GEPHE SUMMARY

Gephebase Gene
ODORANT1 [pseudo-replication between 2 ODO1 entries due to possible homology between alleles] (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^ODORANT1 [pseudo-replication between 2 ODO1 entries due to possible homology between alleles]^#gephebase-summary-title)

GepheID
GP00000750

Entry Status
Published

Main curator
Martin

PHENOTYPIC CHANGE

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

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

Trait State in Taxon A
Petunia axillaris (odorant)

Trait State in Taxon B
Petunia exserta (scentless)

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 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 A an Infraspecies?
No

Taxon B

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

Common Name
-

Synonyms
Petunia exserta Stehmann, 1987

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
323115 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 323115)

is Taxon B an Infraspecies?
No

GENOTYPIC CHANGE

Generic Gene Name
ODO1

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 hybrida
Q50EX6 (http://www.uniprot.org/uniprot/Q50EX6)

GenebankID or UniProtKB
()

Presumptive Null

Unknown (https://www.gephebase.org/search-criteria?/and+Presumptive Null=^Unknown^#gephebase-summary-title)

Molecular Type

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

Aberration Type

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

Molecular Details of the Mutation

Not identified; but probably homologous to P. hybrida Mitchell x R27 promoter variation since these P. hybrida accessions are derived from a P. axillaris x P. integrifolia cross

Experimental Evidence

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

Main Reference

Pollinator choice in Petunia depends on two major genetic Loci for floral scent production. (2011) (https://pubmed.ncbi.nlm.nih.gov/21497087)

Authors

Klahre U; Gurba A; Hermann K; Saxenhofer M; Bossolini E; Guerin PM; Kuhlemeier C

Abstract

Differences in floral traits, such as petal color, scent, morphology, or nectar quality and quantity, can lead to specific interactions with pollinators and may thereby cause reproductive isolation. Petunia provides an attractive model system to study the role of floral characters in reproductive isolation and speciation. The night-active hawkmoth pollinator Manduca sexta relies on olfactory cues provided by Petunia axillaris. In contrast, Petunia exserta, which displays a typical hummingbird pollination syndrome, is devoid of scent. The two species can easily be crossed in the laboratory, which makes it possible to study the genetic basis of the evolution of scent production and the importance of scent for pollinator behavior.

In an F2 population derived from an interspecific cross between P. axillaris and P. exserta, we identified two quantitative trait loci (QTL) that define the difference between the two species' ability to produce benzenoid volatiles. One of these loci was identified as the MYB transcription factor ODORANT1. Reciprocal introgressions of scent QTL were used for choice experiments under controlled conditions. These experiments demonstrated that the hawkmoth M. sexta prefers scented plants and that scent determines choice at a short distance. When exposed to conflicting cues of color versus scent, the insects display no preference, indicating that color and scent are equivalent cues.

Our results show that scent is an important flower trait that defines plant-pollinator interactions at the level of individual plants. The genetic basis underlying such a major phenotypic difference appears to be relatively simple and may enable rapid loss or gain of scent through hybridization.

Additional References

RELATED GEPHE

Related Genes

3 (benzoic acid/salicylic acid carboxyl methyltransferase (BSMT), benzoyl-CoA:benzylalcohol/2-phenylethanol benzoyltransferase (BPBT), Cinnamate-CoA ligase 1 (CNL1)) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^33119^/and+Trait=Fragrance/or+Taxon ID=^323115^/and+Trait=Fragrance/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS