

Table S1. Long-term mean monthly maximum & minimum temperature (°C) & pan evaporation (mm) for 9 locations in Yunnan Province.

Location	Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean
Jinghong	Tmax	26.10	30.30	31.90	29.00	29.00	28.10	27.00	27.30	27.30	25.80	24.00	21.50	27.30
	Tmin	12.60	12.80	15.50	16.20	18.70	20.00	20.00	19.60	19.30	17.20	15.00	12.10	16.60
	Evap	61.80	82.00	109.70	115.90	127.10	110.50	87.00	99.20	91.70	88.50	68.60	66.90	92.40
Xingping	Tmax	17.70	20.10	24.20	26.60	27.50	27.20	26.60	27.40	25.90	24.30	21.60	18.30	23.90
	Tmin	5.10	6.80	10.30	13.50	16.50	18.50	18.20	18.50	17.80	15.50	10.20	6.70	13.10
	Evap	40.12	60.10	101.20	120.13	128.15	119.13	90.23	97.10	85.13	80.12	57.12	51.20	78.26
Dehong	Tmax	21.70	24.10	26.90	27.80	29.00	28.20	27.90	29.40	29.60	29.40	25.90	23.40	26.90
	Tmin	7.20	9.60	12.60	16.40	18.60	21.30	21.30	21.80	21.60	19.50	13.20	8.90	16.00
	Evap	50.61	78.16	110.12	128.13	130.12	70.12	69.10	72.30	78.13	67.13	72.11	68.16	82.85
Mengzhe	Tmax	21.60	24.00	27.70	28.30	28.10	27.90	26.80	27.40	27.20	26.90	24.90	22.40	26.10
	Tmin	6.80	7.90	11.00	14.10	16.90	19.00	19.10	19.30	18.90	17.00	12.90	8.50	14.28
	Evap	52.5	64.1	78.89	87.13	128.34	118.16	90.23	91.22	86.13	82.34	60.12	58.23	83.12
Wenshang	Tmax	17.60	18.00	23.10	26.20	26.80	27.90	27.20	27.80	27.10	24.50	21.20	17.00	23.70
	Tmin	7.80	7.20	11.50	15.40	17.60	19.40	19.20	19.40	18.40	16.30	11.90	7.90	14.33
	Evap	43.20	51.50	70.20	87.21	110.21	128.12	130.12	110.13	99.20	78.23	77.15	78.17	88.62
Honghe	Tmax	20.30	22.30	26.70	29.40	30.70	29.80	29.10	30.40	29.40	28.00	23.80	20.50	26.70
	Tmin	10.50	11.40	15.50	17.70	20.40	21.50	20.90	21.50	20.90	19.00	14.80	12.00	17.18
	Evap	50.13	64.12	90.15	104.13	110.21	121.13	132.13	129.15	100.10	80.12	70.12	63.21	92.89
Puer	Tmax	20.90	24.40	26.80	25.10	25.30	24.50	23.40	23.80	23.50	21.70	20.30	17.80	23.13
	Tmin	9.20	9.90	12.80	13.60	15.90	17.60	17.40	17.10	16.70	14.60	11.90	9.10	13.82
	Evap	63.50	89.10	112.60	126.30	122.50	88.50	71.20	82.30	80.80	82.10	64.70	57.30	86.74
Lancang	Tmax	23.30	26.40	28.90	26.60	26.70	25.50	24.20	24.90	25.20	23.90	22.30	19.90	24.82
	Tmin	8.60	8.50	11.70	13.10	16.20	18.30	18.20	18.00	17.60	15.00	12.10	9.10	13.87
	Evap	66.80	78.80	107.30	110.50	117.60	88.40	71.70	83.30	82.40	89.50	73.90	65.90	86.34
Yiliang	Tmax	17.20	18.70	23.90	25.50	27.40	27.90	27.30	28.20	26.50	24.30	21.10	17.30	23.78
	Tmin	3.10	5.40	9.10	12.80	16.00	18.50	18.50	18.50	17.30	14.50	8.30	5.00	12.25
	Evap	48.90	53.60	5.30	64.40	186.20	100.10	131.50	101.40	17.80	15.10	156.00	10.80	74.26

Table S2. Monthly rainfall (mm) in 2016 and 2017 relative to the long-term mean monthly rainfall (mm) at 9 locations in Yunnan province.

