

GEPHE SUMMARY

	Gephebase Gene		GepheID
anthocyanin2 (an2) (https://www.gephebase.org/search-criteria?/and+GeneGephebase=~anthocyanin2 (an2)^#gephebase-summary-title)	GP00000093		
	Entry Status	Martin	Main curator
Published			

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		
Petunia integrifolia		Trait State in Taxon B	
Petunia axillaris			
	Ancestral State		
Data not curated		Taxonomic Status	
Interspecific (https://www.gephebase.org/search-criteria?/and+TaxonomicStatus=~Interspecific^#gephebase-summary-title)			
	Taxon A		Taxon B
	Latin Name		Latin Name
Petunia integrifolia (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=~Petunia integrifolia^#gephebase-summary-title)		Petunia axillaris (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=~Petunia axillaris^#gephebase-summary-title)	
	Common Name		Common Name
-		-	
	Synonyms		Synonyms
violet-flowered petunia; Petunia integrifolia (Hook.) Schinz & Thell., 1915		large white petunia; white moon petunia; Petunia axillaris (Lam.) Britton, Stern & Poggenb.; Petunia axillaris	
	Rank		Rank
species		species	
	Lineage		Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Solanales; Solanaceae; Petunioidae; Petunia		cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Solanales; Solanaceae; Petunioidae; Petunia	
	Parent		Parent
Petunia () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4101)		Petunia () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4101)	
	NCBI Taxonomy ID		NCBI Taxonomy ID
4103 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4103)		33119 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 33119)	
	is Taxon A an Intraspecies?		is Taxon B an Intraspecies?
No		No	

GENOTYPIC CHANGE

	Generic Gene Name		UniProtKB Petunia integrifolia
AN2		A4GRU8 (http://www.uniprot.org/uniprot/A4GRU8)	
	Synonyms		GenebankID or UniProtKB
-		AAF66734 (https://www.ncbi.nlm.nih.gov/nucleotide/AAF66734)	
	String		
-			
	Sequence Similarities		
-			
	GO - Molecular Function		
GO:0003677 : DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0003677)			
	GO - Biological Process		
-			
	GO - Cellular Component		
GO:0005634 : nucleus (https://www.ebi.ac.uk/QuickGO/term/GO:0005634)			
			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

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

SNP Coding Change

Nonsense

Molecular Details of the Mutation

1 aa substitution; premature stop

Experimental Evidence

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

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

Main Reference

Single gene-mediated shift in pollinator attraction in *Petunia*. (2007) (<https://pubmed.ncbi.nlm.nih.gov/17337627>)

Authors

Hoballah ME; GÃ¼lbitz T; Stuurman J; Broger L; Barone M; Mandel T; Dell’Olivo A; Arnold M; Kuhlemeier C

Abstract

Animal-mediated pollination is essential in plant reproductive biology and is often associated with pollination syndromes, sets of floral traits, such as color, scent, shape, or nectar content. Selection by pollinators is often considered a key factor in floral evolution and plant speciation. Our aim is the identification and characterization of the genetic changes that caused the evolution of divergent pollination syndromes in closely related plant species. We focus on ANTHOCYANIN2 (AN2), a well-defined myb-type transcription factor that is a major determinant of flower color variation between *Petunia integrifolia* and *Petunia axillaris*. Analysis of sequence variation in AN2 in wild *P. axillaris* accessions showed that loss-of-function alleles arose at least five times independently. DNA sequence analysis was complemented by functional assays for pollinator preference using genetic introgressions and transgenics. These results show that AN2 is a major determinant of pollinator attraction. Therefore, changes in a single gene cause a major shift in pollination biology and support the notion that the adaptation of a flowering plant to a new pollinator type may involve a limited number of genes of large effect. Gene identification and analysis of molecular evolution in combination with behavioral and ecological studies can ultimately unravel the evolutionary genetics of pollination syndromes.

Additional References

RELATED GEPHE

Related Genes

1 (MYB-FL) (<https://www.gephebase.org/search-criteria?/or+Taxon+ID=~4103~/and+Trait=Coloration/or+Taxon+ID=~33119~/and+Trait=Coloration/and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

5 ([https://www.gephebase.org/search-criteria?/or+Gene+Gephebase=~anthocyanin2+\(an2\)~/and+Taxon+ID=~4103~/or+Gene+Gephebase=~anthocyanin2+\(an2\)~/and+Taxon+ID=~33119~#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Gene+Gephebase=~anthocyanin2+(an2)~/and+Taxon+ID=~4103~/or+Gene+Gephebase=~anthocyanin2+(an2)~/and+Taxon+ID=~33119~#gephebase-summary-title))

EXTERNAL LINKS

COMMENTS