

GEPHE SUMMARY

	Gephebase Gene	GephelD
SVP (SHORT VEGETATIVE PHASE) (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^SVP (SHORT VEGETATIVE PHASE)^#gephebase-summary-title)	GP00001087	Main curator
	Entry Status	
Published	Martin	

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

GENOTYPIC CHANGE

	Generic Gene Name	UniProtKB Arabidopsis thaliana
SVP	Synonyms	Q9FVC1 (http://www.uniprot.org/uniprot/Q9FVC1)
AGAMOUS-like 22; AGL22; AT2G22550; F14M13.6; F14M13_6; FAQ1; Flowering Arabidopsis QTL1; SHORT VEGETATIVE PHASE; At2g22540	String	GenebankID or UniProtKB EU078686 (https://www.ncbi.nlm.nih.gov/nucleotide/EU078686)
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.gephbase.org/search-criteria?/and+Presumptive+Null=^No^#gephbase-summary-title>)

Molecular Type

Coding (<https://www.gephbase.org/search-criteria?/and+Molecular+Type=^Coding^#gephbase-summary-title>)

Aberration Type

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

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

Ala32Val

Experimental Evidence

Linkage Mapping (<https://www.gephbase.org/search-criteria?/and+Experimental+Evidence=^Linkage+Mapping^#gephbase-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

MÁñez-Vigo B; Martínez-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) EDI 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.gephbase.org/search-criteria?/or+TaxonID=^3702^/and+Trait=Flowering+time/and+groupHaplotypes=true#gephbase-summary-title>)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

@GxE - @Epistasis with effects dependent on genetic background