GEPHE SUMMARY

Gephebase Gene
R2R3 MYB transcription factor (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^R2R3 MYB transcription factor^#gephebase-summary-title)

GepheID
GP00001598

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

Trait State in Taxon A
Mimulus guttatus of Yellowstone National Park nonthermal adapted most completely glabrous

Trait State in Taxon B
Mimulus guttatus of Yellowstone National Park geothermally adapted densely hairy

Ancestral State
Unknown

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

Taxon A

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

Common Name
spotted monkey flower

Synonyms
Mimulus guttatus; Mimulus guttatus subsp. guttatus; spotted monkey flower; common monkey flower; yellow monkey flower; Erythranthe guttata (Fisch. ex DC.) G.L.Nesom; Mimulus guttatus Fisch. ex DC.; Erythranthe guttatus

Rank
species

Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Lamiales; Phrymaceae; Erythranthe

Parent
Erythranthe () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 1502711)

NCBI Taxonomy ID
4155 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4155)

is Taxon A an Infraspecies?
Yes

Taxon A Description
Mimulus guttatus of Yellowstone National Park nonthermal adapted most completely glabrous

Taxon B

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

Common Name
spotted monkey flower

Synonyms
Mimulus guttatus; Mimulus guttatus subsp. guttatus; spotted monkey flower; common monkey flower; yellow monkey flower; Erythranthe guttata (Fisch. ex DC.) G.L.Nesom; Mimulus guttatus Fisch. ex DC.; Erythranthe guttatus

Rank
species

Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Lamiales; Phrymaceae; Erythranthe

Parent
Erythranthe () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 1502711)

NCBI Taxonomy ID
4155 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4155)

is Taxon B an Infraspecies?
Yes

Taxon B Description
Mimulus guttatus of Yellowstone National Park geothermally adapted densely hairy

GENOTYPIC CHANGE

Generic Gene Name
PELAN

Synonyms
-

String
-

Sequence Similarities
-

GO - Molecular Function
GO:0003677 : DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0003677)

GO - Biological Process
-

UniProtKB Erythranthe cardinalis
A0A060IEP7 (http://www.uniprot.org/uniprot/A0A060IEP7)

GenebankID or UniProtKB
()

GO - Cellular Component

GO:0005634 : nucleus (https://www.ebi.ac.uk/QuickGO/term/GO:0005634)

Presumptive Null

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

Molecular Type

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

Aberration Type

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

Molecular Details of the Mutation

Unknown ; candidate indel in first intron and a nonsynonymous substitution (glutamine>lysine) in the 3rd exon

Experimental Evidence

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

Main Reference

The genetics of extreme microgeographic adaptation: an integrated approach identifies a major gene underlying leaf trichome divergence in Yellowstone Mimulus guttatus. (2016) (https://pubmed.ncbi.nlm.nih.gov/27393073)

Authors

Hendrick MF; Finseth FR; Mathiasson ME; Palmer KA; Broder EM; Breigenzer P; Fishman L

Abstract

Microgeographic adaptation provides a particularly interesting context for understanding the genetic basis of phenotypic divergence and may also present unique empirical challenges. In particular, plant adaptation to extreme soil mosaics may generate barriers to gene flow or shifts in mating system that confound simple genomic scans for adaptive loci. Here, we combine three approaches - quantitative trait locus (QTL) mapping of candidate intervals in controlled crosses, population resequencing (PoolSeq) and analyses of wild recombinant individuals - to investigate one trait associated with Mimulus guttatus (yellow monkeyflower) adaptation to geothermal soils in Yellowstone National Park. We mapped a major QTL causing dense leaf trichomes in thermally adapted plants to a <50-kb region of linkage Group 14 (Tr14) previously implicated in trichome divergence between independent M.Â guttatus populations. A PoolSeq scan of Tr14 region revealed a cluster of six genes, coincident with the inferred QTL peak, with high allele frequency differences sufficient to explain observed phenotypic differentiation. One of these, the R2R3 MYB transcription factor Migut.N02661, is a plausible functional candidate and was also strongly associated (r Â =Â 0.27) with trichome phenotype in analyses of wild-collected admixed individuals. Although functional analyses will be necessary to definitively link molecular variants in Tr14 with trichome divergence, our analyses are a major step in that direction. They point to a simple, and parallel, genetic basis for one axis of Mimulus guttatus adaptation to an extreme habitat, suggest a broadly conserved genetic basis for trichome variation across flowering plants and pave the way for further investigations of this challenging case of microgeographic incipient speciation.

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Additional References

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

the functional analysis has not been done yet