

GEPHE SUMMARY

Rc	Gephebase Gene	GP00000960	GephelD
(#gephebase-summary-title)			Main curator
	Entry Status	Martin	
Published			

PHENOTYPIC CHANGE

	Trait Category
Morphology (#gephebase-summary-title)	Trait
Coloration (seed) (#gephebase-summary-title)	Trait State in Taxon A
Oryza sativa	Trait State in Taxon B
Oryza sativa var. aus	Ancestral State
Data not curated	Taxonomic Status
Domesticated (#gephebase-summary-title)	

Taxon A

	Latin Name
Oryza sativa	(#gephebase-summary-title)
rice	Common Name
rice; red rice; Oryza sativa L.	Synonyms
species	Rank
	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)	Parent
(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4527)	NCBI Taxonomy ID
4530	
(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4530)	
No	is Taxon A an Infraspecies?

Taxon B

	Latin Name
Oryza sativa	(#gephebase-summary-title)
rice	Common Name
rice; red rice; Oryza sativa L.	Synonyms
species	Rank
	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)	Parent
(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4527)	NCBI Taxonomy ID
4530	
(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4530)	
Yes	is Taxon B an Infraspecies?
Oryza sativa var. aus	Taxon B Description

GENOTYPIC CHANGE

Rc	Generic Gene Name	UniProtKB Oryza sativa subsp. japonica
-	Synonyms	A7J5U6 (http://www.uniprot.org/uniprot/A7J5U6)
-	String	GenebankID or UniProtKB
-	Sequence Similarities	AFl99125 (https://www.ncbi.nlm.nih.gov/nuccore/AFl99125)
-	GO - Molecular Function	
GO:0046983 : protein dimerization activity (https://www.ebi.ac.uk/QuickGO/term/GO:0046983)	GO - Biological Process	
-	GO - Cellular Component	
-		Presumptive Null

Yes ([#gephebase-summary-title\)](https://www.gephebase.org/search-criteria?/and+Presumptive Null=^Yes)

Molecular Type

Coding ([#gephebase-summary-title\)](https://www.gephebase.org/search-criteria?/and+Molecular Type=^Coding)

Aberration Type

SNP ([#gephebase-summary-title\)](https://www.gephebase.org/search-criteria?/and+Aberration Type=^SNP)

SNP Coding Change

Nonsense

Molecular Details of the Mutation

substitution; C->A in exon 6; introduces a premature stop codon (Cys>*) that truncates the protein before the bHLH domain

Experimental Evidence

Candidate Gene ([#gephebase-summary-title\)](https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Candidate Gene)

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

Global dissemination of a single mutation conferring white pericarp in rice. (2007) (<https://pubmed.ncbi.nlm.nih.gov/17696613>)

Main Reference

Sweeney MT; Thomson MJ; Cho YG; Park YJ; Williamson SH; Bustamante CD; McCouch SR

Authors

Here we report that the change from the red seeds of wild rice to the white seeds of cultivated rice (*Oryza sativa*) resulted from the strong selective sweep of a single mutation, a frame-shift deletion within the *Rc* gene that is found in 97.9% of white rice varieties today. A second mutation, also within *Rc*, is present in less than 3% of white accessions surveyed. Haplotype analysis revealed that the predominant mutation originated in the japonica subspecies and crossed both geographic and sterility barriers to move into the indica subspecies. A little less than one Mb of japonica DNA hitchhiked with the *rc* allele into most indica varieties, suggesting that other linked domestication alleles may have been transferred from japonica to indica along with white pericarp color. Our finding provides evidence of active cultural exchange among ancient farmers over the course of rice domestication coupled with very strong, positive selection for a single white allele in both subspecies of *O. sativa*.

Abstract

Genome-wide association studies of 14 agronomic traits in rice landraces. (2010) (<https://pubmed.ncbi.nlm.nih.gov/20972439>)

Caught red-handed: *Rc* encodes a basic helix-loop-helix protein conditioning red pericarp in rice. (2006) (<https://pubmed.ncbi.nlm.nih.gov/16399804>)

Additional References

RELATED GEPHE

	Related Genes
2 (Bh4, OsC1) (#gephebase-summary-title)	Related Genes
1 (#gephebase-summary-title)	Related Haplotypes

EXTERNAL LINKS

COMMENTS