

GEPHE SUMMARY

	Gephebase Gene	GepheID
flavonoid 3';5'-hydroxylase (F3'5'H) (https://www.gephebase.org/search-criteria?/and+GeneGephebase=^flavonoid 3';5'-hydroxylase (F3'5'H)^#gephebase-summary-title)	GP00000326	
	Entry Status	Main curator
Published	Martin	

PHENOTYPIC CHANGE

	Trait Category		
Morphology (https://www.gephebase.org/search-criteria?/and+TraitCategory=^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		
Pisum sativum		Trait State in Taxon B	
Pisum sativum - b type line JI118			
	Ancestral State		
Data not curated		Taxonomic Status	
Domesticated (https://www.gephebase.org/search-criteria?/and+TaxonomicStatus=^Domesticated^#gephebase-summary-title)			
	Taxon A		Taxon B
	Latin Name		Latin Name
Pisum sativum (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Pisum sativum^#gephebase-summary-title)		Pisum sativum (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Pisum sativum^#gephebase-summary-title)	
	Common Name		Common Name
pea		pea	
	Synonyms		Synonyms
pea; garden pea; peas; Pisum sativum L.		pea; garden pea; peas; Pisum sativum L.	
	Rank		Rank
species		species	
	Lineage		Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; fabids; Fabales; Fabaceae; Papilionoideae; 50 kb inversion clade; NPAAA clade; Hologalegina; IRL clade; Fabeae; Pisum		cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; fabids; Fabales; Fabaceae; Papilionoideae; 50 kb inversion clade; NPAAA clade; Hologalegina; IRL clade; Fabeae; Pisum	
	Parent		Parent
Pisum () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3887)		Pisum () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3887)	
	NCBI Taxonomy ID		NCBI Taxonomy ID
3888 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3888)		3888 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3888)	
	is Taxon A an Intraspecies?		is Taxon B an Intraspecies?
No		No	

GENOTYPIC CHANGE

	Generic Gene Name	UniProtKB Solanum melongena
CYP75A2		P37120 (http://www.uniprot.org/uniprot/P37120)
	Synonyms	GenebankID or UniProtKB
CYP75; CYPEG1		ADW66161 (https://www.ncbi.nlm.nih.gov/nuccore/ADW66161)
-	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:0004497 : monooxygenase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0004497)		
GO:0016705 : oxidoreductase activity, acting on paired donors, with incorporation or reduction of molecular oxygen (https://www.ebi.ac.uk/QuickGO/term/GO:0016705)		
	GO - Biological Process	
GO:0009718 : anthocyanin-containing compound biosynthetic process		

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

Coding (<https://www.gephebase.org/search-criteria?/and+Molecular Type=~Coding~#gephebase-summary-title>)

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

Nonsynonymous

G111E

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

Presumptive Null

Molecular Type

Aberration Type

SNP Coding Change

Molecular Details of the Mutation

Experimental Evidence

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

Main Reference

The B gene of pea encodes a defective flavonoid 3',5'-hydroxylase, and confers pink flower color. (2012) (<https://pubmed.ncbi.nlm.nih.gov/22492867>)

Authors

Moreau C; Ambrose MJ; Turner L; Hill L; Ellis TH; Hofer JM

Abstract

The inheritance of flower color in pea (*Pisum sativum*) has been studied for more than a century, but many of the genes corresponding to these classical loci remain unidentified. Anthocyanins are the main flower pigments in pea. These are generated via the flavonoid biosynthetic pathway, which has been studied in detail and is well conserved among higher plants. A previous proposal that the *Clariroseus* (B) gene of pea controls hydroxylation at the 5' position of the B ring of flavonoid precursors of the anthocyanins suggested to us that the gene encoding flavonoid 3',5'-hydroxylase (F3'5'H), the enzyme that hydroxylates the 5' position of the B ring, was a good candidate for B. In order to test this hypothesis, we examined mutants generated by fast neutron bombardment. We found allelic pink-flowered b mutant lines that carried a variety of lesions in an F3'5'H gene, including complete gene deletions. The b mutants lacked glycosylated delphinidin and petunidin, the major pigments present in the progenitor purple-flowered wild-type pea. These results, combined with the finding that the F3'5'H gene cosegregates with b in a genetic mapping population, strongly support our hypothesis that the B gene of pea corresponds to a F3'5'H gene. The molecular characterization of genes involved in pigmentation in pea provides valuable anchor markers for comparative legume genomics and will help to identify differences in anthocyanin biosynthesis that lead to variation in pigmentation among legume species.

Additional References

RELATED GEPHE

Related Genes

1 (PsbHLH = A) (<https://www.gephebase.org/search-criteria?/or+Taxon ID=~3888~/and+Trait=Coloration/and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

1 ([https://www.gephebase.org/search-criteria?/or+Gene Gephebase=~flavonoid 3';5'-hydroxylase \(F3'5'H\)~/and+Taxon ID=~3888~/or+Gene Gephebase=~flavonoid 3';5'-hydroxylase \(F3'5'H\)~/and+Taxon ID=~3888~#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Gene Gephebase=~flavonoid 3';5'-hydroxylase (F3'5'H)~/and+Taxon ID=~3888~/or+Gene Gephebase=~flavonoid 3';5'-hydroxylase (F3'5'H)~/and+Taxon ID=~3888~#gephebase-summary-title))

EXTERNAL LINKS

COMMENTS