

GEPHE SUMMARY

	Gephebase Gene		GepheID
GmHs1-1 (Glyma02g43700.1) ( <a href="https://www.gephebase.org/search-criteria?/and+Gene">https://www.gephebase.org/search-criteria?/and+Gene</a> )		GP00001543	
Gephebase="GmHs1-1 (Glyma02g43700.1)"#gephebase-summary-title)			Main curator
	Entry Status	Prigent	
Published			

PHENOTYPIC CHANGE

Trait #1	Trait Category
Physiology ( <a href="https://www.gephebase.org/search-criteria?/and+Trait">https://www.gephebase.org/search-criteria?/and+Trait</a> )	
Category="Physiology"#gephebase-summary-title)	Trait
Seed hardness ( <a href="https://www.gephebase.org/search-criteria?/and+Trait=" seed"="">https://www.gephebase.org/search-criteria?/and+Trait="Seed</a> )	
hardness"#gephebase-summary-title)	Trait State in Taxon A
Wild soybean hard-seeded (PI 468916 & PI 479752)	
	Trait State in Taxon B
Soybean cultivar Williams 82 with permeable seeds	

Trait #2	Trait Category
Physiology ( <a href="https://www.gephebase.org/search-criteria?/and+Trait">https://www.gephebase.org/search-criteria?/and+Trait</a> )	
Category="Physiology"#gephebase-summary-title)	Trait
Seed coat permeability ( <a href="https://www.gephebase.org/search-criteria?/and+Trait=" seed"="">https://www.gephebase.org/search-criteria?/and+Trait="Seed</a> )	
coat permeability"#gephebase-summary-title)	Trait State in Taxon A
-	
	Trait State in Taxon B
-	

	Ancestral State
Taxon A	
	Taxonomic Status
Domesticated ( <a href="https://www.gephebase.org/search-criteria?/and+Taxonomic">https://www.gephebase.org/search-criteria?/and+Taxonomic</a> )	
Status="Domesticated"#gephebase-summary-title)	

Taxon A	Taxon B
	Latin Name
Glycine soja	Glycine max
( <a href="https://www.gephebase.org/search-criteria?/and+Taxon">https://www.gephebase.org/search-criteria?/and+Taxon</a> )	( <a href="https://www.gephebase.org/search-criteria?/and+Taxon">https://www.gephebase.org/search-criteria?/and+Taxon</a> )
and Synonyms="Glycine soja"#gephebase-summary-title)	and Synonyms="Glycine max"#gephebase-summary-title)
	Common Name
-	soybean
	Synonyms
wild soybean; Glycine soja Siebold & Zucc.	soybean; soybeans; Glycine max (L.) Merr.; Glycine max; cv. Wye
	Rank
species	species
	Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta;	cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta;
Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae;	Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae;
eudicotyledons; Gunneridae; Pentapetalae; rosids; fabids; Fabales; Fabaceae;	eudicotyledons; Gunneridae; Pentapetalae; rosids; fabids; Fabales; Fabaceae;
Papilionoideae; 50 kb inversion clade; NPAAA clade; indigoferoid/millettioid clade;	Papilionoideae; 50 kb inversion clade; NPAAA clade; indigoferoid/millettioid clade;
Phaseoleae; Glycine; Soja	Phaseoleae; Glycine; Soja
	Parent
Soja () - (Rank: subgenus)	Soja () - (Rank: subgenus)
( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=1462606">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=1462606</a> )	( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=1462606">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=1462606</a> )
	NCBI Taxonomy ID
3848	3847
( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3848">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3848</a> )	( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3847">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3847</a> )
	is Taxon A an Intraspecies?
Yes	Yes
	Taxon A Description
Wild soybean hard-seeded (PI 468916 & PI 479752)	Soybean cultivar Williams 82 with permeable seeds

