

TABLE S1**Field experiment design and traits investigated in multiple environments**

Name of macro-environment	Name of agro-ecological area	Location and geographic feature	Rapeseed growing period	Population planted	Code of experiment*	Investigated traits†		
Semi-winter	Middle valley of Yangtze River	Wuhan, Hubei, E114°21′ / N30°37′ / 40m	Oct 2002 – May 2003	TNDH	S3D	BN,FT,MT,PH,PN,SN,SW,SY		
			Oct 2003 – May 2004	TNDH	S4D	BN,FT,MT,PH,PN,SN,SW,SY		
		Wuhan, Hubei, E114°21′ / N30°37′ / 40m	Oct 2006 – May 2007	TNDH	S7D	FT,MT,SW,SY		
			Oct 2004 – May 2005	TNDH	S5D	BN,FT,MT,PH,PN,SN,SW,SY		
		Jiangling, Hubei, E113°25′ / N30°30′ / 40m	Oct 2004 – May 2005	RC-F ₂	S5R	BN,FT,MT,PH,PN,SN,SW,SY		
			Oct 2005 – May 2006	TNDH	S6D	BN,BY,FT,MT,PH,PN,SN,SW,SY		
		Daye, Hubei, E114°48′ / N30°06′ / 100m	Oct 2005 – May 2006	RC-F ₂	S6R	BN,BY,FT,MT,PH,PN,SN,SW,SY		
			Lower valley of Yangtze River	Hangzhou, Zhejiang, E120°12′ / N30°16′ / 40m	Oct 2006 – May 2007	TNDH	E7D	FT,MT,SW,SY
		Winter	The Loess Plateau	Dali, Shaanxi, E109°56′ / N34°52′ / 800m	Sep 2002 – Jun 2003	TNDH	N3D	BN,FT,MT,PH,PN,SN,SW,SY
					Sep 2003 – Jun 2004	TNDH	N4D	BN,FT,MT,PH,PN,SN,SW,SY
Dali, Shaanxi, E109°56′ / N34°52′ / 800m	Sep 2005 – Jun 2006			TNDH	N6D	BN,BY,FT,MT,PH,PN,SN,SW,SY		

	2006			
	Sep 2005 – Jun			
Dali, Shaanxi, E109°56' / N34°52' / 800m	2006	RC-F ₂	N6R	BN,BY,FT,MT,PH,PN,SN,SW,SY
	Sep 2006 – Jun			
Dali, Shaanxi, E109°56' / N34°52' / 800m	2007	TNDH	N7D	FT,MT,SW,SY

*The first letter represents the code of the agro-ecological area (middle valley of Yangtze River was in south China and coded as S; lower valley of Yangtze River was in east China and coded as E; the Loess Plateau was in north China and coded as N), the middle letter represents the year of harvest and the last letter represents the code of the population (D, DH population; R, RC-F₂ population). †BN: branch number; BY: biomass yield; FT: flowering time; MT: maturity time; PH: plant height; PN: pod number; SN: seed number; SW: seed weight; SY: seed yield.