

GEPHE SUMMARY

EARLY FLOWERING 3/ EARLYMATURITY8 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^EARLY FLOWERING 3/ EARLYMATURITY8^#gephebase-summary-title)	Gephebase Gene	GepheID
	GP00000246	Main curator
	Martin	
Published	Entry Status	

PHENOTYPIC CHANGE

Physiology (https://www.gephebase.org/search-criteria?/and+Trait Category=^Physiology^#gephebase-summary-title)		Trait Category	
Flowering time (https://www.gephebase.org/search-criteria?/and+Trait=^Flowering time^#gephebase-summary-title)		Trait	
Hordeum vulgare		Trait State in Taxon A	
Hordeum vulgare - var. Mona		Trait State in Taxon B	
Taxon A		Ancestral State	
Domesticated (https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Domesticated^#gephebase-summary-title)		Taxonomic Status	
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)	
-		-	
barley; Hordeum vulgare L.; Horedum vulgare		barley; Hordeum vulgare L.; Horedum vulgare	
species		species	
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	
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)	
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. Mona	

GENOTYPIC CHANGE

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

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

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

Deletion Size

1-9 bp

Molecular Details of the Mutation

4bp deletion resulting in truncated protein ; this deletion seem to have evolved multiple times (fragile site?)

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))

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/ EARLY MATURITY 8, 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

@Parallelism independent evoution of the same mutation (or alternatively: pseudo-replicate?)

