GEPHE SUMMARY

Gephebase Gene
Cryptochrome 2 (CRY2) EDI allele (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^Cryptochrome 2 (CRY2) EDI allele^#gephebase-summary-title)

GepheID
GP00000192

Main curator
Martin

Entry Status
Published

PHENOTYPIC CHANGE

Trait #1

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
Arabidopsis thaliana

Trait State in Taxon B
Arabidopsis thaliana

Trait #2

Trait Category
Morphology (https://www.gephebase.org/search-criteria?/and+Trait Category=^Morphology^#gephebase-summary-title)

Trait
Fruit shape (fruit length) (https://www.gephebase.org/search-criteria?/and+Trait=^Fruit shape (fruit length)^#gephebase-summary-title)

Trait State in Taxon A
Arabidopsis thaliana

Trait State in Taxon B
Arabidopsis thaliana

Trait #3

Trait Category
Morphology (https://www.gephebase.org/search-criteria?/and+Trait Category=^Morphology^#gephebase-summary-title)

Trait
Flower morphology (ovule number per fruit) (https://www.gephebase.org/search-criteria?/and+Trait=^Flower morphology (ovule number per fruit)^#gephebase-summary-title)

Trait State in Taxon A
Arabidopsis thaliana

Trait State in Taxon B
Arabidopsis thaliana

Trait #4

Trait Category
Physiology (https://www.gephebase.org/search-criteria?/and+Trait Category=^Physiology^#gephebase-summary-title)

Trait
Fertility (percentage of unfertilized ovules) (https://www.gephebase.org/search-criteria?/and+Trait=^Fertility (percentage of unfertilized ovules)^#gephebase-summary-title)

Trait State in Taxon A
Arabidopsis thaliana

Trait State in Taxon B
Arabidopsis thaliana

Ancestral State
Data not curated

Taxonomic Status
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Intraspecific^#gephebase-summary-title)

Taxon A

Latin Name

Arabidopsis thaliana (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Arabidopsis thaliana^#gephebase-summary-title)

Common Name

thale cress

Synonyms

thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress

Rank

species

Lineage

cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis

Parent

Arabidopsis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3701)

NCBI Taxonomy ID

3702 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3702)

is Taxon A an Infraspecies?

No

Taxon B

Latin Name

Arabidopsis thaliana (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Arabidopsis thaliana^#gephebase-summary-title)

Common Name

thale cress

Synonyms

thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress

Rank

species

Lineage

cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis

Parent

Arabidopsis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3701)

NCBI Taxonomy ID

3702 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3702)

is Taxon B an Infraspecies?

No

GENOTYPIC CHANGE

Generic Gene Name

CRY2

Synonyms

AT-PHH1; ATCRY2; cryptochrome 2; CRYPTOCHROME 2 APOPROTEIN; F19P19.14; F19P19_14; FHA; PHH1; SEL20; At1g04400

String

3702.AT1G04400.1 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 3702.AT1G04400.1)

Sequence Similarities

Belongs to the DNA photolyase class-1 family.

GO - Molecular Function

GO:0005524 : ATP binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005524)
GO:0042802 : identical protein binding (https://www.ebi.ac.uk/QuickGO/term/GO:0042802)
GO:0046872 : metal ion binding (https://www.ebi.ac.uk/QuickGO/term/GO:0046872)
GO:0009882 : blue light photoreceptor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0009882)
GO:0071949 : FAD binding (https://www.ebi.ac.uk/QuickGO/term/GO:0071949)

GO - Biological Process

GO:0009637 : response to blue light (https://www.ebi.ac.uk/QuickGO/term/GO:0009637)
GO:0009416 : response to light stimulus (https://www.ebi.ac.uk/QuickGO/term/GO:0009416)
GO:0009911 : positive regulation of flower development (https://www.ebi.ac.uk/QuickGO/term/GO:0009911)
GO:0007623 : circadian rhythm (https://www.ebi.ac.uk/QuickGO/term/GO:0007623)
GO:0009785 : blue light signaling pathway (https://www.ebi.ac.uk/QuickGO/term/GO:0009785)
GO:0006325 : chromatin organization (https://www.ebi.ac.uk/QuickGO/term/GO:0006325)
GO:0006338 : chromatin remodeling (https://www.ebi.ac.uk/QuickGO/term/GO:0006338)
GO:0010617 : circadian regulation of calcium ion oscillation (https://www.ebi.ac.uk/QuickGO/term/GO:0010617)
GO:0051607 : defense response to virus (https://www.ebi.ac.uk/QuickGO/term/GO:0051607)
GO:0072387 : flavin adenine dinucleotide metabolic process (https://www.ebi.ac.uk/QuickGO/term/GO:0072387)
GO:0048574 : long-day photoperiodism, flowering (https://www.ebi.ac.uk/QuickGO/term/GO:0048574)
GO:0016310 : phosphorylation (https://www.ebi.ac.uk/QuickGO/term/GO:0016310)
GO:0009638 : phototropism (https://www.ebi.ac.uk/QuickGO/term/GO:0009638)
GO:2000379 : positive regulation of reactive oxygen species metabolic process (https://www.ebi.ac.uk/QuickGO/term/GO:2000379)
GO:0018298 : protein-chromophore linkage (https://www.ebi.ac.uk/QuickGO/term/GO:0018298)
GO:0042752 : regulation of circadian rhythm

