

GEPHE SUMMARY

	Gephebase Gene	GephelD
Flowering locus T (=TaFT=VRN3) (https://www.gephebase.org/search-criteria?/and+Gene	GP00000344	
Gephebase=^Flowering locus T (=TaFT=VRN3)^#gephebase-summary-title)		Main curator
Published	Entry Status	Martin

PHENOTYPIC CHANGE

	Trait Category	
Physiology (https://www.gephebase.org/search-criteria?/and+Trait	Trait	
Category=^Physiology^#gephebase-summary-title)		
Flowering time (https://www.gephebase.org/search-criteria?/and+Trait=^Flowering	Trait State in Taxon A	
time^#gephebase-summary-title)		
Triticum aestivum	Trait State in Taxon B	
Triticum aestivum	Ancestral State	
Taxon A	Taxonomic Status	
Domesticated (https://www.gephebase.org/search-criteria?/and+Taxonomic		
Status=^Domesticated^#gephebase-summary-title)		
Taxon A	Latin Name	Taxon B
Triticum aestivum (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Triticum+aestivum^#gephebase-summary-title)		Latin Name
bread wheat	Common Name	
	Synonyms	
Triticum aestivum subsp. aestivum; Triticum vulgare; bread wheat; Canadian hard winter wheat; common wheat; wheat; Triticum aestivum L.; Triticum vulgare L.; Triticum vulgare Vill., nom. illeg.; Tricum aestivum; Triticum aestivam; Triticum aestivum8		
	Rank	
species	Lineage	
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Pooideae; Triticodae; Triticeae; Triticinae; Triticum		
Triticum () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4564)	Parent	
4565 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4565)	NCBI Taxonomy ID	
	is Taxon A an Infraspecies?	
No		
T	Generic Gene Name	UniProtKB Arabidopsis thaliana
	Synonyms	
F5l14.3; F5l14_3; FLOWERING LOCUS T; REDUCED STEM BRANCHING 8; RSB8; At1g65480		GenebankID or UniProtKB
3702.AT1G65480.1 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=3702.AT1G65480.1)	String	
	Sequence Similarities	
Belongs to the phosphatidylethanolamine-binding protein family.		
GO:0008429 : phosphatidylethanolamine binding (https://www.ebi.ac.uk/QuickGO/term/GO:0008429)	GO - Molecular Function	
	GO - Biological Process	
GO:0030154 : cell differentiation (https://www.ebi.ac.uk/QuickGO/term/GO:0030154)		

GENOTYPIC CHANGE

FT	Generic Gene Name	UniProtKB Arabidopsis thaliana
	Synonyms	
F5l14.3; F5l14_3; FLOWERING LOCUS T; REDUCED STEM BRANCHING 8; RSB8; At1g65480		GenebankID or UniProtKB
3702.AT1G65480.1 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=3702.AT1G65480.1)	String	
	Sequence Similarities	
Belongs to the phosphatidylethanolamine-binding protein family.		
GO:0008429 : phosphatidylethanolamine binding (https://www.ebi.ac.uk/QuickGO/term/GO:0008429)	GO - Molecular Function	
	GO - Biological Process	
GO:0030154 : cell differentiation (https://www.ebi.ac.uk/QuickGO/term/GO:0030154)		

GO:0009911 : positive regulation of flower development
(<https://www.ebi.ac.uk/QuickGO/term/GO:0009911>)
GO:0009908 : flower development (<https://www.ebi.ac.uk/QuickGO/term/GO:0009908>)
GO:0009909 : regulation of flower development
(<https://www.ebi.ac.uk/QuickGO/term/GO:0009909>)
GO:0048573 : photoperiodism, flowering
(<https://www.ebi.ac.uk/QuickGO/term/GO:0048573>)
GO:0010119 : regulation of stomatal movement
(<https://www.ebi.ac.uk/QuickGO/term/GO:0010119>)

GO - Cellular Component

GO:0005737 : cytoplasm (<https://www.ebi.ac.uk/QuickGO/term/GO:0005737>)
GO:0005634 : nucleus (<https://www.ebi.ac.uk/QuickGO/term/GO:0005634>)
GO:0005783 : endoplasmic reticulum
(<https://www.ebi.ac.uk/QuickGO/term/GO:0005783>)

Presumptive Null

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

Molecular Type

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

Aberration Type

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

Insertion Size

1-10 kb

Molecular Details of the Mutation

Retrotransposition in promoter region

Experimental Evidence

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

Main Reference

The wheat and barley vernalization gene VRN3 is an orthologue of FT. (2006) (<https://pubmed.ncbi.nlm.nih.gov/17158798>)

Authors

Yan L; Fu D; Li C; Blechl A; Tranquilli G; Bonafede M; Sanchez A; Valarik M; Yasuda S; Dubcovsky J

Abstract

Winter wheat and barley varieties require an extended exposure to low temperatures to accelerate flowering (vernalization), whereas spring varieties do not have this requirement. In this study, we show that in these species, the vernalization gene VRN3 is linked completely to a gene similar to *Arabidopsis* FLOWERING LOCUS T (FT). FT induction in the leaves results in a transmissible signal that promotes flowering. Transcript levels of the barley and wheat orthologues, designated as HvFT and TaFT, respectively, are significantly higher in plants homozygous for the dominant Vrn3 alleles (early flowering) than in plants homozygous for the recessive vrn3 alleles (late flowering). In wheat, the dominant Vrn3 allele is associated with the insertion of a retroelement in the TaFT promoter, whereas in barley, mutations in the HvFT first intron differentiate plants with dominant and recessive VRN3 alleles. Winter wheat plants transformed with the TaFT allele carrying the promoter retroelement insertion flowered significantly earlier than nontransgenic plants, supporting the identity between TaFT and VRN-B3. Statistical analyses of flowering times confirmed the presence of significant interactions between vernalization and FT allelic classes in both wheat and barley ($P < 0.0001$). These interactions were supported further by the observed up-regulation of HvFT transcript levels by vernalization in barley winter plants ($P = 0.002$). These results confirmed that the wheat and barley FT genes are responsible for natural allelic variation in vernalization requirement, providing additional sources of adaptive diversity to these economically important crops.

Additional References

RELATED GEPHE

1 (VRN1) (<https://www.gephebase.org/search-criteria/?or+Taxon+ID=%274565%27+and+Trait=Flowering+time+and+groupHaplotypes=true#gephebase-summary-title>)

Related Genes

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

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