

GEPHE SUMMARY

PigmR (https://www.gephebase.org/search-criteria?/and+Gene Gephebase="PigmR">#gephebase-summary-title)	Gephebase Gene	GP00001592	GephelD
	Entry Status	Prigent	Main curator
Published			

PHENOTYPIC CHANGE

	Trait Category		
Physiology (https://www.gephebase.org/search-criteria?/and+Trait Category="Physiology">#gephebase-summary-title)		Trait	
Pathogen resistance (plant fungus pathogen) (https://www.gephebase.org/search-criteria?/and+Trait=^Pathogen+resistance+(plant+fungus+pathogen)^#gephebase-summary-title)		Trait State in Taxon A	
nipponbare japonica (NIPB) cultivar without this resistance		Trait State in Taxon B	
Chinese rice variety Gumei 4 resistant		Ancestral State	
Unknown		Taxonomic Status	
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic Status="Intraspecific">#gephebase-summary-title)			
Taxon A		Taxon B	
Oryza sativa (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Oryza+sativa^#gephebase-summary-title)	Latin Name	Oryza sativa (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Oryza+sativa^#gephebase-summary-title)	Latin Name
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
is Taxon A an Infraspecies?		is Taxon B an Infraspecies?	
Yes	Taxon A Description	Yes	Taxon B Description
Nipponbare japonica (NIPB) cultivar without this resistance		Chinese rice variety Gumei 4 resistant	

GENOTYPIC CHANGE

Pigm_GM4.7	Generic Gene Name	UniProtKB Oryza sativa subsp. indica A0A1P8CYR1 (http://www.uniprot.org/uniprot/A0A1P8CYR1)
-	Synonyms	GenebankID or UniProtKB
-	String	0
Belongs to the disease resistance NB-LRR family.	Sequence Similarities	
GO:0043531 : ADP binding (https://www.ebi.ac.uk/QuickGO/term/GO:0043531)	GO - Molecular Function	
-	GO - Biological Process	
-	GO - Cellular Component	
-		Presumptive Null

Unknown ([https://www.gephebase.org/search-criteria?/and+Presumptive Null=%5EUnknown%5E#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Presumptive+Null=%5EUnknown%5E#gephebase-summary-title))

Molecular Type

Unknown ([https://www.gephebase.org/search-criteria?/and+Molecular Type=%5EUnknown%5E#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Molecular+Type=%5EUnknown%5E#gephebase-summary-title))

Aberration Type

Unknown ([https://www.gephebase.org/search-criteria?/and+Aberration Type=%5EUnknown%5E#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Aberration+Type=%5EUnknown%5E#gephebase-summary-title))

Molecular Details of the Mutation

unknown

Experimental Evidence

Linkage Mapping ([https://www.gephebase.org/search-criteria?/and+Experimental Evidence=%5ELinkage Mapping%5E#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Experimental+Evidence=%5ELinkage+Mapping%5E#gephebase-summary-title))

Main Reference

Epigenetic regulation of antagonistic receptors confers rice blast resistance with yield balance. (2017) (<https://pubmed.ncbi.nlm.nih.gov/28154240>)

Authors

Deng Y; Zhai K; Xie Z; Yang D; Zhu X; Liu J; Wang X; Qin P; Yang Y; Zhang G; Li Q; Zhang J; Wu S; Milazzo J; Mao B; Wang E; Xie H; Tharreau D; He Z

Abstract

Crop breeding aims to balance disease resistance with yield; however, single resistance (R) genes can lead to resistance breakdown, and R gene pyramiding may affect growth fitness. Here we report that the rice Pigm locus contains a cluster of genes encoding nucleotide-binding leucine-rich repeat (NLR) receptors that confer durable resistance to the fungus *Magnaporthe oryzae* without yield penalty. Among these NLR receptors, PigmR confers broad-spectrum resistance, whereas PigmS competitively attenuates PigmR homodimerization to suppress resistance. PigmS expression, and thus PigmR-mediated resistance, are subjected to tight epigenetic regulation. PigmS increases seed production to counteract the yield cost induced by PigmR. Therefore, our study reveals a mechanism balancing high disease resistance and yield through epigenetic regulation of paired antagonistic NLR receptors, providing a tool to develop elite crop varieties.

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Additional References

RELATED GEPHE

Related Genes

15 (Pi-ta, Pi2 (Nb4-Pi2), Pi36, Pi37, Pi5-1 + Pi5-2 cluster, Pi9 (= Nb52-Pi9), Pib, Pid3, Pikm1-TS + Pikm2-TS cluster, Pit, Piz-t, SLB1/2, Xa1, Xa21, Xa26) ([https://www.gephebase.org/search-criteria?/or+Taxon ID=%5E4530%5E/and+Trait=Pathogen resistance/and+groupHaplotypes=true#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Taxon+ID=%5E4530%5E/and+Trait=Pathogen+resistance/and+groupHaplotypes=true#gephebase-summary-title))

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

PigmR displayed constitutive low-level expression in all tissues and is repressed by PigmS in pollen and panicles. Susceptible varieties may not have this gene?