Location	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean
Jinghong	2016	25.4	30.2	0.0	18.9	135.1	142.8	122.7	223.2	92.2	117.6	62.8	1.8	81.1
	2017	60.7	7.9	26.9	54.0	22.1	85.7	308.2	302.3	146.2	188.6	99.2	40.8	111.9
	Mean	11.1	13.0	26.6	58.8	144.7	148.0	225.4	200.8	135.7	93.7	60.9	17.9	11.1
Xingping	2016	44.0	15.9	14.2	42.8	66.3	155.0	131.8	197.9	121.1	96.3	112.5	10.6	84.0
	2017	52.5	10.4	31.7	114.8	43.3	43.2	229.9	240.0	118.1	121.1	123.1	35.1	98.2
	Mean	16.8	13.1	23.2	52.8	139.4	168.1	222.0	222.6	141.3	94.8	52.8	20.9	16.6
Dehong	2016	10.7	13.0	6.2	99.0	203.0	254.9	344.5	236.8	36.4	104.6	9.5	0.0	109.9
	2017	5.8	5.0	23.2	146.2	59.8	307.9	255.2	233.0	83.0	110.1	121.1	45.1	124.3
	Mean	9.8	17.8	21.5	55.3	161.6	259.5	309.3	253.9	167.0	132.3	51.6	10.6	9.8
Mengzhe	2016	31.1	34.7	1.5	48.2	153.9	178.2	172.4	282.7	69.7	122.5	88.8	6.5	99.2
	2017	53.1	22.3	47.1	91.4	146.7	261.9	323.7	301.7	179.7	145.1	112.1	35.2	158.6
	Mean	17.2	13.4	22.9	53.0	140.0	169.0	222.0	223.1	141.0	95.2	53.0	20.1	17.0
Wenshang	2016	35.9	28.4	37.3	59.2	175.9	85.2	200.2	190.8	106.1	33.5	74.0	2.8	85.8
	2017	31.2	5.2	61.1	49.3	78.9	127.8	244.8	219.2	167.6	158.1	121.1	20.2	109.5
	Mean	13.9	18.3	28.9	53.8	134.8	206.4	185.4	119.4	66.0	45.6	11.9	13.9	18.3
Honghe	2016	48.9	53.6	5.3	64.4	186.2	100.1	131.5	101.4	17.8	15.1	156.0	10.8	74.3
	2017	55.6	5.6	26.9	76.8	72.4	68.3	210.0	171.4	69.8	70.1	142.3	33.1	84.1
	Mean	17.2	17.2	25.0	52.7	102.5	112.2	169.8	152.4	91.7	52.3	48.1	13.9	17.2
Puer	2016	58.9	38.5	1.4	51.4	164.1	248.7	271.1	316.1	166.2	113.7	81.9	3.3	126.3
	2017	72.5	23.8	13.9	87.6	56.0	116.4	402.4	308.4	121.1	132.1	112.1	20.1	133.6
	Mean	14.1	18.0	25.5	52.8	155.7	213.9	329.4	289.2	178.0	120.0	69.1	21.8	14.1
Lancang	2016	17.5	47.0	7.8	54.0	169.8	280.0	300.9	227.7	162.4	116.5	166.0	8.8	129.9
	2017	58.5	11.3	3.7	158.4	61.7	176.3	326.0	345.0	348.3	166.4	110.4	24.6	149.2
	Mean	11.9	16.2	21.9	51.3	157.0	262.7	334.4	295.7	185.0	163.0	65.9	21.5	11.9
Yilaing	2016	11.1	10.8	14.5	15.4	58.5	57.9	47.9	136.6	115.2	65.5	82.3	3.7	51.6
	2017	15.3	4.7	50.8	40.5	21.8	178.4	317.0	153.2	125.7	82.1	101.3	40.1	100.8
	Mean	13.0	17.3	17.8	28.0	95.8	145.8	162.6	181.7	111.7	71.9	43.1	10.9	13.0

Table S3. Identities and mean grain yields (t ha⁻¹) of 3 genotypes in each of 35 environments in Yunnan Province.

Environment	G1	G2	G3	G1 (PR23)	G2 (RD23)	G3 (HXR7)	Mean
JH16F	PR23	Caoguogu	HXR7	5.895	6.500	4.945	5.780
JH16S	PR23	Caoguogu	HXR7	5.223	5.710	4.803	5.245
JH17F	PR23	Caoguogu	HXR7	5.639	6.650	5.394	5.894
JH17S	PR23	Caoguogu	HXR7	4.670	5.410	4.344	4.808
XP16S	PR23	Wenfu6	HXR7	6.049	6.510	6.128	6.229
XP17F	PR23	Wenfu6	HXR7	5.065	6.450	4.525	5.347
DH16F	PR23	Deyou8	HXR7	7.335	5.320	6.105	6.253
DH17F	PR23	Deyou8	HXR7	6.752	6.750	4.638	6.047
MZ16F	PR23	Diantun502	HXR7	10.670	7.520	8.358	8.849
MZ16S	PR23	Diantun502	HXR7	5.528	7.990	5.437	6.318
MZ17F	PR23	Diantun502	HXR7	8.598	5.710	7.652	7.320
MZ17S	PR23	Diantun502	HXR7	4.670	7.690	4.496	5.619
WS16F	PR23	Wendao11	HXR7	6.507	6.750	5.996	6.418
WS17F	PR23	Wendao11	HXR7	5.388	7.350	5.648	6.128
HH16F	PR23	Mazhagu	HXR7	6.084	6.150	3.227	5.154
HH17F	PR23	Mazhagu	HXR7	4.782	6.030	4.621	5.145
PU15F	PR23	Yunjing37	HXR7	5.237	6.980	4.788	5.668
PU16F	PR23	Yunjing37	HXR7	4.938	6.990	5.635	5.854
PU17F	PR23	Yunjing37	HXR7	5.217	7.050	6.969	6.412
LC16F	PR23	Dongfugu	HXR7	6.165	5.700	6.352	6.072
LC17F	PR23	Dongfugu	HXR7	6.003	6.000	6.357	6.120
YL16F	PR23	Chujing28	YJ26	9.410	9.870	9.835	9.705
YL17F	PR23	Chujing28	YJ26	8.203	9.350	9.106	8.886
PU11F	PR23	RD23	CJ28	7.350	6.990	7.210	7.183
PU12F	PR23	RD23	CJ28	6.720	6.480	6.890	6.697
PU13F	PR23	RD23	CJ28	6.440	6.230	6.810	6.493
PU15FA	PR23	RD23	HXR7	5.240	5.310	4.790	5.113
PU16FA	PR23	RD23	HXR7	4.940	5.120	5.640	5.233
PU17FA	PR23	RD23	HXR7	5.220	5.400	6.970	5.863
JH11F	PR23	RD23	BN21	5.620	5.640	5.910	5.723
JH11S	PR23	RD23	BN21	5.210	5.300	5.080	5.197
JH12F	PR23	RD23	BN21	5.030	4.910	5.520	5.153
JH12S	PR23	RD23	BN21	5.900	6.310	6.150	6.120
JH13F	PR23	RD23	BN21	4.900	5.110	5.210	5.073
JH13S	PR23	RD23	BN21	4.760	5.230	5.100	5.030

