

GEPHE SUMMARY

	Gephebase Gene	GepheID
teosinte glume architecture (tga1) (https://www.gephebase.org/search-criteria?/and+Gene Gephebase="teosinte glume architecture (tga1)"#gephebase-summary-title)	GP00001118	
	Entry Status	Main curator
Published	Martin	

PHENOTYPIC CHANGE

	Trait Category
Morphology (https://www.gephebase.org/search-criteria?/and+Trait Category="Morphology">#gephebase-summary-title)	Trait
Cupule retraction (https://www.gephebase.org/search-criteria?/and+Trait=Cupule retraction"#gephebase-summary-title)	Trait State in Taxon A
Zea mays ssp. parviflora and mexicana (teosinthe)	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	Taxon B	Latin Name
Zea mays (#gephebase-summary-title)	Common Name	Zea mays (#gephebase-summary-title)	Common Name
-		-	
Zea mays var. japonica; maize; Zea mays L.; Zea mays mays species	Rank	Zea mays var. japonica; maize; Zea mays L.; Zea mays mays species	Rank
	Lineage		Lineage
cellular organisms; Eukaryota; Viriplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; PACMAD clade; Panicoideae; Andropogonidae; Andropogoneae; Tripsacinae; Zea		cellular organisms; Eukaryota; Viriplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; PACMAD clade; Panicoideae; Andropogonidae; Andropogoneae; Tripsacinae; Zea	
Zea () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4575)	Parent	Zea () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4575)	Parent
4577 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4577)	NCBI Taxonomy ID	4577 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4577)	NCBI Taxonomy ID
Yes	is Taxon A an Infraspecies?	Yes	is Taxon B an Infraspecies?
Zea mays ssp. parviflora and mexicana (teosinthe)	Taxon A Description	Zea mays ssp. mays	Taxon B Description

GENOTYPIC CHANGE

	Generic Gene Name	UniProtKB Arabidopsis thaliana
TGA1		
MQN23_15; MQN23_15; TGACG sequence-specific binding protein 1; BZIP47; At5g65210 3702.AT5G65210.1 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=3702.AT5G65210.1)	Q39237 (http://www.uniprot.org/uniprot/Q39237)	
Belongs to the bZIP family.	String	AEP96351 (https://www.ncbi.nlm.nih.gov/nuccore/AEP96351)
GO:0003700 : DNA-binding transcription factor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0003700) GO:0043565 : sequence-specific DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0043565) GO:0044212 : transcription regulatory region DNA binding	Sequence Similarities	GO - Molecular Function

GO:0006351 : transcription, DNA-templated

(<https://www.ebi.ac.uk/QuickGO/term/GO:0006351>)

GO:0042742 : defense response to bacterium

(<https://www.ebi.ac.uk/QuickGO/term/GO:0042742>)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

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

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

K6N; the lysine residue being conserved in rice and wheat

Experimental Evidence

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

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

Main Reference

The origin of the naked grains of maize. (2005) (<https://pubmed.ncbi.nlm.nih.gov/16079849>)

Authors

Wang H; Nussbaum-Wagler T; Li B; Zhao Q; Vigouroux Y; Faller M; Bomblies K; Lukens L; Doebley JF

Abstract

The most critical step in maize (*Zea mays* ssp. *mays*) domestication was the liberation of the kernel from the hardened, protective casing that envelops the kernel in the maize progenitor, teosinte. This evolutionary step exposed the kernel on the surface of the ear, such that it could readily be used by humans as a food source. Here we show that this key event in maize domestication is controlled by a single gene (teosinte glume architecture or *tga1*), belonging to the SBP-domain family of transcriptional regulators. The factor controlling the phenotypic difference between maize and teosinte maps to a 1-kilobase region, within which maize and teosinte show only seven fixed differences in their DNA sequences. One of these differences encodes a non-conservative amino acid substitution and may affect protein function, and the other six differences potentially affect gene regulation. Molecular evolution analyses show that this region was the target of selection during maize domestication. Our results demonstrate that modest genetic changes in single genes can induce dramatic changes in phenotype during domestication and evolution.

Additional References

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS