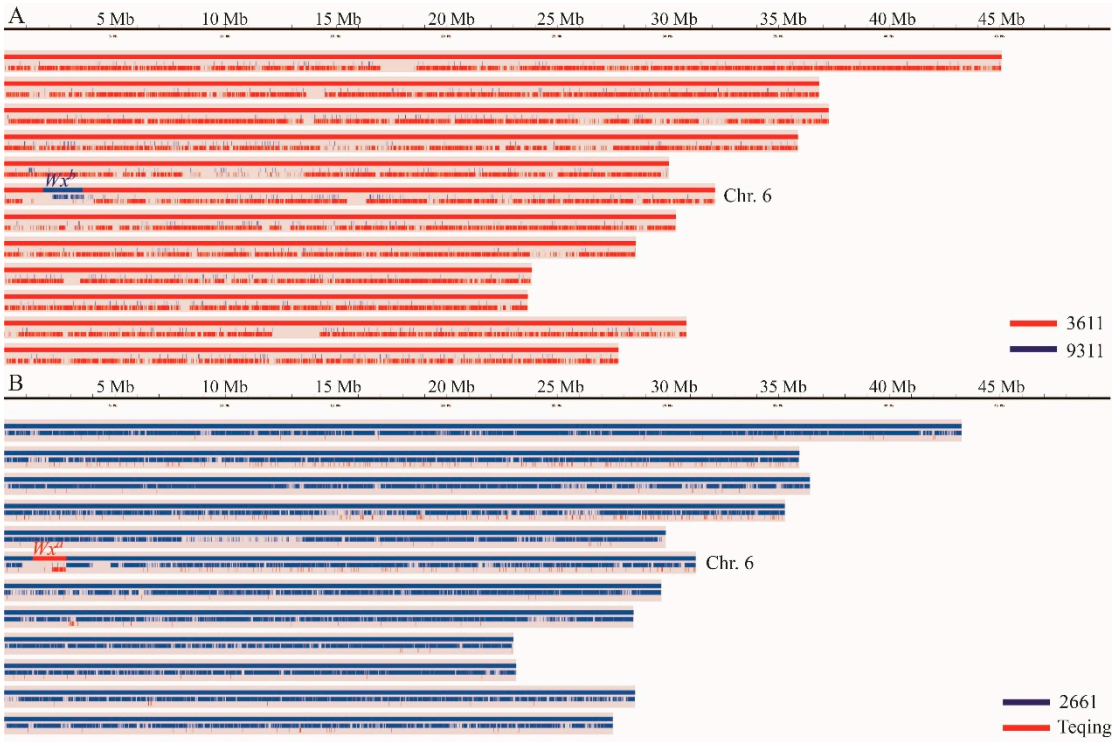
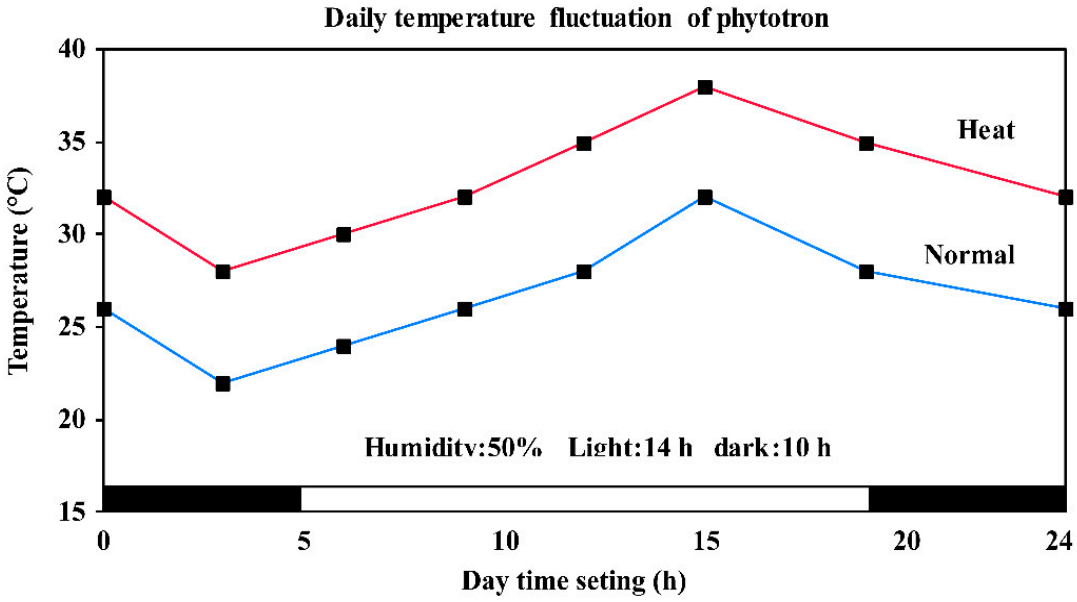
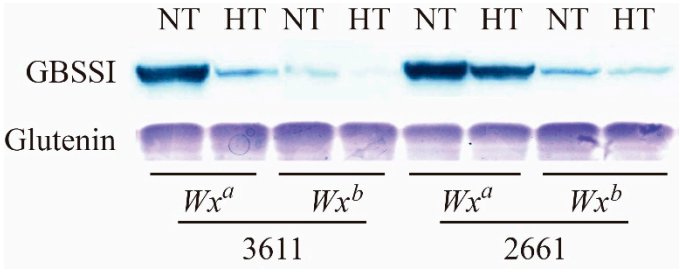
Supplementary Figures and Tables



