

GEPHE SUMMARY

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

PHENOTYPIC CHANGE

	Trait Category		
Physiology (https://www.gephebase.org/search-criteria?/and+Trait Category=^Physiology^#gephebase-summary-title)		Trait	
Pathogen resistance (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		Taxon B	
Oryza sativa	Latin Name	Oryza sativa	Latin Name
(https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Oryza sativa^#gephebase-summary-title)		(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; Oryzeae; Oryzinae; Oryza	Lineage	cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Oryzoideae; Oryzeae; Oryzinae; Oryza	Lineage
Oryza () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4527)	Parent	Oryza () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4527)	Parent
4530 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4530)	NCBI Taxonomy ID	4530 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4530)	NCBI Taxonomy ID
Yes	is Taxon A an Infraspecies?	Yes	is Taxon B an Infraspecies?
Oryza sativa - blast susceptible 99SL44	Taxon A Description	Oryza sativa - blast resistant Tsuyuake	Taxon B Description

GENOTYPIC CHANGE

PIKM1-TS	Generic Gene Name	UniProtKB Oryza sativa subsp. japonica
PI-KM1	Synonyms	B5UBC1 (http://www.uniprot.org/uniprot/B5UBC1)
-	String	GenebankID or UniProtKB
Belongs to the disease resistance NB-LRR family.	Sequence Similarities	0
GO:0005524 : ATP binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005524)	GO - Molecular Function	
GO:0043531 : ADP binding (https://www.ebi.ac.uk/QuickGO/term/GO:0043531)		
GO:0006952 : defense response (https://www.ebi.ac.uk/QuickGO/term/GO:0006952)	GO - Biological Process	
-	GO - Cellular Component	
		Presumptive Null

No ([#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Presumptive Null=%No))

Molecular Type

Coding ([#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Molecular Type=%Coding))

Aberration Type

Unknown ([#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Aberration Type=%Unknown))

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

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*) ([#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Taxon ID=%4530/and+Trait=Pathogen resistance/and+groupHaplotypes=true))

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

Cluster of paralogous genes