

GEPHE SUMMARY

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

PHENOTYPIC CHANGE

	Trait Category
Morphology (https://www.gephebase.org/search-criteria?/and+Trait Category=Morphology^#gephebase-summary-title)	Trait
Coloration (wing; male ; irridescence) (https://www.gephebase.org/search-criteria?/and+Trait =^Coloration (wing; male ; irridescence)^#gephebase-summary-title)	Trait State in Taxon A
Colias philodice - non iridescent scales on the dorsal wings of males	Trait State in Taxon B
Colias eurytheme - iridescent ultraviolet UV scales on the dorsal wings of males	Ancestral State
Unknown	Taxonomic Status
Interspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Interspecific^#gephebase-summary-title)	

Taxon A		Taxon B	
	Latin Name		Latin Name
Colias philodice	-		Common Name
(https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Colias+philodice^#gephebase-summary-title)	-		Synonyms
clouded sulphur butterfly	-		Rank
	Common Name		
clouded sulphur butterfly; common sulphur butterfly; Colias philodice Godart, 1819	-		Lineage
	Synonyms		
species	-		Parent
	Rank		
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Endopterygota; Amphiesmenoptera; Lepidoptera; Glossata; Neolepidoptera; Heteroneura; Ditrysia; Obtectomera; Papilionoidea; Pieridae; Coliadinae; Colias	-		NCBI Taxonomy ID
	Lineage		
Colias (clouded yellows) - (Rank: genus)	Parent	No	is Taxon B an Infraspecies?
(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 42295)	NCBI Taxonomy ID		
72851			
(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 72851)			
			is Taxon A an Infraspecies?
No			

GENOTYPIC CHANGE

	Generic Gene Name	UniProtKB Drosophila melanogaster
bab1		Q9W0K7 (http://www.uniprot.org/uniprot/Q9W0K7)
	Synonyms	GenebankID or UniProtKB
anon-WO0118547.639; bab; BAB; BAB-1; bab-I; Bab1; BAB1; bric-a-brac; CG13910; CG9097; Dmel\CG9097	0	
	String	
7227.FBpp0072538		
(http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 7227.FBpp0072538)		
	Sequence Similarities	
-		
	GO - Molecular Function	
GO:0003700 : DNA-binding transcription factor activity		
(https://www.ebi.ac.uk/QuickGO/term/GO:0003700)		
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 ([#gephebase-summary-title](https://www.gephebase.org/search-criteria/?and+Presumptive+Null=%22No%22))

Molecular Type

Cis-regulatory ([#gephebase-summary-title](https://www.gephebase.org/search-criteria/?and+Molecular+Type=%22Cis-regulatory%22))

Aberration Type

Unknown ([#gephebase-summary-title](https://www.gephebase.org/search-criteria/?and+Aberration+Type=%22Unknown%22))

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 ([#gephebase-summary-title](https://www.gephebase.org/search-criteria/?and+Experimental+Evidence=%22Linkage+Mapping%22))

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; Tunstrøm 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

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

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