

GEPHE SUMMARY

PTS/TKD1 (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=^PTS/TKD1^#gephebase-summary-title)	Gephebase Gene	GP00000938	GepheID
Published	Entry Status	Martin	Main curator

PHENOTYPIC CHANGE

Morphology (https://www.gephebase.org/search-criteria?/and+Trait+Category=^Morphology^#gephebase-summary-title)	Trait Category		
Leaf shape (https://www.gephebase.org/search-criteria?/and+Trait=^Leaf+shape^#gephebase-summary-title)	Trait		
Solanum cheesmaniae	Trait State in Taxon A		
Solanum galapagense	Trait State in Taxon B		
Taxon A	Ancestral State		
Interspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=^Interspecific^#gephebase-summary-title)	Taxonomic Status		
	Taxon A		Taxon B
Solanum cheesmaniae (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Solanum+cheesmaniae^#gephebase-summary-title)	Latin Name	Solanum galapagense (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Solanum+galapagense^#gephebase-summary-title)	Latin Name
-	Common Name	-	Common Name
Lycopersicon cheesmaniae; Lycopersicon cheesmanii; non Solanum cheesmanii Geras.; Lycopersicon cheesmaniae L.Riley; Solanum cheesmaniae (L.Riley) Fosberg	Synonyms	Lycopersicon cheesmaniae f. minor; Lycopersicon cheesmaniae f. minor (Hook.f.) C.H.Mull.; Solanum galapagense S.C.Darwin & Peralta; Solanum galapagense	Synonyms
species	Rank	species	Rank
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Solanales; Solanaceae; Solanoideae; Solanaeae; Solanum; Lycopersicon	Lineage	cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Solanales; Solanaceae; Solanoideae; Solanaeae; Solanum; Lycopersicon	Lineage
Lycopersicon () - (Rank: subgenus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=49274)	Parent	Lycopersicon () - (Rank: subgenus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=49274)	Parent
142759 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=142759)	NCBI Taxonomy ID	315350 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=315350)	NCBI Taxonomy ID
No	is Taxon A an Intraspecies?	No	is Taxon B an Intraspecies?

GENOTYPIC CHANGE

PTS	Generic Gene Name	B2Y2G9 (http://www.uniprot.org/uniprot/B2Y2G9)	UniProtKB Solanum lycopersicum
KD1; TKD1; 100191115	Synonyms	()	GenebankID or UniProtKB
4081.Solyc06g072480.1.1 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=4081.Solyc06g072480.1.1)	String		
-	Sequence Similarities		
GO:0003677 : DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0003677)	GO - Molecular Function		
-	GO - Biological Process		
GO:0005634 : nucleus (https://www.ebi.ac.uk/QuickGO/term/GO:0005634)	GO - Cellular Component		
			Presumptive Null

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

Molecular Type

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

Aberration Type

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

Deletion Size

1-9 bp

Molecular Details of the Mutation

1bp deletion at -1232 from start Met

Experimental Evidence

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

Main Reference

Natural variation in leaf morphology results from mutation of a novel KNOX gene. (2008) (<https://pubmed.ncbi.nlm.nih.gov/18424140>)

Authors

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Abstract

Striking diversity in size, arrangement, and complexity of leaves can sometimes be seen in closely related species. One such variation is found between wild tomato species collected by Charles Darwin from the Galapagos Islands [1-5]. Here, we show that a single-nucleotide deletion in the promoter of the PETROSELINUM (PTS) [3] gene upregulates the gene product in leaves and is responsible for the natural variation in leaf shape in the Galapagean tomatoes. PTS encodes a novel KNOTTED1-LIKE HOMEODOMAIN (KNOX) gene that lacks a homeodomain. We also showed that the tomato classical mutant bipinnata (bip) [6], which recapitulates the Pts phenotype, results from the loss of function of a BEL-LIKE HOMEODOMAIN (BELL) gene, BIP. We used bimolecular fluorescence complementation and two-hybrid competition assays to show that PTS represses KNOX1 protein interactions with BIP, as well as subsequent nuclear localization of this transcriptional complex. We suggest that natural variation in leaf shape can be created with a rheostat-like mechanism that alters the KNOX1 protein interaction network specifically during leaf development. This subtle change in interaction between transcription factors leaves essential KNOX1 function in the shoot apical meristem intact and appears to be a facile way to alter leaf morphology during evolution.

Additional References

RELATED GEPHE

No matches found.

Related Genes

No matches found.

Related Haplotypes

EXTERNAL LINKS

COMMENTS