

GEPHE SUMMARY

bab (https://www.gephebase.org/search-criteria?/and+GeneGephebase=~bab~#gephebase-summary-title)	Gephebase Gene	GP00002425	GepheID
	Entry Status	Courtier	Main curator
Published			

PHENOTYPIC CHANGE

Morphology (https://www.gephebase.org/search-criteria?/and+TraitCategory=~Morphology~#gephebase-summary-title)	Trait Category		
Coloration (wing; male ; iridescence) (https://www.gephebase.org/search-criteria?/and+Trait=~Coloration(wing;male;iridescence)~#gephebase-summary-title)	Trait		
Colias philodice - non iridescent scales on the dorsal wings of males	Trait State in Taxon A		
Colias eurytheme - iridescent ultraviolet UV scales on the dorsal wings of males	Trait State in Taxon B		
Unknown	Ancestral State		
Interspecific (https://www.gephebase.org/search-criteria?/and+TaxonomicStatus=~Interspecific~#gephebase-summary-title)	Taxonomic Status		
	Taxon A	Taxon B	
Colias philodice (https://www.gephebase.org/search-criteria?/and+TaxonandSynonyms=~Coliasphilodice~#gephebase-summary-title)	Latin Name	-	Latin Name
clouded sulphur butterfly	Common Name	-	Common Name
clouded sulphur butterfly; common sulphur butterfly; Colias philodice Godart, 1819	Synonyms	-	Synonyms
species	Rank	-	Rank
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Endopterygota; Amphimesnoptera; Lepidoptera; Glossata; Neolepidoptera; Heteroneura; Ditrysia; Obtectomera; Papilionoidea; Pieridae; Coliadinae; Colias	Lineage	-	Lineage
Colias (clouded yellows) - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=42295)	Parent	No	Parent
72851 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=72851)	NCBI Taxonomy ID	42296NULL (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=42296NULL)	NCBI Taxonomy ID
No	is Taxon A an Intraspecies?		is Taxon B an Intraspecies?

GENOTYPIC CHANGE

bab1	Generic Gene Name	Q9W0K7 (http://www.uniprot.org/uniprot/Q9W0K7)	UniProtKB Drosophila melanogaster
anon-WO0118547.639; bab; BAB; BAB-1; bab-l; Bab1; BAB1; bric-a-brac; CG13910; CG9097; Dmel\CG9097	Synonyms	()	GenebankID or UniProtKB
7227.FBpp0072538 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=7227.FBpp0072538)	String		
-	Sequence Similarities		
GO:0003700 : DNA-binding transcription factor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0003700)	GO - Molecular Function		
GO:0003680 : AT DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0003680)	GO - Biological Process		
GO:0006357 : regulation of transcription by RNA polymerase II			

(<https://www.ebi.ac.uk/QuickGO/term/GO:0006357>)
 GO:0006355 : regulation of transcription, DNA-templated
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0006355>)
 GO:0007548 : sex differentiation (<https://www.ebi.ac.uk/QuickGO/term/GO:0007548>)
 GO:0006351 : transcription, DNA-templated
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0006351>)
 GO:0048085 : adult chitin-containing cuticle pigmentation
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0048085>)
 GO:0007455 : eye-antennal disc morphogenesis
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0007455>)
 GO:0046660 : female sex differentiation
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0046660>)
 GO:0007478 : leg disc morphogenesis
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0007478>)
 GO:0048086 : negative regulation of developmental pigmentation
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0048086>)
 GO:0048092 : negative regulation of male pigmentation
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0048092>)
 GO:0048070 : regulation of developmental pigmentation
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0048070>)
 GO:0048071 : sex-specific pigmentation
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0048071>)

GO - Cellular Component

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

Presumptive Null

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

Molecular Type

Cis-regulatory ([https://www.gephebase.org/search-criteria?/and+Molecular Type="+Cis-regulatory^"#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Molecular+Type=))

Aberration Type

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

Molecular Details of the Mutation

no fixed coding variation at the bab locus between the sister species. Lower expression of bab in the iridescent scale species. CRISPR bab mutants show that bab is a negative regulator of iridescent scales.

Experimental Evidence

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

Main Reference

A genetic switch for male UV iridescence in an incipient species pair of sulphur butterflies. (2022) (<https://pubmed.ncbi.nlm.nih.gov/35012980>)

Authors

Ficarrotta V; Hanly JJ; Loh LS; Francescutti CM; Ren A; Tunström K; Wheat CW; Porter AH; Counterman BA; Martin A

Abstract

Mating cues evolve rapidly and can contribute to species formation and maintenance. However, little is known about how sexual signals diverge and how this variation integrates with other barrier loci to shape the genomic landscape of reproductive isolation. Here, we elucidate the genetic basis of ultraviolet (UV) iridescence, a courtship signal that differentiates the males of *Colias eurytheme* butterflies from a sister species, allowing females to avoid costly heterospecific matings. Anthropogenic range expansion of the two incipient species established a large zone of secondary contact across the eastern United States with strong signatures of genomic admixtures spanning all autosomes. In contrast, Z chromosomes are highly differentiated between the two species, supporting a disproportionate role of sex chromosomes in speciation known as the large-X (or large-Z) effect. Within this chromosome-wide reproductive barrier, linkage mapping indicates that cis-regulatory variation of *bric a brac* (*bab*) underlies the male UV-iridescence polymorphism between the two species. *Bab* is expressed in all non-UV scales, and butterflies of either species or sex acquire widespread ectopic iridescence following its CRISPR knockout, demonstrating that *Bab* functions as a suppressor of UV-scale differentiation that potentiates mating cue divergence. These results highlight how a genetic switch can regulate a premating signal and integrate with other reproductive barriers during intermediate phases of speciation.

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Additional References

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No matches found.

Related Genes

No matches found.

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EXTERNAL LINKS

COMMENTS

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