

GEPHE SUMMARY

	Gephebase Gene		GepheID
Pikm1-TS + Pikm2-TS cluster (https://www.gephebase.org/search-criteria?/and+Gene Gephebase="Pikm1-TS + Pikm2-TS cluster" #gephebase-summary-title)		GP00000884	
Published	Entry Status	Courtier	Main curator

PHENOTYPIC CHANGE

	Trait Category	
Physiology (https://www.gephebase.org/search-criteria?/and+Trait Category="Physiology" #gephebase-summary-title)		
	Trait	
Pathogen resistance (<a "="" href="https://www.gephebase.org/search-criteria?/and+Trait=">https://www.gephebase.org/search-criteria?/and+Trait=" Pathogen resistance" #gephebase-summary-title)		
	Trait State in Taxon A	
Oryza sativa - blast susceptible 99SL44		
	Trait State in Taxon B	
Oryza sativa - blast resistant Tsuyuake		
	Ancestral State	
Data not curated		
	Taxonomic Status	
Domesticated (https://www.gephebase.org/search-criteria?/and+Taxonomic Status="Domesticated" #gephebase-summary-title)		

Taxon A	Latin Name	Taxon B	Latin Name
Oryza sativa (<a "="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=" Oryza sativa" #gephebase-summary-title)		Oryza sativa (<a "="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">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; Oryzaceae; Oryzinae; Oryza		cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Oryzoideae; Oryzaceae; 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 - blast susceptible 99SL44		Oryza sativa - blast resistant Tsuyuake	

GENOTYPIC CHANGE

	Generic Gene Name	UniProtKB Oryza sativa subsp. japonica
PIKM1-TS		B5UBC1 (http://www.uniprot.org/uniprot/B5UBC1)
	Synonyms	GenebankID or UniProtKB
PI-KM1		
-	String	
	Sequence Similarities	
Belongs to the disease resistance NB-LRR family.		
	GO - Molecular Function	
GO:0005524 : ATP binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005524)		
GO:0043531 : ADP binding (https://www.ebi.ac.uk/QuickGO/term/GO:0043531)		
	GO - Biological Process	
GO:0006952 : defense response (https://www.ebi.ac.uk/QuickGO/term/GO:0006952)		
	GO - Cellular Component	
-		

No (<https://www.gephebase.org/search-criteria?/and+Presumptive Null=~No^#gephebase-summary-title>)

Molecular Type

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

Aberration Type

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

Molecular Details of the Mutation

Coding variation in both genes; with alleles of both genes necessary for resistance in complementation assays

Experimental Evidence

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

Main Reference

Two adjacent nucleotide-binding site-leucine-rich repeat class genes are required to confer Pikm-specific rice blast resistance. (2008) (<https://pubmed.ncbi.nlm.nih.gov/18940787>)

Authors

Ashikawa I; Hayashi N; Yamane H; Kanamori H; Wu J; Matsumoto T; Ono K; Yano M

Abstract

The rice blast resistance gene *Pikm* was cloned by a map-based cloning strategy. High-resolution genetic mapping and sequencing of the gene region in the *Pikm*-containing cultivar Tsuyuake narrowed down the candidate region to a 131-kb genomic interval. Sequence analysis predicted two adjacently arranged resistance-like genes, *Pikm1-TS* and *Pikm2-TS*, within this candidate region. These genes encoded proteins with a nucleotide-binding site (NBS) and leucine-rich repeats (LRRs) and were considered the most probable candidates for *Pikm*. However, genetic complementation analysis of transgenic lines individually carrying these two genes negated the possibility that either *Pikm1-TS* or *Pikm2-TS* alone was *Pikm*. Instead, it was revealed that transgenic lines carrying both of these genes expressed blast resistance. The results of the complementation analysis and an evaluation of the resistance specificity of the transgenic lines to blast isolates demonstrated that *Pikm*-specific resistance is conferred by cooperation of *Pikm1-TS* and *Pikm2-TS*. Although these two genes are not homologous with each other, they both contain all the conserved motifs necessary for an NBS-LRR class gene to function independently as a resistance gene.

Additional References

The isolation of *Pi1*, an allele at the *Pik* locus which confers broad spectrum resistance to rice blast. (2012) (<https://pubmed.ncbi.nlm.nih.gov/22643901>)

RELATED GEPHE

Related Genes

15 (*Pi-ta*, *Pi2* (*Nbs4-Pi2*), *Pi36*, *Pi37*, *Pi5-1 + Pi5-2* cluster, *Pi9* (= *Nbs2-Pi9*), *Pib*, *Pid3*, *PigmR*, *Pit*, *Piz-t*, *SLB1/2*, *Xa1*, *Xa21*, *Xa26*) (<https://www.gephebase.org/search-criteria?/or+Taxon ID=~4530^/and+Trait=Pathogen resistance/and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

Cluster of paralogous genes