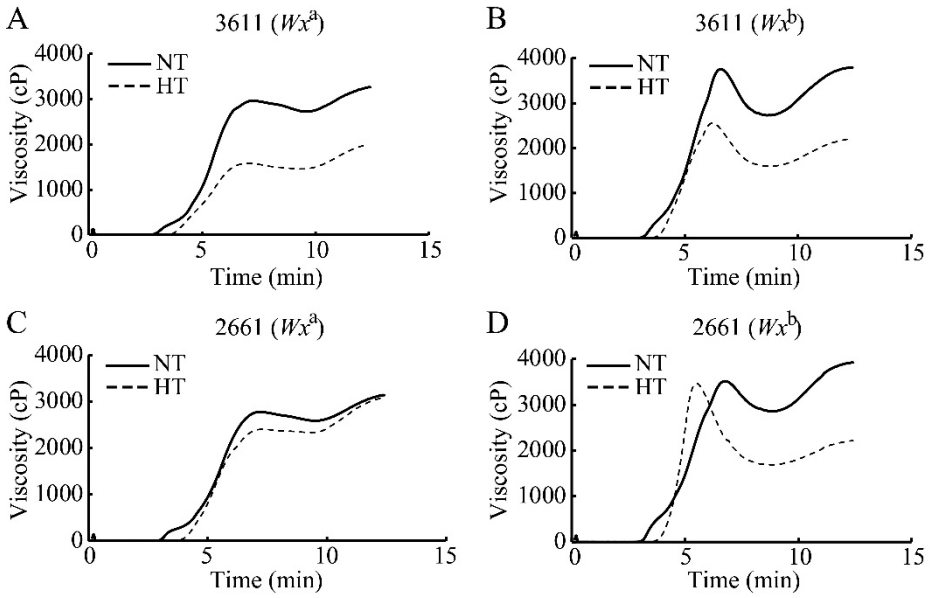
Supplementary Figure S1. Genomic resequencing analysis of *Wx* NILs with different backgrounds. (A) Genomic resequencing analysis of *Wx* NILs with 3611 background. (B) Genomic resequencing analysis of *Wx* NILs with 2661 background.



Supplementary Figure S2. Artificial climate chamber condition setting for temperature treatment



Supplementary Figure S3. The influence of high temperature on the expression level of GBSSI protein in the mature seeds from different *Wx* NILs. "NT" stands for normal condition and "HT" stands for high temperature condition.



