

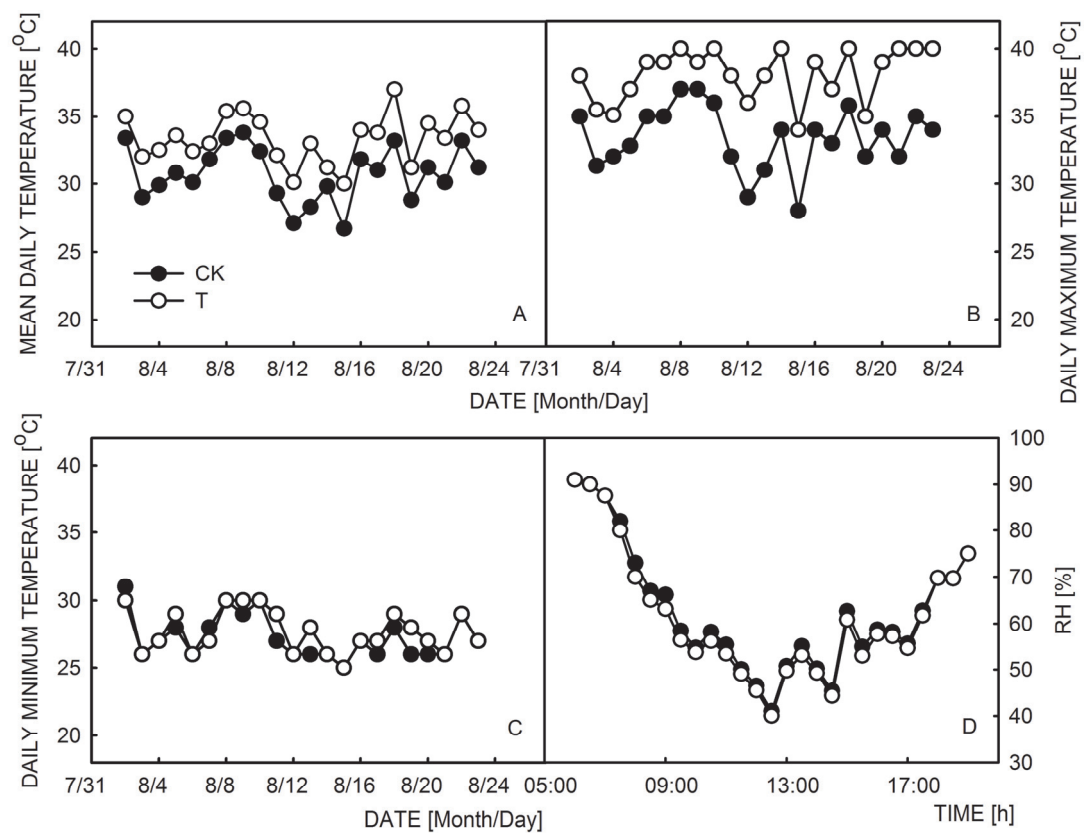


Fig. 1 Suppl. Mean daily air temperature (A), maximum daily temperature (B), minimum daily temperature (C), and the daily change of relative humidity (D) under a high temperature of 36 °C (T) and control conditions (CK) during 0 - 20 d after heading or anthesis.

Table 1 Suppl. Parameters of grain-filling characteristics of two cultivars (HHZ - Huanghuazhan and SG-1 - Shuanggui 1). The parameters of grain-filling characteristics were calculated by the Richards growth equation (1959): A - maximum mass of a kernel; $T_{\max}$ - time reaching a maximum grain filling rate; $G_{\max}$ - maximum grain-filling rate; G_{mean} - mean grain-filling rate; D - active grain-filling period; S - superior spikelets; I - inferior spikelets. Values followed by different letters within the same column for a cultivar and a grain position are significantly different at $P < 0.05$ between the treatment and control.

