

## GEPHE SUMMARY

	Gephebase Gene	GephelD
Heading Date 1 (HD1) ( <a href="https://www.gephebase.org/search-criteria?/and+Gene">https://www.gephebase.org/search-criteria?/and+Gene</a>	GP00001410	
Gephebase=^Heading Date 1 (HD1)^#gephebase-summary-title)		Main curator
Published	Entry Status	Prigent

## PHENOTYPIC CHANGE

	Trait Category		
Physiology ( <a href="https://www.gephebase.org/search-criteria?/and+Trait">https://www.gephebase.org/search-criteria?/and+Trait</a>		Trait	
Category=^Physiology^#gephebase-summary-title)			
Flowering time ( <a href="https://www.gephebase.org/search-criteria?/and+Trait=^Flowering">https://www.gephebase.org/search-criteria?/and+Trait=^Flowering</a>			
time^#gephebase-summary-title)			
foxtail millet wild type	Trait State in Taxon A		
Domesticated foxtail millet with delayed flowering time	Trait State in Taxon B		
Taxon A	Ancestral State		
	Taxonomic Status		
Domesticated ( <a href="https://www.gephebase.org/search-criteria?/and+Taxonomic">https://www.gephebase.org/search-criteria?/and+Taxonomic</a>			
Status=^Domesticated^#gephebase-summary-title)			
Taxon A	Latin Name	Taxon B	Latin Name
Setaria italica ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Setaria+italica^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Setaria+italica^#gephebase-summary-title</a> )		Setaria italica ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Setaria+italica^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Setaria+italica^#gephebase-summary-title</a> )	
foxtail millet	Common Name	foxtail millet	Common Name
Chaetochloa italicica; Panicum italicum; Setaria viridis subsp. italica; foxtail millet; Chaetochloa italicica (L.) Scribn.; Panicum italicum L.; Setaria italica (L.) P.Beauv.; Setaria viridis subsp. italica (L.) Briq.	Synonyms	Chaetochloa italicica; Panicum italicum; Setaria viridis subsp. italica; foxtail millet; Chaetochloa italicica (L.) Scribn.; Panicum italicum L.; Setaria italica (L.) P.Beauv.; Setaria viridis subsp. italica (L.) Briq.	Synonyms
species	Rank	species	Rank
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; PACMAD clade; Panicoideae; Panicodae; Paniceae; Cenchrinae; Setaria	Lineage	cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; PACMAD clade; Panicoideae; Panicodae; Paniceae; Cenchrinae; Setaria	Lineage
Setaria () - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4554">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4554</a> )	Parent	Setaria () - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4554">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4554</a> )	Parent
4555 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4555">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4555</a> )	NCBI Taxonomy ID	4555 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4555">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4555</a> )	NCBI Taxonomy ID
No	is Taxon A an Infraspecies?	No	is Taxon B an Infraspecies?

## GENOTYPIC CHANGE

CO	Generic Gene Name	UniProtKB Arabidopsis thaliana
B-box domain protein 1; BBX1; CONSTANS; F14F8.220; F14F8_220; FG; At5g15840	Synonyms	GenebankID or UniProtKB
3702.AT5G15840.1 ( <a href="http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 3702.AT5G15840.1">http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 3702.AT5G15840.1</a> )	String	AB807720 ( <a href="https://www.ncbi.nlm.nih.gov/nuccore/AB807720">https://www.ncbi.nlm.nih.gov/nuccore/AB807720</a> )
Belongs to the CONSTANS family.	Sequence Similarities	
GO:0003700 : DNA-binding transcription factor activity ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0003700">https://www.ebi.ac.uk/QuickGO/term/GO:0003700</a> )	GO - Molecular Function	
GO:0008270 : zinc ion binding ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0008270">https://www.ebi.ac.uk/QuickGO/term/GO:0008270</a> )		
GO:0003677 : DNA binding ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0003677">https://www.ebi.ac.uk/QuickGO/term/GO:0003677</a> )		
	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:0009909 : regulation of flower development  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0009909>)  
GO:0010218 : response to far red light  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0010218>)  
GO:0010018 : far-red light signaling pathway  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0010018>)

GO - Cellular Component

GO:0005634 : nucleus (<https://www.ebi.ac.uk/QuickGO/term/GO:0005634>)

Presumptive Null

Yes ([#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Presumptive+Null=^Yes))

Molecular Type

Coding ([#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Molecular+Type=^Coding))

Aberration Type

SNP ([#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Aberration+Type=^SNP))

SNP Coding Change

-

Molecular Details of the Mutation

splicing variant at position 787 GT>AT resulting in a splicing shift to position 754 introducing a deletion of 33 bp in the transcript and 11 aa in the protein

Experimental Evidence

Association Mapping ([#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Experimental+Evidence=^Association+Mapping))

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	-	-	-

Main Reference

Parallel Domestication of the Heading Date 1 Gene in Cereals. (2015) (<https://pubmed.ncbi.nlm.nih.gov/26116860>)

Authors

Liu H; Liu H; Zhou L; Zhang Z; Zhang X; Wang M; Li H; Lin Z

Abstract

Flowering time is one of the key determinants of crop adaptation to local environments during domestication. However, the genetic basis underlying flowering time is yet to be elucidated in most cereals. Although staple cereals, such as rice, maize, wheat, barley, and sorghum, have spread and adapted to a wide range of ecological environments during domestication, it is yet to be determined whether they have a common genetic basis for flowering time. In this study, we show, through map-based cloning, that flowering time in sorghum is controlled by a major quantitative trait locus (QTL) Heading Date 1 (HD1), located on chromosome 10. The causal gene encodes the CONSTANS gene family which contains a CCT domain. A 5-bp deletion of a minor allele present in the coding sequence leads to a gene frameshift that delays flowering in sorghum. In contrast, in foxtail millet, association mapping of HD1 showed a common causal site with a splicing variant from "GT" to "AT" that was highly correlated with flowering time. In addition, the rice HD1 gene is known to harbor several causal variants controlling flowering time. These data indicate that the major flowering time QTL HD1 was under parallel domestication in sorghum, foxtail millet, and rice. The pattern of common mixed minor, or even rare, causal alleles in HD1 across different species may be representative of the genetic basis of the domestication syndrome. Furthermore, large DNA sequence analysis of HD1 revealed multiple origins for domesticated sorghum and a single origin for domesticated foxtail millet.

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Additional References

## RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

## EXTERNAL LINKS

## COMMENTS

@Splicing

