GEPHE SUMMARY

Gephebase Gene
Shattering1 - ZmSh1-1 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^Shattering1 - ZmSh1-1^#gephebase-summary-title)

GepheID
GP00001043

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
Zea mays ssp. parviglumis and mexicana (teosinte)

Trait State in Taxon B
Zea mays ssp. Mays

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
Zea mays (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Zea mays^#gephebase-summary-title)

Common Name
-

Synonyms
Zea mays var. japonica; maize; Zea mays L.; Zea mays mays

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; Tripsacinae; Zea

Parent
Zea () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4575)

NCBI Taxonomy ID
4577 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4577)

is Taxon A an Infraspecies?
Yes

Taxon A Description
Zea mays ssp. parviglumis and mexicana (teosinte)

Taxon B

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

Common Name
-

Synonyms
Zea mays var. japonica; maize; Zea mays L.; Zea mays mays

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; Tripsacinae; Zea

Parent
Zea () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4575)

NCBI Taxonomy ID
4577 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4577)

is Taxon B an Infraspecies?
Yes

Taxon B Description
Zea mays ssp. Mays

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)

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

GenebankID or UniProtKB
()

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

complex structural variations

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

RELATED GEPHE

Related Genes

1 (Shattering1 - ZmSh1-5.1 + ZmSh1-5.2) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^4577^/and+Trait=Seed shattering/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

Verify Orthology