GEPHE SUMMARY

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

GepheID
GP00000090

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
Taxon A

Taxonomic Status
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Intraspecific^#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

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

Insertion Size

1-9 bp

Molecular Details of the Mutation

4bp insertion at a.a. 127; premature stop

Experimental Evidence

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

Main Reference

Molecular analysis of the anthocyanin2 gene of petunia and its role in the evolution of flower color. (1999) (https://pubmed.ncbi.nlm.nih.gov/10449578)

Authors

Quattrocchio F; Wing J; van der Woude K; Souer E; de Vetten N; Mol J; Koes R

Abstract

The shape and color of flowers are important for plant reproduction because they attract pollinators such as insects and birds. Therefore, it is thought that alterations in these traits may result in the attraction of different pollinators, genetic isolation, and ultimately, (sympatric) speciation. Petunia integrifolia and P. axillaris bear flowers with different shapes and colors that appear to be visited by different insects. The anthocyanin2 (an2) locus, a regulator of the anthocyanin biosynthetic pathway, is the main determinant of color differences. Here, we report an analysis of molecular events at the an2 locus that occur during Petunia spp evolution. We isolated an2 by transposon tagging and found that it encodes a MYB domain protein, indicating that it is a transcription factor. Analysis of P. axillaris subspecies with white flowers showed that they contain an2(-) alleles with two alternative frameshifts at one site, apparently caused by the insertion and subsequent excision of a transposon. A third an2(-) allele has a nonsense mutation elsewhere, indicating that it arose independently. The distribution of polymorphisms in an2(-) alleles suggests that the loss of an2 function and the consequent changes in floral color were not the primary cause for genetic separation of P. integrifolia and P. axillaris. Rather, they were events that occurred late in the speciation process, possibly to reinforce genetic isolation and complete speciation.

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