

GEPHE SUMMARY

Gephebase Gene

flavonoid 3'-hydroxylase (F3'H)

Entry Status

Published

GepheID

GP00000319

Main curator

Martin

PHENOTYPIC CHANGE

Trait Category

Morphology

Trait

Coloration (flowers)

Trait State in Taxon A

Ipomoea nil; *Ip. purpurea* and *I. tricolor* - purple/blue

Trait State in Taxon B

Ipomoea quamoclit - Red

Ancestral State

Taxon A

Taxonomic Status

Interspecific

	Taxon A	Taxon B
Latin Name	<i>Ipomoea</i>	<i>Ipomoea quamoclit</i>
Common Name	-	-
Synonyms	Pharbitis; <i>Ipomoea</i> L.; Pharbitis Choisy	bejuco de cipres; cambusteria; clavellina; hummingbird-vine; red-jasmine; regadero; <i>Ipomoea quamoclit</i> L., 1753
Rank	genus	species
Lineage	cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Solanales; Convolvulaceae; Ipomoeae	cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Solanales; Convolvulaceae; Ipomoeae; <i>Ipomoea</i>
Parent	Ipomoeae () - (Rank: tribe)	<i>Ipomoea</i> () - (Rank: genus)
NCBI Taxonomy ID	4119	89660
is Taxon A an Intraspecies?	No	No

GENOTYPIC CHANGE

Generic Gene Name

CYP75B1

Synonyms

CYP75B1; CYTOCHROME P450 75B1; D501; F13G24.190; F13G24_190; F3'H; FLAVONOID 3'-HYDROXYLASE; TRANSPARENT TESTA 7; TT7; At5g07990

String

3702.AT5G07990.1

Sequence Similarities

Belongs to the cytochrome P450 family.

GO - Molecular Function

GO:0020037 : heme binding

GO:0005506 : iron ion binding

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

GO - Biological Process

GO:0009733 : response to auxin

GO:0009813 : flavonoid biosynthetic process

GO - Cellular Component

UniProtKB *Arabidopsis thaliana*

Q9SD85

GenebankID or UniProtKB

AAS46257

GO:0016021 : integral component of membrane
GO:0016020 : membrane
GO:0005789 : endoplasmic reticulum membrane

Presumptive Null

Yes

Molecular Type

Unknown

Aberration Type

Unknown

Molecular Details of the Mutation

Not identified

Experimental Evidence

Candidate Gene

Main Reference

The genetic basis of a flower color polymorphism in the common morning glory (*Ipomoea purpurea*). (2003 Nov-Dec)

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)

Genetic changes associated with floral adaptation restrict future evolutionary potential. (2004)

Parallel evolution at multiple levels in the origin of hummingbird pollinated flowers in *Ipomoea*. (2010)

RELATED GEPHE

Related Genes

2 (Anthocyanin gene transcription factor *Ipmyb1*, Chalcone synthase D (CHS-D))

Related Haplotypes

No matches found.

COMMENTS