

GEPHE SUMMARY

<p>PigmR (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase+PigmR+Gephebase-summary-title)</p> <p>Published</p>	<p>Gephebase Gene</p> <p>Entry Status</p>	<p>GP00001592</p> <p>Prigent</p>	<p>GepheID</p> <p>Main curator</p>
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PHENOTYPIC CHANGE

<p>Physiology (https://www.gephebase.org/search-criteria?/and+Trait+Category+Physiology+Gephebase-summary-title)</p> <p>Pathogen resistance (plant fungus pathogen) (https://www.gephebase.org/search-criteria?/and+Trait+Pathogen+resistance+plant+fungus+pathogen+Gephebase-summary-title)</p> <p>nipponbare japonica (NIPB) cultivar without this resistance</p> <p>Chinese rice variety Gumei 4 resistant</p> <p>Unknown</p> <p>Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status+Intraspecific+Gephebase-summary-title)</p>	<p>Trait Category</p> <p>Trait</p> <p>Trait State in Taxon A</p> <p>Trait State in Taxon B</p> <p>Ancestral State</p> <p>Taxonomic Status</p>	<p>Taxon A</p> <p>Latin Name</p> <p>Oryza sativa (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms+Oryza+sativa+Gephebase-summary-title)</p> <p>Common Name</p> <p>rice</p> <p>Synonyms</p> <p>rice; red rice; Oryza sativa L.</p> <p>Rank</p> <p>species</p> <p>Lineage</p> <p>cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Oryzoideae; Oryzaceae; Oryzinae; Oryza</p> <p>Parent</p> <p>Oryza () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4527)</p> <p>NCBI Taxonomy ID</p> <p>4530 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4530)</p> <p>is Taxon A an Intraspecies?</p> <p>Yes</p> <p>Taxon A Description</p> <p>Nipponbare japonica (NIPB) cultivar without this resistance</p>	<p>Taxon B</p> <p>Latin Name</p> <p>Oryza sativa (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms+Oryza+sativa+Gephebase-summary-title)</p> <p>Common Name</p> <p>rice</p> <p>Synonyms</p> <p>rice; red rice; Oryza sativa L.</p> <p>Rank</p> <p>species</p> <p>Lineage</p> <p>cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Oryzoideae; Oryzaceae; Oryzinae; Oryza</p> <p>Parent</p> <p>Oryza () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4527)</p> <p>NCBI Taxonomy ID</p> <p>4530 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4530)</p> <p>is Taxon B an Intraspecies?</p> <p>Yes</p> <p>Taxon B Description</p> <p>Chinese rice variety Gumei 4 resistant</p>
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GENOTYPIC CHANGE

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

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

Molecular Type

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

Aberration Type

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

Molecular Details of the Mutation

unknown

Experimental Evidence

Linkage Mapping (<https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Linkage Mapping^#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 (Nbs4-Pi2), Pi36, Pi37, Pi5-1 + Pi5-2 cluster, Pi9 (= Nbs2-Pi9), Pib, Pid3, Pigm1-TS + Pigm2-TS cluster, 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

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?