**Supporting Information**

*PE-1*, encoding heme oxygenase 1, impacts heading date and chloroplast development in rice (*Oryza sativa*.L)

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Table S1 Molecular markers for fine mapping and sequencing of *PE-1*.

Table S2 Primer sequence for Vector construction.

Table S3 Primer sequence for real-time PCR.

Figure S1 A. Constructing a complementary vector by 1300s B. Phenotypic characterization of complementary plant PE-1-C and WT, *pe-1*. Bars 5 cm.

**Table S1** Molecular markers for fine mapping and sequencing of *PE-1*

| Primer name | Forward primer (5′→3′) | Reverse primer (5′→3′) |
|---|---|---|
| B6-11 | ATGAAAGTCGGTGACGATGG | ACTTAGGGGATCAGGGGATG |
| B6-14 | AGCGTGTGACTTCATTGCAC | GGTGATCACCAGCAACACAC |
| M1 | CTTCCTCATCTCTTGCCGGT | AATACTCCTGTTCGCGTGGA |
| M2 | GCATGGATGGCTAGATTTGTAGT | TGCTTGCCATCATAGTACCCT |
| M3 | TCATTTTGTAAGTTTCAAGCCGT | TGAACCAAACAGTTTTAGCTCCA |
| M4 | CGTGCGGGTGGAATCAATTT | GTTTGCGGGTGGATTTTGAT |
| M5 | CTAGACGGACACACAGCCTA | GGTCGGAAAGAAAAGGGGAC |
| M6 | GGGTGCGTATGTTTGTTCCA | AAAGGCCGGATCCCCAAG |
| M7 | ATTGCCCGTTTGTCTGTGTC | CCCCTCAGCTCATCAGATCA |

**Table S2** Primer sequence for Vector construction

| Primer name | Primer sequences (5′→3′) |
|---|---|
| PE-1-C-KpnI-F | AATTCGAGCTAGGTACCTCCAGTTTTGTGTGGGTGAA |
| PE-1-C-BamHI-R | CTGAGGTCGACTCTAGAAGGGCATATACGATGGCAAG |
| PE-1-GFP-KpnI-F | GGTACCCGGGGATCCATGGCGCCCGCGGCAGCGTC |
| PE-1-GFP-BamHI-R | TTGCATGCCTGCAGGGTGAATATGTGACGGAGGA |
| PE-1-GUS-SacI-F | CATGATTACGAATTCGAATTTCACTGGAAAAATT |
| PE-1-GUS-BamHI-R | GCCTGCAGGTCGACGGGTAAGGGACTCTCCTTTC |
| CRISPR Cas9-F | CACCATCTACCACCTGAGAA |
| CRISPR Cas9-R | CGAAGTTGCTCTTGAAGTTG |

**Table S3** Primer sequence for real-time PCR

| Primer name | Forward primer (5′→3′) | Reverse primer (5′→3′) |
|---|---|---|
| *OsActin* | TGGCATCTCTCAGCACATTCC | TGCACAATGGATGGGTCAGA |
| *Hd1* | ACAGGGAGAAGAAGAAGGCC | CTGATCTCTTGGCGAAACGG |
| *Ehd1* | TACAATGGCGAGATCACGGA | GTGGTTCACTGCTGCAATGA |
| *EF3* | CCAGTGATGAACCCAGTTGC | TGACATCCGAGAGTGTTGCT |
| *FGL* | GGTGTACTGGAGCTGGAACA | TGAGCTCCCAGACCTTCTTG |

| | | |
|---|---|---|
| *CAO* | GGAATTTCGACCACCATGCA | GAGATGCGTCGAACATTGCT |
| *YGL1* | GCTACCTTTTCAGTTCCGGC | ACTTCACAGGGTCCTTGAGG |
| *lvp1* | AATGAAGAGGCAGGGTGACA | AAGCGCGACATGTTTCCTTT |
| *FCA* | ATCCATCAAGCCCAAGGTCA | GGTCGAAAAGTGGCCGTATC |
| *DTH2* | CAGGGAGCAAAGGTCAATGG | CTTGTATGGCGTCGGGAAAG |
| *ELF3* | CTTCCCGCCTTTCAGCATAC | CACGACTGCTGCTCAAAGTT |
| *Ghd7* | GAGGCCAAGCTGATGAGGTA | TAGGCTTTTCTGGACGCGTA |
| *CK1* | CTGACCAAGCTGCCTTCATC | GACATGGTTGCTGGGAAAGG |
| *FT* | CCTCTTGTGGTTGGTAGGGT | TCTTGGAGCCATAGGTGACC |

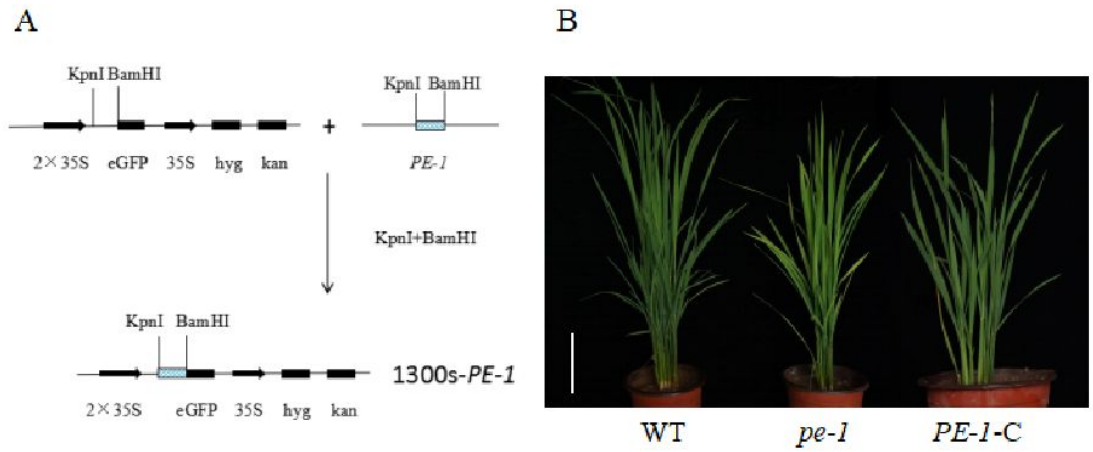


**Figure S1** A Constructing a complementary vector by 1300s B Phenotypic characterization of complementary plant *PE-1-C* and WT, *pe-1* Bars 5 cm