

GEPHE SUMMARY

Gephebase Gene		GepheID
FLC (Flowering Locus C) (https://www.gephebase.org/search-criteria?/and+Gene Gephebase="FLC (Flowering Locus C)"#gephebase-summary-title)		GP00000330
Entry Status		Martin
Published		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	
Arabidopsis thaliana- Col0		Trait State in Taxon B	
Arabidopsis thaliana- Van-0		Ancestral State	
Data not curated		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)		Arabidopsis thaliana (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; Pentapetales; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis		cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetales; 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- Col0		Arabidopsis thaliana- Van-0	

GENOTYPIC CHANGE

Generic Gene Name		UniProtKB Arabidopsis thaliana
FLC		Q9S7Q7 (http://www.uniprot.org/uniprot/Q9S7Q7)
Synonyms		GenebankID or UniProtKB
AGAMOUS-like 25; AGL25; FLF; FLOWERING LOCUS C; FLOWERING LOCUS F; MADS BOX PROTEIN FLOWERING LOCUS F; REDUCED STEM BRANCHING 6; RSB6; T31P16.130; T31P16_130; At5g10140		AF116528 (https://www.ncbi.nlm.nih.gov/nucore/AF116528)
String		
3702.AT5G10140.1 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=3702.AT5G10140.1)		
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 - 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:0009908 : flower development (<https://www.ebi.ac.uk/QuickGO/term/GO:0009908>)
GO:0009910 : negative regulation of flower development
(<https://www.ebi.ac.uk/QuickGO/term/GO:0009910>)
GO:0042752 : regulation of circadian rhythm
(<https://www.ebi.ac.uk/QuickGO/term/GO:0042752>)
GO:0009266 : response to temperature stimulus
(<https://www.ebi.ac.uk/QuickGO/term/GO:0009266>)
GO:0010048 : vernalization response
(<https://www.ebi.ac.uk/QuickGO/term/GO:0010048>)

GO - Cellular Component

GO:0005634 : nucleus (<https://www.ebi.ac.uk/QuickGO/term/GO:0005634>)

Presumptive Null

Yes (<https://www.gephebase.org/search-criteria?/and+Presumptive Null=~Yes~#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

Nonsense

Molecular Details of the Mutation

Substitution creating premature Stop (codon 158)

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

FRIGIDA-independent variation in flowering time of natural Arabidopsis thaliana accessions. (2005) (<https://pubmed.ncbi.nlm.nih.gov/15911588>)

Authors

Werner JD; Borevitz JO; Uhlenhaut NH; Ecker JR; Chory J; Weigel D

Abstract

FRIGIDA (FRI) and FLOWERING LOCUS C (FLC) are two genes that, unless plants are vernalized, greatly delay flowering time in Arabidopsis thaliana. Natural loss-of-function mutations in FRI cause the early flowering growth habits of many A. thaliana accessions. To quantify the variation among wild accessions due to FRI, and to identify additional genetic loci in wild accessions that influence flowering time, we surveyed the flowering times of 145 accessions in long-day photoperiods, with and without a 30-day vernalization treatment, and genotyped them for two common natural lesions in FRI. FRI is disrupted in at least 84 of the accessions, accounting for only approximately 40% of the flowering-time variation in long days. During efforts to dissect the causes for variation that are independent of known dysfunctional FRI alleles, we found new loss-of-function alleles in FLC, as well as late-flowering alleles that do not map to FRI or FLC. An FLC nonsense mutation was found in the early flowering Van-0 accession, which has otherwise functional FRI. In contrast, Lz-0 flowers late because of high levels of FLC expression, even though it has a deletion in FRI. Finally, eXtreme array mapping identified genomic regions linked to the vernalization-independent, late-flowering habit of Bur-0, which has an alternatively spliced FLC allele that behaves as a null allele.

Additional References

Adaptive divergence in flowering time among natural populations of Arabidopsis thaliana: Estimates of selection and QTL mapping. (2017) (<https://pubmed.ncbi.nlm.nih.gov/27859214>)

RELATED GEPHE

Related Genes

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

Related Haplotypes

6 ([https://www.gephebase.org/search-criteria?/or+Gene Gephebase=~FLC \(Flowering Locus C\)~/and+Taxon ID=~3702~/or+Gene Gephebase=~FLC \(Flowering Locus C\)~/and+Taxon ID=~3702~#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Gene Gephebase=~FLC (Flowering Locus C)~/and+Taxon ID=~3702~/or+Gene Gephebase=~FLC (Flowering Locus C)~/and+Taxon ID=~3702~#gephebase-summary-title))

EXTERNAL LINKS

COMMENTS