

GEPHE SUMMARY

Gephebase Gene		GepheID
CBF2-CBF4; CBF13 (https://www.gephebase.org/search-criteria?/and+GeneGephebase=~CBF2-CBF4; CBF13~#gephebase-summary-title)	GP00000176	
Entry Status	Martin	Main curator
Published		

PHENOTYPIC CHANGE

Trait Category			
Physiology (https://www.gephebase.org/search-criteria?/and+TraitCategory=~Physiology~#gephebase-summary-title)			
Trait			
Temperature tolerance (cold) (https://www.gephebase.org/search-criteria?/and+Trait=~Temperature tolerance (cold)~#gephebase-summary-title)			
Trait State in Taxon A			
Hordeum vulgare; Spring “Tremois”			
Trait State in Taxon B			
Hordeum vulgare; winter-hardy “Dicktoo” and “Nure”			
Ancestral State			
Data not curated			
Taxonomic Status			
Domesticated (https://www.gephebase.org/search-criteria?/and+TaxonomicStatus=~Domesticated~#gephebase-summary-title)			
Taxon A		Taxon B	
Hordeum vulgare (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=~Hordeum vulgare~#gephebase-summary-title)		Hordeum vulgare (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=~Hordeum vulgare~#gephebase-summary-title)	
Common Name		Common Name	
-		-	
Synonyms		Synonyms	
barley; Hordeum vulgare L.; Horedum vulgare		barley; Hordeum vulgare L.; Horedum vulgare	
Rank		Rank	
species		species	
Lineage		Lineage	
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Pooideae; Triticodae; Triticeae; Hordeinae; Hordeum		cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Pooideae; Triticodae; Triticeae; Hordeinae; Hordeum	
Parent		Parent	
Hordeum () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4512)		Hordeum () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4512)	
NCBI Taxonomy ID		NCBI Taxonomy ID	
4513 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4513)		4513 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4513)	
is Taxon A an Intraspecies?		is Taxon B an Intraspecies?	
Yes		Yes	
Taxon A Description		Taxon B Description	
Hordeum vulgare; Tremois		Hordeum vulgare; Barley genotypes “Dicktoo” and “Nure”	

GENOTYPIC CHANGE

Generic Gene Name		UniProtKB Triticum monococcum
-		B1NSN2 (http://www.uniprot.org/uniprot/B1NSN2)
Synonyms		GenebankID or UniProtKB
-		ACI62506 (https://www.ncbi.nlm.nih.gov/nuccore/ACI62506)
String		
-		
Sequence Similarities		
-		
GO - Molecular Function		
GO:0003700 : DNA-binding transcription factor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0003700)		
GO:0003677 : DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0003677)		
GO - Biological Process		
GO:0006351 : transcription, DNA-templated (https://www.ebi.ac.uk/QuickGO/term/GO:0006351)		
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
Complex Change (https://www.gephebase.org/search-criteria?/and+Aberration Type=^Complex Change^#gephebase-summary-title)	Molecular Details of the Mutation
tandem duplication of CBF2-CBF4 region and/or pseudogenisation of CBF13	Experimental Evidence
Candidate Gene (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Candidate Gene^#gephebase-summary-title)	Main Reference
CBF gene copy number variation at Frost Resistance-2 is associated with levels of freezing tolerance in temperate-climate cereals. (2010) (https://pubmed.ncbi.nlm.nih.gov/20213518)	Authors
Knox AK; Dhillon T; Cheng H; Tondelli A; Pecchioni N; Stockinger EJ	Abstract
Frost Resistance-1 (FR-1) and FR-2 are two loci affecting freezing tolerance and winter hardiness of the temperate-climate cereals. FR-1 is hypothesized to be due to the pleiotropic effects of VRN-1. FR-2 spans a cluster of C-Repeat Binding Factor (CBF) genes. These loci are genetically and functionally linked. Recent studies indicate CBF transcripts are downregulated by the VRN-1 encoded MADS-box protein or a factor in the VRN-1 pathway. Here, we report that barley genotypes ‘Dicktoo’ and ‘Nure’ carrying a vrn-H1 winter allele at VRN-H1 harbor increased copy numbers of CBF coding sequences relative to Vrn-H1 spring allele genotypes ‘Morex’ and ‘Tremois’. Sequencing bacteriophage lambda genomic clones from these four genotypes alongside DNA blot hybridizations indicate approximately half of the eleven CBF orthologs at FR-H2 are duplicated in individual genomes. One of these duplications discriminates vrn-H1 genotypes from Vrn-H1 genotypes. The vrn-H1 winter allele genotypes harbor tandem segmental duplications through the CBF2A-CBF4B genomic region and maintain two distinct CBF2 paralogs, while the Vrn-H1 spring allele genotypes harbor single copies of CBF2 and CBF4. An additional CBF gene, CBF13, is a pseudogene interrupted by multiple non-sense codons in ‘Tremois’ whereas CBF13 is a complete uninterrupted coding sequence in ‘Dicktoo’ and ‘Nure’. DNA blot hybridization with wheat DNAs reveals greater copy numbers of CBF14 also occurs in winter wheats than in spring wheats. These data indicate that variation in CBF gene copy numbers is widespread in the Triticeae and suggest selection for winter hardiness co-selects winter alleles at both VRN-1 and FR-2.	
	Additional References

RELATED GEPHE

No matches found.	Related Genes
No matches found.	Related Haplotypes

EXTERNAL LINKS

COMMENTS