Taxon B	Taxon A
	Latin Name
Glycine max	Glycine soja
( <a href="https://www.gephebase.org/search-criteria?/and+Taxon">https://www.gephebase.org/search-criteria?/and+Taxon</a> )	( <a href="https://www.gephebase.org/search-criteria?/and+Taxon">https://www.gephebase.org/search-criteria?/and+Taxon</a> )
and Synonyms="Glycine max"#gephebase-summary-title)	and Synonyms="Glycine soja"#gephebase-summary-title)
	Common Name
soybean	-
	Synonyms
soybean; soybeans; Glycine max (L.) Merr.; Glycine max; cv. Wye	wild soybean; Glycine soja Siebold & Zucc.
	Rank
species	species
	Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta;	cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta;
Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae;	Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae;
eudicotyledons; Gunneridae; Pentapetalae; rosids; fabids; Fabales; Fabaceae;	eudicotyledons; Gunneridae; Pentapetalae; rosids; fabids; Fabales; Fabaceae;
Papilionoideae; 50 kb inversion clade; NPAAA clade; indigoferoid/millettioid clade;	Papilionoideae; 50 kb inversion clade; NPAAA clade; indigoferoid/millettioid clade;
Phaseoleae; Glycine; Soja	Phaseoleae; Glycine; Soja
	Parent
Soja () - (Rank: subgenus)	Soja () - (Rank: subgenus)
( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=1462606">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=1462606</a> )	( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=1462606">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=1462606</a> )
	NCBI Taxonomy ID
3847	3848
( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3847">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3847</a> )	( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3848">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3848</a> )
	is Taxon B an Intraspecies?
Yes	Yes
	Taxon B Description
Soybean cultivar Williams 82 with permeable seeds	Wild soybean hard-seeded (PI 468916 & PI 479752)

## GENOTYPIC CHANGE

Hs1	Generic Gene Name	I1JIK2 ( <a href="http://www.uniprot.org/uniprot/I1JIK2">http://www.uniprot.org/uniprot/I1JIK2</a> )	UniProtKB Glycine max
GmHs1-1; 100801460; WBb98N11.1; GLYMA_02G269500	Synonyms	()	GenebankID or UniProtKB
3847.GLYMA02G43700.1 ( <a href="http://string-db.org/newstring.cgi/show_network_section.pl?identifier=3847.GLYMA02G43700.1">http://string-db.org/newstring.cgi/show_network_section.pl?identifier=3847.GLYMA02G43700.1</a> )	String		
-	Sequence Similarities		
GO:0004035 : alkaline phosphatase activity ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0004035">https://www.ebi.ac.uk/QuickGO/term/GO:0004035</a> )	GO - Molecular Function		
-	GO - Biological Process		
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> )	GO - Cellular Component		
No ( <a +no+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Presumptive+Null=">https://www.gephebase.org/search-criteria?/and+Presumptive+Null="+No+"#gephebase-summary-title</a> )			Presumptive Null
Coding ( <a +coding+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Molecular+Type=">https://www.gephebase.org/search-criteria?/and+Molecular+Type="+Coding+"#gephebase-summary-title</a> )			Molecular Type
SNP ( <a +snp+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Aberration+Type=">https://www.gephebase.org/search-criteria?/and+Aberration+Type="+SNP+"#gephebase-summary-title</a> )			Aberration Type
Nonsynonymous			SNP Coding Change
C>T p.Thr>Met predicted to affect the alpha-helix of the protein			Molecular Details of the Mutation
Linkage Mapping ( <a +linkage+mapping+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Experimental+Evidence=">https://www.gephebase.org/search-criteria?/and+Experimental+Evidence="+Linkage+Mapping+"#gephebase-summary-title</a> )			Experimental Evidence

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	-	-	-

GmHs1-1, encoding a calcineurin-like protein, controls hard-seededness in soybean. (2015) ( <a href="https://pubmed.ncbi.nlm.nih.gov/26098868">https://pubmed.ncbi.nlm.nih.gov/26098868</a> )	Main Reference
Sun L; Miao Z; Cai C; Zhang D; Zhao M; Wu Y; Zhang X; Swarm SA; Zhou L; Zhang ZJ; Nelson RL; Ma J	Authors
Loss of seed-coat impermeability was essential in the domestication of many leguminous crops to promote the production of their highly nutritious seeds. Here we show that seed-coat impermeability in wild soybean is controlled by a single gene, GmHs1-1, which encodes a calcineurin-like metallophosphoesterase transmembrane protein. GmHs1-1 is primarily expressed in the Malpighian layer of the seed coat and is associated with calcium content. The transition from impermeability to permeability in domesticated soybean was caused by artificial selection of a point mutation in GmHs1-1. Interestingly, a number of soybean landraces evaded selection for permeability because of an alternative selection for seed-coat cracking that also enables seed imbibition. Despite the single origin of the mutant allele Gmhs1-1, the distribution pattern of allelic variants in the context of soybean population structure and the detected signature of genomic introgression between wild and cultivated soybeans suggest that Gmhs1-1 may have experienced reselection for seed-coat permeability.	Abstract
	Additional References

## RELATED GEPHE

No matches found.	Related Genes
No matches found.	Related Haplotypes

## EXTERNAL LINKS

## COMMENTS

@Introgression - Hard-seeded is dominant

