

GEPHE SUMMARY

SaM + SaF (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=~SaM+SaF~#gephebase-summary-title)	Gephebase Gene	GepheID
	GP00001022	
	Entry Status	Martin
Published		Main curator

PHENOTYPIC CHANGE

Physiology (https://www.gephebase.org/search-criteria?/and+Trait+Category=~Physiology~#gephebase-summary-title)		Trait Category	
Hybrid incompatibility (F1 male sterility) (https://www.gephebase.org/search-criteria?/and+Trait=~Hybrid+incompatibility+(F1+male+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)		Oryza sativa (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Oryza+sativa~#gephebase-summary-title)	
rice		rice	
rice; red rice; Oryza sativa L.		rice; red rice; Oryza sativa L.	
species		species	
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Oryzoideae; Oryzeae; Oryzinae; Oryza		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)		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)		4530 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4530)	
Yes		Yes	
Oryza sativa japonica		Oryza sativa indica	

GENOTYPIC CHANGE

SaF+	Generic Gene Name	UniProtKB Oryza sativa subsp. indica
	Synonyms	B6RRX2 (http://www.uniprot.org/uniprot/B6RRX2)
	String	GenebankID or UniProtKB ACA52286 (https://www.ncbi.nlm.nih.gov/nuccore/ACA52286)
-	Sequence Similarities	
-	GO - Molecular Function	
-	GO - Biological Process	
-	GO - Cellular Component	
Unknown (https://www.gephebase.org/search-criteria?/and+Presumptive+Null=~Unknown~#gephebase-summary-title)		Presumptive Null

Unknown (<a +unknown^#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Molecular+Type=">https://www.gephebase.org/search-criteria?/and+Molecular+Type="+Unknown^#gephebase-summary-title)	Molecular Type
Unknown (<a +unknown^#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Aberration+Type=">https://www.gephebase.org/search-criteria?/and+Aberration+Type="+Unknown^#gephebase-summary-title)	Aberration Type
Intron structure + aa changes on two adjacent coding genes	Molecular Details of the Mutation
Linkage Mapping (<a +linkage+mapping^#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Experimental+Evidence=">https://www.gephebase.org/search-criteria?/and+Experimental+Evidence="+Linkage+Mapping^#gephebase-summary-title)	Experimental Evidence
Hybrid male sterility in rice controlled by interaction between divergent alleles of two adjacent genes. (2008) (https://pubmed.ncbi.nlm.nih.gov/19033192)	Main Reference
Long Y; Zhao L; Niu B; Su J; Wu H; Chen Y; Zhang Q; Guo J; Zhuang C; Mei M; Xia J; Wang L; Wu H; Liu YG	Authors
Sterility is common in hybrids between divergent populations, such as the indica and japonica subspecies of Asian cultivated rice (<i>Oryza sativa</i>). Although multiple loci for plant hybrid sterility have been identified, it remains unknown how alleles of the loci interact at the molecular level. Here we show that a locus for indica-japonica hybrid male sterility, Sa, comprises two adjacent genes, SaM and SaF, encoding a small ubiquitin-like modifier E3 ligase-like protein and an F-box protein, respectively. Most indica cultivars contain a haplotype SaM(+)SaF(+), whereas all japonica cultivars have SaM(-)SaF(-) that diverged by nucleotide variations in wild rice. Male semi-sterility in this heterozygous complex locus is caused by abortion of pollen carrying SaM(-). This allele-specific gamete elimination results from a selective interaction of SaF(+) with SaM(-), a truncated protein, but not with SaM(+) because of the presence of an inhibitory domain, although SaM(+) is required for this male sterility. Lack of any one of the three alleles in recombinant plants does not produce male sterility. We propose a two-gene/three-component interaction model for this hybrid male sterility system. The findings have implications for overcoming male sterility in inter-subspecific hybrid rice breeding.	Abstract
Allele distributions at hybrid incompatibility loci facilitate the potential for gene flow between cultivated and weedy rice in the US. (2014) (https://pubmed.ncbi.nlm.nih.gov/24489758)	Additional References

RELATED GEPHE

2 (S5, S5 (ORF3-ORF4-ORF5 gene complex)) (<a +4530^="" and+trait='Hybrid+incompatibility/and+groupHaplotypes=true#gephebase-summary-title"' href="https://www.gephebase.org/search-criteria?/or+Taxon+ID=">https://www.gephebase.org/search-criteria?/or+Taxon+ID="+4530^/and+Trait=Hybrid+incompatibility/and+groupHaplotypes=true#gephebase-summary-title)	Related Genes
No matches found.	Related Haplotypes

EXTERNAL LINKS

COMMENTS

The locus for indica-japonica hybrid male sterility, Sa, comprises two adjacent genes, SaM and SaF; encoding a small ubiquitin-like modifier E3 ligase-like protein and an F-box protein; respectively