

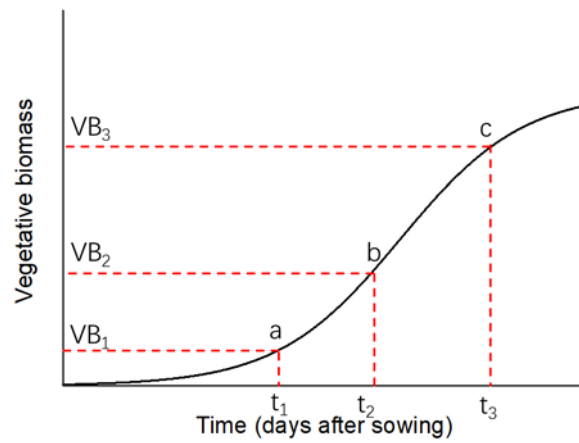
Supplementary Table S1 Origin, length of growing season, and flowering time of 18 genotypes of spring wheat used in field experiment. GAAS: Gansu Agricultural Academy Science; DIAAS: Dingxi Agricultural Academy Science; GAAU: Gansu Agricultural University; ICARDA: International Center for Agricultural Research in the Dry Areas. Anthesis was when anthers were visible in about 50% of spikelets in each PVC cylinder, and flowering time was defined as the duration from sowing to flowering.

Genotype	Genotypic type	Breeder/ Source	Year released or introduced	Time from sowing to flowering (days)	Length of growing season (days)
Heshangtou	Landrace	Landraces	Before 1900	82	115
Jinbaoyin	Landrace	Landraces	Before 1900	90	124
Dingxi24	Cultivar	DIAAS	1971	90	122
Lantian	Cultivar	GAAS	1993	77	106
Dingxi35	Cultivar	DIAAS	1996	89	121

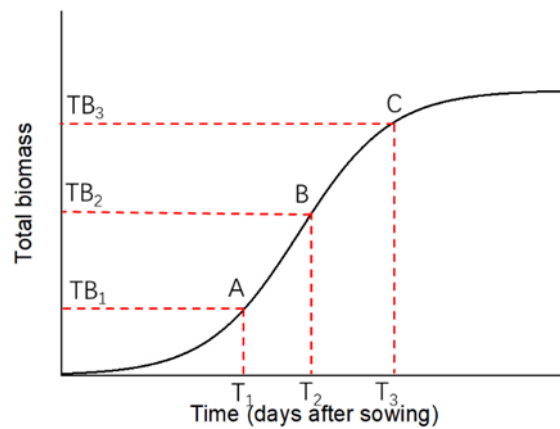
Longchun23	Cultivar	GAAS	2004	77	110
Longchun30	Cultivar	GAAS	2004	75	108
Xihan2	Cultivar	GAAU	2006	80	110
Longchun26	Cultivar	GAAS	2010	76	108
Ganhan5	Line	GAAU	Not released	76	108
Zhonghan4	Line	GAAS	Not released	76	110
Ganhan3	Line	GAAU	Not released	79	112
Zhonghan1	Line	GAAS	Not released	78	112
Dingxi43-4	Line	DIAAS	Not released	78	110
021-128	Line	GAAS	Not released	77	111
DAIRA-12	Cultivar	ICARDA	2012	82	109
DURRA-5	Cultivar	ICARDA	2012	76	109
NABUQ-6	Unknown	ICARDA	2012	74	107

Supplementary Table S2. Yield components and time until flowering (days after sowing) of 18 genotypes of spring wheat grown in pots. Total biomass comprises roots, stem, leaves, and spikes; vegetative biomass comprises total biomass minus grain yield. Genotypes are listed in ascending order of grain yield.

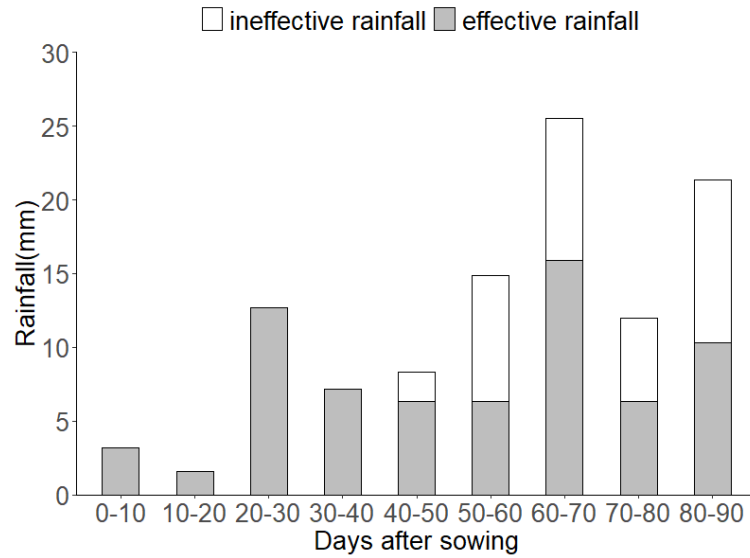
Genotypes ID	Genotypes	Time from sowing to flowering (days)	Length of growing season (days)	Total biomass (g m ⁻²)	Vegetative biomass (g m ⁻²)	Grain yield (g m ⁻²)	Harvest index	Reproductive effort
1	Jinbaoyin	75±1	99±1	1801	1450	351	0.22	0.19
2	Dingxi24	72±1	98±1	1887	1463	425	0.24	0.23
3	Dingxi35	71±1	97±1	2036	1568	468	0.25	0.23
4	Heshangtou	69±1	96±1	1957	1472	485	0.27	0.25
5	Longchun23	65±1	96±1	1648	1117	531	0.34	0.32
6	Xihan2	69±1	97±1	1962	1391	571	0.31	0.29
7	Zhonghan4	65±1	96±1	1830	1231	599	0.35	0.33
8	DAIRA-12	67±1	96±1	1742	1136	606	0.37	0.35
9	DURRA-5	68±1	97±1	1756	1143	612	0.37	0.35
10	Ganhan3	65±1	96±1	1948	1312	637	0.35	0.33
11	Zhonghan1	67±1	96±1	1969	1330	639	0.35	0.32
12	Dingxi43-4	69±1	97±1	1782	1139	642	0.38	0.36
13	021-128	65±1	97±1	1665	1010	655	0.41	0.39
14	Ganhan5	63±1	96±1	1685	1030	655	0.4	0.39
15	Lantian	65±1	97±1	1778	1095	683	0.4	0.38
16	Longchun26	61±1	95±1	1654	955	699	0.45	0.42
17	Longchun30	64±1	96±1	1760	1023	737	0.43	0.42
18	NABUQ-6	61±1	96±1	1766	1017	750	0.45	0.42
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Supplementary Figure. S1 Relationship between the time from sowing to flowering and final vegetative biomass at flowering for genotypes with different pre-flowering growth periods. If a plant flowers at t_1 , its vegetative biomass is VB_1 . The same applies to t_2 and t_3 .



Supplementary Figure. S2 Relationship between the time from sowing to maturity and final total biomass at the end of the growing season for genotypes with different growth periods. If a plant maturity at T_1 , its total biomass is TB_1 . The same applies to T_2 and T_3 .



Supplementary Figure. S3 Irrigation volume corresponding to average local rainfall during the same period from 2005 to 2014. Up to 45 days after sowing, rainfall less than 2 mm was not included, since it would have evaporated completely within a few of hours. The total volume of irrigation during the whole growing season was the same as that provided by 70 mm of rainfall.