

Gephebase Gene		GepheID
S5 (<a +s5+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=">https://www.gephebase.org/search-criteria?/and+Gene Gephebase="+S5+"#gephebase-summary-title)	GP00001020	Main curator
Published	Entry Status	Courtier

Physiology (https://www.gephebase.org/search-criteria?/and+Trait+Category=^Physiology^#gephebase-summary-title)		Trait Category
Hybrid incompatibility (F1 female sterility) (https://www.gephebase.org/search-criteria?/and+Trait=^Hybrid incompatibility (F1 female sterility)^#gephebase-summary-title)		Trait
Oryza sativa japonica	Trait State in Taxon A	
Oryza sativa indica	Trait State in Taxon B	
Data not curated	Ancestral State	
Domesticated (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=^Domesticated^#gephebase-summary-title)	Taxonomic Status	
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)
rice	Common Name	rice
rice; red rice; Oryza sativa L.	Synonyms	rice; red rice; Oryza sativa L.
species	Rank	species
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
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)
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)
is Taxon A an Intraspecies?		is Taxon B an Intraspecies?
Yes		Yes
Oryza sativa japonica	Taxon A Description	Oryza sativa indica

GRXS5	Generic Gene Name	UniProtKB <i>Oryza sativa</i> subsp. <i>japonica</i>
	Synonyms	Q5QLR2 (http://www.uniprot.org/uniprot/Q5QLR2)
GRXS5; P0014E08.2; Os01g0667900; LOC_Os01g47760; OSJNBb0063G05.32		GenebankID or UniProtKB
	String	ACG76112 (https://www.ncbi.nlm.nih.gov/nuccore/ACG76112)
39947.LOC_Os01g47760.1 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=39947.LOC_Os01g47760.1)		
	Sequence Similarities	
Belongs to the glutaredoxin family. CC-type subfamily.		
	GO - Molecular Function	
GO:0046872 : metal ion binding (https://www.ebi.ac.uk/QuickGO/term/GO:0046872)		
GO:0009055 : electron transfer activity (https://www.ebi.ac.uk/QuickGO/term/GO:0009055)		
GO:0051537 : 2 iron, 2 sulfur cluster binding (https://www.ebi.ac.uk/QuickGO/term/GO:0051537)		

GO:0015035 : protein disulfide oxidoreductase activity
(<https://www.ebi.ac.uk/QuickGO/term/GO:0015035>)

GO - Biological Process

GO:0045454 : cell redox homeostasis
(<https://www.ebi.ac.uk/QuickGO/term/GO:0045454>)

GO - Cellular Component

GO:0005737 : cytoplasm (<https://www.ebi.ac.uk/QuickGO/term/GO:0005737>)
GO:0005634 : nucleus (<https://www.ebi.ac.uk/QuickGO/term/GO:0005634>)

Presumptive Null

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

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

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

2 non-synonymous changes Leu273Phe and Val471Ala segregate perfectly between japonica (Leu-Val) and japonica (Phe-Ala) - the effect of each amino acid chaeg has not been tested

Experimental Evidence

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

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	-	-	-

Main Reference

A triallelic system of S5 is a major regulator of the reproductive barrier and compatibility of indica-japonica hybrids in rice. (2008) (<https://pubmed.ncbi.nlm.nih.gov/18678896>)

Authors

Chen J; Ding J; Ouyang Y; Du H; Yang J; Cheng K; Zhao J; Qiu S; Zhang X; Yao J; Liu K; Wang L; Xu C; Li X; Xue Y; Xia M; Ji Q; Lu J; Xu M; Zhang Q

Abstract

Hybrid sterility is a major form of postzygotic reproductive isolation. Although reproductive isolation has been a key issue in evolutionary biology for many decades in a wide range of organisms, only very recently a few genes for reproductive isolation were identified. The Asian cultivated rice (*Oryza sativa* L.) is divided into two subspecies, indica and japonica. Hybrids between indica and japonica varieties are usually highly sterile. A special group of rice germplasm, referred to as wide-compatibility varieties, is able to produce highly fertile hybrids when crossed to both indica and japonica. In this study, we cloned S5, a major locus for indica-japonica hybrid sterility and wide compatibility, using a map-based cloning approach. We show that S5 encodes an aspartic protease conditioning embryo-sac fertility. The indica (S5-i) and japonica (S5-j) alleles differ by two nucleotides. The wide compatibility gene (S5-n) has a large deletion in the N terminus of the predicted S5 protein, causing subcellular mislocalization of the protein, and thus is presumably nonfunctional. This triallelic system has a profound implication in the evolution and artificial breeding of cultivated rice. Genetic differentiation between indica and japonica would have been enforced because of the reproductive barrier caused by S5-i and S5-j, and species coherence would have been maintained by gene flow enabled by the wide compatibility gene.

Additional References

RELATED GEPHE

Related Genes

2 (S5 (ORF3-ORF4-ORF5 gene complex), SaM + SaF) (<https://www.gephebase.org/search-criteria?/or+Taxon ID=~4530~/and+Trait=Hybrid incompatibility/and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS