

GEPHE SUMMARY

	Gephebase Gene		GepheID
SELF PRUNING 5G (SP5G) (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase+^SELF+PRUNING+5G+(SP5G)^#gephebase-summary-title)		GP00001564	
Published	Entry Status	Courtier	Main curator

PHENOTYPIC CHANGE

	Trait Category		
Physiology (https://www.gephebase.org/search-criteria?/and+Trait+Category+^Physiology^#gephebase-summary-title)			
	Trait		
Flowering time (https://www.gephebase.org/search-criteria?/and+Trait+^Flowering+time^#gephebase-summary-title)			
	Trait State in Taxon A		
Wild relative of tomato (<i>Solanum pimpinellifolium</i> & <i>S. cheesmaniae</i> & <i>S. galapagense</i>)			
	Trait State in Taxon B		
Cultivated tomato			
	Ancestral State		
Unknown			
	Taxonomic Status		
Domesticated (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status+^Domesticated^#gephebase-summary-title)			

Taxon A	Latin Name	Taxon B	Latin Name
<i>Solanum pimpinellifolium</i> (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms+^Solanum+pimpinellifolium^#gephebase-summary-title)		<i>Solanum lycopersicum</i> (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms+^Solanum+lycopersicum^#gephebase-summary-title)	
-	Common Name	tomato	Common Name
	Synonyms		Synonyms
Lycopersicon pimpinellifolium; <i>Solanum pimpinellifolium</i> var. <i>racemigerum</i> ; currant tomato; <i>Lycopersicon pimpinellifolium</i> (L.) Mill.; <i>Solanum pimpinellifolium</i> L.		Lycopersicon esculentum var. <i>esculentum</i> ; <i>Solanum esculentum</i> ; <i>Solanum lycopersicum</i> var. <i>humboldtii</i> ; tomato; <i>Lycopersicon esculentum</i> Mill.; <i>Solanum esculentum</i> Dunal; <i>Solanum lycopersicum</i> L.; <i>Lycopersicon lycopersicum</i> ; <i>Lycopersicon esculentum</i> ; <i>Solanum lycopersicon</i>	
species	Rank	species	Rank
	Lineage		Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetales; asterids; lamiids; Solanales; Solanaceae; Solanoideae; Solanaeae; Solanum; Lycopersicon		cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetales; asterids; lamiids; Solanales; Solanaceae; Solanoideae; Solanaeae; Solanum; Lycopersicon	
	Parent		Parent
Lycopersicon () - (Rank: subgenus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=49274)		Lycopersicon () - (Rank: subgenus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=49274)	
4084 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4084)	NCBI Taxonomy ID	4081 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4081)	NCBI Taxonomy ID
No	is Taxon A an Intraspecies?	No	is Taxon B an Intraspecies?

GENOTYPIC CHANGE

	Generic Gene Name	UniProtKB <i>Solanum lycopersicum</i>
SP5G		
	Synonyms	GenebankID or UniProtKB
101254900		0
	String	
4081.Solyc05g053850.2.1 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=4081.Solyc05g053850.2.1)		
	Sequence Similarities	
-		
	GO - Molecular Function	
-		
	GO - Biological Process	
GO:0009911 : positive regulation of flower development (https://www.ebi.ac.uk/QuickGO/term/GO:0009911)		

GO:0009909 : regulation of flower development
(<https://www.ebi.ac.uk/QuickGO/term/GO:0009909>)
GO:0048573 : photoperiodism, flowering
(<https://www.ebi.ac.uk/QuickGO/term/GO:0048573>)
GO:0010119 : regulation of stomatal movement
(<https://www.ebi.ac.uk/QuickGO/term/GO:0010119>)

GO - Cellular Component

GO:0005737 : cytoplasm (<https://www.ebi.ac.uk/QuickGO/term/GO:0005737>)
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](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

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

Molecular Details of the Mutation

several candidate SNPs and structural variants

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

Variation in the flowering gene SELF PRUNING 5G promotes day-neutrality and early yield in tomato. (2017) (<https://pubmed.ncbi.nlm.nih.gov/27918538>)

Authors

Soyk S; MÃller NA; Park SJ; Schmalenbach I; Jiang K; Hayama R; Zhang L; Van Eck J; JimÃ©nez-GÃ³mez JM; Lippman ZB

Abstract

Plants evolved so that their flowering is triggered by seasonal changes in day length. However, day-length sensitivity in crops limits their geographical range of cultivation, and thus modification of the photoperiod response was critical for their domestication. Here we show that loss of day-length-sensitive flowering in tomato was driven by the florigen paralog and flowering repressor SELF-PRUNING 5G (SP5G). SP5G expression is induced to high levels during long days in wild species, but not in cultivated tomato because of cis-regulatory variation. CRISPR/Cas9-engineered mutations in SP5G cause rapid flowering and enhance the compact determinate growth habit of field tomatoes, resulting in a quick burst of flower production that translates to an early yield. Our findings suggest that pre-existing variation in SP5G facilitated the expansion of cultivated tomato beyond its origin near the equator in South America, and they provide a compelling demonstration of the power of gene editing to rapidly improve yield traits in crop breeding.

Additional References

RELATED GEPHE

No matches found.

Related Genes

No matches found.

Related Haplotypes

EXTERNAL LINKS

COMMENTS