

GEPHE SUMMARY

	Gephebase Gene	GephelD
LIMONENE-MYRCENE SYNTHASE (LMS) (https://www.gephebase.org/search-criteria/?and+Gene+Gephebase=%LIMONENE-MYRCENE+SYNTHASE+(LMS)%#gephebase-summary-title)	GP00001761	Main curator
	Courtier	
Published	Entry Status	

PHENOTYPIC CHANGE

	Trait Category	
Physiology (https://www.gephebase.org/search-criteria/?and+Trait+Category=%Physiology%#gephebase-summary-title)	Trait	
Fragrance (floral terpenoid volatiles; D -limonene and beta-myrcene) (https://www.gephebase.org/search-criteria/?and+Trait=%Fragrance+(floral+terpenoid+volatiles;+D+-limonene+and+beta-myrcene)%#gephebase-summary-title)	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
Erythranthe lewisiai (https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=%Erythranthe+lewisiai%#gephebase-summary-title)	Latin Name	Latin Name
-	Common Name	Common Name
Mimulus lewisiai; Erythranthe lewisiai (Pursh) G.L.Nesom & N.S.Fraga; Mimulus lewisiai Pursh	Synonyms	Synonyms
species	Rank	Rank
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphylophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Lamiales; Phrymaceae; Erythranthe	Lineage	Lineage
Erythranthe () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=1502711)	Parent	Parent
69919 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=69919)	NCBI Taxonomy ID	NCBI Taxonomy ID
No	is Taxon A an Infraspecies?	is Taxon B an Infraspecies?
Belongs to the terpene synthase family.		No

GENOTYPIC CHANGE

LMS	Generic Gene Name	UniProtKB Erythranthe lewisiai
-	Synonyms	GenebankID or UniProtKB
-	String	Erythranthe lewisiai
Belongs to the terpene synthase family.	Sequence Similarities	
GO:0000287 : magnesium ion binding (https://www.ebi.ac.uk/QuickGO/term/GO:0000287)	GO - Molecular Function	
GO:0010333 : terpene synthase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0010333)		
-	GO - Biological Process	

Yes (#gephebase-summary-title)	Presumptive Null
Coding (#gephebase-summary-title)	Molecular Type
SNP (#gephebase-summary-title)	Aberration Type
Nonsense	SNP Coding Change
G66T transversion mutation in exon 3 of McLMS (KM659024) that results in a nonsense mutation in the McLMS protein (G201X)	Molecular Details of the Mutation
Linkage Mapping (#gephebase-summary-title)	Experimental Evidence

Taxon A	Taxon B	Position
Codon		
Amino-acid		
	GGA	66
	Gly	STP
		201

Floral volatile alleles can contribute to pollinator-mediated reproductive isolation in monkeyflowers (<i>Mimulus</i>). (2014) (https://pubmed.ncbi.nlm.nih.gov/25319242)	Main Reference
Byers KJ; Vela JP; Peng F; Riffell JA; Bradshaw HD	Authors

Pollinator-mediated reproductive isolation is a major factor in driving the diversification of flowering plants. Studies of floral traits involved in reproductive isolation have focused nearly exclusively on visual signals, such as flower color. The role of less obvious signals, such as floral scent, has been studied only recently. In particular, the genetics of floral volatiles involved in mediating differential pollinator visitation remains unknown. The bumblebee-pollinated *Mimulus lewisii* and hummingbird-pollinated *Mimulus cardinalis* are a model system for studying reproductive isolation via pollinator preference. We have shown that these two species differ in three floral terpenoid volatiles – d-limonene, β -myrcene, and E- β -ocimene – that are attractive to bumblebee pollinators. By genetic mapping and in vitro analysis of enzyme activity we demonstrate that these interspecific differences are consistent with allelic variation at two loci, LIMONENE-MYRCENE SYNTHASE (LMS) and OCIMENE SYNTHASE (OS). *Mimulus lewisii* LMS (MILMS) and OS (MIOS) are expressed most strongly in floral tissue in the last stages of floral development. *Mimulus cardinalis* LMS (McLMS) is weakly expressed and has a nonsense mutation in exon 3. *Mimulus cardinalis* OS (McOS) is expressed similarly to MIOS, but the encoded McOS enzyme produces no E- β -ocimene. Recapitulating the *M. A. cardinalis* phenotype by reducing the expression of MILMS by RNA interference in transgenic *M. A. lewisii* produces no behavioral difference in pollinating bumblebees; however, reducing MIOS expression produces a 6% decrease in visitation. Allelic variation at the OCIMENE SYNTHASE locus is likely to contribute to differential pollinator visitation, and thus promote reproductive isolation between *M. A. lewisii* and *M. A. cardinalis*. OCIMENE SYNTHASE joins a growing list of ‘speciation genes’ (‘barrier genes’) in flowering plants.

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[Additional References](#)

RELATED GEPHE

1 (OCYMENE SYNTHASE (OS)) (#gephebase-summary-title)	Related Genes
No matches found.	Related Haplotypes

EXTERNAL LINKS

COMMENTS