

GEPHE SUMMARY

GL7 (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=^GL7^#gephebase-summary-title)	Gephebase Gene	GP00001541	GepheID
Published	Entry Status	Prigent	Main curator

PHENOTYPIC CHANGE

Trait #1	Trait Category
Morphology (https://www.gephebase.org/search-criteria?/and+Trait+Category=^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
Nipponbare japonica (NPB) cultivar	Trait State in Taxon B
Ping13 (P13) indica variety with superior grain length and appearance quality (decreased chalkiness & larger starch granules)	

Trait #2	Trait Category
Physiology (https://www.gephebase.org/search-criteria?/and+Trait+Category=^Physiology^#gephebase-summary-title)	Trait
Grain quality (https://www.gephebase.org/search-criteria?/and+Trait=^Grain+quality^#gephebase-summary-title)	Trait State in Taxon A
-	Trait State in Taxon B
-	

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

	Taxon A	Latin Name		Taxon B	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)
rice	Common Name			rice	Common Name
rice; red rice; Oryza sativa L.	Synonyms			rice; red rice; Oryza sativa L.	Synonyms
species	Rank			species	Rank
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Oryzoideae; Oryzaceae; Oryzinae; Oryza	Lineage			cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Oryzoideae; Oryzaceae; Oryzinae; Oryza	Lineage
Oryza () - (Rank: genus)	Parent			Oryza () - (Rank: genus)	Parent
(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4527)	NCBI Taxonomy ID			(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4527)	NCBI Taxonomy ID
4530				4530	
(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4530)	is Taxon A an Intraspecies?			(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4530)	is Taxon B an Intraspecies?
Yes				Yes	
Nipponbare japonica (NPB) cultivar	Taxon A Description			Ping13 (P13) indica variety with superior grain length and appearance quality (decreased chalkiness & larger starch granules)	Taxon B Description

	Taxon B	Latin Name
Oryza sativa	(https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Oryza+sativa^#gephebase-summary-title)	
rice	Common Name	
rice; red rice; Oryza sativa L.	Synonyms	
species	Rank	
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Oryzoideae; Oryzaceae; Oryzinae; Oryza	Lineage	
Oryza () - (Rank: genus)	Parent	
(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 Intraspecies?	
Yes		
Ping13 (P13) indica variety with superior grain length and appearance quality (decreased chalkiness & larger starch granules)	Taxon B Description	

GENOTYPIC CHANGE

LNG1	Generic Gene Name	Q9LF24 (http://www.uniprot.org/uniprot/Q9LF24)	UniProtKB Arabidopsis thaliana
LONGIFOLIA1; T20K14.190; T20K14_190; TON1 Recruiting Motif 2; TRM2; At5g15580	Synonyms	KP899557 (https://www.ncbi.nlm.nih.gov/nucore/KP899557)	GenebankID or UniProtKB
3702.AT5G15580.1 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=3702.AT5G15580.1)	String		
-	Sequence Similarities		
-	GO - Molecular Function		
-	GO - Biological Process		
GO:0051513 : regulation of monopolar cell growth (https://www.ebi.ac.uk/QuickGO/term/GO:0051513)			
GO:0005829 : cytosol (https://www.ebi.ac.uk/QuickGO/term/GO:0005829)	GO - Cellular Component		
GO:0005634 : nucleus (https://www.ebi.ac.uk/QuickGO/term/GO:0005634)			
No (https://www.gephebase.org/search-criteria?/and+Presumptive+Null=~No~#gephebase-summary-title)			Presumptive Null
Gene Amplification (https://www.gephebase.org/search-criteria?/and+Molecular+Type=~Gene+Amplification~#gephebase-summary-title)			Molecular Type
Indel (https://www.gephebase.org/search-criteria?/and+Aberration+Type=~Indel~#gephebase-summary-title)			Aberration Type
10-100 kb			Indel Size
tandem duplication of a 17.1 kb segment containing GL7. Both copies encode exactly the same polypeptide and exhibit similar transcript levels leading to upregulation			Molecular Details of the Mutation
Linkage Mapping (https://www.gephebase.org/search-criteria?/and+Experimental+Evidence=~Linkage+Mapping~#gephebase-summary-title)			Experimental Evidence
Copy number variation at the GL7 locus contributes to grain size diversity in rice. (2015) (https://pubmed.ncbi.nlm.nih.gov/26147619)			Main Reference
Wang Y; Xiong G; Hu J; Jiang L; Yu H; Xu J; Fang Y; Zeng L; Xu E; Xu J; Ye W; Meng X; Liu R; Chen H; Jing Y; Wang Y; Zhu X; Li J; Qian Q			Authors
Copy number variants (CNVs) are associated with changes in gene expression levels and contribute to various adaptive traits. Here we show that a CNV at the Grain Length on Chromosome 7 (GL7) locus contributes to grain size diversity in rice (<i>Oryza sativa</i> L.). GL7 encodes a protein homologous to Arabidopsis thaliana LONGIFOLIA proteins, which regulate longitudinal cell elongation. Tandem duplication of a 17.1-kb segment at the GL7 locus leads to upregulation of GL7 and downregulation of its nearby negative regulator, resulting in an increase in grain length and improvement of grain appearance quality. Sequence analysis indicates that allelic variants of GL7 and its negative regulator are associated with grain size diversity and that the CNV at the GL7 locus was selected for and used in breeding. Our work suggests that pyramiding beneficial alleles of GL7 and other yield- and quality-related genes may improve the breeding of elite rice varieties.			Abstract
			Additional References

RELATED GEPHE

10 (GL3.1, GS3, GS5, GW2, OsPPKL1/qGL3, qSW5, OsSPL13, Os07g0603400, GW7, OsSPL16) (https://www.gephebase.org/search-criteria?/or+Taxon+ID=~4530~/and+Trait=Grain+size/or+Taxon+ID=~4530~/and+Trait=Grain+quality/and+groupHaplotypes=true#gephebase-summary-title)	Related Genes
No matches found.	Related Haplotypes

EXTERNAL LINKS

COMMENTS

Increase in grain length is correlated with the expression level of GL7 in transgenic plants. Overexpression of GL7 promotes the formation of densely and regularly packed starch granules.