

GEPHE SUMMARY

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

PHENOTYPIC CHANGE

	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		
Triticum monococcum - spring cultivar	Trait State in Taxon B		
Triticum monococcum - winter cultivar	Ancestral State		
Data not curated	Taxonomic Status		
Domesticated (https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Domesticated^#gephebase-summary-title)			
Taxon A		Taxon B	
	Latin Name		Latin Name
Triticum monococcum (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Triticum+monococcum^#gephebase-summary-title)		Triticum monococcum (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Triticum+monococcum^#gephebase-summary-title)	
-	Common Name	-	Common Name
	Synonyms		Synonyms
Crithodium monococcum; einkorn wheat; one-grained wheat; small spelt; Crithodium monococcum (L.) A.Love; Triticum monococcum L.		Crithodium monococcum; einkorn wheat; one-grained wheat; small spelt; Crithodium monococcum (L.) A.Love; Triticum monococcum L.	
species	Rank	species	Rank
	Lineage		Lineage
cellular organisms; Eukaryota; Viriplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphylophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Pooideae; Triticodae; Triticeae; Triticinae; Triticum		cellular organisms; Eukaryota; Viriplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphylophyta; 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	Triticum () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4564)	Parent
4568 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4568)	NCBI Taxonomy ID	4568 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4568)	NCBI Taxonomy ID
No	is Taxon A an Infraspecies?	No	is Taxon B an Infraspecies?

GENOTYPIC CHANGE

	Generic Gene Name	UniProtKB Arabidopsis thaliana
VRN1	Synonyms	GenebankID or UniProtKB
REDUCED VERNALIZATION RESPONSE 1; REM39; REPRODUCTIVE MERISTEM 39; At3g18990; K13E13.10		ABQ82076 (https://www.ncbi.nlm.nih.gov/nuccore/ABQ82076)
3702.AT3G18990.1 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 3702.AT3G18990.1)	String	
	Sequence Similarities	
-		
	GO - Molecular Function	
GO:0043565 : sequence-specific DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0043565)		
GO:0003677 : DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0003677)	GO - Biological Process	
GO:0009909 : regulation of flower development		

(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 <i>Triticum monococcum</i> sequence or in the colinear regions in rice and sorghum. Wheat AP1 and AGLG1 genes were similar to <i>Arabidopsis</i> 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

1 (VRN2) (https://www.gephebase.org/search-criteria?/or+Taxon+ID=^4568^/and+Trait=Flowering+time/and+groupHaplotypes=true#gephebase-summary-title)	Related Genes
	Related Haplotypes
No matches found.	

EXTERNAL LINKS

COMMENTS

@Epistasis