

## GEPHE SUMMARY

	Gephebase Gene	GephelD
FLC (=Pep1) ( <a href="https://www.gephebase.org/search-criteria/?and+Gene+Gephebase=%FLC+=%Pep1%#gephebase-summary-title">https://www.gephebase.org/search-criteria/?and+Gene+Gephebase=%FLC+=%Pep1%#gephebase-summary-title</a> )	GP00000329	Main curator
Published	Entry Status	Martin

## PHENOTYPIC CHANGE

	Trait Category		
Physiology ( <a href="https://www.gephebase.org/search-criteria/?and+Trait+Category=%Physiology%#gephebase-summary-title">https://www.gephebase.org/search-criteria/?and+Trait+Category=%Physiology%#gephebase-summary-title</a> )		Trait	
Flowering time ( <a href="https://www.gephebase.org/search-criteria/?and+Trait=%Flowering+time%#gephebase-summary-title">https://www.gephebase.org/search-criteria/?and+Trait=%Flowering+time%#gephebase-summary-title</a> )	Trait State in Taxon A		
Arabina alpina	Trait State in Taxon B		
Arabina alpina -Paj accession (obligate vernalization)	Ancestral State		
Data not curated	Taxonomic Status		
Intraspecific ( <a href="https://www.gephebase.org/search-criteria/?and+Taxonomic+Status=%Intraspecific%#gephebase-summary-title">https://www.gephebase.org/search-criteria/?and+Taxonomic+Status=%Intraspecific%#gephebase-summary-title</a> )			
Taxon A	Latin Name	Taxon B	Latin Name
Arabis alpina ( <a href="https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=%Arabis+alpina%#gephebase-summary-title">https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=%Arabis+alpina%#gephebase-summary-title</a> )		Arabis alpina ( <a href="https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=%Arabis+alpina%#gephebase-summary-title">https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=%Arabis+alpina%#gephebase-summary-title</a> )	
gray rockcress	Common Name	gray rockcress	Common Name
gray rockcress; alpine rockcress; <i>Arabis alpina</i> L.	Synonyms	gray rockcress; alpine rockcress; <i>Arabis alpina</i> L.	Synonyms
species	Rank	species	Rank
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Arabidae; <i>Arabis</i>	Lineage	cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Arabidae; <i>Arabis</i>	Lineage
Arabis (rockcress) - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 50451">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 50451</a> )	Parent	Arabis (rockcress) - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 50451">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 50451</a> )	Parent
50452 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 50452">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 50452</a> )	NCBI Taxonomy ID	50452 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 50452">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 50452</a> )	NCBI Taxonomy ID
No	is Taxon A an Infraspecies?	Yes	is Taxon B an Infraspecies?
			Taxon B Description
			Arabina alpina -Paj accession (obligate vernalization)

## GENOTYPIC CHANGE

FLC	Generic Gene Name	UniProtKB <i>Arabidopsis thaliana</i>
	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	Q9S7Q7 ( <a href="http://www.uniprot.org/uniprot/Q9S7Q7">http://www.uniprot.org/uniprot/Q9S7Q7</a> )	0
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	
-	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=^No^#gephbase-summary-title>)

Molecular Type

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

Aberration Type

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

Indel Size

1-10 kb

Molecular Details of the Mutation

complex structural variations

Experimental Evidence

Candidate Gene (<https://www.gephbase.org/search-criteria?/and+Experimental+Evidence=^Candidate+Gene^#gephbase-summary-title>)

Main Reference

PEP1 of *Arabis alpina* is encoded by two overlapping genes that contribute to natural genetic variation in perennial flowering. (2012) (<https://pubmed.ncbi.nlm.nih.gov/23284298>)

Authors

Albani MC; Castaings L; WÃ¶tzel S; Mateos JL; Wunder J; Wang R; Reymond M; Coupland G

Abstract

Higher plants exhibit a variety of different life histories. Annual plants live for less than a year and after flowering produce seeds and senesce. By contrast perennials live for many years, dividing their life cycle into episodes of vegetative growth and flowering. Environmental cues control key check points in both life histories. Genes controlling responses to these cues exhibit natural genetic variation that has been studied most in short-lived annuals. We characterize natural genetic variation conferring differences in the perennial life cycle of *Arabis alpina*. Previously the accession Pajares was shown to flower after prolonged exposure to cold (vernalization) and only for a limited period before returning to vegetative growth. We describe five accessions of *A. alpina* that do not require vernalization to flower and flower continuously. Genetic complementation showed that these accessions carry mutant alleles at PERPETUAL FLOWERING 1 (PEP1), which encodes a MADS box transcription factor orthologous to FLOWERING LOCUS C in the annual *Arabidopsis thaliana*. Each accession carries a different mutation at PEP1, suggesting that such variation has arisen independently many times. Characterization of these alleles demonstrated that in most accessions, including Pajares, the PEP1 locus contains a tandem arrangement of a full length and a partial PEP1 copy, which give rise to two full-length transcripts that are differentially expressed. This complexity contrasts with the single gene present in *A. thaliana* and might contribute to the more complex expression pattern of PEP1 that is associated with the perennial life-cycle. Our work demonstrates that natural accessions of *A. alpina* exhibit distinct life histories conferred by differences in PEP1 activity, and that continuous flowering forms have arisen multiple times by inactivation of the floral repressor PEP1. Similar phenotypic variation is found in other herbaceous perennial species, and our results provide a paradigm for how characteristic perennial phenotypes might arise.

Additional References

## RELATED GEPHE

### Related Genes

No matches found.

Related Haplotypes

No matches found.

## EXTERNAL LINKS

## COMMENTS

