

GEPHE SUMMARY

	Gephebase Gene		GepheID
SVP (SHORT VEGETATIVE PHASE) (<a +svp+(short+vegetative+phase)+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase="+SVP+(SHORT+VEGETATIVE+PHASE)+"#gephebase-summary-title)		GP00001087	
	Entry Status	Martin	Main curator
Published			

PHENOTYPIC CHANGE

	Trait Category		
Physiology (<a +physiology+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait+Category=">https://www.gephebase.org/search-criteria?/and+Trait+Category="+Physiology+"#gephebase-summary-title)		Trait	
Flowering time (<a +flowering+time+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait=">https://www.gephebase.org/search-criteria?/and+Trait="+Flowering+time+"#gephebase-summary-title)			
	Trait State in Taxon A		
Arabidopsis thaliana - Ler		Trait State in Taxon B	
Arabidopsis thaliana - Fuk			
	Ancestral State		
Taxon A		Taxonomic Status	
Intraspecific (<a +intraspecific+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=">https://www.gephebase.org/search-criteria?/and+Taxonomic+Status="+Intraspecific+"#gephebase-summary-title)			
	Taxon A		Taxon B
	Latin Name		Latin Name
Arabidopsis thaliana (<a +arabidopsis+thaliana+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Arabidopsis+thaliana+"#gephebase-summary-title)		Arabidopsis thaliana (<a +arabidopsis+thaliana+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Arabidopsis+thaliana+"#gephebase-summary-title)	
	Common Name		Common Name
thale cress		thale cress	
	Synonyms		Synonyms
thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress		thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress	
	Rank		Rank
species		species	
	Lineage		Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis		cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis	
	Parent		Parent
Arabidopsis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701)		Arabidopsis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701)	
	NCBI Taxonomy ID		NCBI Taxonomy ID
3702 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702)		3702 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702)	
	is Taxon A an Intraspecies?		is Taxon B an Intraspecies?
Yes		Yes	
	Taxon A Description		Taxon B Description
Arabidopsis thaliana - Ler		Arabidopsis thaliana - Fuk	

GENOTYPIC CHANGE

	Generic Gene Name		UniProtKB Arabidopsis thaliana
SVP		Q9FVC1 (http://www.uniprot.org/uniprot/Q9FVC1)	
	Synonyms		GenebankID or UniProtKB
AGAMOUS-like 22; AGL22; AT2G22550; F14M13.6; F14M13_6; FAQ1; Flowering Arabidopsis QTL1; SHORT VEGETATIVE PHASE; At2g22540		EU078686 (https://www.ncbi.nlm.nih.gov/nucore/EU078686)	
	String		
3702.AT2G22540.1 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=3702.AT2G22540.1)			
	Sequence Similarities		
-			
	GO - Molecular Function		
GO:0046983 : protein dimerization activity (https://www.ebi.ac.uk/QuickGO/term/GO:0046983)			

GO:0003700 : DNA-binding transcription factor activity
(<https://www.ebi.ac.uk/QuickGO/term/GO:0003700>)
GO:0000977 : RNA polymerase II regulatory region sequence-specific DNA binding
(<https://www.ebi.ac.uk/QuickGO/term/GO:0000977>)
GO:0043565 : sequence-specific DNA binding
(<https://www.ebi.ac.uk/QuickGO/term/GO:0043565>)
GO:0008134 : transcription factor binding
(<https://www.ebi.ac.uk/QuickGO/term/GO:0008134>)
GO:0000982 : transcription factor activity, RNA polymerase II proximal promoter
sequence-specific DNA binding (<https://www.ebi.ac.uk/QuickGO/term/GO:0000982>)
GO:0044212 : transcription regulatory region DNA binding
(<https://www.ebi.ac.uk/QuickGO/term/GO:0044212>)
GO:0000900 : translation repressor activity, mRNA regulatory element binding
(<https://www.ebi.ac.uk/QuickGO/term/GO:0000900>)

GO - Biological Process

GO:0007275 : multicellular organism development
(<https://www.ebi.ac.uk/QuickGO/term/GO:0007275>)
GO:0045944 : positive regulation of transcription by RNA polymerase II
(<https://www.ebi.ac.uk/QuickGO/term/GO:0045944>)
GO:0030154 : cell differentiation (<https://www.ebi.ac.uk/QuickGO/term/GO:0030154>)
GO:0045892 : negative regulation of transcription, DNA-templated
(<https://www.ebi.ac.uk/QuickGO/term/GO:0045892>)
GO:0009910 : negative regulation of flower development
(<https://www.ebi.ac.uk/QuickGO/term/GO:0009910>)
GO:0009266 : response to temperature stimulus
(<https://www.ebi.ac.uk/QuickGO/term/GO:0009266>)
GO:0048438 : floral whorl development
(<https://www.ebi.ac.uk/QuickGO/term/GO:0048438>)

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

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

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

Ala32Val

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 flowering repressor SVP underlies a novel Arabidopsis thaliana QTL interacting with the genetic background. (2013) (<https://pubmed.ncbi.nlm.nih.gov/23382706>)

Authors

MÃ©ndez-Vigo B; MartÃnez-Zapater JM; Alonso-Blanco C

Abstract

The timing of flowering initiation is a fundamental trait for the adaptation of annual plants to different environments. Large amounts of intraspecific quantitative variation have been described for it among natural accessions of many species, but the molecular and evolutionary mechanisms underlying this genetic variation are mainly being determined in the model plant Arabidopsis thaliana. To find novel A. thaliana flowering QTL, we developed introgression lines from the Japanese accession Fuk, which was selected based on the substantial transgression observed in an F(2) population with the reference strain Ler. Analysis of an early flowering line carrying a single Fuk introgression identified Flowering Arabidopsis QTL1 (FAQ1). We fine-mapped FAQ1 in an 11 kb genomic region containing the MADS transcription factor gene SHORT VEGETATIVE PHASE (SVP). Complementation of the early flowering phenotype of FAQ1-Fuk with a SVP-Ler transgen demonstrated that FAQ1 is SVP. We further proved by directed mutagenesis and transgenesis that a single amino acid substitution in SVP causes the loss-of-function and early flowering of Fuk allele. Analysis of a worldwide collection of accessions detected FAQ1/SVP-Fuk allele only in Asia, with the highest frequency appearing in Japan, where we could also detect a potential ancestral genotype of FAQ1/SVP-Fuk. In addition, we evaluated allelic and epistatic interactions of SVP natural alleles by analysing more than one hundred transgenic lines carrying Ler or Fuk SVP alleles in five genetic backgrounds. Quantitative analyses of these lines showed that FAQ1/SVP effects vary from large to small depending on the genetic background. These results support that the flowering repressor SVP has been recently selected in A. thaliana as a target for early flowering, and evidence the relevance of genetic interactions for the intraspecific evolution of FAQ1/SVP and flowering time.

Additional References

RELATED GEPHE

Related Genes

12 (AGAMOUS-LIKE 50, Cryptochrome 2 (CRY2) ED1 allele, EARLY FLOWERING 3(ELF3), FLC (Flowering Locus C), FLM (MAF1), Flowering locus T (FT), Frigida (FRI), Frigida like 1 (FRL1), Frigida like 2 (FRL2), MADS AFFECTING FLOWERING 2 (MAF2), VIN3, HUA2) (<https://www.gephebase.org/search-criteria?/or+Taxon ID=~3702~/and+Trait=Flowering time/and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

@GxE - @Epistasis with effects dependent on genetic background