

GEPHE SUMMARY

	Gephebase Gene		GepheID
OsPPKL1/qGL3 (https://www.gephebase.org/search-criteria?/and+GeneGephebase=^OsPPKL1/qGL3^#gephebase-summary-title)	GP00000812		
	Entry Status	Martin	Main curator
Published			

PHENOTYPIC CHANGE

	Trait Category		
Morphology (https://www.gephebase.org/search-criteria?/and+TraitCategory=^Morphology^#gephebase-summary-title)		Trait	
Grain size (https://www.gephebase.org/search-criteria?/and+Trait=^Grain size^#gephebase-summary-title)			
	Trait State in Taxon A		
Oryza sativa L. ssp. indica - N643		Trait State in Taxon B	
Oryza sativa L. ssp. Japonica N411			
	Ancestral State		
Data not curated		Taxonomic Status	
Domesticated (https://www.gephebase.org/search-criteria?/and+TaxonomicStatus=^Domesticated^#gephebase-summary-title)			
Taxon A		Taxon B	
	Latin Name		Latin Name
Oryza sativa (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Oryza sativa^#gephebase-summary-title)		Oryza sativa (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Oryza sativa^#gephebase-summary-title)	
	Common Name		Common Name
rice		rice	
	Synonyms		Synonyms
rice; red rice; Oryza sativa L.		rice; red rice; Oryza sativa L.	
	Rank		Rank
species		species	
	Lineage		Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Oryzoideae; Oryzeae; Oryzinae; Oryza		cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Oryzoideae; Oryzeae; Oryzinae; Oryza	
	Parent		Parent
Oryza () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4527)		Oryza () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4527)	
	NCBI Taxonomy ID		NCBI Taxonomy ID
4530 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4530)		4530 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4530)	
is Taxon A an Intraspecies?		is Taxon B an Intraspecies?	
Yes		Yes	
	Taxon A Description		Taxon B Description
Oryza sativa L. ssp. indica - N643		Oryza sativa L. ssp. Japonica N411	

GENOTYPIC CHANGE

	Generic Gene Name	UniProtKB Oryza sativa subsp. japonica
qLTG-3-1		B3IWl0 (http://www.uniprot.org/uniprot/B3IWl0)
	Synonyms	GenebankID or UniProtKB
qGL3-1; qLTG3-1		AAD27631 (https://www.ncbi.nlm.nih.gov/nuccore/AAD27631)
	String	
-		
	Sequence Similarities	
-		
	GO - Molecular Function	
-		
	GO - Biological Process	
-		
	GO - Cellular Component	
-		
		Presumptive Null
No (https://www.gephebase.org/search-criteria?/and+Presumptive Null=^No^#gephebase-summary-title)		

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

Nonsynonymous

Molecular Details of the Mutation

Asp364Glu

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

Rare allele of OsPPKL1 associated with grain length causes extra-large grain and a significant yield increase in rice. (2012) (<https://pubmed.ncbi.nlm.nih.gov/23236132>)

Authors

Zhang X; Wang J; Huang J; Lan H; Wang C; Yin C; Wu Y; Tang H; Qian Q; Li J; Zhang H

Abstract

Grain size and shape are important components determining rice grain yield, and they are controlled by quantitative trait loci (QTLs). Here, we report the cloning and functional characterization of a major grain length QTL, qGL3, which encodes a putative protein phosphatase with Kelch-like repeat domain (OsPPKL1). We found a rare allele qgl3 that leads to a long grain phenotype by an aspartate-to-glutamate transition in a conserved AVLDT motif of the second Kelch domain in OsPPKL1. The rice genome has other two OsPPKL1 homologs, OsPPKL2 and OsPPKL3. Transgenic studies showed that OsPPKL1 and OsPPKL3 function as negative regulators of grain length, whereas OsPPKL2 as a positive regulator. The Kelch domains are essential for the OsPPKL1 biological function. Field trials showed that the application of the qgl3 allele could significantly increase grain yield in both inbred and hybrid rice varieties, due to its favorable effect on grain length, filling, and weight.

Additional References

RELATED GEPHE

Related Genes

9 (GL3.1, GS3, GS5, GW2, qSW5, OsSPL13, GL7, Os07g0603400, OsSPL16) (<https://www.gephebase.org/search-criteria?/or+Taxon+ID=~4530^/and+Trait=Grain+size/and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS