GEPHE SUMMARY

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

GepheID
GP00001589

Entry Status
Published

Main curator
Prigent

PHENOTYPIC CHANGE

Trait Category
Morphology (https://www.gephebase.org/search-criteria?/and+Trait Category=^Morphology^#gephebase-summary-title)

Trait
Coloration (flower ; UV absorbance) (https://www.gephebase.org/search-criteria?/and+Trait=^Coloration (flower ; UV absorbance)^#gephebase-summary-title)

Trait State in Taxon A
Petunia inflata bee pollinated (purple) flower without UV absorbance but UV reflective

Trait State in Taxon B
Petunia axillaris hawkmoth pollinated (white with abundant volatiles at dusk) flower with UV absorbance

Ancestral State
Taxon A

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
MYB-FL

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 axillaris subsp. axillaris
A0A0S3CVD3 (http://www.uniprot.org/uniprot/A0A0S3CVD3)

GenebankID or UniProtKB
()

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

Molecular Type

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

Aberration Type

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

Insertion Size

100-1000 kb

Molecular Details of the Mutation

A 977-kb insertion 12 bp upstream of the predicted TATA-binding box is causing upregulation of the promoter

Experimental Evidence

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

Main Reference

MYB-FL controls gain and loss of floral UV absorbance, a key trait affecting pollinator preference and reproductive isolation. (2016) (https://pubmed.ncbi.nlm.nih.gov/26656847)

Authors

Sheehan H; Moser M; Klahre U; Esfeld K; Dell'Olivo A; Mandel T; Metzger S; Vandenbussche M; Freitas L; Kuhlemeier C

Abstract

Adaptations to new pollinators involve multiple floral traits, each requiring coordinated changes in multiple genes. Despite this genetic complexity, shifts in pollination syndromes have happened frequently during angiosperm evolution. Here we study the genetic basis of floral UV absorbance, a key trait for attracting nocturnal pollinators. In Petunia, mutations in a single gene, MYB-FL, explain two transitions in UV absorbance. A gain of UV absorbance in the transition from bee to moth pollination was determined by a cis-regulatory mutation, whereas a frameshift mutation caused subsequent loss of UV absorbance during the transition from moth to hummingbird pollination. The functional differences in MYB-FL provide insight into the process of speciation and clarify phylogenetic relationships between nascent species.

Additional References

RELATED GEPHE

Related Genes

1 (anthocyanin2 (an2)) (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

No matches found.

EXTERNAL LINKS

COMMENTS

Non-null mutation