GEPHE SUMMARY

Gephebase Gene
Shattering1 - Sh1 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^Shattering1 - Sh1^#gephebase-summary-title)

GepheID
GP00001041

Entry Status
Published

Main curator
Courtier

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
Sorghum virgatum - shattering

Trait State in Taxon B
Sorghum bicolor; Tx430-like non-shattering

Ancestral State
Data not curated

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

Taxon A

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

Common Name
-

Synonyms
Sorghum bicolor var. virgatum; Sorghum bicolor var. virgatum (Hack.) de Wet & Huckabay, nom. inval.; Sorghum virgatum (Hack.) Stapf

Rank
species

Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; PACMAD clade; Panicoideae; Andropogonodae; Andropogoneae; Sorghinae; Sorghum

Parent
Sorghum () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4557)

NCBI Taxonomy ID
1428165 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 1428165)

is Taxon A an Infraspecies?
No

Taxon B

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

Common Name
sorghum

Synonyms
Andropogon sorghum; Sorghum bicolor subsp. bicolor; Sorghum nervosum; Sorghum saccharatum; Sorghum vulgare; sorghum; broomcorn; milo; Andropogon sorghum (L.) Brot.; Sorghum bicolor (L.) Moench; Sorghum nervosum Besser ex Schult.; Sorghum saccharatum (L.) Moench; Sorghum vulgare Pers.; Sorghum bicolor milo; Sorghum_bicolor

Rank
species

Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliopsida; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; PACMAD clade; Panicoideae; Andropogonodae; Andropogoneae; Sorghinae; Sorghum

Parent
Sorghum () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4557)

NCBI Taxonomy ID
4558 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4558)

is Taxon B an Infraspecies?
Yes

Taxon B Description
Sorghum bicolor; Tx430-like non-shattering

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

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

GenebankID or UniProtKB
()

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)

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

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

Aberration Type

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

Molecular Details of the Mutation

two promoter variants at positions -1194 and -1185

Experimental Evidence

Linkage Mapping (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Linkage 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

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

2 (https://www.gephebase.org/search-criteria?/or+Gene Gephebase=^Shattering1 - Sh1^/and+Taxon ID=^1428165^/or+Gene Gephebase=^Shattering1 - Sh1^/and+Taxon ID=^4558^#gephebase-summary-title)

EXTERNAL LINKS

COMMENTS

Verify Orthology