

GEPHE SUMMARY

	Gephebase Gene		GepheID
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
Published	Entry Status	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)			
(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		Taxon B	
	Latin Name		Latin Name
Ipomoea tricolor		Ipomoea tricolor	
(https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms="Ipomoea		(https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms="Ipomoea	
tricolor"#gephebase-summary-title)		tricolor"#gephebase-summary-title)	
	Common Name		Common Name
-		-	
	Synonyms		Synonyms
Ipomoea rubro-caerulea; Ipomoea rubrocaerulea; Pharbitis rubro-caerulea; Pharbitis		Ipomoea rubro-caerulea; Ipomoea rubrocaerulea; Pharbitis rubro-caerulea; Pharbitis	
rubrocaeruleus; campanilla; flying-saucers; pearly-gates; yaxcelil; Ipomoea rubrocaerulea		rubrocaeruleus; campanilla; flying-saucers; pearly-gates; yaxcelil; Ipomoea rubrocaerulea	
Hook., 1834; Ipomoea tricolor Cav., 1795; Pharbitis rubrocaeruleus (Hook.) Planch., 1854		Hook., 1834; Ipomoea tricolor Cav., 1795; Pharbitis rubrocaeruleus (Hook.) Planch., 1854	
	Rank		Rank
species		species	
	Lineage		Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta;		cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta;	
Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliopsida; Mesangiospermae;		Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliopsida; Mesangiospermae;	
eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Solanales; Convolvulaceae;		eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Solanales; Convolvulaceae;	
Ipomoeae; Ipomoea		Ipomoeae; Ipomoea	
	Parent		Parent
Ipomoea () - (Rank: genus)		Ipomoea () - (Rank: genus)	
(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4119)		(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4119)	
	NCBI Taxonomy ID		NCBI Taxonomy ID
89664		89664	
(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=89664)		(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=89664)	
	is Taxon A an Infrasppecies?		is Taxon B an Infrasppecies?
No		No	

GENOTYPIC CHANGE

	Generic Gene Name		UniProtKB Arabidopsis thaliana
CYP75B1		Q9SD85 (http://www.uniprot.org/uniprot/Q9SD85)	
	Synonyms		GenebankID or UniProtKB
CYP75B1; CYTOCHROME P450 75B1; D501; F13G24.190; F13G24_190; F3'H;		Q	
FLAVONOID 3'-HYDROXYLASE; TRANSPARENT TESTA 7; TT7; At5g07990			
	String		
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](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

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

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

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

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

Related Genes

No matches found.

Related Haplotypes

EXTERNAL LINKS

COMMENTS