Cultivar	Position	Treatment	A [mg kernel ⁻¹]	$T_{\max}$ [d]	$G_{\max}$ [mg grain ⁻¹ d ⁻¹]	G_{mean} [mg grain ⁻¹ d ⁻¹]	D [d]
HHZ	S	CK	17.5 a	11.1 a	2.03 a	1.34 a	13.0 a
		T1	17.1 a	10.4 a	1.91 a	1.26 a	13.2 a
		T2	17.3 a	10.8 a	1.99 a	1.32 a	12.6 a
	I	CK	14.6 a	17.1 a	1.47 a	0.98 a	13.8 a
		T1	13.1 b	14.6 b	1.35 b	0.89 a	14.4 a
		T2	13.9 a	17.2 a	1.49 a	1.00 a	13.5 a
SG-1	S	CK	17.5 a	11.0 a	1.84 b	1.21 b	14.5 a
		T1	15.8 b	10.2 a	1.74 b	1.15 b	13.0 b
		T2	16.7 a	10.3 a	2.26 a	1.50 a	11.1 c
	I	CK	15.5 a	20.2 a	1.00 b	0.66 b	21.9 a
		T1	13.3 b	14.2 b	1.60 a	1.07 a	12.4 b
		T2	14.7 a	21.7 a	0.93 b	0.62 b	21.2 a

Table 2 Suppl. The date and temperature during heat-stress treatment. (SG-1 - Shuanggui 1; HHZ - Huanghuazhan). Means $\pm$ SDs ($n = 10$). ** and * indicate significant difference at $P < 0.01$ and $P < 0.05$ between the treatment and control, respectively.

Cultivar	Month/day)	Maximum daily temperature		Mean daily temperature		Minimum daily temperature	
		CK	heat-stress	CK	heat-stress	CK	heat-stress
SG-1	2010	8/2—8/11	34.3 $\pm$ 0.3	38.1 $\pm$ 1.2**	30.1 $\pm$ 0.3	33.6 $\pm$ 0.4**	28.2 $\pm$ 0.2
		8/12—8/21	32.3 $\pm$ 0.8	37.8 $\pm$ 0.7**	29.5 $\pm$ 0.2	32.9 $\pm$ 0.6**	26.2 $\pm$ 0.1
	2011	8/4—8/13	33.7 $\pm$ 0.4	38.6 $\pm$ 1.5**	30.2 $\pm$ 0.7	33.2 $\pm$ 0.4**	27.6 $\pm$ 0.2
		8/14—8/23	33.2 $\pm$ 1.3	38.4 $\pm$ 1.2**	29.5 $\pm$ 0.6	33.5 $\pm$ 0.8**	26.5 $\pm$ 0.2
HHZ	2010	8/4—8/13	33.7 $\pm$ 1.1	38.1 $\pm$ 0.8**	29.9 $\pm$ 0.4	33.2 $\pm$ 0.6**	27.7 $\pm$ 0.1
		8/14—8/23	33.2 $\pm$ 0.2	38.4 $\pm$ 0.6**	30.1 $\pm$ 0.5	33.7 $\pm$ 0.5**	26.6 $\pm$ 0.2
	2011	8/7—8/16	33.3 $\pm$ 0.8	38.3 $\pm$ 0.9**	30.2 $\pm$ 0.3	32.9 $\pm$ 0.2**	27.4 $\pm$ 0.2
		8/17—8/26	32.9 $\pm$ 0.7	38.7 $\pm$ 1.6**	29.7 $\pm$ 0.4	33.9 $\pm$ 0.3**	25.6 $\pm$ 0.1

Table 3 Suppl. Correlation coefficients between grain-filling rate and content of free polyamines (HHZ - Huanghuazhan, SG-1 - Shuanggui 1); * and ** indicate significant correlations at $P < 0.05$ and $P < 0.01$, respectively ($n = 39$).

Cultivars/polyamines	Spd	Spm	Put	Spm/Spd	Spd+Spm	(Spd+Spm)/Put
HHZ	0.665**	0.866**	0.078	0.878**	0.768**	0.639**
SG-1	0.401*	0.548**	0.073	0.864**	0.678**	0.533**

Table 4 Suppl. Correlation coefficients between grain-filling rate and content of phytohormones [HHZ - Huanghuazhan, SG-1 - Shuanggui 1); r_1 - $Z+ZR+IAA+ABA$, r_2 - $(Z+ZR+IAA)/ABA$, r_3 - $ABA/(Z+ZR+IAA)$, r_4 - $ABA/(Z+ZR+IAA+ABA)$]. * and ** indicate significant correlations at $P < 0.05$ and $P < 0.01$, respectively ($n = 39$).

Correlation coefficient	Z+ZR	IAA	ABA	r_1	r_2	r_3	r_4
HHZ	0.868**	0.840**	0.916**	0.890**	-0.375*	0.370*	0.402*
SG-1	0.759**	0.807**	0.930**	0.832**	-0.403**	0.378*	0.412**