	0.0141*	0.0001***	0.0008**
SOD	0.0106*	0.0233*	0.0004**	0.1282NS	0.0018**	0.0029**
POD	0.0001***	0.9393NS	0.3752NS	0.0001***	0.9251NS	0.2812NS
CAT	0.0001***	0.0004**	0.0001***	0.6548NS	0.7668NS	0.0001***
APX	0.0001***	0.0001***	0.0002**	0.0001***	0.0001***	0.0001***
MDA	0.0001***	0.0001***	0.0001***	0.0001***	0.0001***	0.0001***