Supplementary Figure S4. The influence of high temperature on the RVA features of *Wx* NILs with 3611 (**A** and **B**) and 2661 (**C** and **D**) genetic backgrounds. "NT" stands for normal condition and "HT" stands for high temperature condition.

Supplementary Table S1. Starch SEC analysis of different *Wx* NILs planted under different temperature conditions

Samples	AC（%）	P2（%）	P1（%）
3611-Wx^a NT	25.50±0.82	20.69±0.74	53.81±0.83
3611-Wx^a HT	17.10±0.49**	27.78±0.34**	55.12±1.21**
3611-Wx^b NT	13.22±0.67	22.16±1.11	64.62±0.68
3611-Wx^b HT	10.62±0.41**	24.23±0.89**	65.15±0.79*
2661-Wx^a NT	23.63±0.62	20.65±0.34	55.72±2.48
2661-Wx^a HT	23.34±0. 91	25.09±0.66**	51.57±1.46**
2661-Wx^b NT	16.60±0.39	21.75±0.53	61.65±0.34
2661-Wx^b HT	9.30±0.59**	28.23±0.43**	62.47±0.68

"NT" stands for normal condition and "HT" stands for high temperature condition. P1, P2 and P3 represent the peaks of grade 2 amylopectin, grade 1 amylopectin, and amylose, respectively. P1 is composed of A chains and short B chains of external starch, and P2 is composed of long B chains. Double asterisks denote a highly significant difference using Student's *t*-test ($P < 0.01$), single asterisk denotes a significant difference using Student's *t*-test ($0.01 < P < 0.05$). All difference significance analyses were performed between the same samples at different temperatures.

Supplementary Table S2. DSC analysis of different *Wx* NILs planted under different temperature conditions

Samples	△Hgel (J/g)	T_P (°C)	T_0 (°C)	T_C (°C)
3611-*Wx*^{a} NT	7.02±0.29	70.85±0.21	65.50±0.42	78.05±0.49
3611-*Wx*^{a} HT	8.98±0.28**	81.35±0.21**	74.05±0.35**	88.25±0.92**
3611-*Wx*^{b} NT	8.83±0.14	73.90±0.00	69.50±0.14	80.15±0.07
3611-*Wx*^{b} HT	8.67±0.54	81.30±0.14**	74.55±0.21**	88.40±0.14**
2661-*Wx*^{a} NT	7.08±0.30	70.80±0.00	65.35±0.21	77.55±0.49
2661-*Wx*^{a} HT	7.21±1.38**	74.25±0.07**	68.20±0.28**	80.55±0.49*
2661-*Wx*^{b} NT	8.63±0.17	73.25±0.21	67.90±0.28	80.10±0.00
2661-*Wx*^{b} HT	10.41±1.49**	83.10±0.00**	74.85±0.35**	89.85±0.35**

"NT" stands for normal condition and "HT" stands for high temperature condition. T_0, T_P and T_C mean the temperatures of onset (T_0), peak (T_P), and conclusion (T_C), respectively; △Hgel represents the enthalpy of gelatinization. Double asterisks denote a highly significant difference using Student's *t*-test ($P < 0.01$), single asterisk denotes a significant difference using Student's *t*-test ($0.01 < P < 0.05$). All difference significance analyses were performed between the same samples at different temperatures.

Supplementary Table S3. Relative crystallinity of different *Wx* NILs planted under different temperature conditions

Samples	Relative crystallinity (%)
3611-*Wx*^{a} NT	27.80±0.00
3611-*Wx*^{a} HT	33.03±0.01*
3611-*Wx*^{b} NT	31.06±0.01
3611-*Wx*^{b} HT	33.39±0.00
2661-*Wx*^{a} NT	29.98±0.01
2661-*Wx*^{a} HT	31.52±0.01
2661-*Wx*^{b} NT	31.57±0.00
2661-*Wx*^{b} HT	32.98±0.00*

"NT" stands for normal condition and "HT" stands for high temperature condition. Single asterisk denotes a significant difference using Student's *t*-test ($0.01 < P < 0.05$). All difference significance analyses were performed between the same samples at different temperatures.