

GEPHE SUMMARY

	Gephebase Gene		GepheID
BADH2 (https://www.gephebase.org/search-criteria?/and+GeneGephebase=^BADH2^#gephebase-summary-title)		GP00000134	
	Entry Status	Martin	Main curator
Published			

PHENOTYPIC CHANGE

	Trait Category		
Physiology (https://www.gephebase.org/search-criteria?/and+TraitCategory=^Physiology^#gephebase-summary-title)		Trait	
		Fragrance (https://www.gephebase.org/search-criteria?/and+Trait=^Fragrance^#gephebase-summary-title)	
	Trait State in Taxon A		
Oryza sativa indica and japonica - non-fragrant		Trait State in Taxon B	
		Oryza sativa indica and japonica - fragrant	
	Ancestral State		
Data not curated		Taxonomic Status	
		Domesticated (https://www.gephebase.org/search-criteria?/and+TaxonomicStatus=^Domesticated^#gephebase-summary-title)	
Taxon A		Taxon B	
	Latin Name		Latin Name
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)	
	Common Name		Common Name
rice		rice	
	Synonyms		Synonyms
rice; red rice; Oryza sativa L.		rice; red rice; Oryza sativa L.	
	Rank		Rank
species		species	
	Lineage		Lineage
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	
	Parent		Parent
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)	
	NCBI Taxonomy ID		NCBI Taxonomy ID
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)	
	is Taxon A an Intraspecies?		is Taxon B an Intraspecies?
No		No	

GENOTYPIC CHANGE

	Generic Gene Name		UniProtKB Oryza sativa subsp. japonica
BADH2		Q84LK3 (http://www.uniprot.org/uniprot/Q84LK3)	
	Synonyms		GenebankID or UniProtKB
fgr; BADH2; OsBADH2; OsJ_27367; LOC_Os08g32870; Os08g0424500; OSJNBa0056L09.30; P0456B03.101		ALZ42021 (https://www.ncbi.nlm.nih.gov/nuccore/ALZ42021)	
	String		
39947.LOC_Os08g32870.1 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=39947.LOC_Os08g32870.1)			
	Sequence Similarities		
Belongs to the aldehyde dehydrogenase family.			
	GO - Molecular Function		
GO:0008802 : betaine-aldehyde dehydrogenase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0008802)			
	GO - Biological Process		
GO:0071454 : cellular response to anoxia (https://www.ebi.ac.uk/QuickGO/term/GO:0071454)			
GO:0019285 : glycine betaine biosynthetic process from choline			

(https://www.ebi.ac.uk/QuickGO/term/GO:0019285)	GO - Cellular Component	
GO:0005737 : cytoplasm (https://www.ebi.ac.uk/QuickGO/term/GO:0005737)		
GO:0005777 : peroxisome (https://www.ebi.ac.uk/QuickGO/term/GO:0005777)		Presumptive Null
Yes (https://www.gephebase.org/search-criteria?/and+Presumptive Null=~Yes~#gephebase-summary-title)		Molecular Type
Coding (https://www.gephebase.org/search-criteria?/and+Molecular Type=~Coding~#gephebase-summary-title)		Aberration Type
Deletion (https://www.gephebase.org/search-criteria?/and+Aberration Type=~Deletion~#gephebase-summary-title)		Deletion Size
1-9 bp		Molecular Details of the Mutation
8bp deletion resulting in premature stop codon		Experimental Evidence
Linkage Mapping (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=~Linkage Mapping~#gephebase-summary-title)		Main Reference
The gene for fragrance in rice. (2005) (https://pubmed.ncbi.nlm.nih.gov/17129318)		Authors
Bradbury LM; Fitzgerald TL; Henry RJ; Jin Q; Waters DL		Abstract
The flavour or fragrance of basmati and jasmine rice is associated with the presence of 2-acetyl-1-pyrroline. A recessive gene (fgr) on chromosome 8 of rice has been linked to this important trait. Here, we show that a gene with homology to the gene that encodes betaine aldehyde dehydrogenase (BAD) has significant polymorphisms in the coding region of fragrant genotypes relative to non-fragrant genotypes. The accumulation of 2-acetyl-1-pyrroline in fragrant rice genotypes may be explained by the presence of mutations resulting in a loss of function of the fgr gene product. The allele in fragrant genotypes has a mutation introducing a stop codon upstream of key amino acid sequences conserved in other BADs. The fgr gene corresponds to the gene encoding BAD2 in rice, while BAD1 is encoded by a gene on chromosome 4. BAD has been linked to stress tolerance in plants. However, the apparent loss of function of BAD2 does not seem to limit the growth of fragrant rice genotypes. Fragrance in domesticated rice has apparently originated from a common ancestor and may have evolved in a genetically isolated population, or may be the outcome of a separate domestication event. This is an example of effective human selection for a recessive trait during domestication.		
The origin and evolution of fragrance in rice (<i>Oryza sativa</i> L.). (2009) (https://pubmed.ncbi.nlm.nih.gov/19706531)		Additional References

RELATED GEPHE

	Related Genes
No matches found.	
	Related Haplotypes
9 (https://www.gephebase.org/search-criteria?/or+Gene Gephebase=~BADH2~/and+Taxon ID=~4530~/or+Gene Gephebase=~BADH2~/and+Taxon ID=~4530~#gephebase-summary-title)	

EXTERNAL LINKS

COMMENTS