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Supplementary Material

Phenotyping from lab to field – tomato lines screened for heat stress using F_v/F_m maintain high fruit yield during thermal stress in the field

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Table S1. Genotype number, source and name of the tomato germplasm collection

Genotype number	Genotype name	Code used in the study	Remarks
1	BL 410	BL410	Commercial cultivar in Nepal
2	BL 5.2	BL5	Pipeline variety selected from BL 410, Nepal
3	CL 1131	NCL1	Released as a commercial cultivar in Nepal
4	Dami 2	D2	Commercial variety, Nepal
5	Doti Local 1	DL1	Collected from Far-western part of Nepal
6	HRD 1	H1	Parent of commercial F1 tomato variety, originally introduced from Bangladesh
7	HRD 17	H17	Parent of commercial F1 tomato variety, originally introduced from Bangladesh
8	LA3956	IL44	Vegetable System Modelling, Leibniz Universitaet Hannover, Germany
9	LA3957	IL45	Vegetable System Modelling, Leibniz Universitaet Hannover, Germany
10	LA4024 CV E-6203	RP92	Vegetable System Modelling, Leibniz Universitaet Hannover, Germany
11	Lapsigede	LG	Commercial cultivar in Nepal
12	ST 02	ST2	Collected from Dolakha, Nepal
13	ST 07	ST7	Collected from Chitwan, Nepal
14	ST 08	ST8	Collected from Nawalparasi, Nepal
15	ST 0 b'S'	ST0	Pipeline variety collected from Lamjung, Nepal
16	ST 10	ST10	Pipeline variety, Nepal
17	ST 11'a'	ST11	Collected from Surkhet, Nepal
18	ST 12 'a'	ST12	Collected from Parbat, Nepal
19	ST 22	ST22	Pipeline variety, Nepal
20	ST 26	ST26	Collected from Parbat, Nepal
21	ST 52	ST52	Pipeline variety, Nepal
22	Thankot Selection 1	T1	Collected locally and selected at Kathmandu, Nepal
23	Thankot Selection 2	T2	Collected locally and selected at Kathmandu, Nepal
24	Thankot Selection 3	T3	Collected locally and selected at Kathmandu, Nepal
25	Thankot Selection 4	T4	Collected locally and selected at Kathmandu, Nepal
26	Thankot Selection 5	T5	Collected locally and selected at Kathmandu, Nepal
27	Thankot Selection 8	T8	Collected locally and selected at Kathmandu, Nepal
28	Thankot Selection 9	T9	Collected locally and selected at Kathmandu, Nepal

Table S2. The performance of and selection among the 28 tomato genotypes in the first and second screening experiments based on F_v/F_m

‘T’ indicates a heat-tolerant genotype with high F_v/F_m and ‘S’ indicates a heat-sensitive genotype with low F_v/F_m and ‘D’ indicated a discarded group with medium F_v/F_m

Genotype code	First screening		Second screening		Genotypes used in validation
	Performance	Selected genotype	Performance	Selected genotype	
BL410	D				
BL5	S	BL5	D		
NCL1	D				
D2	S	D2	S	D2	D2
DL1	T	DL1	D		
H1	T				
H17	T	H17	T	H17	H17
IL44	D				
IL45	D				
RP92	D				
LG	D				
ST2	S	ST2	D		
ST7	D				
ST8	D				
ST0	D				
ST10	T	ST10	D		
ST11	D				
ST12	D				
ST22	D				
ST26	D				
ST52	T	ST52	T	ST52	ST52
T1	S	T1	S	T1	T1
T2	D				
T3	D				
T4	D				
T5	D				
T8	D				
T9	D				

Table S3. Weather data of Nepalgunj (N 28° 06', E 81° 37' and 181 m above sea level), Nepal

It is estimated that the PPFD 550–600 $\mu\text{mol m}^{-2}\text{s}^{-1}$ during the trial period May–July 2015 at Nepalgunj, Nepal.