UniProtKB Arabidopsis thaliana

Q96524 (http://www.uniprot.org/uniprot/Q96524)

GenebankID or UniProtKB

EU351972 (https://www.ncbi.nlm.nih.gov/nuccore/EU351972)

(https://www.ebi.ac.uk/QuickGO/term/GO:0042752)
GO:0009909 : regulation of flower development
(https://www.ebi.ac.uk/QuickGO/term/GO:0009909)
GO:1901371 : regulation of leaf morphogenesis
(https://www.ebi.ac.uk/QuickGO/term/GO:1901371)
GO:0010075 : regulation of meristem growth
(https://www.ebi.ac.uk/QuickGO/term/GO:0010075)
GO:2000028 : regulation of photoperiodism, flowering
(https://www.ebi.ac.uk/QuickGO/term/GO:2000028)
GO:0009646 : response to absence of light
(https://www.ebi.ac.uk/QuickGO/term/GO:0009646)
GO:0010244 : response to low fluence blue light stimulus by blue low-fluence system
(https://www.ebi.ac.uk/QuickGO/term/GO:0010244)
GO:1902347 : response to strigolactone
(https://www.ebi.ac.uk/QuickGO/term/GO:1902347)
GO:0009414 : response to water deprivation
(https://www.ebi.ac.uk/QuickGO/term/GO:0009414)
GO:0010118 : stomatal movement (https://www.ebi.ac.uk/QuickGO/term/GO:0010118)

GO - Cellular Component

GO:0005737 : cytoplasm (https://www.ebi.ac.uk/QuickGO/term/GO:0005737)
GO:0005634 : nucleus (https://www.ebi.ac.uk/QuickGO/term/GO:0005634)
GO:0016604 : nuclear body (https://www.ebi.ac.uk/QuickGO/term/GO:0016604)
GO:0016605 : PML body (https://www.ebi.ac.uk/QuickGO/term/GO:0016605)
GO:0005773 : vacuole (https://www.ebi.ac.uk/QuickGO/term/GO:0005773)

Presumptive Null

No (https://www.gephebase.org/search-criteria?/and+Presumptive Null=^No^#gephebase-summary-title)

Molecular Type

Coding (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)

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

V367M

Experimental Evidence

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

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

Main Reference

A QTL for flowering time in Arabidopsis reveals a novel allele of CRY2. (2001) (https://pubmed.ncbi.nlm.nih.gov/11726930)

Authors

El-Din El-Assal S; Alonso-Blanco C; Peeters AJ; Raz V; Koornneef M

Abstract

Variation of flowering time is found in the natural populations of many plant species. The underlying genetic variation, mostly of a quantitative nature, is presumed to reflect adaptations to different environments contributing to reproductive success. Analysis of natural variation for flowering time in Arabidopsis thaliana has identified several quantitative trait loci (QTL), which have yet to be characterized at the molecular level. A major environmental factor that determines flowering time is photoperiod or day length, the length of the light period, which changes across the year differently with geographical latitude. We identified the EDI locus as a QTL partly accounting for the difference in flowering response to the photoperiod between two Arabidopsis accessions: the laboratory strain Landsberg erecta (Ler), originating in Northern Europe, and Cvi, collected in the tropical Cape Verde Islands. Positional cloning of the EDI QTL showed it to be a novel allele of CRY2, encoding the blue-light photoreceptor cryptochrome-2 that has previously been shown to promote flowering in long-day (LD) photoperiods. We show that the unique EDI flowering phenotype results from a single amino-acid substitution that reduces the light-induced downregulation of CRY2 in plants grown under short photoperiods, leading to early flowering.

Additional References

Linkage disequilibrium mapping of Arabidopsis CRY2 flowering time alleles. (2004) (https://pubmed.ncbi.nlm.nih.gov/15280248)
Pleiotropic effects of the Arabidopsis cryptochrome 2 allelic variation underlie fruit trait-related QTL. (2004) (https://pubmed.ncbi.nlm.nih.gov/15248119)
The Cape Verde Islands allele of cryptochrome 2 enhances cotyledon unfolding in the absence of blue light in Arabidopsis. (2003) (https://pubmed.ncbi.nlm.nih.gov/14605225)

RELATED GEPHE

Related Genes

13 (AGAMOUS-LIKE 50, EARLY FLOWERING 3(ELF3), FLC (Flowering Locus C), FLM (MAF1), Flowering locus T (FT), Frigida (FRI), Frigida like 1 (FRL1), Frigida like 2 (FRL2), MADS AFFECTING FLOWERING 2 (MAF2), SVP (SHORT VEGETATIVE PHASE), VIN3, GIBBERELLIC ACID REQUIRING 1 (GA1), HUA2)
(https://www.gephebase.org/search-criteria?/or+Taxon ID=^3702^/and+Trait=Flowering time/or+Taxon ID=^3702^/and+Trait=Fruit shape/or+Taxon ID=^3702^/and+Trait=Flower morphology/or+Taxon ID=^3702^/and+Trait=Fertility/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

@Pleiotropy @GxE