GEPHE SUMMARY

Gephebase Gene
Agouti (ASIP) (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^Agouti (ASIP)^#gephebase-summary-title)

GepheID
GP00001334

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

Trait State in Taxon A
Chestnut-bellied flycatcher-chesnut-bellied form of Makira island

Trait State in Taxon B
Chestnut-bellied flycatcher-melanic form of Ugi and three-sister islands

Ancestral State
Taxon A

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

Taxon A

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

Common Name
Makira monarch

Synonyms
Makira monarch; Monarcha castaneiventris Verreaux, J, 1858

Rank
species

Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Sauropsida; Sauria; Archelosauria; Archosauria; Dinosauria; Saurischia; Theropoda; Coelurosauria; Aves; Neognathae; Passeriformes; Corvoidea; Monarchidae; Monarcha

Parent
Monarcha () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 175125)

NCBI Taxonomy ID
338458 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 338458)

is Taxon A an Infraspecies?
Yes

Taxon A Description
Chestnut-bellied flycatcher-chesnut-bellied form of Makira island

Taxon B

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

Common Name
Makira monarch

Synonyms
Makira monarch; Monarcha castaneiventris Verreaux, J, 1858

Rank
species

Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Sauropsida; Sauria; Archelosauria; Archosauria; Dinosauria; Saurischia; Theropoda; Coelurosauria; Aves; Neognathae; Passeriformes; Corvoidea; Monarchidae; Monarcha

Parent
Monarcha () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 175125)

NCBI Taxonomy ID
338458 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 338458)

is Taxon B an Infraspecies?
Yes

Taxon B Description
Chestnut-bellied flycatcher-melanic form of Ugi and three-sister islands

GENOTYPIC CHANGE

Generic Gene Name
Asip

Synonyms
As; ASP; A<y>; ASIP; a

String
10090.ENSMUSP00000029123 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 10090.ENSMUSP00000029123)

Sequence Similarities
-

GO - Molecular Function
GO:0031779 : melanocortin receptor binding (https://www.ebi.ac.uk/QuickGO/term/GO:0031779)
GO:0031781 : type 3 melanocortin receptor binding (https://www.ebi.ac.uk/QuickGO/term/GO:0031781)

UniProtKB Mus musculus
Q03288 (http://www.uniprot.org/uniprot/Q03288)

GenebankID or UniProtKB
()

GO:0031782 : type 4 melanocortin receptor binding
(https://www.ebi.ac.uk/QuickGO/term/GO:0031782)

GO - Biological Process

GO:0008343 : adult feeding behavior
(https://www.ebi.ac.uk/QuickGO/term/GO:0008343)
GO:0006091 : generation of precursor metabolites and energy
(https://www.ebi.ac.uk/QuickGO/term/GO:0006091)
GO:0071514 : genetic imprinting (https://www.ebi.ac.uk/QuickGO/term/GO:0071514)
GO:0009755 : hormone-mediated signaling pathway
(https://www.ebi.ac.uk/QuickGO/term/GO:0009755)
GO:0042438 : melanin biosynthetic process
(https://www.ebi.ac.uk/QuickGO/term/GO:0042438)
GO:0032438 : melanosome organization
(https://www.ebi.ac.uk/QuickGO/term/GO:0032438)
GO:0032402 : melanosome transport
(https://www.ebi.ac.uk/QuickGO/term/GO:0032402)
GO:0043473 : pigmentation (https://www.ebi.ac.uk/QuickGO/term/GO:0043473)
GO:0048023 : positive regulation of melanin biosynthetic process
(https://www.ebi.ac.uk/QuickGO/term/GO:0048023)
GO:0040030 : regulation of molecular function, epigenetic
(https://www.ebi.ac.uk/QuickGO/term/GO:0040030)

GO - Cellular Component

GO:0005576 : extracellular region (https://www.ebi.ac.uk/QuickGO/term/GO:0005576)
GO:0005623 : cell (https://www.ebi.ac.uk/QuickGO/term/GO:0005623)

Presumptive Null

No (https://www.gephebase.org/search-criteria?/and+Presumptive Null=^No^#gephebase-summary-title)

Molecular Type

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

Aberration Type

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

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

Ile55Thr

Experimental Evidence

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

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	-	-	-

Main Reference

Mutations in different pigmentation genes are associated with parallel melanism in island flycatchers. (2016) (https://pubmed.ncbi.nlm.nih.gov/27412275)

Authors

Uy JA; Cooper EA; Cutie S; Concannon MR; Poelstra JW; Moyle RG; Filardi CE

Abstract

The independent evolution of similar traits across multiple taxa provides some of the most compelling evidence of natural selection. Little is known, however, about the genetic basis of these convergent or parallel traits: are they mediated by identical or different mutations in the same genes, or unique mutations in different genes? Using a combination of candidate gene and reduced representation genomic sequencing approaches, we explore the genetic basis of and the evolutionary processes that mediate similar plumage colour shared by isolated populations of the Monarcha castaneiventris flycatcher of the Solomon Islands. A genome-wide association study (GWAS) that explicitly controlled for population structure revealed that mutations in known pigmentation genes are the best predictors of parallel plumage colour. That is, entirely black or melanic birds from one small island share an amino acid substitution in the melanocortin-1 receptor (MC1R), whereas similarly melanic birds from another small island over 100 km away share an amino acid substitution in a predicted binding site of agouti signalling protein (ASIP). A third larger island, which separates the two melanic populations, is inhabited by birds with chestnut bellies that lack the melanic MC1R and ASIP allelic variants. Formal FST outlier tests corroborated the results of the GWAS and suggested that strong, directional selection drives the near fixation of the MC1R and ASIP variants across islands. Our results, therefore, suggest that selection acting on different mutations with large phenotypic effects can drive the evolution of parallel melanism, despite the relatively small population size on islands.

Additional References

RELATED GEPHE

Related Genes

1 (MC1R) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^338458^/and+Trait=Coloration/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

another candidate regions was identified but without known gene