

GEPHE SUMMARY

VRN1 (https://www.gephebase.org/search-criteria?/and+GeneGephebase=~VRN1~#gephebase-summary-title)	Gephebase Gene	GP00001185	GepheID
	Entry Status	Martin	Main curator
	Published		

PHENOTYPIC CHANGE

Physiology (https://www.gephebase.org/search-criteria?/and+TraitCategory=~Physiology~#gephebase-summary-title)		Trait Category	
Flowering time (https://www.gephebase.org/search-criteria?/and+Trait=~Floweringtime~#gephebase-summary-title)		Trait	
Triticum monococum - spring cultivar		Trait State in Taxon A	
Triticum monococum - winter cultivar		Trait State in Taxon B	
Data not curated		Ancestral State	
Domesticated (https://www.gephebase.org/search-criteria?/and+TaxonomicStatus=~Domesticated~#gephebase-summary-title)		Taxonomic Status	
Taxon A		Taxon B	
Triticum monococum (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Triticummonococum~#gephebase-summary-title)		Triticum monococum (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Triticummonococum~#gephebase-summary-title)	
-		-	
Crithodium monococum; einkorn wheat; one-grained wheat; small spelt; Crithodium monococum (L.) A.Love; Triticum monococum L.		Crithodium monococum; einkorn wheat; one-grained wheat; small spelt; Crithodium monococum (L.) A.Love; Triticum monococum L.	
species		species	
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Pooideae; Triticodae; Triticeae; Triticinae; Triticum		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)		Triticum () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4564)	
4568 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4568)		4568 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4568)	
is Taxon A an Intraspecies?		is Taxon B an Intraspecies?	
No		No	

GENOTYPIC CHANGE

VRN1		Generic Gene Name	UniProtKB Arabidopsis thaliana
REDUCED VERNALIZATION RESPONSE 1; REM39; REPRODUCTIVE MERISTEM 39; At3g18990; K13E13.10		Synonyms	GenebankID or UniProtKB
3702.AT3G18990.1 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=3702.AT3G18990.1)		String	
-		Sequence Similarities	
GO:0043565 : sequence-specific DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0043565)		GO - Molecular Function	
GO:0003677 : DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0003677)			
GO:0009909 : regulation of flower development		GO - Biological Process	

(<https://www.ebi.ac.uk/QuickGO/term/GO:0009909>)
GO:0010048 : vernalization response
(<https://www.ebi.ac.uk/QuickGO/term/GO:0010048>)

GO - Cellular Component

GO:0005654 : nucleoplasm (<https://www.ebi.ac.uk/QuickGO/term/GO:0005654>)

Presumptive Null

Unknown (<https://www.gephebase.org/search-criteria?/and+Presumptive Null=^Unknown^#gephebase-summary-title>)

Molecular Type

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

Aberration Type

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

Molecular Details of the Mutation

Not identified

Experimental Evidence

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

Main Reference

Positional cloning of the wheat vernalization gene VRN1. (2003) (<https://pubmed.ncbi.nlm.nih.gov/12730378>)

Authors

Yan L; Loukoianov A; Tranquilli G; Helguera M; Fahima T; Dubcovsky J

Abstract

Winter wheats require several weeks at low temperature to flower. This process, vernalization, is controlled mainly by the VRN1 gene. Using 6,190 gametes, we found VRN1 to be completely linked to MADS-box genes AP1 and AGLG1 in a 0.03-centimorgan interval flanked by genes Cysteine and Cytochrome B5. No additional genes were found between the last two genes in the 324-kb Triticum monococcum sequence or in the colinear regions in rice and sorghum. Wheat AP1 and AGLG1 genes were similar to Arabidopsis meristem identity genes AP1 and AGL2, respectively. AP1 transcription was regulated by vernalization in both apices and leaves, and the progressive increase of AP1 transcription was consistent with the progressive effect of vernalization on flowering time. Vernalization was required for AP1 transcription in apices and leaves in winter wheat but not in spring wheat. AGLG1 transcripts were detected during spike differentiation but not in vernalized apices or leaves, suggesting that AP1 acts upstream of AGLG1. No differences were detected between genotypes with different VRN1 alleles in the AP1 and AGLG1 coding regions, but three independent deletions were found in the promoter region of AP1. These results suggest that AP1 is a better candidate for VRN1 than AGLG1. The epistatic interactions between vernalization genes VRN1 and VRN2 suggested a model in which VRN2 would repress directly or indirectly the expression of AP1. A mutation in the promoter region of AP1 would result in the lack of recognition of the repressor and in a dominant spring growth habit.

Additional References

RELATED GEPHE

Related Genes

1 (VRN2) (<https://www.gephebase.org/search-criteria?/or+Taxon ID=^4568^/and+Trait=Flowering time/and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

@Epistasis