

Description of Additional Supplementary Files

File name: Supplementary Data 1

Description: Genetic regions and candidate gene list underlying selection of *DG* vs. *PC* and *Par* vs. *DG*, respectively.

- s1 Overlapping regions of F_{ST} (top 5%) and compared π (50%) analysis of *DG/PC*.
- s2 Genes within putative selective sweeps of *DG* from *PC*.
- s3 Overlapping regions of F_{ST} (top 5%) and compared π (50%) analysis of *Par/PC*.
- s4 Genes within putative selective sweeps of *Par* from *DG*.
- s5 Differently expressed genes during (DEGs) floral transition in the selected regions of *DG/PC*
- s6 Differently expressed genes during (DEGs) floral transition in the selected regions of *Par/DG*

File name: Supplementary Data 2

Description: Enriched Gene Ontology (GO) categories of the selected genes in Supplementary Data 1, s1, and s3.

- s1 A total of 171 GO terms were specifically enriched in the *DG/PC* comparison.
- s2 A total of 45 GO terms were specifically enriched in the *Par/DG* comparison.

File name: Supplementary Data 3

Description: The selective loci and gene list which were specially differentiates between *Par* vs. *DG* but not *DG* vs. *PC*.

- s1 The selective loci specially differentiates between *Par/DG* but not *DG/PC*.
- s2 The selective genes which were specially differentiates between *Par/DG* but not *DG/PC*.

File name: Supplementary Data 4

Description: Flowering time QTL(HS)s which specially respond to high temperature

File name: Supplementary Data 5

Description: Differentially expressed genes (DEGs) in the RNA sequencing data of *PC*, *DG* and *Par* planted under natural field.

- s1 DEGs of *PC* planted under natural field conditions in Beijing
- s2 DEGs of *DG* planted under natural field conditions in Beijing
- s3 DEGs of *Par* planted under natural field conditions in Beijing
- s4 Expression patterns of the three candidates BrJMJs in gQTLA09-1 of *PC*, *DG* and *Par* before and during bolting under natural field conditions in Beijing.
- s5 Mapping information of the RNA sequencing samples

File name: Supplementary Data 6

Description: Candidate BrMJ18 binding genes screened by CHIP-seq and RNA-seq.

File name: Supplementary Data 7

Description: Genes enriched in anti-GFP CHIP-seq using BrMJ18-OX *Par* plants under NC and HT conditions.

s1 Genes enriched in BrMJ18^{PC}-OX *Par* plants under NC condition.

s2 Genes enriched in BrMJ18^{Par}-OX *Par* plants under NC condition.

s3 Genes enriched in BrMJ18^{PC}-OX *Par* plants under HT condition.

s4 Genes enriched in BrMJ18^{Par}-OX *Par* plants under HT condition.

s5 Data quality

File name: Supplementary Data 8

Description: Differentially expressed genes (DEGs) in the RNA sequencing data of BrMJ18^{PC}-OX and BrMJ18^{Par}-OX *Par* plants.

s1 DEGs in BrMJ18^{PC}-OX *Par* plants under NC conditions

s2 DEGs in BrMJ18^{Par}-OX *Par* plants under NC conditions

s3 DEGs in in BrMJ18^{PC}-OX *Par* plants under HS conditions

s4 DEGs in BrMJ18^{Par}-OX *Par* plants under HS conditions

s5 Mapping information