April	Temp, °C					May	Temp, °C					June	Temp, °C					July	Temp, °C				
	High	Low	Precip, mm	Avg Hi	Avg Lo		High	Low	Precip, mm	Avg Hi	Avg Lo		High	Low	Precip, mm	Avg Hi	Avg Lo		High	Low	Precip, mm	Avg Hi	Avg Lo
1	34	18	0	35	18	1	37	24	0	39	23	1	41	24	0	40	26	1	34	25	5	36	27
2	36	19	0	36	18	2	38	23	0	39	23	2	42	27	0	40	26	2	37	26	0	36	27
3	35	22	0	36	18	3	39	21	0	40	23	3	43	26	0	39	26	3	39	28	0	36	27
4	31	21	0	36	18	4	40	21	0	40	23	4	38	28	0	39	26	4	39	28	0	36	27
5	31	18	0	36	18	5	41	21	0	40	23	5	41	26	0	39	26	5	40	28	8	35	27
6	34	17	0	36	19	6	41	22	0	40	23	6	43	26	0	39	26	6	31	23	24	35	26
7	32	18	0	37	19	7	40	26	0	40	24	7	44	26	0	39	27	7	33	25	1	35	26
8	35	17	0	37	19	8	41	26	0	40	24	8	46	27	0	39	27	8	34	26	0	35	26
9	36	20	0	37	19	9	40	27	0	40	24	9	46	29	0	39	27	9	35	26	0	35	26
10	37	19	0	37	20	10	43	26	0	40	24	10	44	32	0	39	27	10	34	26	14	35	26
11	38	17	0	37	20	11	42	25	0	40	24	11	43	32	0	39	27	11	29	24	82	34	26
12	30	20	18	38	20	12	37	23	0	40	24	12	41	30	0	39	27	12	31	25	36	34	26
13	29	18	19	38	20	13	38	26	1	40	24	13	40	29	0	39	27	13	35	25	0	34	26
14	31	19	0	38	20	14	37	26	0	40	25	14	39	27	0	39	27	14	35	27	3	34	26
15	31	21	0	38	21	15	39	27	0	40	25	15	38	27	1	39	27	15	37	28	0	34	26
16	34	21	0	38	21	16	34	22	2	41	25	16	37	28	1	39	27	16	31	27	3	34	26
17	35	22	0	38	21	17	39	23	0	40	25	17	39	28	0	38	27	17	33	26	0	34	26
18	38	21	0	38	21	18	40	25	0	40	25	18	41	29	0	38	27	18	33	25	13	34	26
19	40	22	0	38	21	19	41	27	0	40	25	19	40	29	0	38	27	19	35	27	0	34	26
20	37	25	0	39	21	20	40	24	0	40	25	20	42	30	0	38	27	20	34	26	0	34	26
21	41	23	0	39	21	21	43	25	0	40	25	21	41	30	0	38	27	21	34	27	0	33	26
22	40	23	0	39	22	22	44	27	0	40	25	22	40	29	0	38	27	22	34	27	0	33	26

23	40	21	0	39	22	23	44	24	0	40	25	23	40	29	0	37	27	23	32	26	0	33	26
24	39	23	0	39	22	24	45	27	0	40	25	24	39	27	2	37	27	24	34	26	12	33	26
25	33	20	0	39	22	25	44	27	0	40	25	25	36	26	11	37	27	25	32	25	0	33	26
26	33	20	0	39	22	26	44	30	0	40	26	26	37	24	2	37	27	26	34	25	1	33	26
27	35	23	0	39	22	27	42	28	0	40	26	27	39	26	0	37	27	27	34	25	0	33	26
28	31	17	20	39	22	28	43	27	0	40	26	28	33	28	1	37	27	28	35	25	0	33	26
29	34	21	0	39	22	29	44	24	0	40	26	29	28	24	30	36	27	29	35	25	1	33	26
30	36	22	0	39	23	30	43	23	0	40	26	30	30	24	26	36	27	30	34	25	0	33	26
						31	44	26	0	40	26							31	33	26	2	33	26

