GEPHE SUMMARY

Gephebase Gene
Bh4

GepheID
GP00000143

Entry Status
Published

Main curator
Martin

PHENOTYPIC CHANGE

Trait Category
Morphology

Trait
Coloration (seed hull)

Trait State in Taxon A
Oryza rufipogon

Trait State in Taxon B
Oryza sativa

Ancestral State
Taxon A

Taxonomic Status
Domesticated

Taxon A

Latin Name
Oryza rufipogon

Common Name
-

Synonyms
red rice; common wild rice; Oryza rufipogon Griff.

Rank
species

Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Oryzoideae; Oryzeae; Oryzinae; Oryza

Parent
Oryza () - (Rank: genus)

NCBI Taxonomy ID
4529

is Taxon A an Infraspecies?
No

Taxon B

Latin Name
Oryza sativa

Common Name
rice

Synonyms
rice; red rice; Oryza sativa L.

Rank
species

Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Oryzoideae; Oryzeae; Oryzinae; Oryza

Parent
Oryza () - (Rank: genus)

NCBI Taxonomy ID
4530

is Taxon B an Infraspecies?
No

GENOTYPIC CHANGE

Generic Gene Name
Bh4

Synonyms
-

String
-

Sequence Similarities
-

GO - Molecular Function
-

GO - Biological Process
-

GO - Cellular Component
GO:0016021 : integral component of membrane

Presumptive Null
Yes

Molecular Type

UniProtKB Oryza sativa
A0A0H3ZGK8

GenebankID or UniProtKB
KR815346

Coding

Aberration Type
Deletion

Deletion Size
10-99 bp

Molecular Details of the Mutation
22-bp deletion

Experimental Evidence
Linkage Mapping

Main Reference
Genetic control of a transition from black to straw-white seed hull in rice domestication. (2011)

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)

RELATED GEPHE

Related Genes
1 (Rc)
Related Haplotypes
No matches found.

COMMENTS