

GEPHE SUMMARY

	Gephebase Gene	GephelD
ROSE INTENSITY1 (ROI1) (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^ROSE INTENSITY1 (ROI1)^#gephebase-summary-title)	GP00000996	Main curator
Published	Entry Status	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
Mimulus lewisii - bumblebee-pollinated	Trait State in Taxon B
Mimulus cardinalis - hummingbird-pollinated	Ancestral State
Data not curated	Taxonomic Status

Taxon A	Latin Name	Taxon B	Latin Name
Erythranthe lewisii (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Erythranthe+lewisii^#gephebase-summary-title)		Erythranthe lewisii (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Erythranthe+lewisii^#gephebase-summary-title)	
-	Common Name	-	Common Name
	Synonyms		Synonyms
Mimulus lewisii; Erythranthe lewisii (Pursh) G.L.Nesom & N.S.Fraga; Mimulus lewisii Pursh species	Mimulus lewisii; Erythranthe lewisii (Pursh) G.L.Nesom & N.S.Fraga; Mimulus lewisii Pursh Rank	Mimulus lewisii; Erythranthe lewisii (Pursh) G.L.Nesom & N.S.Fraga; Mimulus lewisii Pursh species	Mimulus lewisii; Erythranthe lewisii (Pursh) G.L.Nesom & N.S.Fraga; Mimulus lewisii Pursh Rank
	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;		
	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)		
69919 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=69919)	NCBI Taxonomy ID 69919 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=69919)		NCBI Taxonomy ID 69919 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=69919)
No	is Taxon A an Infraspecies?		is Taxon B an Infraspecies?

GENOTYPIC CHANGE

ROI1	Generic Gene Name	UniProtKB Erythranthe lewisi
-	Synonyms	GenebankID or UniProtKB
-	String	JX992854 (https://www.ncbi.nlm.nih.gov/nuccore/JX992854)
-	Sequence Similarities	
GO:0003677 : DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0003677)	GO - Molecular Function	
GO:0005634 : nucleus (https://www.ebi.ac.uk/QuickGO/term/GO:0005634)	GO - Biological Process	
GO:0003677 : DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0003677)	GO - Cellular Component	
Unknown (https://www.gephebase.org/search-criteria?/and+Presumptive+Null=^Unknown^#gephebase-summary-title)		Presumptive Null
Cis-regulatory (https://www.gephebase.org/search-criteria?/and+Molecular+Type=^Cis-regulatory^#gephebase-summary-title)		Molecular Type

Unknown (<https://www.gephebase.org/search-criteria?/and+Aberration+Type=%5EUnknown%23gephebase-summary-title>)

Molecular Details of the Mutation

unknown but coding variation was ruled out

Experimental Evidence

Linkage Mapping (<https://www.gephebase.org/search-criteria?/and+Experimental+Evidence=%5ELinkage+Mapping%23gephebase-summary-title>)

Main Reference

Genetic dissection of a major anthocyanin QTL contributing to pollinator-mediated reproductive isolation between sister species of *Mimulus*. (2013) (<https://pubmed.ncbi.nlm.nih.gov/23335333>)

Authors

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Abstract

Prezygotic barriers play a major role in the evolution of reproductive isolation, which is a prerequisite for speciation. However, despite considerable progress in identifying genes and mutations responsible for postzygotic isolation, little is known about the genetic and molecular basis underlying prezygotic barriers. The bumblebee-pollinated *Mimulus lewisii* and the hummingbird-pollinated *M. cardinalis* represent a classic example of pollinator-mediated prezygotic isolation between two sister species in sympatry. Flower color differences resulting from both carotenoid and anthocyanin pigments contribute to pollinator discrimination between the two species in nature. Through fine-scale genetic mapping, site-directed mutagenesis, and transgenic experiments, we demonstrate that a single-repeat R3 MYB repressor, ROSE INTENSITY1 (ROI1), is the causal gene underlying a major quantitative trait locus (QTL) with the largest effect on anthocyanin concentration and that cis-regulatory change rather than coding DNA mutations cause the allelic difference between *M. lewisii* and *M. cardinalis*. Together with the genomic resources and stable transgenic tools developed here, these results suggest that *Mimulus* is an excellent platform for studying the genetics of pollinator-mediated reproductive isolation and the molecular basis of morphological evolution at the most fundamental level—gene by gene, mutation by mutation.

[Additional References](#)

RELATED GEPHE

Related Genes

2 (Dihydroflavonol 4 reductase (MIDfr), LIGHT AREAS1 (LAR1)) (<https://www.gephebase.org/search-criteria?/or+Taxon+ID=%5E69919%23gephebase-summary-title>)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

Gain of a regulatory repressor