Source: [www0accuweather0com: http://www0accuweather0com/en/np/nepalgunj/241973/may-weather/241973?monyr=5/1/2015&view=table](http://www0accuweather0com/en/np/nepalgunj/241973/may-weather/241973?monyr=5/1/2015&view=table)

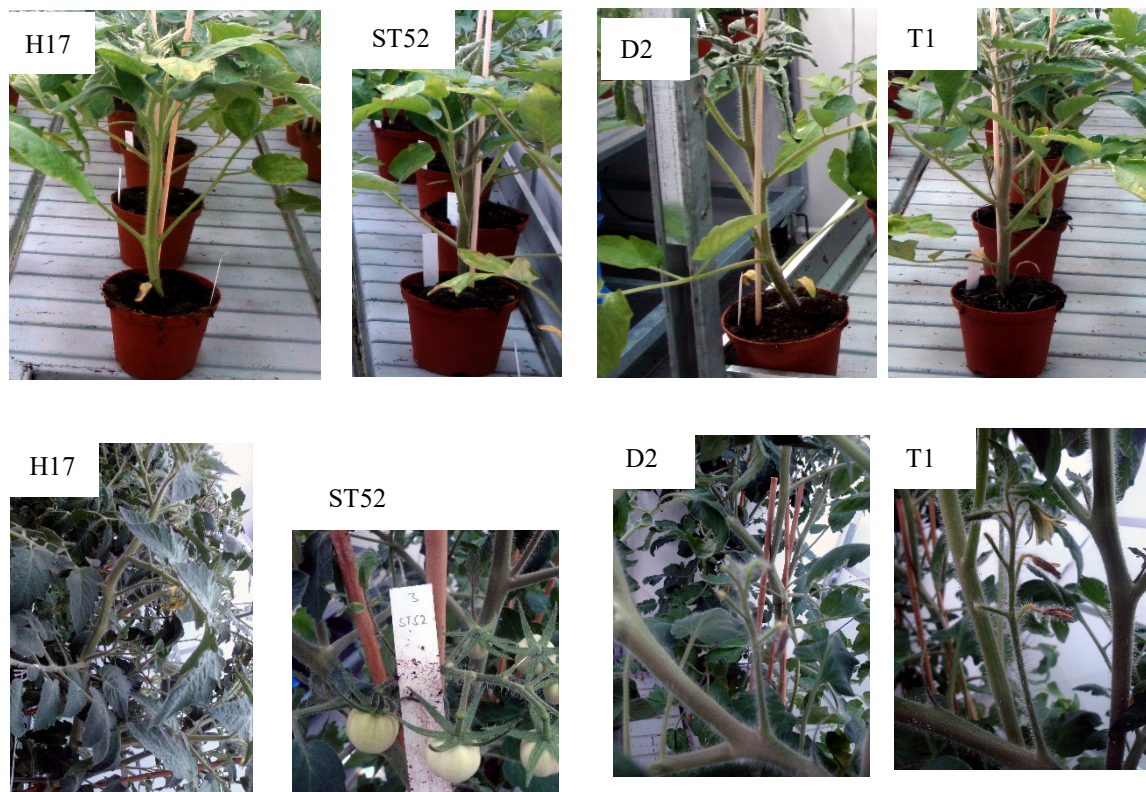


Fig. S1. Morphological difference in tomato genotypes in the climate chamber. Note: Pictures in upper row were taken during the first screening under heat stress (40/28 °C), and pictures taken during the second screening under heat stress (38/28 °C) were shown in the second row. H17 and ST52 were categorized as heat-tolerant; D2 and T1 were categorized as heat-sensitive based on the F_v/F_m .



Fig. S2. Morphological difference of tomato genotypes at natural light and high temperatures in the open field condition. Note: **(A, B)** Heat tolerant tomato genotype and **(C, D)** heat sensitive tomato genotype in the open field. The average temperature from May to July in the open field was 38 °C ranging from 34 °C to 41 °C during the day, and it was 26 °C ranging from 24 °C to 28 °C during the night. The pictures were taken on last fortnight of June 2015.