

GEPHE SUMMARY

	Gephebase Gene	GephelD
flavonoid 3'-hydroxylase (F3'H) (https://www.gephebase.org/search-criteria?/and+Gene	GP00000319	
Gephebase=^flavonoid 3'-hydroxylase (F3'H)^#gephebase-summary-title)		Main curator
	Entry Status	Martin
Published		

PHENOTYPIC CHANGE

	Trait Category
Morphology (https://www.gephebase.org/search-criteria?/and+Trait	
Category="Morphology">#gephebase-summary-title)	
	Trait
Coloration (flowers) (https://www.gephebase.org/search-criteria?/and+Trait=^Coloration	
(flowers)^#gephebase-summary-title)	
	Trait State in Taxon A
Ipomoea purpurea - dark purple flowers	
	Trait State in Taxon B
Ipomoea purpurea - pink mutant - stable reddish flowers	
	Ancestral State
Taxon A	
	Taxonomic Status
Domesticated (https://www.gephebase.org/search-criteria?/and+Taxonomic	
Status="Domesticated">#gephebase-summary-title)	

Taxon A	Latin Name	Taxon B	Latin Name
Ipomoea purpurea (#gephebase-summary-title)		Ipomoea purpurea (#gephebase-summary-title)	
common morning-glory	Common Name	common morning-glory	Common Name
Convolvulus purpureus; Pharbitis purpurea; common morning-glory; Convolvulus purpureus L., 1762; Ipomoea purpurea (L.) Roth, 1787; Pharbitis purpurea (L.) Voigt, 1845; Pharbitis purpurea	Synonyms	Convolvulus purpureus; Pharbitis purpurea; common morning-glory; Convolvulus purpureus L., 1762; Ipomoea purpurea (L.) Roth, 1787; Pharbitis purpurea (L.) Voigt, 1845; Pharbitis purpurea	Synonyms
species	Rank	species	Rank
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Solanales; Convolvulaceae; Ipomoeae; Ipomoea	Lineage	cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Solanales; Convolvulaceae; Ipomoeae; Ipomoea	Lineage
Ipomoea () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4119)	Parent	Ipomoea () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4119)	Parent
4121 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4121)	NCBI Taxonomy ID	4121 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4121)	NCBI Taxonomy ID
is Taxon A an Infraspecies?		is Taxon B an Infraspecies?	
No		No	

GENOTYPIC CHANGE

	Generic Gene Name	UniProtKB Arabidopsis thaliana
CYP75B1	Synonyms	GenebankID or UniProtKB
CYP75B1; CYTOCHROME P450 75B1; D501; F13G24.190; F13G24_190; F3'H; FLAVONOID 3'-HYDROXYLASE; TRANSPARENT TESTA 7; TT7; At5g07990	String	AAS46257 (https://www.ncbi.nlm.nih.gov/nucore/AAS46257)
3702.AT5G07990.1 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=3702.AT5G07990.1)	Sequence Similarities	
Belongs to the cytochrome P450 family.		
	GO - Molecular Function	
GO:0020037 : heme binding (https://www.ebi.ac.uk/QuickGO/term/GO:0020037)		
GO:0005506 : iron ion binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005506)		
GO:0016709 : oxidoreductase activity, acting on paired donors, with incorporation or reduction of molecular oxygen, NAD(P)H as one donor, and incorporation of one atom of		

oxygen (<https://www.ebi.ac.uk/QuickGO/term/GO:0016709>)

GO - Biological Process

GO:0009733 : response to auxin (<https://www.ebi.ac.uk/QuickGO/term/GO:0009733>)

GO:0009813 : flavonoid biosynthetic process

(<https://www.ebi.ac.uk/QuickGO/term/GO:0009813>)

GO - Cellular Component

GO:0016021 : integral component of membrane

(<https://www.ebi.ac.uk/QuickGO/term/GO:0016021>)

GO:0016020 : membrane (<https://www.ebi.ac.uk/QuickGO/term/GO:0016020>)

GO:0005789 : endoplasmic reticulum membrane

(<https://www.ebi.ac.uk/QuickGO/term/GO:0005789>)

Presumptive Null

Yes (<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>)

Aberration Type

Insertion (<https://www.gephebase.org/search-criteria?/and+Aberration+Type=%Insertion%#gephebase-summary-title>)

Insertion Size

-

Molecular Details of the Mutation

insertion of the 0.55-kb DNA transposable element Tip201 belonging to the Ac/Ds superfamily. No excision of Tip201 from the F3'H gene could be detected. Both splicing and polyadenylation patterns of the F3'H transcripts were affected by the Tip201 integration.

Experimental Evidence

Candidate Gene (<https://www.gephebase.org/search-criteria?/and+Experimental+Evidence=%Candidate+Gene%#gephebase-summary-title>)

Main Reference

The genetic basis of a flower color polymorphism in the common morning glory (*Ipomoea purpurea*). (2003 Nov-Dec) (<https://pubmed.ncbi.nlm.nih.gov/14691310>)

Authors

Zufall RA; Rausher MD

Abstract

The common morning glory (*Ipomoea purpurea*) is highly polymorphic for flower color. Part of this phenotypic variation is due to allelic variation at the P locus. This locus determines whether flowers will be purple or pink, where purple is dominant to pink. We have determined that the anthocyanin biosynthetic gene flavonoid 3'-hydroxylase (f3'h) corresponds to the P locus. In the pink allele of f3'h there is a large insertion in the third exon, which results in the production of a truncated transcript. This shortened transcript produces a nonfunctional F3'H enzyme, resulting in the production of pink flowers rather than purple. In addition, we describe a polymerase chain reaction (PCR)-based assay that can be used to determine the genotype of a plant at this locus.

Additional References

Spontaneous mutations of the flavonoid 3'-hydroxylase gene conferring reddish flowers in the three morning glory species. (2003) (<https://pubmed.ncbi.nlm.nih.gov/14581624>)

Genetic changes associated with floral adaptation restrict future evolutionary potential. (2004) (<https://pubmed.ncbi.nlm.nih.gov/15103375>)

Parallel evolution at multiple levels in the origin of hummingbird pollinated flowers in *Ipomoea*. (2010) (<https://pubmed.ncbi.nlm.nih.gov/20148948>)

RELATED GEPHE

Related Genes

3' (bHLH2, Chalcone synthase D (CHS-D), MYB1) (<https://www.gephebase.org/search-criteria?/or+Taxon+ID=%4121%and+Trait=Coloration+and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

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