

# GEPHE SUMMARY

Bh4 ( <a href="https://www.gephebase.org/search-criteria/?and+GeneGephebase=Bh4">#gephebase-summary-title)</a>	Gephebase Gene	GP00000143	GepheID
Published	Entry Status	Martin	Main curator

## PHENOTYPIC CHANGE

Morphology ( <a href="https://www.gephebase.org/search-criteria/?and+TraitCategory=Morphology">#gephebase-summary-title)</a>	Trait Category		
Coloration (seed hull) ( <a ?and+taxonomicstatus='Domesticated"' href="https://www.gephebase.org/search-criteria/?and+Trait=Coloration(seed hull)#gephebase-summary-title)&lt;/a&gt;&lt;/td&gt;&lt;td&gt;Trait&lt;/td&gt;&lt;td&gt;&lt;/td&gt;&lt;td&gt;&lt;/td&gt;&lt;/tr&gt; &lt;tr&gt; &lt;td&gt;Oryza rufipogon&lt;/td&gt;&lt;td&gt;Trait State in Taxon A&lt;/td&gt;&lt;td&gt;&lt;/td&gt;&lt;td&gt;&lt;/td&gt;&lt;/tr&gt; &lt;tr&gt; &lt;td&gt;Oryza sativa&lt;/td&gt;&lt;td&gt;Trait State in Taxon B&lt;/td&gt;&lt;td&gt;&lt;/td&gt;&lt;td&gt;&lt;/td&gt;&lt;/tr&gt; &lt;tr&gt; &lt;td&gt;Taxon A&lt;/td&gt;&lt;td&gt;Ancestral State&lt;/td&gt;&lt;td&gt;&lt;/td&gt;&lt;td&gt;&lt;/td&gt;&lt;/tr&gt; &lt;tr&gt; &lt;td&gt;Domesticated (&lt;a href=" https:="" search-criteria="" www.gephebase.org="">#gephebase-summary-title)</a>	Taxonomic Status		
Oryza rufipogon ( <a href="https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=Oryza rufipogon">#gephebase-summary-title)</a> )	Latin Name		Latin Name
-	Common Name		Common Name
red rice; common wild rice; Oryza rufipogon Griff.	Synonyms		Synonyms
species	Rank		Rank
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Oryzoideae; Oryzeae; Oryzinae; Oryza	Lineage		Lineage
Oryza () - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4527">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4527</a> )	Parent		Parent
4529 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4529">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4529</a> )	NCBI Taxonomy ID		NCBI Taxonomy ID
No	is Taxon A an Infraspecies?		is Taxon B an Infraspecies?

## GENOTYPIC CHANGE

Bh4	Generic Gene Name	UniProtKB Oryza sativa
-	Synonyms	GenebankID or UniProtKB
-	String	
-	Sequence Similarities	
-	GO - Molecular Function	
-	GO - Biological Process	
-	GO - Cellular Component	
GO:0016021 : integral component of membrane ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0016021">https://www.ebi.ac.uk/QuickGO/term/GO:0016021</a> )		Presumptive Null
Yes ( <a href="https://www.gephebase.org/search-criteria/?and+Presumptive+Null=Yes">#gephebase-summary-title)</a>		Molecular Type

Coding ([https://www.gephebase.org/search-criteria?/and+Molecular Type=%27Coding%27#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Molecular%20Type=%27Coding%27#gephebase-summary-title))

Aberration Type

Deletion ([https://www.gephebase.org/search-criteria?/and+Aberration Type=%27Deletion%27#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Aberration%20Type=%27Deletion%27#gephebase-summary-title))

Deletion Size

10-99 bp

Molecular Details of the Mutation

22-bp deletion

Experimental Evidence

Linkage Mapping ([https://www.gephebase.org/search-criteria?/and+Experimental Evidence=%27Linkage Mapping%27#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Experimental%20Evidence=%27Linkage%20Mapping%27#gephebase-summary-title))

Main Reference

Genetic control of a transition from black to straw-white seed hull in rice domestication. (2011) (<https://pubmed.ncbi.nlm.nih.gov/21263038>)

Authors

Zhu BF; Si L; Wang Z; Zhou Y; Zhu J; Shangguan Y; Lu D; Fan D; Li C; Lin H; Qian Q; Sang T; Zhou B; Minobe Y; Han B

Abstract

The genetic mechanism involved in a transition from the black-colored seed hull of the ancestral wild rice (*Oryza rufipogon* and *Oryza nivara*) to the straw-white seed hull of cultivated rice (*Oryza sativa*) during grain ripening remains unknown. We report that the black hull of *O. rufipogon* was controlled by the Black hull4 (*Bh4*) gene, which was fine-mapped to an 8.8-kb region on rice chromosome 4 using a cross between *O. rufipogon* W1943 (black hull) and *O. sativa* indica cv Guangluai 4 (straw-white hull). *Bh4* encodes an amino acid transporter. A 22-bp deletion within exon 3 of the *bh4* variant disrupted the *Bh4* function, leading to the straw-white hull in cultivated rice. Transgenic study indicated that *Bh4* could restore the black pigment on hulls in cv Guangluai 4 and Kasalath. *Bh4* sequence alignment of all taxa with the outgroup *Oryza barthii* showed that the wild rice maintained comparable levels of nucleotide diversity that were about 70 times higher than those in the cultivated rice. The results from the maximum likelihood Hudson-Kreitman-Aguade test suggested that the significant reduction in nucleotide diversity in rice cultivars could be caused by artificial selection. We propose that the straw-white hull was selected as an important visual phenotype of nonshattered grains during rice domestication.

Additional References

A map of rice genome variation reveals the origin of cultivated rice. (2012) (<https://pubmed.ncbi.nlm.nih.gov/23034647>)

## RELATED GEPHE

Related Genes

1 (Rc) ([https://www.gephebase.org/search-criteria?/or+Taxon ID=%274529%27/and+Trait=Coloration/or+Taxon ID=%274530%27/and+Trait=Coloration/and+groupHaplotypes=true#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Taxon%20ID=%274529%27/and+Trait=Coloration/or+Taxon%20ID=%274530%27/and+Trait=Coloration/and+groupHaplotypes=true#gephebase-summary-title))

Related Haplotypes

No matches found.

## EXTERNAL LINKS

## COMMENTS