

GEPHE SUMMARY

FLC (=Pep1) (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=^FLC) (=Pep1)^#gephebase-summary-title)	Gephebase Gene	GP00000329	GepheID
Published	Entry Status	Martin	Main curator

PHENOTYPIC CHANGE

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

GENOTYPIC CHANGE

FLC	Generic Gene Name	Q9S7Q7 (http://www.uniprot.org/uniprot/Q9S7Q7)	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	()	GenebankID or UniProtKB
3702.AT5G10140.1 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=3702.AT5G10140.1)	String		
-	Sequence Similarities		
GO:0046983 : protein dimerization activity (https://www.ebi.ac.uk/QuickGO/term/GO:0046983)	GO - Molecular Function		
GO:0003700 : DNA-binding transcription factor activity			

(<https://www.ebi.ac.uk/QuickGO/term/GO:0003700>)
GO:000977 : RNA polymerase II regulatory region sequence-specific DNA binding
(<https://www.ebi.ac.uk/QuickGO/term/GO:000977>)
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:000982 : transcription factor activity, RNA polymerase II proximal promoter
sequence-specific DNA binding (<https://www.ebi.ac.uk/QuickGO/term/GO:000982>)
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.gephebase.org/search-criteria?/and+Presumptive Null=^No^#gephebase-summary-title>)

Molecular Type

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

Aberration Type

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

Indel Size

1-10 kb

Molecular Details of the Mutation

complex structural variations

Experimental Evidence

Candidate Gene (<https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Candidate Gene^#gephebase-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; WÄtzel 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

No matches found.

Related Genes

No matches found.

Related Haplotypes

EXTERNAL LINKS

COMMENTS

