GEPHE SUMMARY

Gephebase Gene
qPE9-1 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^qPE9-1^#gephebase-summary-title)

GepheID
GP00000941

Entry Status
Published

Main curator
Martin

PHENOTYPIC CHANGE

Trait #1

Trait Category
Morphology (https://www.gephebase.org/search-criteria?/and+Trait Category=^Morphology^#gephebase-summary-title)

Trait
Plant architecture (https://www.gephebase.org/search-criteria?/and+Trait=^Plant architecture^#gephebase-summary-title)

Trait State in Taxon A
Oryza sativa

Trait State in Taxon B
Oryza sativa japonica

Trait #2

Trait Category
Morphology (https://www.gephebase.org/search-criteria?/and+Trait Category=^Morphology^#gephebase-summary-title)

Trait
Inflorescence architecture (https://www.gephebase.org/search-criteria?/and+Trait=^Inflorescence architecture^#gephebase-summary-title)

Trait State in Taxon A
-

Trait State in Taxon B
-

Ancestral State
Taxon A

Taxonomic Status
Domesticated (https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Domesticated^#gephebase-summary-title)

Taxon A

Latin Name
Oryza sativa (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Oryza sativa^#gephebase-summary-title)

Common Name
rice

Synonyms
rice; red rice; Oryza sativa L.

Rank
species

Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Oryzoideae; Oryzeae; Oryzinae; Oryza

Parent
Oryza () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4527)

NCBI Taxonomy ID
4530 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4530)

is Taxon A an Infraspecies?
No

Taxon B

Latin Name
Oryza sativa (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Oryza sativa^#gephebase-summary-title)

Common Name
rice

Synonyms
rice; red rice; Oryza sativa L.

Rank
species

Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Oryzoideae; Oryzeae; Oryzinae; Oryza

Parent
Oryza () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4527)

NCBI Taxonomy ID
4530 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4530)

is Taxon B an Infraspecies?
Yes

Taxon B Description
Oryza sativa japonica

GENOTYPIC CHANGE

Generic Gene Name

PAY1

UniProtKB Oryza sativa subsp. indica

B8Y995 (http://www.uniprot.org/uniprot/B8Y995)

Synonyms

-

GenebankID or UniProtKB

()

String

-

Sequence Similarities

-

GO - Molecular Function

-

GO - Biological Process

GO:0007186 : G protein-coupled receptor signaling pathway (https://www.ebi.ac.uk/QuickGO/term/GO:0007186)

GO - Cellular Component

GO:0005882 : intermediate filament (https://www.ebi.ac.uk/QuickGO/term/GO:0005882)

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

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

Indel Size

100-999 bp

Molecular Details of the Mutation

637-bp deletion and 12-bp insertion resulting in truncated protein

Experimental Evidence

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

Main Reference

Deletion in a quantitative trait gene qPE9-1 associated with panicle erectness improves plant architecture during rice domestication. (2009) (https://pubmed.ncbi.nlm.nih.gov/19546322)

Authors

Zhou Y; Zhu J; Li Z; Yi C; Liu J; Zhang H; Tang S; Gu M; Liang G

Abstract

Rice plant architecture is an important agronomic trait and a major determinant in high productivity. Panicle erectness is the preferred plant architecture in japonica rice, but the molecular mechanism underlying domestication of the erect panicle remains elusive. Here we report the map-based cloning of a major quantitative trait locus, qPE9-1, which plays an integral role in regulation of rice plant architecture including panicle erectness. The R6547 qPE9-1 gene encodes a 426-amino-acid protein, homologous to the keratin-associated protein 5-4 family. The gene is composed of three Von Willebrand factor type C domains, one transmembrane domain, and one 4-disulfide-core domain. Phenotypic comparisons of a set of near-isogenic lines and transgenic lines reveal that the functional allele (qPE9-1) results in drooping panicles, and the loss-of-function mutation (qpe9-1) leads to more erect panicles. In addition, the qPE9-1 locus regulates panicle and grain length, grain weight, and consequently grain yield. We propose that the panicle erectness trait resulted from a natural random loss-of-function mutation for the qPE9-1 gene and has subsequently been the target of artificial selection during japonica rice breeding.

Additional References

RELATED GEPHE

Related Genes

1 (PROG1) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^4530^/and+Trait=Plant architecture/or+Taxon ID=^4530^/and+Trait=Inflorescence architecture/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS