

GEPHE SUMMARY

	Gephebase Gene	GephelD
flavonoid 3'-hydroxylase (F3'H) (https://www.gephebase.org/search-criteria?/and+Gene	GP00002088	
Gephebase=^flavonoid 3'-hydroxylase (F3'H)^#gephebase-summary-title)		Main curator
	Entry Status	
Published	Courtier	

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 tricolor - bright blue flowers	
	Trait State in Taxon B
Ipomoea tricolor - fuchsia 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 tricolor (#gephebase-summary-title)		Ipomoea tricolor (#gephebase-summary-title)	
-		-	
	Synonyms		Synonyms
Ipomoea rubro-caerulea; Ipomoea rubrocaerulea; Pharbitis rubro-caerulea; Pharbitis rubrocaeruleus; campanilla; flying-saucers; pearly-gates; yaxcelil; Ipomoea rubrocaerulea Hook., 1834; Ipomoea tricolor Cav., 1795; Pharbitis rubrocaeruleus (Hook.) Planch., 1854		Ipomoea rubro-caerulea; Ipomoea rubrocaerulea; Pharbitis rubro-caerulea; Pharbitis rubrocaeruleus; campanilla; flying-saucers; pearly-gates; yaxcelil; Ipomoea rubrocaerulea Hook., 1834; Ipomoea tricolor Cav., 1795; Pharbitis rubrocaeruleus (Hook.) Planch., 1854	
	Rank		Rank
species	Lineage	species	Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphylophyta; Spermatophyta; Magnoliopsida; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Solanales; Convolvulaceae; Ipomoeae; Ipomoea		cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphylophyta; Spermatophyta; Magnoliopsida; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Solanales; Convolvulaceae; Ipomoeae; Ipomoea	
	Parent		Parent
Ipomoea () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4119)		Ipomoea () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4119)	
89664 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=89664)	NCBI Taxonomy ID	89664 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=89664)	NCBI Taxonomy ID
	is Taxon A an Infraspecies?		is Taxon B an Infraspecies?
No		No	

GENOTYPIC CHANGE

CYP75B1	Generic Gene Name	UniProtKB Arabidopsis thaliana
	Synonyms	GenebankID or UniProtKB
CYP75B1; CYTOCHROME P450 75B1; D501; F13G24.190; F13G24_190; F3'H; FLAVONOID 3'-HYDROXYLASE; TRANSPARENT TESTA 7; TT7; At5g07990		
3702.AT5G07990.1 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=3702.AT5G07990.1)	String	
	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 ([#gephbase-summary-title](https://www.gephbase.org/search-criteria?/and+Presumptive+Null=^Yes))

Molecular Type

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

Aberration Type

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

Insertion Size

1-9 bp

Molecular Details of the Mutation

a single T insertion generating the stop codon TAG. The accumulation of the F3'H transcripts is drastically reduced by the nonsense-mediated RNA decay.

Experimental Evidence

Candidate Gene ([#gephbase-summary-title](https://www.gephbase.org/search-criteria?/and+Experimental+Evidence=^Candidate+Gene))

Main Reference

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>)

Authors

Hoshino A; Morita Y; Choi JD; Saito N; Toki K; Tanaka Y; Iida S

Abstract

Among the Ipomoea plants, both Ipomoea nil and Ipomoea tricolor display bright blue flowers, and Ipomoea purpurea exhibits dark purple flowers. While all of these flowers contain cyanidin-based anthocyanin pigments, the mutants of *I. nil*, *I. purpurea*, and *I. tricolor* carrying the magenta, pink, and fuchsia alleles, respectively, produce reddish flowers containing pelargonidin derivatives, and all of them are deficient in the gene for flavonoid 3'-hydroxylase (F3'H). The magenta allele in *I. nil* is a nonsense mutation caused by a single C to T base transition generating the stop codon TGA, and the cultivar Violet carries the same mutation. Several tested pink mutants in *I. purpurea* carry inserts of the 0.55-kb DNA transposable element Tip201 belonging to the Ac/Ds superfamily at the identical site. No excision of Tip201 from the F3'H gene could be detected, and both splicing and polyadenylation patterns of the F3'H transcripts were affected by the Tip201 integration. The fuchsia allele in *I. tricolor* is a single T insertion generating the stop codon TAG, and the accumulation of the F3'H transcripts was drastically reduced by the nonsense-mediated RNA decay. Spontaneous mutations in *Ipomoea*, including a possible founder mutation in the pink allele, are also discussed.

Additional References

RELATED GEPHE

Related Genes

1 (bHLH2) ([#gephbase-summary-title](https://www.gephbase.org/search-criteria?/or+Taxon+ID=^89664#/and+Trait=Coloration/and+groupHaplotypes=true))

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS