

## GEPHE SUMMARY

BarH1 ( <a href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=~BarH1~#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=~BarH1~#gephebase-summary-title</a> )	Gephebase Gene	GP00002095	GepheID
Published	Entry Status	Courtier	Main curator

## PHENOTYPIC CHANGE

Morphology ( <a href="https://www.gephebase.org/search-criteria?/and+Trait+Category=~Morphology~#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait+Category=~Morphology~#gephebase-summary-title</a> )	Trait Category
Coloration (wing; sex-specific; female-specific) ( <a href="https://www.gephebase.org/search-criteria?/and+Trait=~Coloration+wing+sex-specific+female-specific~#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait=~Coloration+wing+sex-specific+female-specific~#gephebase-summary-title</a> )	Trait
orange females - orange wings; slower pupal development; smaller fat body; significantly fewer mature eggs at eclosion	Trait State in Taxon A
Alba females - white wings; faster pupal development; larger fat body; significantly more mature eggs at eclosion	Trait State in Taxon B
Taxon A	Ancestral State
Intraspecific ( <a href="https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=~Intraspecific~#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=~Intraspecific~#gephebase-summary-title</a> )	Taxonomic Status

Taxon A	Latin Name	Taxon B	Latin Name
<i>Colias croceus</i> ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Colias+croceus~#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Colias+croceus~#gephebase-summary-title</a> )	<i>Colias croceus</i> ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Colias+croceus~#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Colias+croceus~#gephebase-summary-title</a> )	<i>Colias croceus</i> ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Colias+croceus~#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Colias+croceus~#gephebase-summary-title</a> )	<i>Colias croceus</i> ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Colias+croceus~#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Colias+croceus~#gephebase-summary-title</a> )
clouded yellow	Common Name	clouded yellow	Common Name
Colias crocea; Papilio croceus; clouded yellow; clouded yellow butterfly; Colias croceus (Fourcroy, 1785); Colias croceus (Geoffroy, 1785)	Synonyms	Colias crocea; Papilio croceus; clouded yellow; clouded yellow butterfly; Colias croceus (Fourcroy, 1785); Colias croceus (Geoffroy, 1785)	Synonyms
species	Rank	species	Rank
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Amphiesmenoptera; Lepidoptera; Glossata; Neolepidoptera; Heteroneura; Ditrysia; Obtectomera; Papilionoidea; Pieridae; Coliadinae; Colias	Lineage	cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Panarthropoda; Arthropoda; Mandibulata; Pancrustacea; Hexapoda; Insecta; Dicondylia; Pterygota; Neoptera; Holometabola; Amphiesmenoptera; Lepidoptera; Glossata; Neolepidoptera; Heteroneura; Ditrysia; Obtectomera; Papilionoidea; Pieridae; Coliadinae; Colias	Lineage
Colias (clouded yellows) - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=42295">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=42295</a> )	Parent	Colias (clouded yellows) - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=42295">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=42295</a> )	Parent
72248 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=72248">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=72248</a> )	NCBI Taxonomy ID	72248 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=72248">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=72248</a> )	NCBI Taxonomy ID
No	is Taxon A an Intraspecies?	No	is Taxon B an Intraspecies?

## GENOTYPIC CHANGE

B-H1	Generic Gene Name	UniProtKB Drosophila melanogaster
Bar; Bar H1; bar-h1; Bar-H1; BarH; barh1; barH1; Barh1; BarHl; BH1; CG5529; Dmel\CG5529	Synonyms	GenebankID or UniProtKB
7227.FBpp0074204 ( <a href="http://string-db.org/newstring.cgi/show_network_section.pl?identifier=7227.FBpp0074204">http://string-db.org/newstring.cgi/show_network_section.pl?identifier=7227.FBpp0074204</a> )	String	
Belongs to the Antp homeobox family.	Sequence Similarities	
GO:0001228 : DNA-binding transcription activator activity, RNA polymerase II-specific ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0001228">https://www.ebi.ac.uk/QuickGO/term/GO:0001228</a> )	GO - Molecular Function	

GO:0000977 : RNA polymerase II regulatory region sequence-specific DNA binding  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0000977>)  
GO:0000981 : DNA-binding transcription factor activity, RNA polymerase II-specific  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0000981>)

GO - Biological Process

GO:0008407 : chaeta morphogenesis  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0008407>)  
GO:0007399 : nervous system development  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0007399>)  
GO:0006357 : regulation of transcription by RNA polymerase II  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0006357>)  
GO:0000122 : negative regulation of transcription by RNA polymerase II  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0000122>)  
GO:0045892 : negative regulation of transcription, DNA-templated  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0045892>)  
GO:0007455 : eye-antennal disc morphogenesis  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0007455>)  
GO:0007479 : leg disc proximal/distal pattern formation  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0007479>)  
GO:0001751 : compound eye photoreceptor cell differentiation  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0001751>)  
GO:0007601 : visual perception (<https://www.ebi.ac.uk/QuickGO/term/GO:0007601>)  
GO:0048513 : animal organ development  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0048513>)  
GO:0050896 : response to stimulus (<https://www.ebi.ac.uk/QuickGO/term/GO:0050896>)  
GO:0008057 : eye pigment granule organization  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0008057>)  
GO:0008052 : sensory organ boundary specification  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0008052>)  
GO:0009888 : tissue development (<https://www.ebi.ac.uk/QuickGO/term/GO:0009888>)

GO - Cellular Component

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

Presumptive Null

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

Molecular Type

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

Aberration Type

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

Insertion Size

1-10 kb

Molecular Details of the Mutation

insertion of a Jockey-like transposable element 6â€‰kb downstream of the Colias homolog of BarH-1. BarH-1 expression suppresses orange coloration in the wings.

Experimental Evidence

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

Main Reference

A transposable element insertion is associated with an alternative life history strategy. (2019) (<https://pubmed.ncbi.nlm.nih.gov/31848330>)

Authors

Woronik A; Tunstr m K; Perry MW; Neethiraj R; Stefanescu C; Celorio-Mancera MP; Brattstr m O; Hill J; Lehmann P; K rkel r R; Wheat CW

Abstract

Tradeoffs affect resource allocation during development and result in fitness consequences that drive the evolution of life history strategies. Yet despite their importance, we know little about the mechanisms underlying life history tradeoffs. Many species of Colias butterflies exhibit an alternative life history strategy (ALHS) where females divert resources from wing pigment synthesis to reproductive and somatic development. Due to this reallocation, a wing color polymorphism is associated with the ALHS: either yellow/orange or white. Here we map the locus associated with this ALHS in Colias crocea to a transposable element insertion located downstream of the Colias homolog of BarH-1, a homeobox transcription factor. Using CRISPR/Cas9 gene editing, antibody staining, and electron microscopy we find white-specific expression of BarH-1 suppresses the formation of pigment granules in wing scales and gives rise to white wing color. Lipid and transcriptome analyses reveal physiological differences associated with the ALHS. Together, these findings characterize a mechanism for a female-limited ALHS.

Additional References

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS

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