

GEPHE SUMMARY

	Gephebase Gene	GepheID
EARLY FLOWERING 3/ EARLY MATURITY 8 (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=^EARLY FLOWERING 3/ EARLY MATURITY 8^#gephebase-summary-title)	GP00000245	
	Martin	Main curator
Published	Entry Status	

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		
Hordeum vulgare		Trait State in Taxon B	
Hordeum vulgare - var. Early Russian			
	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
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?
No		Yes	
			Taxon B Description
			Hordeum vulgare - var. Early Russian

GENOTYPIC CHANGE

	Generic Gene Name	UniProtKB Arabidopsis thaliana
ELF3		O82804 (http://www.uniprot.org/uniprot/O82804)
	Synonyms	GenebankID or UniProtKB
EARLY FLOWERING 3; F17H15.25; PYK20; At2g25930; T19L18.26		AEW48248 (https://www.ncbi.nlm.nih.gov/nuccore/AEW48248)
	String	
3702.AT2G25930.1 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier= 3702.AT2G25930.1)		
	Sequence Similarities	
-		
	GO - Molecular Function	
GO:0003700 : DNA-binding transcription factor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0003700)		
	GO - Biological Process	
GO:0009733 : response to auxin (https://www.ebi.ac.uk/QuickGO/term/GO:0009733)		

GO:0009826 : unidimensional cell growth
(<https://www.ebi.ac.uk/QuickGO/term/GO:0009826>)
GO:0009737 : response to abscisic acid
(<https://www.ebi.ac.uk/QuickGO/term/GO:0009737>)
GO:0007623 : circadian rhythm (<https://www.ebi.ac.uk/QuickGO/term/GO:0007623>)
GO:0009409 : response to cold (<https://www.ebi.ac.uk/QuickGO/term/GO:0009409>)
GO:0009909 : regulation of flower development
(<https://www.ebi.ac.uk/QuickGO/term/GO:0009909>)
GO:2000028 : regulation of photoperiodism, flowering
(<https://www.ebi.ac.uk/QuickGO/term/GO:2000028>)
GO:0010031 : circumnutation (<https://www.ebi.ac.uk/QuickGO/term/GO:0010031>)
GO:0048573 : photoperiodism, flowering
(<https://www.ebi.ac.uk/QuickGO/term/GO:0048573>)
GO:0009585 : red, far-red light phototransduction
(<https://www.ebi.ac.uk/QuickGO/term/GO:0009585>)
GO:0010119 : regulation of stomatal movement
(<https://www.ebi.ac.uk/QuickGO/term/GO:0010119>)

GO - Cellular Component

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

Presumptive Null

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

Molecular Type

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

Aberration Type

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

SNP Coding Change

Nonsense

Molecular Details of the Mutation

Premature stop codon; C-to-T point mutation in exon 2

Experimental Evidence

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

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

Main Reference

Mutation at the circadian clock gene EARLY MATURITY 8 adapts domesticated barley (*Hordeum vulgare*) to short growing seasons. (2012) (<https://pubmed.ncbi.nlm.nih.gov/22566625>)

Authors

Faure S; Turner AS; Gruszka D; Christodoulou V; Davis SJ; von Korff M; Laurie DA

Abstract

The circadian clock is an autonomous oscillator that produces endogenous biological rhythms with a period of about 24 h. This clock allows organisms to coordinate their metabolism and development with predicted daily and seasonal changes of the environment. In plants, circadian rhythms contribute to both evolutionary fitness and agricultural productivity. Nevertheless, we show that commercial barley varieties bred for short growing seasons by use of early maturity 8 (eam8) mutations, also termed mat-a, are severely compromised in clock gene expression and clock outputs. We identified EAM8 as a barley ortholog of the *Arabidopsis thaliana* circadian clock regulator EARLY FLOWERING3 (ELF3) and demonstrate that eam8 accelerates the transition from vegetative to reproductive growth and inflorescence development. We propose that eam8 was selected as barley cultivation moved to high-latitude short-season environments in Europe because it allowed rapid flowering in genetic backgrounds that contained a previously selected late-flowering mutation of the photoperiod response gene Ppd-H1. We show that eam8 mutants have increased expression of the floral activator HvFT1, which is independent of allelic variation at Ppd-H1. The selection of independent eam8 mutations shows that this strategy facilitates short growth-season adaptation and expansion of the geographic range of barley, despite the pronounced clock defect.

Additional References

RELATED GEPHE

Related Genes

6 (CENTRORADIALIS (HvCEN), EARLY FLOWERING 3 (here = Mat-a), EARLY FLOWERING 3/ EARLYMATURITY8, Flowering locus T (=HvFT=VRN3), PRR37-like Photoperiod-H1 (Ppd-H1), VRN2) ([https://www.gephebase.org/search-criteria?/or+Taxon ID=~4513^/and+Trait=Flowering time/and+groupHaplotypes=true#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Taxon+ID=~4513^/and+Trait=Flowering+time/and+groupHaplotypes=true#gephebase-summary-title))

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

