GEPHE SUMMARY

Gephebase Gene
Shattering1 - OsSh1 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^Shattering1 - OsSh1^#gephebase-summary-title)

Entry Status
Published

GepheID
GP00001039

Main curator
Martin

PHENOTYPIC CHANGE

Trait Category
Physiology (https://www.gephebase.org/search-criteria?/and+Trait Category=^Physiology^#gephebase-summary-title)

Trait
Seed shattering (https://www.gephebase.org/search-criteria?/and+Trait=^Seed shattering^#gephebase-summary-title)

Trait State in Taxon A
Oryza sativa - wild-type

Trait State in Taxon B
Oryza sativa- mutant and domesticated non-shattering strains

Ancestral State
Taxon A

Taxonomic Status
Domesticated (https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Domesticated^#gephebase-summary-title)

Taxon A

Latin Name
Oryza sativa
(https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Oryza sativa^#gephebase-summary-title)

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)
(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)

is Taxon A an Infraspecies?
No

Taxon B

Latin Name
Oryza sativa
(https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Oryza sativa^#gephebase-summary-title)

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)
(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)

is Taxon B an Infraspecies?
No

GENOTYPIC CHANGE

Generic Gene Name
YAB2

Synonyms
FIL2; Os03g0650000; LOC_Os03g44710

String
39947.LOC_Os03g44710.1
(http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 39947.LOC_Os03g44710.1)

Sequence Similarities
Belongs to the YABBY family.

GO - Molecular Function
GO:0046872 : metal ion binding (https://www.ebi.ac.uk/QuickGO/term/GO:0046872)

GO - Biological Process
GO:0007275 : multicellular organism development
(https://www.ebi.ac.uk/QuickGO/term/GO:0007275)
GO:0045165 : cell fate commitment (https://www.ebi.ac.uk/QuickGO/term/GO:0045165)
GO:0010158 : abaxial cell fate specification
(https://www.ebi.ac.uk/QuickGO/term/GO:0010158)

UniProtKB Oryza sativa subsp. japonica
Q10FZ7 (http://www.uniprot.org/uniprot/Q10FZ7)

GenebankID or UniProtKB
()

GO - Cellular Component

GO:0005634 : nucleus (https://www.ebi.ac.uk/QuickGO/term/GO:0005634)

Presumptive Null

No (https://www.gephebase.org/search-criteria?/and+Presumptive Null=^No^#gephebase-summary-title)

Molecular Type

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

Aberration Type

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

Insertion Size

1-10 kb

Molecular Details of the Mutation

>4kb insertion in intron (unclear)

Experimental Evidence

Association Mapping (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Association Mapping^#gephebase-summary-title)

Main Reference

Parallel domestication of the Shattering1 genes in cereals. (2012) (https://pubmed.ncbi.nlm.nih.gov/22581231)

Authors

Lin Z; Li X; Shannon LM; Yeh CT; Wang ML; Bai G; Peng Z; Li J; Trick HN; Clemente TE; Doebley J; Schnable PS; Tuinstra MR; Tesso TT; White F; Yu J

Abstract

A key step during crop domestication is the loss of seed shattering. Here, we show that seed shattering in sorghum is controlled by a single gene, Shattering1 (Sh1), which encodes a YABBY transcription factor. Domesticated sorghums harbor three different mutations at the Sh1 locus. Variants at regulatory sites in the promoter and intronic regions lead to a low level of expression, a 2.2-kb deletion causes a truncated transcript that lacks exons 2 and 3, and a GT-to-GG splice-site variant in the intron 4 results in removal of the exon 4. The distributions of these non-shattering haplotypes among sorghum landraces suggest three independent origins. The function of the rice ortholog (OsSh1) was subsequently validated with a shattering-resistant mutant, and two maize orthologs (ZmSh1-1 and ZmSh1-5.1+ZmSh1-5.2) were verified with a large mapping population. Our results indicate that Sh1 genes for seed shattering were under parallel selection during sorghum, rice and maize domestication.

Additional References

Two evolutionary histories in the genome of rice: the roles of domestication genes. (2011) (https://pubmed.ncbi.nlm.nih.gov/21695282)
Resequencing 50 accessions of cultivated and wild rice yields markers for identifying agronomically important genes. (2011) (https://pubmed.ncbi.nlm.nih.gov/22158310)

RELATED GEPHE

Related Genes

3 (OsLG1, shattering4 - sh4, qSH1) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^4530^/and+Trait=Seed shattering/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

Verify Orthology