

GEPHE SUMMARY

<p>PRR37 pseudoresponse regulator protein 37 (#gephebase-summary-title)</p> <p>Published</p>	<p>Gephebase Gene</p> <p>Entry Status</p>	<p>GP00001635</p> <p>Prigent</p>	<p>GepheID</p> <p>Main curator</p>
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PHENOTYPIC CHANGE

<p>Physiology (#gephebase-summary-title)</p> <p>Flowering time (heading date) (https://www.gephebase.org/search-criteria?/and+Trait+Flowering+time+(heading+date)#gephebase-summary-title)</p> <p>Middle-late-flowering Tongil-type (japonica/indica hybrid) rice Milyang23 (116 days)</p> <p>Indica-type Kasalath cultivar</p> <p>Taxon A</p> <p>Domesticated (#gephebase-summary-title)</p>	<p>Trait Category</p> <p>Trait</p> <p>Trait State in Taxon A</p> <p>Trait State in Taxon B</p> <p>Ancestral State</p> <p>Taxonomic Status</p>	<p>Taxon A</p> <p>Latin Name</p> <p>Oryza sativa (#gephebase-summary-title)</p> <p>Common Name</p> <p>rice</p> <p>Synonyms</p> <p>rice; red rice; Oryza sativa L.</p> <p>Rank</p> <p>species</p> <p>Lineage</p> <p>cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Oryzoideae; Oryzaceae; Oryzinae; Oryza</p> <p>Parent</p> <p>Oryza () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4527)</p> <p>NCBI Taxonomy ID</p> <p>4530 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4530)</p> <p>is Taxon A an Intraspecies?</p> <p>Yes</p> <p>Taxon A Description</p> <p>Middle-late-flowering Tongil-type (japonica/indica hybrid) rice Milyang23 (116 days)</p>	<p>Taxon B</p> <p>Latin Name</p> <p>Oryza sativa (#gephebase-summary-title)</p> <p>Common Name</p> <p>rice</p> <p>Synonyms</p> <p>rice; red rice; Oryza sativa L.</p> <p>Rank</p> <p>species</p> <p>Lineage</p> <p>cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Oryzoideae; Oryzaceae; Oryzinae; Oryza</p> <p>Parent</p> <p>Oryza () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4527)</p> <p>NCBI Taxonomy ID</p> <p>4530 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4530)</p> <p>is Taxon B an Intraspecies?</p> <p>Yes</p> <p>Taxon B Description</p> <p>Indica-type Kasalath cultivar</p>
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GENOTYPIC CHANGE

<p>PRR37</p> <p>PRR37; OsPRR37; DTH7; HD2; Os07g0695100; LOC_Os07g49460; P0627E10.21</p> <p>39947.LOC_Os07g49460.1 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=39947.LOC_Os07g49460.1)</p> <p>Belongs to the ARR-like family.</p> <p>GO - Molecular Function</p> <p>-</p> <p>GO - Biological Process</p> <p>GO:0009908 : flower development (https://www.ebi.ac.uk/QuickGO/term/GO:0009908)</p> <p>GO:0000160 : phosphorelay signal transduction system</p>	<p>Generic Gene Name</p> <p>Synonyms</p> <p>String</p> <p>Sequence Similarities</p> <p>GO - Molecular Function</p> <p>GO - Biological Process</p>	<p>UniProtKB Oryza sativa subsp. japonica</p> <p>Q0D3B6 (http://www.uniprot.org/uniprot/Q0D3B6)</p> <p>GenebankID or UniProtKB</p> <p>()</p>
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(<https://www.ebi.ac.uk/QuickGO/term/GO:0000160>)
 GO:0009585 : red, far-red light phototransduction
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0009585>)
 GO:0048579 : negative regulation of long-day photoperiodism, flowering
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0048579>)
 GO:0048511 : rhythmic process (<https://www.ebi.ac.uk/QuickGO/term/GO:0048511>)
 GO - Cellular Component
 GO:0005634 : nucleus (<https://www.ebi.ac.uk/QuickGO/term/GO:0005634>)

Presumptive Null

Yes (<https://www.gephebase.org/search-criteria?/and+Presumptive Null=^Yes^#gephebase-summary-title>)

Molecular Type

Coding (<https://www.gephebase.org/search-criteria?/and+Molecular Type=^Coding^#gephebase-summary-title>)

Aberration Type

SNP (<https://www.gephebase.org/search-criteria?/and+Aberration Type=^SNP^#gephebase-summary-title>)

SNP Coding Change

Nonsense

Molecular Details of the Mutation

Nonfunctional allele PRR37-1c: a premature stop Q705*

Experimental Evidence

Linkage Mapping (<https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Linkage Mapping^#gephebase-summary-title>)

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	-	-	-

Main Reference

Natural variation in *OsPRR37* regulates heading date and contributes to rice cultivation at a wide range of latitudes. (2013) (<https://pubmed.ncbi.nlm.nih.gov/23713079>)

Authors

Koo BH; Yoo SC; Park JW; Kwon CT; Lee BD; An G; Zhang Z; Li J; Li Z; Paek NC

Abstract

Heading date and photoperiod sensitivity are fundamental traits that determine rice adaptation to a wide range of geographic environments. By quantitative trait locus (QTL) mapping and candidate gene analysis using whole-genome re-sequencing, we found that *Oryza sativa* Pseudo-Response Regulator37 (*OsPRR37*; hereafter *PRR37*) is responsible for the Early heading7-2 (EH7-2)/Heading date2 (Hd2) QTL which was identified from a cross of late-heading rice 'Milyang23 (M23)' and early-heading rice 'H143'. H143 contains a missense mutation of an invariantly conserved amino acid in the CCT (CONSTANS, CO-like, and TOC1) domain of *PRR37* protein. In the world rice collection, different types of nonfunctional *PRR37* alleles were found in many European and Asian rice cultivars. Notably, the japonica varieties harboring nonfunctional alleles of both *Ghd7/Hd4* and *PRR37/Hd2* flower extremely early under natural long-day conditions, and are adapted to the northernmost regions of rice cultivation, up to 53° N latitude. Genetic analysis revealed that the effects of *PRR37* and *Ghd7* alleles on heading date are additive, and *PRR37* down-regulates *Hd3a* expression to suppress flowering under long-day conditions. Our results demonstrate that natural variations in *PRR37/Hd2* and *Ghd7/Hd4* have contributed to the expansion of rice cultivation to temperate and cooler regions.

Additional References

RELATED GEPHE

Related Genes

9 (DTH2, EARLY FLOWERING 3/Hd17, Hd1, Hd6a, se5, Early flowering1 (EL1), HEADING DATE 1, Ehd1 (Response regulator), Ghd7) (<https://www.gephebase.org/search-criteria?/or+Taxon ID=^4530^/and+Trait=Flowering time/and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

3 (<https://www.gephebase.org/search-criteria?/or+Gene Gephebase=^PRR37 pseudoresponse regulator protein 37^/and+Taxon ID=^4530^/or+Gene Gephebase=^PRR37 pseudoresponse regulator protein 37^/and+Taxon ID=^4530^#gephebase-summary-title>)

EXTERNAL LINKS

COMMENTS

@GxE