

GEPHE SUMMARY

Gephebase Gene
 OCYMENE SYNTHASE (OS) (<https://www.gephebase.org/search-criteria?/and+Gene>
 Gephebase="OCYMENE SYNTHASE (OS)"#gephebase-summary-title) GP00001762 GepheID
 Entry Status Courtier Main curator
 Published

PHENOTYPIC CHANGE

Trait Category
 Physiology (<https://www.gephebase.org/search-criteria?/and+Trait>
 Category="Physiology"#gephebase-summary-title)
 Trait
 Fragrance (floral terpenoid volatiles; E- beta-ocimene) ([https://www.gephebase.org/search-criteria?/and+Trait="Fragrance \(floral terpenoid volatiles; E- beta-ocimene\)"#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Trait=))
 Trait State in Taxon A
 scent
 Trait State in Taxon B
 no scent
 Ancestral State
 Taxon A
 Taxonomic Status
 Interspecific (<https://www.gephebase.org/search-criteria?/and+Taxonomic>
 Status="Interspecific"#gephebase-summary-title)

Taxon A	Taxon B
Latin Name	Latin Name
Erythranthe lewisii (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms="Erythranthe lewisii"#gephebase-summary-title)	Erythranthe verbenacea (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms="Erythranthe verbenacea"#gephebase-summary-title)
Common Name	Common Name
-	-
Synonyms	Synonyms
Mimulus lewisii; Erythranthe lewisii (Pursh) G.L.Nesom & N.S.Fraga; Mimulus lewisii Pursh	Mimulus verbenaceus; Erythranthe verbenacea (Greene) G.L.Nesom & N.S.Fraga; Mimulus verbenaceus Greene
Rank	Rank
species	species
Lineage	Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Lamiales; Phrymaceae; Erythranthe	cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Lamiales; Phrymaceae; Erythranthe
Parent	Parent
Erythranthe () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=1502711)	Erythranthe () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=1502711)
NCBI Taxonomy ID	NCBI Taxonomy ID
69919 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=69919)	271017 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=271017)
is Taxon A an Intraspecies?	is Taxon B an Intraspecies?
No	No

GENOTYPIC CHANGE

Generic Gene Name
 TPS02 P0CJ43 (<http://www.uniprot.org/uniprot/P0CJ43>) UniProtKB Arabidopsis thaliana
 Synonyms
 - 0 GenebankID or UniProtKB
 String
 -
 Sequence Similarities
 Belongs to the terpene synthase family. Tpsb subfamily.
 GO - Molecular Function
 GO:0000287 : magnesium ion binding
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0000287>)
 GO:0010333 : terpene synthase activity
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0010333>)
 GO - Biological Process
 GO:0016114 : terpenoid biosynthetic process
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0016114>)

GO:0009507 : chloroplast (<https://www.ebi.ac.uk/QuickGO/term/GO:0009507>)

	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
Deletion (https://www.gephebase.org/search-criteria?/and+Aberration Type=~Deletion^#gephebase-summary-title)	Deletion Size
-	
	Molecular Details of the Mutation
large deletion from the third exon to the last exon	
	Experimental Evidence
Candidate Gene (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=~Candidate Gene^#gephebase-summary-title)	Main Reference
Less is more: Independent loss-of-function OCIMENE SYNTHASE alleles parallel pollination syndrome diversification in monkeyflowers (<i>Mimulus</i>). (2017) (https://pubmed.ncbi.nlm.nih.gov/28724593)	
	Authors
Peng F; Byers KJRP; Bradshaw HD	
	Abstract
Pollinator-mediated selection on flower phenotypes (e.g., shape, color, scent) is key to understanding the adaptive radiation of angiosperms, many of which have evolved specialized relationships with a particular guild of animal pollinators (e.g., birds, bats, moths, bees). E-Î²-Ocimene, a monoterpene produced by OCIMENE SYNTHASE (OS) in <i>Mimulus lewisii</i> , is a floral scent important in attracting the species' bumblebee pollinators. The taxa closely related to <i>M. lewisii</i> have evolved several different pollination syndromes, including hummingbird pollination and self pollination (autogamy). We are interested in how floral scent variation contributed to species diversification in this clade.	
We analyzed variation in E-Î²-ocimene emission within this <i>Mimulus</i> clade and explored its molecular basis through a combination of DNA sequencing, reverse transcriptase PCR, and enzyme functional analysis in vitro.	
We found that none of the taxa, other than <i>M. lewisii</i> , emitted E-Î²-ocimene from flowers. But the molecular basis underlying loss of E-Î²-ocimene emission is unique in each taxon, including deletion, missense, or frameshift mutations in the OS gene, and potential posttranscriptional downregulation.	
The molecular evidence suggests that parallel loss-of-function in OS is the best explanation for the observed pattern of E-Î²-ocimene emission, likely as the result of natural selection.	
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	Additional References

RELATED GEPHE

	Related Genes
1 (LIMONENE-MYRCENE SYNTHASE (LMS)) (https://www.gephebase.org/search-criteria?/or+Taxon ID=~69919^/and+Trait=Fragrance/or+Taxon ID=~271017^/and+Trait=Fragrance/and+groupHaplotypes=true#gephebase-summary-title)	
	Related Haplotypes
2 (https://www.gephebase.org/search-criteria?/or+Gene Gephebase=~OCYMENE SYNTHASE (OS)^/and+Taxon ID=~69919^/or+Gene Gephebase=~OCYMENE SYNTHASE (OS)^/and+Taxon ID=~271017^#gephebase-summary-title)	

EXTERNAL LINKS

COMMENTS