GEPHE SUMMARY

Gephebase Gene
anthocyanin2 (an2) (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^anthocyanin2 (an2)^#gephebase-summary-title)

GepheID
GP00000094

Entry Status
Published

Main curator
Martin

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
Petunia integrifolia

Trait State in Taxon B
Petunia axillaris

Ancestral State
Data not curated

Taxonomic Status
Interspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Interspecific^#gephebase-summary-title)

Taxon A

Latin Name
Petunia integrifolia (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Petunia integrifolia^#gephebase-summary-title)

Common Name
-

Synonyms
violet-flowered petunia; Petunia integrifolia (Hook.) Schinz & Thell., 1915

Rank
species

Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Solanales; Solanaceae; Petunioideae; Petunia

Parent
Petunia () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4101)

NCBI Taxonomy ID
4103 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4103)

is Taxon A an Infraspecies?
No

Taxon B

Latin Name
Petunia axillaris (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Petunia axillaris^#gephebase-summary-title)

Common Name
-

Synonyms
large white petunia; white moon petunia; Petunia axillaris (Lam.) Britton, Stern & Poggenb.; Petunia axilliaris

Rank
species

Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Solanales; Solanaceae; Petunioideae; Petunia

Parent
Petunia () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4101)

NCBI Taxonomy ID
33119 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 33119)

is Taxon B an Infraspecies?
No

GENOTYPIC CHANGE

Generic Gene Name
AN2

Synonyms
-

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)

UniProtKB Petunia integrifolia
A4GRU8 (http://www.uniprot.org/uniprot/A4GRU8)

GenebankID or UniProtKB
AAF66734 (https://www.ncbi.nlm.nih.gov/nuccore/AAF66734)

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; GÃ¼bitz 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)

EXTERNAL LINKS

COMMENTS