

## GEPHE SUMMARY

	Gephebase Gene	GephelD
FLC (Flowering Locus C) ( <a href="https://www.gephebase.org/search-criteria/?and+Gene">https://www.gephebase.org/search-criteria/?and+Gene</a> Gephebase=^FLC (Flowering Locus C)^#gephebase-summary-title)	GP00000336	
	Entry Status	Main curator
Published	Martin	

## PHENOTYPIC CHANGE

	Trait Category		
Physiology ( <a href="https://www.gephebase.org/search-criteria/?and+Trait">https://www.gephebase.org/search-criteria/?and+Trait</a> Category="Physiology^#gephebase-summary-title")	Trait		
Flowering time ( <a href="https://www.gephebase.org/search-criteria/?and+Trait=^Flowering">https://www.gephebase.org/search-criteria/?and+Trait=^Flowering</a> time^#gephebase-summary-title)	Trait State in Taxon A		
Arabidopsis thaliana- Ler0	Trait State in Taxon B		
Arabidopsis thaliana- LI-0	Ancestral State		
Taxon A	Taxonomic Status		
Intraspecific ( <a href="https://www.gephebase.org/search-criteria/?and+Taxonomic">https://www.gephebase.org/search-criteria/?and+Taxonomic</a> Status="Intraspecific^#gephebase-summary-title")			
Taxon A	Latin Name	Taxon B	Latin Name
Arabidopsis thaliana ( <a href="https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=^Arabidopsis+thaliana^#gephebase-summary-title">https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=^Arabidopsis+thaliana^#gephebase-summary-title</a> )		Arabidopsis thaliana ( <a href="https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=^Arabidopsis+thaliana^#gephebase-summary-title">https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=^Arabidopsis+thaliana^#gephebase-summary-title</a> )	
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; Viriplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphylophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelinae; Arabidopsis	Lineage	cellular organisms; Eukaryota; Viriplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphylophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelinae; Arabidopsis	Lineage
Arabidopsis () - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701</a> )	Parent	Arabidopsis () - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701</a> )	Parent
3702 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702</a> )	NCBI Taxonomy ID	3702 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702</a> )	NCBI Taxonomy ID
Yes	is Taxon A an Infraspecies?	Yes	is Taxon B an Infraspecies?
Arabidopsis thaliana- Ler0	Taxon A Description	Arabidopsis thaliana- LI-0	Taxon B Description

## GENOTYPIC CHANGE

	Generic Gene Name		
FLC			UniProtKB Arabidopsis thaliana
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	Synonyms	Q9S7Q7 ( <a href="http://www.uniprot.org/uniprot/Q9S7Q7">http://www.uniprot.org/uniprot/Q9S7Q7</a> )	GenebankID or UniProtKB
3702.AT5G10140.1 ( <a href="http://string-db.org/newstring_cgi/show_network_section.pl?identifier=3702.AT5G10140.1">http://string-db.org/newstring_cgi/show_network_section.pl?identifier=3702.AT5G10140.1</a> )	String	AF116527 ( <a href="https://www.ncbi.nlm.nih.gov/nuccore/AF116527">https://www.ncbi.nlm.nih.gov/nuccore/AF116527</a> )	
-	Sequence Similarities		
GO:0046983 : protein dimerization activity ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0046983">https://www.ebi.ac.uk/QuickGO/term/GO:0046983</a> )	GO - Molecular Function		

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

No (<https://www.gephbase.org/search-criteria/?and+Presumptive+Null=%27No%27#gephbase-summary-title>)

Molecular Type

Cis-regulatory (<https://www.gephbase.org/search-criteria/?and+Molecular+Type=%27Cis-regulatory%27#gephbase-summary-title>)

Aberration Type

Deletion (<https://www.gephbase.org/search-criteria/?and+Aberration+Type=%27Deletion%27#gephbase-summary-title>)

Deletion Size

10-99 bp Molecular Details of the Mutation

50bp deletion in 5'UTR Experimental Evidence

Linkage Mapping (<https://www.gephbase.org/search-criteria/?and+Experimental+Evidence=%27Linkage+Mapping%27#gephbase-summary-title>)

Main Reference

Novel natural alleles at FLC and LVR loci account for enhanced vernalization responses in *Arabidopsis thaliana*. (2012) (<https://pubmed.ncbi.nlm.nih.gov/22494398>)

Authors

Sánchez-Bermejo E; Márquez-Vigo B; Pical Á; Martínez-Zapater JM; Alonso-Blanco C

Abstract

Vernalization, the induction of flowering by low winter temperatures, is likely to be involved in plant climatic adaptation. However, the genetic, molecular and ecological bases underlying the quantitative variation that tunes vernalization sensitivity to natural environments are largely unknown. To address these questions, we have studied the enhanced vernalization response shown by the LI-0 accession of *Arabidopsis thaliana*. Quantitative trait locus (QTL) mapping for several flowering initiation traits in relation to vernalization, in a new Ler × LI-0 recombinant inbred line (RIL) population, identified large effect alleles at FRI, FLC and HUA2, together with two small effect loci named as Llagostera vernalization response (LVR) 1 and 2. Phenotypic analyses of near isogenic lines validated LVR1 effect on flowering vernalization responses. To further characterize the FLC allele from LI-0, we carried out genetic association analyses using a regional collection of wild genotypes. FLC-LI-0 appeared as a low-frequency allele that is distinguished by polymorphism Del(-57), a 50-bp-deletion in the 5'-UTR. Del(-57) was significantly associated with enhanced vernalization responses and FLC RNA expression, as well as with altitude and minimum temperatures. These results are consistent with Del(-57) acting as a novel cis-regulatory FLC polymorphism that may confer climatic adaptation by increasing vernalization sensitivity.

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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) ( <a href="https://www.gephbase.org/search-criteria/?or+Taxon+ID=%273702%27+and+Trait=Flowering+time+and+groupHaplotypes=true#gephbase-summary-title">https://www.gephbase.org/search-criteria/?or+Taxon+ID=%273702%27+and+Trait=Flowering+time+and+groupHaplotypes=true#gephbase-summary-title</a> )	Related Genes
6 ( <a href="https://www.gephbase.org/search-criteria/?or+Gene+Gephebase=%27FLC+(Flowering+Locus+C)%27+and+Taxon+ID=%273702%27+or+Gene+Gephebase=%27FLC+(Flowering+Locus+C)%27+and+Taxon+ID=%273702%27#gephbase-summary-title">https://www.gephbase.org/search-criteria/?or+Gene+Gephebase=%27FLC+(Flowering+Locus+C)%27+and+Taxon+ID=%273702%27+or+Gene+Gephebase=%27FLC+(Flowering+Locus+C)%27+and+Taxon+ID=%273702%27#gephbase-summary-title</a> )	Related Haplotypes

## EXTERNAL LINKS

## COMMENTS

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