

GEPHE SUMMARY

	Gephebase Gene	GepheID
Frigida (FRI) (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=~Frigida+(FRI)^#gephebase-summary-title)	GP00000375	Main curator
	Entry Status	Martin
Published		

PHENOTYPIC CHANGE

Trait #1	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- KAS-1	Trait State in Taxon B
Arabidopsis thaliana- TSU-1 (short FT; Low Water Use Efficiency)	

Trait #2	Trait Category
Physiology (https://www.gephebase.org/search-criteria?/and+Trait+Category=~Physiology^#gephebase-summary-title)	Trait
Water use efficiency (https://www.gephebase.org/search-criteria?/and+Trait=~Water+use+efficiency^#gephebase-summary-title)	Trait State in Taxon A
-	Trait State in Taxon B
-	

	Ancestral State
Taxon A	Taxonomic Status
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=~Intraspecific^#gephebase-summary-title)	

Taxon A	Latin Name
Arabidopsis thaliana (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Arabidopsis+thaliana^#gephebase-summary-title)	Common Name
thale cress	Synonyms
thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis...thaliana; Arbisopsis thaliana; thale kress	Rank
species	Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis	Parent
Arabidopsis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701)	NCBI Taxonomy ID
3702 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702)	is Taxon A an Intraspecies?
Yes	Taxon A Description
Arabidopsis thaliana- KAS-1	

Taxon B	Latin Name
Arabidopsis thaliana (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Arabidopsis+thaliana^#gephebase-summary-title)	Common Name
thale cress	Synonyms
thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis...thaliana; Arbisopsis thaliana; thale kress	Rank
species	Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis	Parent
Arabidopsis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701)	NCBI Taxonomy ID
3702 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702)	is Taxon B an Intraspecies?
Yes	Taxon B Description
Arabidopsis thaliana- TSU-1 (short FT; Low Water Use Efficiency)	

GENOTYPIC CHANGE

FRI	Generic Gene Name	PoDH90 (http://www.uniprot.org/uniprot/PoDH90)	UniProtKB Arabidopsis thaliana
-	Synonyms	AF228500 (https://www.ncbi.nlm.nih.gov/nucore/AF228500)	GenebankID or UniProtKB
-	String		
-	Sequence Similarities		
Belongs to the Frigida family.			
-	GO - Molecular Function		
-	GO - Biological Process		
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 - Cellular Component		
GO:0016607 : nuclear speck (https://www.ebi.ac.uk/QuickGO/term/GO:0016607)			
No (<a +no+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Presumptive+Null=">https://www.gephebase.org/search-criteria?/and+Presumptive+Null="+No+"#gephebase-summary-title)			Presumptive Null
Cis-regulatory (<a +cis-regulatory+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Molecular+Type=">https://www.gephebase.org/search-criteria?/and+Molecular+Type="+Cis-regulatory+"#gephebase-summary-title)			Molecular Type
Deletion (<a +deletion+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Aberration+Type=">https://www.gephebase.org/search-criteria?/and+Aberration+Type="+Deletion+"#gephebase-summary-title)			Aberration Type
100-999 bp			Deletion Size
376 bp deletion within the promoter of the TSU-1 FRI allele			Molecular Details of the Mutation
Linkage Mapping (<a +linkage+mapping+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Experimental+Evidence=">https://www.gephebase.org/search-criteria?/and+Experimental+Evidence="+Linkage+Mapping+"#gephebase-summary-title)			Experimental Evidence
Pleiotropy of FRIGIDA enhances the potential for multivariate adaptation. (2013) (https://pubmed.ncbi.nlm.nih.gov/23698015)			Main Reference
Lovell JT; Juenger TE; Michaels SD; Lasky JR; Platt A; Richards JH; Yu X; Easlon HM; Sen S; McKay JK			Authors
An evolutionary response to selection requires genetic variation; however, even if it exists, then the genetic details of the variation can constrain adaptation. In the simplest case, unlinked loci and uncorrelated phenotypes respond directly to multivariate selection and permit unrestricted paths to adaptive peaks. By contrast, 'antagonistic' pleiotropic loci may constrain adaptation by affecting variation of many traits and limiting the direction of trait correlations to vectors that are not favoured by selection. However, certain pleiotropic configurations may improve the conditions for adaptive evolution. Here, we present evidence that the Arabidopsis thaliana gene FRI (FRIGIDA) exhibits 'adaptive' pleiotropy, producing trait correlations along an axis that results in two adaptive strategies. Derived, low expression FRI alleles confer a 'drought escape' strategy owing to fast growth, low water use efficiency and early flowering. By contrast, a dehydration avoidance strategy is conferred by the ancestral phenotype of late flowering, slow growth and efficient water use during photosynthesis. The dehydration avoidant phenotype was recovered when genotypes with null FRI alleles were transformed with functional alleles. Our findings indicate that the well-documented effects of FRI on phenology result from differences in physiology, not only a simple developmental switch.			Abstract
			Additional References

RELATED GEPHE

13 (AGAMOUS-LIKE 50, Cryptochrome 2 (CRY2) ED1 allele, EARLY FLOWERING 3(ELF3), FLC (Flowering Locus C), FLM (MAF1), Flowering locus T (FT), Frigida like 1 (FRL1), Frigida like 2 (FRL2), MADS AFFECTING FLOWERING 2 (MAF2), SVP (SHORT VEGETATIVE PHASE), VIN3, HUA2, MPK12) (<a +3702"="" and+trait='Flowering+time/or+Taxon+ID="+3702"/and+Trait=Water+use+efficiency/and+groupHaplotypes=true#gephebase-summary-title"' href="https://www.gephebase.org/search-criteria?/or+Taxon+ID=">https://www.gephebase.org/search-criteria?/or+Taxon+ID="+3702"/and+Trait=Flowering+time/or+Taxon+ID="+3702"/and+Trait=Water+use+efficiency/and+groupHaplotypes=true#gephebase-summary-title)	Related Genes
18 (<a +3702"#gephebase-summary-title"="" +frigida+(fri)="" and+taxon+id="+3702" href="https://www.gephebase.org/search-criteria?/or+Gene+Gephebase=" or+gene+gephebase="+Frigida+(FRI)/and+Taxon+ID=">https://www.gephebase.org/search-criteria?/or+Gene+Gephebase="+Frigida+(FRI)/and+Taxon+ID="+3702"/or+Gene+Gephebase="+Frigida+(FRI)/and+Taxon+ID="+3702"#gephebase-summary-title)	Related Haplotypes

EXTERNAL LINKS

COMMENTS

@Pleiotropy

