

Supplementary Table S1. Days to heading and heading dates of the RGBM lines grown at different times under long-day condition

| Line name | Designation | Days to heading | | | Heading date | | |
|-----------|---------------------------------------|-----------------|--------|--------|--------------|------------|------------|
| | | 15-Mar | 31-Mar | 15-Apr | 15-Mar | 31-Mar | 15-Apr |
| PSH | | - | - | - | - | - | - |
| RGBM1-1-1 | <i>Gn1a</i> + <i>WFP</i> + Ehd-ST12-1 | 94±4 | 100±4 | 96±1 | June 14~22 | July 5~13 | July 18~21 |
| RGBM1-1-3 | <i>Gn1a</i> + <i>WFP</i> + Ehd-ST12-2 | 94±1 | 97±1 | 92±3 | June 16~20 | July 5~7 | July 15~21 |
| RGBM2-1-1 | <i>Gn1a</i> + <i>WFP</i> + Ehd-ST12-3 | 95±2 | 98±1 | 92±1 | June 15~20 | July 6~8 | July 15~18 |
| RGBM2-1-2 | <i>Gn1a</i> + <i>WFP</i> + Ehd-ST12-4 | 99±4 | 101±3 | 97±3 | June 17~22 | July 7~14 | July 16~23 |
| RGBM2-1-3 | <i>Gn1a</i> + <i>WFP</i> + Ehd-ST12-5 | 98±5 | 101±2 | 94±1 | June 13~25 | July 8~14 | July 16~19 |
| RGBM1-1-2 | <i>Gn1a</i> + Ehd-ST12-1 | 96±2 | 102±2 | 96±2 | June 6~22 | July 8~13 | July 18~22 |
| RGBM2-1-4 | <i>Gn1a</i> + Ehd-ST12-2 | 107±4 | 103±5 | 98±1 | June 3~28 | July 11~18 | July 21~23 |

- indicates no data because PSH cannot heading in summer season.

Supplementary Table S2. Days to heading of the selected promising lines grown at different locations in the 2023 Dry and Monsoon seasons

| Line name | Designation | Days to heading | | | | | | | | | |
|-----------|--------------------------------|-----------------|------|----------|------|-------|------|---------|------|---------|-------|
| | | Myaungmya | | Latpadan | | Yezin | | Kyaukse | | Average | |
| | | 23DS | 23MS | 23DS | 23MS | 23DS | 23MS | 23DS | 23MS | 23DS | 23MS |
| PSH | | - | 148 | - | 149 | - | 128 | - | 149 | - | 143.5 |
| RGBM2-1-1 | <i>Gn1a</i> + WFP + Ehd-ST12-3 | 98 | 88 | 96 | 90 | 99 | 92 | 100 | 91 | 98.3 | 90.3 |
| RGBM2-1-3 | <i>Gn1a</i> + WFP + Ehd-ST12-5 | 100 | 92 | 99 | 93 | 101 | 92 | 101 | 91 | 100.3 | 92 |
| RGBM1-1-2 | <i>Gn1a</i> + Ehd-ST12-1 | 108 | 96 | 100 | 98 | 111 | 97 | 103 | 92 | 105.5 | 95.8 |
| RGBM2-1-4 | <i>Gn1a</i> + Ehd-ST12-2 | 110 | 99 | 105 | 98 | 114 | 104 | 107 | 97 | 109.0 | 99.5 |

- indicates no data because PSH cannot heading in summer season.

Supplementary Table S3. QTL analysis of days to heading in BC₂F₃ population derived from PSH/ST12

| QTL name | Chr. | Left marker ^a | Right marker ^a | Peak marker ^a | Peak LOD | PVE (%) ^b | Additive effect ^c | Dominant effect | LOD threshold ^d |
|--------------|------|--------------------------|---------------------------|--------------------------|----------|----------------------|------------------------------|-----------------|----------------------------|
| <i>qDTH6</i> | 6 | 1,955,920 | 6,595,302 | 2,040,863 | 12.7** | 66.08 | -7.79 | -5.07 | 3.6 |

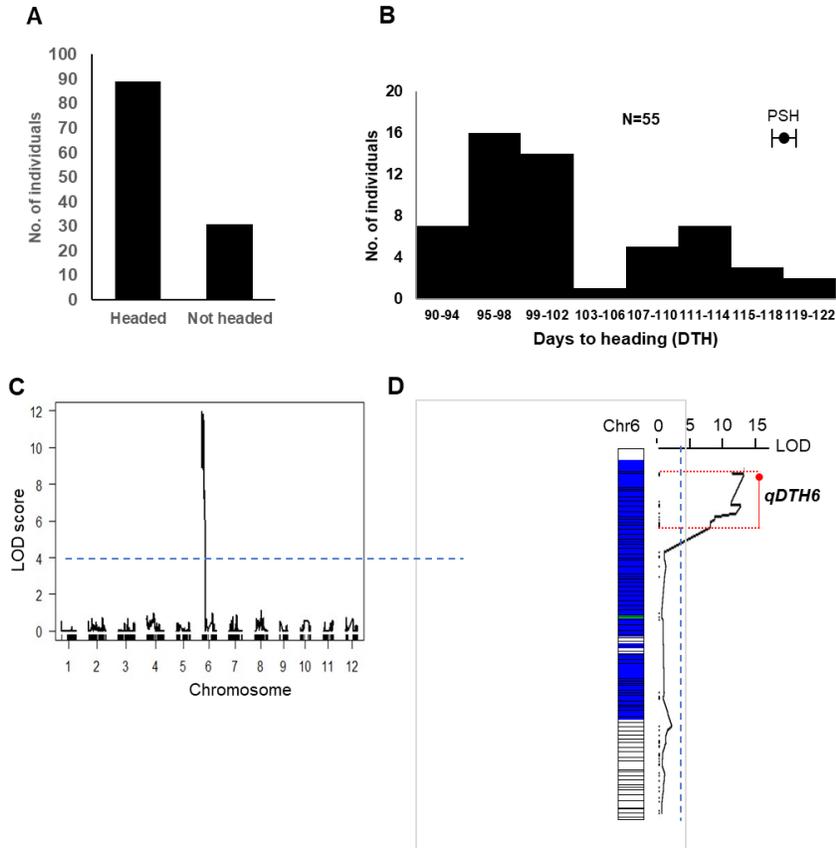
** : Significant at 1% level

^a: The physical position was estimated based on International Rice Genome Sequencing Project (IRGSP-1.0)

^b: Percentage of variance explained

^c: Genetic effect of ST12

^d: LOD threshold at 5% significant level



Supplementary Figure S1. Quantitative trait locus (QTL) analysis of days to heading in the BC₂F₃ population. Frequency distribution of days to heading (DTH) in the BC₂F₃ population in 2020DS (**A**) and 2020MS (**B**). DTH QTL detected from the BC₂F₃ population via genotyping-by-sequencing (GBS) showing all 12 chromosomes (**C**) and only chromosome 6 (**D**). Blue dotted lines indicate the limit of detection (LOD) threshold (5% level of significant). Red bar indicates the genomic region of QTL. Red dot indicates the peak single nucleotide polymorphism (SNP). For graphical genotype of chromosome 6, white, blue and green colored blocks indicate the recurrent parent, donor parent, and heterozygous regions, respectively.